CROSS COUNTRY CANADA OFFICIALS' MANUAL

Version 3.4, November 2009

A Technical Manual for the Organization of Cross Country Ski Events

Jim Thomson, Editor

Revision History V3.1 – updates to V3.0

Page	Revision	Date
1-1	7th paragraph should read “Since 1981 Canada has hosted”	2006-10-30
1-2	Revised page of secondary role positions.	2006-10-30
1-3	To heading “Officials Certification” add “(being actively reviewed October 2006)	2006-10-30
1-7	Revised page to reflect FIS and CCC updates.	2006-10-30
2-1	3rd paragraph line 4 should read “financial management or event marketing”	2006-10-30
3-1	Revised page regarding comments on Competition Committee Organization Chart	2006-10-30
3-2	New chart – “Chief of Start/Finish” becomes “Chief of Start”. Reports to Chief of Timekeeping and Results.	2006-09-15
4-5	Replace page to allow for description of 6Q-6S-6F Sprint Heats.	2006-09-15
4-6	Replace references to 6Q-5S-4F with 6Q-6S-6F.	2006-09-15
12-12	Sprint Qualification Round 3rd line change to “similar to a normal interval start race.”	2006-09-15
Appendix 4-3	3rd table “Individual start” should read “Interval Start”	2006-09-15
13-1, 13-3, 13-5, 13-6, 13-7, 13-8, Appendix 2-5	All references to "Chief of Start/Finish" become "Chief of Start".	2006-09-15
Appendix 8	ParaNordic Competitions	2006-09-15

Revision History V3.2 – updates to V3.1

Page	Revision	Date
1-3 to 1-6	New section October 2007	2007-10-01
4-3	Pursuit Competitons – Without a Break Revise wording in papagraph 2 “change skis and poles (and boots if desired)”	2007-10-01
4-4	Revised paragraph 7 “There should be 4 finish lanes in the finish corridor, with a minimum width of 3 metres for free technique and 1.2 metres for classic technique sprints. They should be as long as possible (100+ metres) and straight. The best line of entry should be to the centre lanes.”	2007-10-01
4-5	Table for Finals 6+6 A Final should list S1 #1, S2 #1, S1 #2, S2 #2, S1 #3, S2 #3. Second sentence below should read “The fastest qualifier Q-R3-1 goes to the first semi-final heats S1”	2007-10-01
7-1	Add to Duties: Pre-race “advise Chief of Competition on schedule of categories within the race after consultation with the Chief of Timing” and “Prepare a schedule of course changes between categories”	2007-10-01
7-2	Add to Chief of Course – Procedure “ In a race with multiple categories using different courses it is generally desirable that the only course open is the one in use. Movable barriers such as V-boards or ropes can be used and moved according to a pre-established schedule. The schedule can be developed based on the start list, distance of the location from the start and the estimated speed of the slowest skier in the category.”	2007-10-01
7-4	Add to Equipment: Start List, Course Change schedule and radio.	2007-10-01
7-4	Add to general procedures: “Two course markers should be at each location schedule for a change and mark off skiers on the start list as they pass. Once the category prior to the course change has passed the barrier(s) may be changed. Course markers need to be informed of non-starters and late starters to perform their job correctly”.	2007-10-01
9-1	Add to ‘supervises’ list “Chief of Exchange Zone”	2007-10-01
9-11	Add to Exchange Zone Judge “Pursuit without a Break. The Judge is responsible for monitoring equipment exchange boxes to ensure skis and poles are not left outside the box after an exchange of equipment. The procedure is to record the bib or box number if equipment is not left entirely within the box, estimating its protrusion beyond the box. The record may be used by the jury to review possible sanctions. When it is safe to do so without interfering with any skiers, return the equipment to the confines of the box.”	2007-10-01
Appendix 1-2	Add carpet for Pursuit w/o Break	2007-10-01
Appendix 1-3	Add Video Cameras and Photo Finish eqipment	2007-10-01
Appendix 2-2	Comment on Course Marshalls. May report to Chief of Competition Security	2007-10-01
Appendix 2-4	Add Drink Pourers	2007-10-01
Appendix 2-5	Add Photo Finish Operator	2007-10-01
Appendix 3 -1	Updated to fix alignment	2007-10-01
Appendix 3-4	Updated to add email and fix alignment	2007-10-01
Appendix 3-6	Add email and fix alignment	2007-10-01
Appendix 3-7	Add email	2007-10-01
Appendix 5-3	Add rows to accommodate 5 quarter finals in 6-6-6 format	2007-10-01

Revision history V3.3 - updates to V3.2

Page	Revision	Date
1-3 to 1-6	Officials Cerification - substantial update	2008-10-24
4-3	Pursuit without a break paragraph 2. Clarify “skiers must change skis (and poles and boots if they wish)	2008-09-25
4-3	Relay Competitions - change reference “heat” to “leg”. Remove reference to “arc startline”.	2008-09-25
8-4	Mass Starts – Remove references to arc start for relays.	2008-09-25
8-6	Relay Start Layout – Arc design – removed	2008-09-25
8-7	Remove 3 paragraphs and substitute with The chevron design has a line where all of the start lanes end. This line is the end of the mass start lanes, and it should be marked in colour on the snow so that each racer is well aware of where he/she can leave their lane and continue in the technique of the particular race. Then, there is a convergence zone to the actual race course. For a free technique race, it should be about 75-100 metres long, at the end of which the skiers should be into the normal trail width. For a classical race, the convergence zone has a number of sub-zones. Following the end of the mass start lanes, there is a 5-10 metre gap with no tracks set, but the classic technique must continue to be used. Then there is a distance of about 30-45 metres where the number of set tracks is half the number of start lanes. This is followed by another gap of 5-10 metres with no set track, followed by another distance of about 30-40 metres with half again the number of tracks. Then there should be a third gap of about 5-10 metres after which the skiers are into the main trail. These gaps are indicators to the skiers that the number of set tracks are continuing to decrease, so they need to be concentrating on making the transition to the reduced number.	2008-09-25
8-12	Exchange Zone – Relays. Change last sentence to “. If a tag is not done within this area, the fact is recorded and reported to the Jury without delay. The Jury may apply a sanction.	2008-09-25
9-9	Servers – On Course. Add note “The regulations require that servers be still when serving in mass start races.”	2008-09-25
9-10	Remove Exchange Zone False Tag Controller	2008-09-25
9-10	Change to procedure with a missed exchange. Now reads “If the exchange contravenes the rules, the incident must be recorded and the Jury informed. The Jury may apply a sanction. “	2008-09-25
9-11	paragraph 3 change to “Should a legal tag not take place before the next competitor exits the exchange zone, a judge must record the fact and report it to the Jury as soon as possible.”	2008-09-25
9-11	Procedure - change end of section to “Should a proper tag not be made, then the judge must record the incident and report it to the Jury as soon as possible.”	2008-09-25
9-11	remove Exchange Zone Tag Controller	2008-09-25
Section 12	Extensive rewrite to accommodate Summit Systems timing and change in False Start procedure.	2008-09-25
13-3	Procedure for Interval Start – bullet 11 change to “in the case of a false start any time prior to the word “GO” in manual timing the Starter declares a False Start which is recorded and reported to the Jury. A false (early) start with Electronic Timing is typically detected by the timer operator. It should be recorded by the Start Time Recorder and reported to the Jury. “	2008-09-25
13-5	Bullets 2-3 “the Starter then calls the skiers to the start line with “take your positions” and, when the skiers are at the start line calls “SET” for them to remain motionless. Within 2-5 seconds signals the start by sounding the start signal (shot or horn), or yelling “GO”. In the event of a false start, the Starter will signal again and call “false start”. The False Start Controller will flag the skiers to stop, and send them back to the start line to be re-started. In sprints a second false start by any competitor in the same heat causes them to be retired from the heat.”	2008-09-25
13-5	Assistant Starter – Duties. Remove false starts	2008-09-25
13-6	Remove “signal false start if informed by the Electronic Timing Assistant that a skier started more than 3 seconds early start “false start” skiers from the recall/late start track. A recalled skier should start as soon as possible after returning across the extended start line (the toe must cross over the line). “	2008-09-25
13-7	False Start Controller Duties. Remove Interval Start duties.	2008-09-25
13-14	Change to “Start time recorders are responsible for checking the bib number”	2008-09-25
13-14	Start Time Recorder – change false start duties to “note false starts as requested by Starter/Assistant Starter(s)	2008-09-25
App 4-11	Relay start positions. Superseded. Use Chevron App 4-9 and 10.	2008-09-25

Revision history V3.4 - updates to V3.3

Page	Revision	Date
1-2	Clarification of Major, Secondary and Individual roles as Officials	2009-11-24
1-3 to 1-6	Further clarification of prerequisites and certification	2009-11-24

PREFACE

This publication has been prepared by the Events Committee of Cross Country Canada. It is designed to facilitate the development of a "Canadian Standard" for the officiating of Cross Country ski competitions.

Preparation of this material has involved officials from across the country - people who have a great deal of experience in race and event organization, from club to international events. This version of the Manual tries to reflect the changes that have occurred over the past decade since the last edition of it. These changes include the use of sophisticated equipment and technology for highly precise timing and very fast results production, and new formats of races. As a result, officials in this sport must also be kept up-to-date in order to be able to officiate in all levels of events.

This Manual was written with the premise that the only one way to run and officiate a cross country ski race at any level is the way that it is done at the level of a World Cup. If club races are not run accordingly, then when clubs are selected to run high level events, their officials will require special training and practice to be able to run them correctly. However, if club races are run like World Cups, then running high level events will entail little in the way of training. By training all officials to the same high standard, the processes and equipment will be very familiar to everyone, so hosting such an event should be quite routine. This Manual should provide you with the appropriate resource knowledge to be able to do this.

Another noticeable change that has been made to this version of the Manual is that descriptive chapters on types of race formats, course preparation and grooming, stadium layouts and grooming, competition secretariat functions, and timing and results systems have been added. This has been done so that new officials can learn about the various duties that occur in each of the functional areas in each type of race format, without becoming bogged down in the detailed duties of the individual officials. However, the chapters on the detailed duties of each official have been updated and still remain as an integral part of the Manual.

I would like to acknowledge the contributions of those who so kindly gave of their time and extensive knowledge:

Al White (Ontario), for sharing the burden with me of rewriting all the chapters. He also reviewed the final version to help ensure consistent formatting and accuracy of references throughout the whole Manual.

Al & I also relied heavily on the following team of experts who contributed to specific sections of the Manual, and who also did frequent reviews of the written material: Al Maddox (Ontario); Dave Rees (Alberta); Len Gottselig (Alberta); Diane Thomson (Ontario); Blair Dunbar (Alberta); and Cal Benson (British Columbia). I also appreciate Sam Niemi's help with diagrams, and Larry Sinclair, Chairman of the CCC Events Committee, for his encouragement.

The result of all of these efforts is this up-to-date Manual. I thank everyone for their very diligent, timely, and graciously given expertise, experience, and time. It has been a great deal of work for everyone.

It is expected that this Manual will be kept up-to-date on a regular basis. New versions with the updated sections will be made available to all through the CCC web site. A list of changes will also be provided so that everyone will know what has been changed and therefore will need to print only those pages that have changed to maintain a current Manual

I trust that this Manual will help all officials in Canada upgrade their skills in order that all competitors can enjoy the pleasure of well-run and fairly officiated events.

Jim Thomson
August 2005

Table of Contents

Overview

Officials Development

Cross Country Skiing is a dynamic and fast changing sport. Change in all aspects of the sport has never been more rapid than in the 1980's when improved snow grooming and track setting paved the way for new technology in the design of cross country skis leading to different ski technique and increased racing speed and improved performance. Courses are now more demanding and faster and this has lead to homologation (design standards) of courses to ensure ski-ability and safety.

The computer age revolutionized racing timing and results production and races are now operating more efficiently yielding more accurate results, more quickly than in the past.

Races now have to be organized in a more professional manner commanding trained and informed officials and a basic consistent race organization.

The Officials Program for Cross Country Skiing has been developed and is maintained by volunteers in the Officials Committee of Cross Country Canada (CCC). The Officials Committee is part of the Events Committee.

Since the first Level 1 and 2 Officials' Manual was produced, Cross Country Canada has produced a rule book which, since 2000, has been available on the CCC web site for downloading and printing free of charge. Since most high level competitions held in Canada are sanctioned by the FIS (Federation international de ski), the CCC rule book is integrated with the FIS Rule Book. Specific Canadian rules are highlighted, to be used for CCC sanctioned events. Level 1,2 and 3 clinics have been run across Canada using this manual and rule book, and Canada is now a world leader in Cross Country ski officials training.

We have also come a long way in the area of race management systems. Today we have more modern race management software supplied by developers who have integrated the management of competitors and the production of results with expanded features and a user-friendly interface consistent with standards in the Windows environment.

Since 1981 Canada has hosted World Cup Cross Country Ski races, the 1988 Olympic Winter Games, the World Nordic Championships in 1995, the Junior Nordic World Ski Championships in 1997, North American Championships, and national championships for both junior and senior levels across the country. Hosting these highest levels of international racing has combined with our annual National events to provide excellent incentives for officials' development opportunities. For many years, the Canadian Ski Odyssey flourished as a Canadian loppet series and provided a focus for the development of national organizational standards for loppets. The Canada Cup and NorAm race series continue to evolve and provide exposure in all regions in Canada to our national level competitors. At the Division or Provincial level, regional championship races, provincial cups, and regional loppets have become well-established and provide a wealth of experience for racers and officials alike. In 2005, Canada will host 2 World Cup events, and the Olympic Winter Games will be in Vancouver with the Callaghan Valley for the site of the nordic events in 2010.

This copy of CCC's Officials' Handbook represents the third edition. It is an effort to address the many changes to the cross country skiing sport since 1992. New race formats and start procedures have radically changed the required skill set of organizers. These changes are paralleled with the increased use of technologies to support timing and communications functions. As CCC looks forward to the re-introduction of World Cups to Canada in December 2005 and beyond that to the challenges of hosting the 2010 Olympics, it is hoped that this re-write will begin the renewal process for its Officials Development Program. This edition is a start to the revision of officials' training methods and course conductors' manuals to accompany the new program. CCC has also developed a "Trail Grooming and Tracksetting" manual and training seminar as well as a "Trail Development Resource Book" and seminar, both of which complement the Officials Program.

Classification of Officiating Roles

In contrast to many sports, cross country ski racing requires a large number of officials. The duties are extremely varied and often performed independent of one another. The tasks have differing degrees of complexity and responsibility associated with them. The distance separating officials can easily be more than a kilometre. These factors place greater emphasis on the communication and coordination skills of the officials and on a need to understand how each job fits into the whole organization.

Adding to these differences are considerations imposed by the level of competition at which any specific duty will be performed. In all, organizing and officiating in Cross Country Skiing implies a widely diversified list of functions. To facilitate future discussions officials will be classified into smaller groups characterized by their complexity and levels of responsibility.

Major Role

This category includes duties which require an in-depth knowledge of the rules and regulations and race organization. The lines of communication, authority, and responsibility must be understood. These positions require very good management skills.

Chief of Competition
Chief of Stadium
Chief of Course
Competition Secretary
Chief of Timekeeping and Data Processing
(Chief of Competition Security)

Secondary Role

This category includes duties which require competence in their own single area of responsibility. A general knowledge of rules and regulations and race organization is necessary. Positions in this group tend to be predominantly task oriented.

Some examples of secondary role positions are:

Chief of Start
Chief of Stadium Preparation
Chief of Competition Security
Chief of Controllers
Chief of Manual Timing
Chief of Results
Chief of Ski Marking
Chief of Equipment
Chief of Medical Services
Chief of Ski Marking
Chief of Mechanical Grooming

Individual Technical and Administrative Roles

These jobs generally involve the processing of information, the control and maintenance of the race site, and medical services. A minimal knowledge of rules and regulations and race organization is necessary; however these officials should understand the relative importance of their jobs to the overall success of the event.

Start Line Officials
Finish Line Officials
Ski Marking and Checking
Stadium setup crew
Manual course groomers
Notice and Results Board Personnel
Temperature Station Personnel
Medical Personnel & First Aid Attendants
Clerical Staff
Runners
Parking/Traffic Attendants
Exchange Zone Judges and Controllers
Forerunners and Course Closers
Refreshment Station Personnel
Announcer and Colour Commentator

Officials Certification

The officials' certification program is developed and coordinated by Cross Country Canada under the guidance of its Events Committee. CCC has revamped its officials training program while at the same time providing a central registry for our officials. Registration is free by visiting the Officials Training Centre on the Cross Country Canada web site. Level 1 and Level 2 officials training and related record keeping are managed by each Division, with the tasks normally assigned to a Divisional officials' coordinator. The curriculum and related power point presentation is prepared as a national standard by the Events Committee and will include online components and online registration for future course offerings across the country. Candidates for Level 3 officials training are recommended for advancement by divisions and the training is coordinated by CCC. Level 4 and 5 officials are recommended for training by the CCC Events Committee within an apprenticeship model.

Level 1 and Level 2 training sessions are scheduled by each CCC Division and individuals are able to attend out of province seminars if the host Division has space available. The cost for this training is determined by each Division. Our online environment has the capacity to list all available courses being offered in the country if a Division posts them online. Once online the participants can request to register on line.

Level 3 clinics are normally delivered in conjunction with a national championships event over four days in order to provide the necessary variety of race format observations and post race analysis.

Level 4 clinics: These are 2-3 day seminars that are designed to be an updating opportunity to keep our Level 4 officials (National TDs) informed of changes in the rules and procedures relating to event management. These are scheduled on an as needed basis and are often held in conjunction with FIS TD updates. Persons attending these sessions are expected to be active TDs at the Division or National level.

"Course Conductor Training" represents a two day clinic which is not run in conjunction with an event the timing of these is not fixed and is based on the frequency of significant changes in the sport and our related education curriculum. The supply and demand for course conductors will also determine the scheduling of these courses;

"Technical Delegate", minimum of a four day assignment focused on "experience-based learning" delivered in conjunction with a national championship event. The candidate is considered an apprentice TD.

Level 5 clinics are conducted by FIS. Candidates are recommended by the CCC Events Committee.

Level 1 Official

A Level 1 official will be able to:

perform all the duties of "individual technical and administrative officials" for Olympic and Popular Cross-Country Ski (Loppet) type competitions.

possess a general knowledge of the Cross Country Rules and Regulations.

possess a general knowledge of the Competition Committee structure for Olympic and Loppet type competitions.

Course Particulars:

theoretical and practical training will be conducted in a one day course.

course conductors will be assigned by the division's officials coordinator from their Level 3 and 4 officials.

Registration is through visiting the Officials Training Centre on the CCC web site

Registrants will be accepted on to the course by the Course Conductor (Instructor).

Web based pre-learning will be expected and a pre-course test will be conducted on the structure and governance of our sport.

The course will cover the overall Event Organizing Committee make-up and duties, the Competition Committee and organization, an overview of the different types of competitions and formats, and specific areas and responsibilities in course preparation and tracksetting, stadium layout and grooming, the competition secretariat, timekeeping and results systems, competition security, and competition safety. The course will include a demonstration of manual timing with mock race practise in start and finish procedures. Participants will be expected to acquire sufficient knowledge to be able to function as individual technical and administrative officials in low-level competitions under the direction of Level 2 and 3 officials. At an awareness level, participants are introduced to the key areas of risk management as it relates to cross-country event hosting.

qualification will be based on passing a post course test on-line test.

Prerequisites:

a desire to help run cross country skiing events, and a willingness to attend a training course to become a certified official. Recommended minimum age is 16 years.

Level 2 Official

A Level 2 Official will be able to:

perform all major, secondary, and administrative duties for Olympic and Popular Cross-Country Ski (Loppet) type competitions.

make appropriate rule interpretations for a specific level of competition.

perform instructional sessions in "individual technical" duties.

make organizational decisions which take into account the needs of the athlete and risk management issues.

organize and officiate interval start, pursuit, sprint, mass start and relay competitions.

Course Particulars:

theoretical training will be conducted during a two day clinic which should incorporate a demonstration of electronic timekeeping, and, if possible, a mock-race practical session.

course conductors will be assigned by the division's officials coordinator from their Level 3 and 4 officials.

Registration is through visiting the Officials Training Centre on the CCC web site.

Course registrants will be accepted on by the Course Conductor after reviewing their recorded experience on the CCC Officials web site.

A pre-course test will be conducted through the web site to ensure technical preparedness.

Post course certification will require completion of an on-line test.

Prerequisites:

The course participant must:

have performed at least three different "secondary official" duties in sanctioned cross country ski events.

hold the Level 1 officials certification.

Re-certification

Race formats have changed considerably in the last few years. As a result CCC requires that officials certified at Level 2 prior to January 2003 will need to re-certify in order to maintain Level 2 on the CCC database.

Level 3 - Event Organizer

A Level 3 official will be able to:

perform any "major official" role at the national championship level.

effectively structure, staff, and manage a competition and event organizing committee at the division through to the national level.

be familiar with the CCC and FIS rule book and make appropriate rule interpretations as they apply to division level competitions. Be able to provide a risk management assessment for a race site and develop an effective Risk Management plan.

teach the Level 1 and 2 Officials clinics after having achieved Certification.

Course Particulars:

theoretical training is conducted during a four day clinic incorporating observation of a national level or regional championship competition that covers at least 3 different race formats.

course conductors will be assigned by the Events Committee from CCC.

Certification will be based on passing a series of pre and post assignments and the course conductor's recommendations.

Prerequisites:

The course participant must:

be recommended by his/her division.

have performed at least two different "major official" duties and at least three different "secondary official" duties at the division cup or national championships (or equivalent) level events (log book documentation may be required).

hold Level 2 officials certification.

To maintain certification:

maintain active interest by working as an official and/or as a TD in club and divisional or provincial events every year.

certification will be reviewed and re-assessed every five years by the CCC Event Committee.

Level 3 Technical Delegate – CCC Divisional TD

A Level 3 TD will be able to:

perform the role of a Divisional Technical Delegate for events which require the overseeing and performing of all aspects of officiating at the division level for division cup and popular cross-country ski (loppet) competitions.

perform any “major official” role at the national championship level.

effectively structure, staff, and manage a competition and event organizing committee at the division through to the national level.

be familiar with the CCC and FIS rule book and make appropriate rule interpretations as they apply to division level competitions. Be able to provide a risk management assessment for a race site and develop an effective Risk Management plan.

teach the Level 1 and 2 Officials clinics after having achieved Certification.

Certification:

Meet the prerequisite requirements of the Level 3 Officials Course

Complete a Level 3 Officials Course

Complete one (1) divisional apprenticeship assignments

must be an active skier, able to ski courses in both techniques and in a reasonable timeframe in order to inspect and assess the quality of the course preparation and tracksetting

Course Particulars:

See Level 3 Event Organizer course.

Prerequisites:

The course participant must:

be recommended by his/her division.

have performed at least two different “major official” duties and at least three different “secondary official” duties at the division cup or national championships (or equivalent) level events (log book documentation may be required).

hold Level 2 officials certification.

To maintain certification:

maintain active interest by working as an official and/or as a TD in club and divisional or provincial events two of every three years.

must attend a CCC TD, FIS TD or Division Level 3/TD update once every two years

must be an active skier, able to ski courses in both techniques and in a reasonable timeframe in order to inspect and assess the quality of the course preparation and tracksetting.

Level 4 Technical Delegate - **FIS National TD**

A Technical Delegate will be able to:

oversee the organization and officiating of national level competitions with special emphasis on race course design and preparation, rules and policies unique to existing national competitions, and administrative responsibilities unique to existing national competitions.

perform as a Technical Delegate for all levels of Olympic type events sanctioned by Cross Country Canada or its Divisions.

perform “major official” duties at an international competition.

effectively train Level 3 officials after having had Course Conductors Certification.

administer a division or provincial officials development program.

make appropriate rule interpretations from the CCC and FIS Rule Books as they apply to national level competitions.

support the National Events Committee and its subcommittees on rules and regulations and officials development.

Qualification Particulars:

Completed a National TD Assistant role.

Attended a CCC/FIS TD Update within the last 2 years.

Prerequisite:

The course participants must:

be recommended for the course by the division's chairman or events committee.

Served as a Divisional TD twice during the past two years and completed one National TD Assistant role

hold an active Level 3 officials certificate.

must be an active skier, able to ski courses in both techniques and in a reasonable timeframe in order to inspect and assess the quality of the course preparation and tracksetting.

Maintain Certification:

must maintain active involvement with Cross Country Skiing by working divisional level events and regional or national sanctioned events when the opportunity arises.

do at least one TD assignment of a sanctioned (CCC or FIS) event every two years.

have certification reviewed and re-certified every five years by the CCC Events Committee.

Level 5 Technical Delegate - FIS International TD

An International Technical Delegate will be able to:

oversee the organization and officiating of an FIS sanctioned competition with the main emphasis being given to technical preparations and installations, and to oversee the administrative aspects of race organization that are unique to events of this magnitude.

train officials at all levels with emphasis placed on Level 4 Technical Delegates.

be involved in FIS committees relating to the Cross Country Discipline

perform as a Technical Delegate for all level of events anywhere in the world as appointed by FIS.

Certification:

Complete a FIS TD course. This course will contain theoretical training completed during a three to four day course run by FIS organization,

Complete an apprentice TD assignment at an international FIS Event..

must be an active skier, able to ski courses in both techniques and in a reasonable timeframe in order to inspect and assess the quality of the course preparation and tracksetting.

Maintenance of certification requires attendance at FIS TD Update session every two years.

Prerequisites:

The course participants must:

be recommended to the course by the Events Committee of CCC.

be an experienced "major official" at the national or international level (international preferred).

be a proven Level 4 National TD

Under 50 years of age

.

Role of the Official

From their position of objective impartiality, officials are charged with the following general responsibilities:

to supervise and control the event in a manner which reflects the spirit and intent of the rules and regulations.

to provide competitions which will preserve the health and safety of all involved.

to guarantee that each competitor receives an equal and fair opportunity to win.

to promote sportsmanship and an atmosphere of enjoyment.

Being an Effective Official

This section represents the nuts and bolts of getting a good job done – the do's and don'ts of how to avoid the seemingly inevitable frustrations that come with the tasks.

Ski competitions are for the skier; officials are present to guarantee that the rights of each competitor as stated in the rules and regulations will be upheld in the competition.

Officials and the job of officiating should be as unobtrusive and inconspicuous as possible. You should assume your responsibilities in a manner which will earn you the respect and support of competitors, coaches and spectators.

Officials should respect the desire of each competitor to be considered as a worthy participant. As officials, your personal views should not be voiced, and each individual effort from a competitor should be taken seriously.

You must make any officiating duty a personal commitment as well as a commitment to your peers. This is easily reflected by your willingness to consult with others and by your effort to keep up-to-date with current rules and procedures.

Remember that you and everyone else officiating at a ski competition are volunteers! Everyone has probably adjusted other priorities in their lives to be there. Respect and support their efforts through a spirit of co-operation. The overall success of the competition is dependent upon the performance of each individual.

Accept an assignment to officiate only if you plan to honour the commitment. There are enough unpredictable situations built into our sport by Mother Nature that we do not need the added frustrations of "no shows".

Be on time for your assignment – this means that you are there before you are needed.

Inform the appropriate major official if you are unable to attend or if you will be late. This must be done as early as possible, and if you are conscientious, you should aid in finding your own qualified replacement.

As an official, you must not be a coach to competitors. Encouragement may be given provided it is done equally for all. For young competitors, it may be necessary to offer more guidance.

Never accept an assignment you are not qualified to handle. Poor performance through ignorance can be harmful to the skier and will reflect poorly on you and the organizing club you represent.

Officials should respect the fact that last minute changes will always be a possibility. Remaining flexible and adaptive in your thinking will enable the competition to continue to its successful conclusion.

Sport Governing Bodies

Federation International de Ski (FIS)

FIS is the international sport governing body for skiing. Its head office is located in Oberhofen, Switzerland. It has numerous policy and program committees which operate under each discipline of the sport. In addition there are sub-committees within each discipline which co-ordinate areas of activity for that discipline. Cross Country Canada has active representation on various FIS Cross Country subcommittees. Cross Country Canada is officially represented to FIS as a National Sport Organization (NSO) through the Canadian Snowsports Association.

Cross Country Canada (CCC)

Cross Country Canada is the national sport governing body for cross country skiing in Canada. CCC is governed by a Board of Directors, elected by the Divisions. The Board in turn appoints an Executive Director who is responsible for the day-to-day running of the organization.

The Divisions (the provinces and territories), through their member clubs, deliver the various programs developed by CCC. CCC's mission is "To develop and deliver programs designed to achieve international excellence in cross country skiing" (CCC, Strategic Plan to 2014(+), Page 9). To deliver on this mission, its mandate is "To provide national programs for the continuous development of cross-country skiing from introductory experience to international excellence, for participants of all ages and abilities, fostering the principles of ethical conduct and fair play" (CCC, Strategic Plan to 2014(+), Page 9).

Sport governing bodies in general provide a framework through which programs can be developed, funding disbursed, standards established, and feedback received. The quality of support that these volunteer organizations can give to their athletes has a substantial effect on their overall success on the race course. CCC has representation on, and works closely with, other sport-related bodies such as the Canadian Olympic Committee, The Canadian Paralympic Committee, the Canadian Snowsports Association, Sport Canada, Own the Podium-2010, the Calgary Olympic Development Association, and the Coaching Association of Canada.

Event Organization and Committees

Event Organization

To successfully plan and execute a cross country ski competition can involve as little as an afternoon's work on one extreme or up to four years of preparation, with ever increasing intensity on the latter. The size and complexity of the competition must be matched by time commitments and skills of the organizers.

Every event has a Competition Committee whose function is to run the competitions (races) in the event. This committee is headed by a Chief of Competition and is comprised of the major officials, who manage the race site activities (e.g., Chief of Course, Chief of Stadium, Competition Secretary, Chief of Timekeeping and Data Processing, etc.), and their subordinate teams who help to prepare and run the competition.

However, if a cross country ski competition includes activities and services that are not directly related to the competition, additional volunteers are necessary to co-ordinate these services. These competition volunteers do not necessarily have to have cross country ski experience. They contribute other skills such as language translation, financial management, or event marketing. It is the competition volunteers who ensure that the needs of the athletes, volunteers, sponsors, spectators, and media are looked after.

In a small competition, the Competition Committee simply adds additional positions as needed, such as Treasurer or Volunteer Coordinator. For higher level cross country competitions of national or international calibre such as the Canada Winter Games or World Cups, a separate Event Organizing Committee (EOC) is necessary. Then the Competition Committee becomes a function under the EOC and looks after the daily running of each race.

In addition to the Cross Country Canada officials' program, competition volunteers may take additional volunteer or competition management training which is available from a number of different divisional and national sources.

The Event Organizing Committee (EOC)

Chairperson/Manager

The Event Organizing Competition Chairperson is one of the first positions filled. Often as the competition's representative to outside groups such as sponsors, government, media, and Cross Country Canada, the Chairperson ensures that all aspects of the competition proceed through the planning stages and meet expected goals.

Duties:

- recruit volunteers for other key EOC positions
- ensure financial goals are met
- serve as competition representative and spokesperson
- motivate and provide guidance for other EOC Chiefs
- choose a Chief of Competition

Chairperson, Venue Planning and Services

The Chairperson of Venue Planning and Service is responsible for all the facilities that serve the public, media, volunteers, coaches, and participants. The goal is to provide a comfortable, safe, and efficient environment for all these groups.

Duties:

- coordinate competition accreditation, ensuring that all athletes/participants, coaches, media, volunteers, officials, and VIPs are properly identified. This identification process allows competition officials to control access to certain competition areas as well as to provide a safe and fair competition.
- working with the Chief of Stadium and the Chief of Security, coordinate spectator services (parking, traffic control, venue security)
- develop a competition communications plan, enabling all key competition officials to communicate as necessary. Radios, cellular phones, and on-site phones/intercoms are a few of the equipment considerations.
- arrange for additional festival facilities such as food and beverage services, washrooms, and souvenir sales areas if the competition size warrants it.
- coordinate medical services including ski patrollers and clinic staff
- ensure that local requirements regarding toilet facilities are met
- obtain licensing for temporary facilities

Chairperson, Athlete Services

If the competition involves a large number of athletes or if the majority of participants are coming from out of town, various services need to be organized for them. Good communication with the athletes and coaches is essential from an information gathering and dissemination standpoint as well as being a means to make them feel that they are indeed welcome and are valued guests.

Duties:

registration packages, including such items as maps of the area, calendar of competitions, key contacts, local information, pins, sponsor giveaways, competition souvenir items.

accommodation - arrange for an official competition hotel, or offer different choices of accommodation depending on the budget, and arrange for off-race-site waxing facilities.

arrange local tours during off-race times

arrange access to local recreation facilities

arrange meals on competition day

if necessary, arrange transportation from the airport, to and from the site

arrange for key team contacts, usually someone who is proficient in the language of a particular team

Chairperson, Protocol and Hospitality

An event, unlike a competition, often has several ceremonial functions that are part of the making the competition a memorable experience for all those that participate. Provincial and Canada Winter Games often have opening and closing ceremonies, for example, giving the host site an opportunity to showcase local talent and celebrate the uniqueness of their area.

It is customary for multi-day competitions to offer a banquet, where the accomplishments of the athletes can be acknowledged, and thanks can be given to the volunteers and sponsors. Also, awards can be presented at the banquet instead of at the site after each competition.

Duties:

coordinate the opening and closing ceremonies

arrange for competition awards (i.e., medals, gifts, cash)

coordinate the awards presentations

organize a banquet

coordinate hospitality services (coaches' meetings, special functions)

coordinate VIP services

Chairperson, Finance

The Treasurer is responsible for the financial management of the competition.

Duties:

establish accountable bookkeeping systems, including a separate competition bank account

produce regular financial statements for review by the EOC

ensure proper sanctioning, if required

prepare and monitor the competition budget

provide various supporting agencies (i.e., government, CCC or sponsors) with reports as required

Chairperson, Marketing and Communications

The marketing portfolio is one of the most important areas in a competition and yet is often one of the most neglected. The successful marketing of the various components that make up a competition can mean the difference between a financially viable competition and a long-term debt for a club. A challenge for organizers is finding the necessary funds to run the competition. With a bit of imagination and some hard work, competitions can successfully involve sponsors and supporters in all aspects of the competition. Contributions can be monetary but also goods-in-kind, items that are needed for the competition that you would normally have to buy.

Successful competition marketing involves a 'Give-to-Get' philosophy; providing your sponsor value for their contribution. One popular provision is ensuring that the sponsor receives maximum media coverage in the locales into which the sponsor does business. Establishing a comprehensive promotions campaign is also important for ensuring that athletes receive recognition for their results. The communications and promotion tasks are often set up as a separate Chair position for larger competitions that have extensive media and sponsor promotion involvement, i.e. Chair of Communications and Media Services.

Duties:

coordinate fund-raising and marketing efforts

provide pre-competition and on-site services to media (press centre, timely results filing, opportunities to interview athletes, press releases)

advertise the competition

coordinate competition communication

Volunteer Coordinator

The Volunteer Coordinator, (and assistants if required), has the responsibility to recruit, train and inform the volunteers.

The commitment of volunteers to a competition can sometimes involve up to a four-year preparation period leading up to a competition. In light of this, keeping the volunteer sector motivated and enthused about their jobs is vital. Important points to remember are: think carefully about whether the job suits the skills, interests and ambitions of the volunteer; train the volunteer properly for the task; and ensure that the volunteer is equipped properly to perform the job.

Communication plays an important role both leading up to the competition and during the competition itself. Informed volunteers perform their jobs better and enjoy the experience more.

Rewards for the time and effort spent by volunteers are an important consideration when budgeting for a competition. You cannot pay volunteers nor do they expect to be paid. However rewards, such as lunches supplied on competition day, free banquet tickets, pins, jackets or toques (if sponsored), go a long way to making volunteers feel their efforts are appreciated.

In cross country ski competitions, the Volunteer Coordinator may work in a staff position as part of the Event Organizing Committee or with the Chief of Competition in the Competition Committee. In competitions where cross country skiing is one of a number of different sports competing in, say, a Winter Games competition, the Volunteer Coordinator works with the Competition Committee developing the officials team for the cross country skiing section. In competitions where cross country skiing is the only sport, the Volunteer Coordinator works as part of the Event Organizing Committee and with all of the volunteers and officials working on the competition, e.g., a Divisional or National Championships.

Duties:

Pre Race:

recruits new and experienced volunteers

in collaboration with the Chief of Competition, organizes officials' training clinics

plans volunteer check in and the volunteer centre

organizes and coordinates group transportation to the site if required, accommodation if required

prepares volunteer and officials' lists for each competition chief and chairperson

distributes accreditation to volunteers

organizes information/team meetings to bring volunteers up to date, promote involvement, and team spirit.

prepares and distributes a volunteer newsletter regularly

During Race:

sets up for check-in and volunteer centre

checks attendance of officials arriving on site

notifies appropriate chief or chairperson of volunteer shortage and assists with job re-assignment

directs officials to area of assignment or to respective Chief

distributes lunch tickets or lunches, banquet tickets

distributes miscellaneous small equipment to officials e.g., clipboards, start lists, course maps, pencils, etc.

distributes any last minute information, e.g., race delays, transportation changes, etc.

Post Race:

collects equipment distributed

expresses a warm "thank you" to each volunteer and distributes any post-race information

dismantles the volunteer centre

Equipment:

personal computer, check in/out lists, tables, pencils, clipboards, radio, items for distribution.

General procedures

The Volunteer Coordinator is a valuable person, to the Event Organizing and Competition Committees, who assists in pulling the volunteers together as a team. In the build-up to a competition, the various Chiefs and Chairpersons focus on details surrounding their areas of responsibility. Training and recruitment are looked upon with a single committee focus. The Volunteer Coordinator works with each Chief to identify his/her people requirements and the training needs of each, and assists with a recruitment and training program which focuses on all committees. Once trained, officials are encouraged to work in a variety of areas to maintain their interest and to

better understand their role and how it relates to other officials' duties. The moving around of officials also develops a more flexible team.

A list of all volunteers and officials, their address, postal code, email addresses, and telephone number with their various job assignments, should be developed. From this list, individual committee and check-in lists are prepared for the various Chiefs and/or Chairpersons.

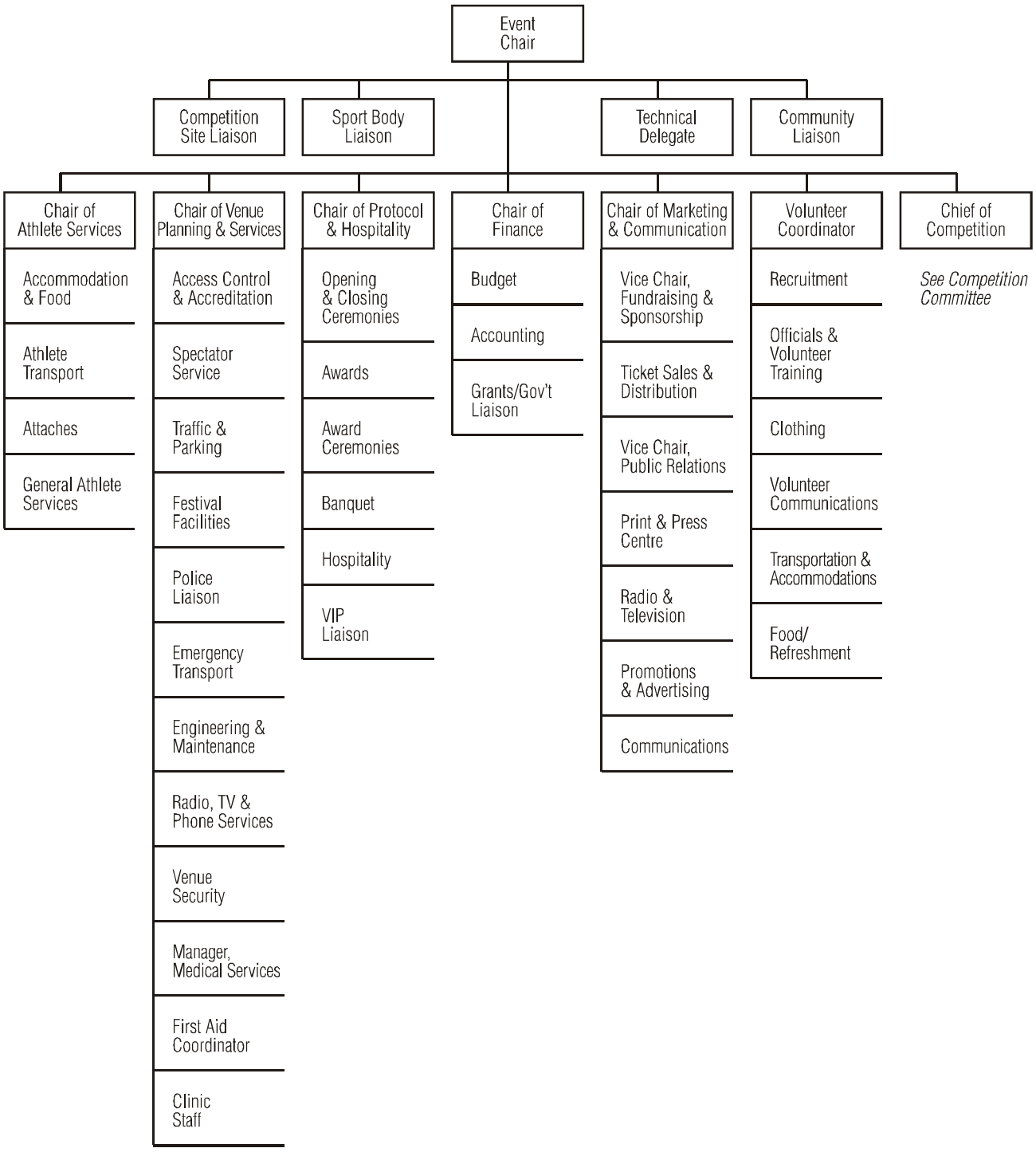
A friendly news letter, well written with information on up and coming competitions, the latest happenings in the committees, and details about the race (e.g., what leading/top racers are coming), meeting notices, keeps the volunteers interested and looking forward to coming activities. The chance to get together and meet one another prior to the competition will also create an atmosphere of involvement and enthusiasm.

Thank-you gifts should be distributed to the volunteers, and the Volunteer Coordinator often assists with organizing any post-race activity to thank or recognize the volunteers.

The welfare of the volunteers and officials is the job of the Volunteer Coordinator. If done well, volunteers will enjoy their experience and be willing to help in the future.

EVENT ORGANIZATION CHART

The chart that follows is appropriate for Canada Cup, Regional Championships, Canada Winter Games and National Championships.


Event Chair
Competition Site Liaison
Sport Body Liaison
Technical Delegate
Community Liaison
Chair of Athlete Services
Accommodation & Food
Athlete Transport
Attaches
General Athlete Services
Chair of Venue Planning & Services
Access Control & Accreditation
Spectator Service
Traffic & Parking
Festival Facilities
Police Liaison
Emergency Transport
Engineering & Maintenance
Radio, TV & Phone Services
Venue Security
Manager, Medical Services
First Aid Coordinator
Clinic Staff
Chair of Protocol & Hospitality
Opening & Closing Ceremonies
Awards
Award Ceremonies
Banquet
Hospitality
VIP Liaison
Chair of Finance
Budget
Accounting
Grants/Gov't Liaison
Chair of Marketing & Communication
Vice Chair, Fundraising & Sponsorship
Ticket Sales & Distribution
Vice Chair, Public Relations
Print & Press Centre
Radio & Television
Promotions & Advertising
Communications
Volunteer Coordinator
Recruitment
Officials & Volunteer Training
Clothing
Volunteer Communications
Transportation & Accommodations
Food/ Refreshment
Chief of Competition
See Competition Committee

Competition Committee

The Competition Committee

The Competition Committee is comprised of all the “major officials” who manage the race site activities and their subordinate teams who help to prepare and run the competition. The major officials represent the top tier of this structure and represent the leadership team. This team is led by the Chief of Competition and the team includes: the Chief of Course, the Chief of Stadium, the Chief of Timekeeping and Data Processing, and the Competition Secretary. In large high level competitions, the Chief of Competition Security may also be a member of this leadership team. This group acts as an executive to discuss interrelated problems between their respective areas of responsibility. At the discretion of the Chief of Competition, the Competition Committee can be expanded to include others. The Competition Committee organization is diagrammed in the following pages for three different levels of Olympic type competitions and one combined for two levels of Popular cross country Ski (Loppets) competitions.

The Competition Committee organization charts are designed to identify major tasks and official positions. Some tasks may require an individual official's attention at one level but these same tasks may be managed by another official in a lower level competition, or in fact may not be needed. These organization charts present a good plan for organizing an appropriate Competition Committee and have been proven to work over many different level of competitions.

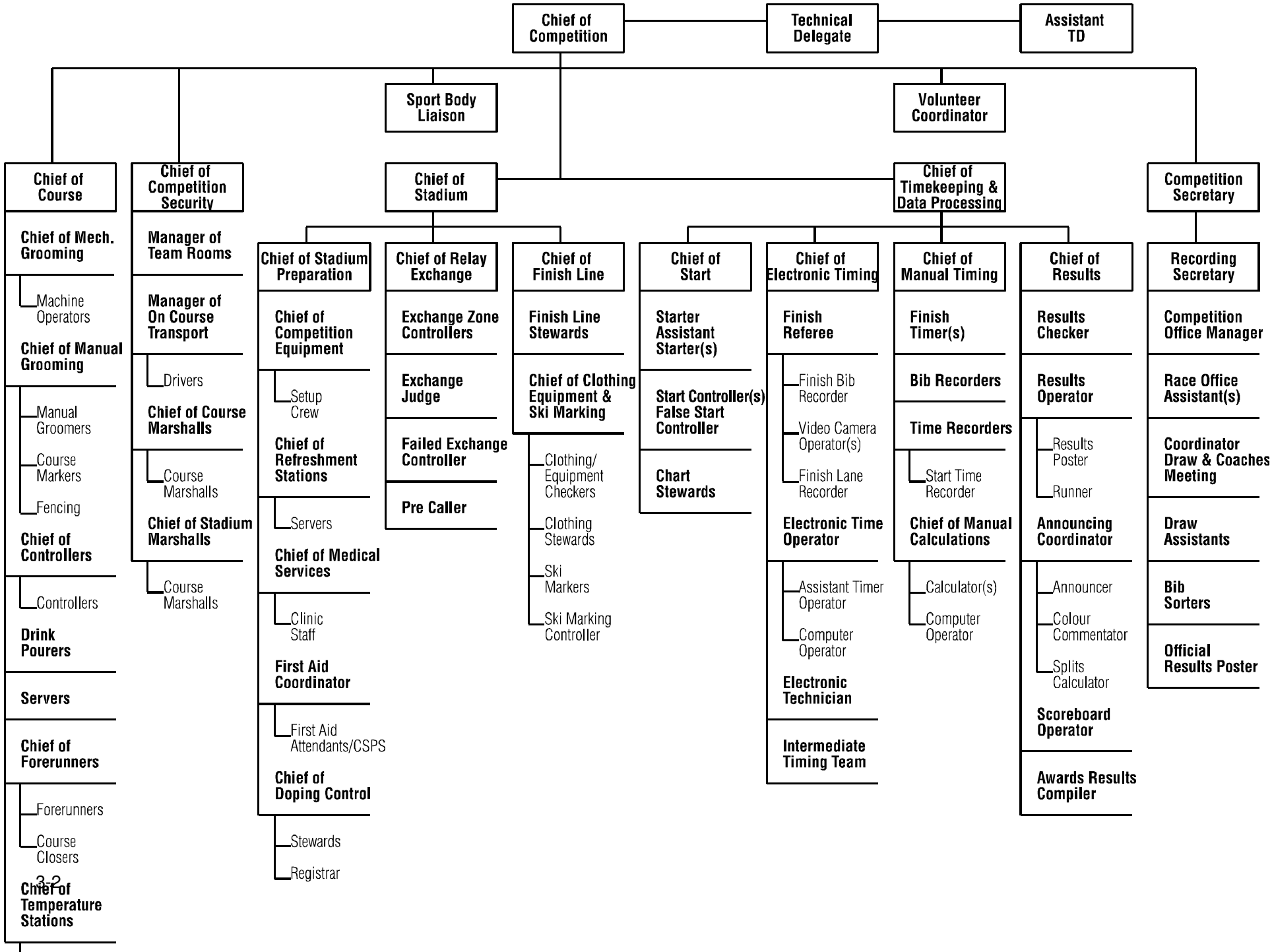
Responsibilities of the Competition Committee

Prior to the competition, the Competition Committee:

- ensures that the race site is prepared, beginning the summer before the competition is to be run.
- ensures that the courses that are going to be used are properly cleared, widened where necessary, bridged where necessary, and curves sloped and supported properly so that snow grooming can be carried out successfully.
- ensures homologation of the courses when required.
- selects those persons who will fill positions of responsibility within each of the functional race areas
- ensures that adequate training of the officials has been (or will be) carried out, including any dress rehearsals if needed.
- decides on the pre-competition races that will be used as dress rehearsals.

Competition Committee Organization Chart

The chart that follows is appropriate for organizing competitions at the level of Canada Cup, Regional & National Championships. As was said with regard to the Event Organizing Committee events of shorter duration or with a lesser number of competitors can be run with a smaller organization, but care should be taken not to overlook covering vital areas and not to overwork the volunteers available. In the Competition Organization never give one individual more than one job because it is not always possible to control timelines. They may not have finished the first job when it is required for them to do the second.


Chief of Competition
Technical Delegate
Assistant TD
Sport Body Liaison
Volunteer Coordinator
Chief of Course
Chief of Competition Security
Chief of Stadium
Chief of Timekeeping & Data Processing
Competition Secretary
Chief of Mech. Grooming
Machine Operators
Chief of Manual Grooming
Manual Groomers
Course Markers
Fencing
Chief of Controllers
Controllers
Drink Pourers
Servers
Chief of Forerunners
Forerunners
Course Closers
Chief of Temperature Stations
Manager of Team Rooms
Manager of On Course Transport
Drivers
Chief of Course Marshalls
Course Marshalls
Chief of Stadium Marshalls
Course Marshalls
Chief of Stadium Preparation
Chief of Competition Equipment
Setup Crew
Chief of Refreshment Stations
Servers
Chief of Medical Services
Clinic Staff
First Aid Coordinator
First Aid Attendants/CSPS
Chief of Doping Control
Stewards
Registrar
Chief of Relay Exchange
Exchange Zone Controllers
Exchange Judge
Failed Exchange Controller
Pre Caller
Chief of Finish Line
Finish Line Stewards
Chief of Clothing Equipment & Ski Marking
Clothing/ Equipment Checkers
Clothing Stewards
Ski Markers
Ski Marking Controller
Chief of Start
Starter
Assistant Starter(s)
Start Controller(s)
False Start Controller
Chart Stewards
Chief of Electronic Timing
Finish Referee
Finish Bib Recorder
Video Camera Operator(s)
Finish Lane Recorder
Electronic Time Operator
Assistant Timer Operator
Computer Operator
Electronic Technician
Intermediate Timing Team
Chief of Manual Timing
Finish Timer(s)
Bib Recorders
Time Recorders
Start Time Recorder
Chief of Manual Calculations
Calculator(s)
Computer Operator
Chief of Results
Results Checker
Results Operator
Results Poster
Runner
Announcing Coordinator
Announcer
Colour Commentator
Splits Calculator
Scoreboard Operator
Awards Results Compiler
Recording Secretary
Competition Office Manager
Race Office Assistant(s)
Coordinator Draw & Coaches Meeting
Draw Assistants
Bib Sorters
Official Results Poster

Reports to Chairperson - Event Organizing Committee

Chief of Competition

— Chief of Timekeeping and Data Processing
— Chief of Course
— Competition Secretary
— Chief of Stadium
— Chief Competition Security
— Indirectly, all other officials.

Duties:

Pre Race:

sits as a member of the Event Organizing Committee and represents the interests of the Competition Committee to the Event Organizing Committee (when one exists).

structures and trains a Competition Committee suited to the competition.

ensures that adequate training of the officials has been (or will be) carried out, including a pre-competition “dress rehearsal” if necessary

establishes and maintains liaison with the Technical Delegate, keeping the TD informed of the preparation of the competition. He/she will assist with arranging accommodation and transportation needs of the TD (billeting is acceptable).

plans the course and stadium layout with the Chief of Course and the Chief of Stadium.

supervises and co-ordinates the major officials in areas of budget spending, equipment acquisition, facility development, and communications.

develops a “timeline” schedule of all activities with the major officials.

evaluates, weekly or bi-weekly, the progress of major officials in relation to their time lines.

acquires current policies, rules and regulations, etc. applicable to the competition and disseminates them to the Chiefs.

provides or approves all technical information contained in race correspondence such as race notices, entry forms, etc.

establishes date and time of first team captains meeting with the Competition Secretary

reports progress to the TD and Assistant TD through minutes of Competition Committee meetings, competition details, course maps, and race information literature.

arranges for site visits and inspections by the TD and Assistant TD, if required.

provides a practice (“dress rehearsal”) race utilizing all officials in their appropriate positions. This is standard procedure for major competitions or for races held at new locations.

chairs the team captains’ meetings with a prepared agenda.

Sets the agendas and chairs the Team Captains’ Meetings, including the draw.

During Race:

checks that all officials and equipment are in place and functioning.

assembles the jury at the TD’s request.

serves on Jury.

supervises the entire race from a strategic position.

maintains close communication with the TD and all major chiefs.

Post Race:

ensures that all officials have fulfilled their duties prior to leaving the race site.

evaluates race day activities with the TD

provides the TD with a complete set of results, minutes of Team Captains’ meetings, and Jury meetings.

implements changes and preparations for subsequent days of racing.

conducts debriefing session with officials and compiles a report.

provides feedback and thanks to all involved

Qualifications:

extensive experience as a major official (it is suggested that this person be at least a Level 2 official).

good organization, management, and delegation skills

high personal performance standards and be capable of motivating others to work collectively

must possess a thorough understanding of the applicable rules and regulation

Equipment:

clipboard, start list, radio, watch, officials list

Method of Performing Duties

As the above list of duties suggests, many of the tasks which confront a Chief of Competition are managerial in nature and take place before the race day. The Chief of Competition is the only member of the Competition Committee who has formal responsibilities to the Event Organizing Committee, and he/she represents the interests of the Competition Committee to that committee. This position on the Organizing Committee entails responsibilities in the areas of Competition Committee budget, race execution, site development, and Competition Committee communications.

With this in mind, the Chief of Competition should take great care at the outset to plan carefully. This responsibility of being informed and knowledgeable requires an effort on his/her part. Training for this position should involve participation in formal officials training courses. This preparation could be further enhanced by visiting other competitions of equal or higher calibre, as an observer.

With a solid understanding of the organization processes and of the detailed tasks required of other major officials, the Chief of Competition must form a Competition Committee in which people are selected and placed in positions suitable to their individual strengths. Consideration must be given to experience, training, personalities, and commitment when assigning the major officiating positions on the committee. A hard-working homogeneous group of major officials represents the first step towards a successful competition.

Once the major positions (those whom the Chief of Competition supervises directly, along with perhaps a few other that are very specialized) have been assigned, the Chief of Competition sets out a general timeline of activities. The Competition Committee works out the details and produces a task-specific timeline for each of the areas under each major official. This process leads to the setting of budgets, site selection, planning, and the establishment of the level of sophistication the competition will seek to achieve.

When these details have been determined, approved by the Competition Committee, and agreed to by the respective chiefs, the Chief of Competition delegates the accomplishment of these tasks to each appropriate chief, and then adopts a supervisory role to each major area. Regular meetings (approximately every 3-4 weeks, and more often as it gets closer to the competition date) are called where each chief reports on progress to-date, items not accomplish which were supposed to have been accomplished, and items that are planned to be accomplished during the next month or so. Through these meetings, all members of the Competition Committee will be abreast of the progress being made, or the lack of progress (which is very important information to know). Remember that the chiefs are volunteers, and generally have full time jobs and families, so getting them to plan ahead and encouraging them to accomplish the tasks on the plans may take some tact, encouragement, and perhaps even some assistance from the Chief of Competition.

The Chief of Competition develops the agendas and chairs the Team Captains' Meetings. This aspect must be planned and carried out with rigour, as this is the place where important information is disseminated and then passed on to the competitors, so it has to be correct and complete.

Immediately before and during the competition, the Chief of Competition is primarily involved in supervising and troubleshooting. This Chief must always be on the look-out for potential problems and implement the necessary precautions or changes required. In order to keep control and coordinate the race site activities, the Chief of Competition must be well-versed in all the plans and activities of the other major officials. Through the Chief of Competition, the major officials support one another in a common and team effort.

The Chief of Competition, as an advocate of the Competition Committee, is an influential member of the Jury and, in the absence of a TD, the spokesperson. In some instances, the Chief of Competition or the Jury cannot satisfy everyone.

As a priority, the Chief of Competition must remember that the race is for the skiers and no one else. The competitors' abilities, safety, and needs must be given the highest priority in reaching any decision.

The Chief of Competition remains in close liaison with the TD throughout the competition. The TD can be his/her best source of information about potential problem areas. If the TD and Chief of Competition are physically apart for a period of time, they should maintain contact through radio communications.

Post race activities provide the Chief of Competition and other major officials the opportunity to reflect and evaluate their performance, and to make changes where and if necessary. The documentation from these sessions can be extremely valuable to future race organizers in the region. Digesting previous race committee reports is an excellent way to prepare oneself as a Chief of Competition.

Technical Delegate

The Technical Delegate (TD) is the representative of the sport governing body to the Event Organizing Committee and the Competition Committee, and is a guarantor for the competition sanctioning body (e.g., FIS, Cross Country Canada, its Divisions, etc.) that the competition is technically in accordance with the FIS or Cross Country Canada rules. The TD is responsible for organizing the work of the Jury. The TD must advise and assist the organizers in a helpful manner. A larger purpose behind this statement is to conduct a **safe** and **fair** competition. The TD is not there to run the race but to help the organizers and officials to run a good competition. See also Rule 304 in the Rule Book.

To accomplish the above stated purpose, TDs:

- help the organizers prepare for, and carry out a quality competition.
- promote basic standards in competition organization
- officially represent the sport governing body that sanctioned the competition.
- uphold and interpret the rules and policies governing the competition.
- provide a detailed and constructive critique of the competition.
- are absolutely neutral.

TDs are qualified officials who have considerable experience in running Cross Country Ski competitions and have taken a Level 3, 4, or 5 TD course. They have wide and detailed experience in organizing and running competitions, are active in the sport, and are provided with up-to-date information, all of which allows them help organizers do a better job. In CCC and the divisions, we encourage organizers to view TDs as a resource to help them organize competitions in the latest and most effective way. This continuity helps to make the job of organizing and running a competition easier and more pleasurable and allows our ski racers to know what to expect with respect to proper and current race formats, stadium layouts, course design, preparations, and final results, etc. The first two goals stated above are considered very important.

Nomination of a TD (and sometimes an Assistant TD):

- for Nationally sanctioned competitions, the TDs are appointed by the Events Committee of CCC.
- for Division sanctioned competitions, the TDs are appointed by the Division.
- the sport governing body which appoints the TD is also responsible to notify the Event Organizing Committee (EOC) of the appointment as soon as it has been confirmed. In the official notification, the sport governing body must provide the name, address, email address, and telephone number of the TD.

Duties of a Technical Delegate:

Pre-competition organization and course preparation:

- establish contact with the Chief Of Competition as soon as possible
- request minutes of Competition Committee (CC) meetings, copies of race notices, invitations, and course maps.
- review the official organization chart and advise on suitability of the volunteer numbers planned and training requirements. Request the names of the Event Organizing Committee and/or the Competition Committee members.
- With the cooperation of the Chief of Competition, try to contact, either by telephone or e-mail, each of the chiefs and have them describe: their preparations for the various functions within their areas of responsibility; how they understand certain technical/complicated processes will operate; and their interfaces with the other chiefs during each competition day (e.g., how does the Chief of Stadium see his/her interface with the Chief of Course, etc.). It provides an opportunity to work through the Chief of Competition to refine/correct certain aspects, and gives the TD an opportunity to appraise the experience of the chiefs before arriving on site.
- schedule site visits if required or requested. If a site visit occurs, try to meet as many of the senior officials as possible. If a site visit is not possible, then the preceding point becomes very important.
- inspect the course, warm up area, wax testing area, and stadium layout, especially for major competitions, new sites, and new event and/or competition organizing committees.
- review participant transportation and accommodation plans.
- review homologation of selected courses and their suitability for the races scheduled. i.e., lengths, profiles, difficulty, etc.
- review course and stadium preparation and operating equipment needs including course marking.

Upon arrival for the competition:

meet with the Competition Committee, especially the Chief of Competition, Chief of Course, and Chief of Stadium.

ski the course, preferably with the Chief of Course. Review the course grooming and tracksetting requirements and course marking plans and signs.

Decide, in collaboration with the Chief of Competition and Chief of Course, when the course shall be prepared, the optimal line, width of track, and safety precautions, as well as closure times.

evaluate the medical services on and off the course.

tour the entire stadium area including: timekeeping, competition office, ski waxing area, etc.

meet with some of the coaches and determine if the site is ready as far as they can tell. Since Juries are now constituted in some circumstance with no coaches' representation, it is imperative that contact be maintained with them through periodic visits at their team rooms.

meet with the Chief of Timing to review procedures and equipment deployment, and in particular examine the planned use of any video equipment.

meet with the Competition Secretary and the Chief of Competition to review the team captains' meeting room and agenda.

attend the team captains' meeting and draw.

address the Team Captains' Meeting, review any special circumstances or rules, and introduce the Jury.

chair all Jury meetings and vote only to break ties.

set race day Jury duties and meeting times with the Jury.

During the competition:

arrive at the race site at least 2 hours prior to the start of the competition or earlier if weather conditions are difficult.

obtain a radio to remain in contact with the major officials.

ski (inspect) the course and inspect the stadium area; where changes are required, arrange with the Chief of Competition to get it done.

meet with the Jury at least one hour prior to the scheduled start of competition to confirm the start time, and to review any Jury members' concerns. Check with some coaches if they know of any problems that need to be attended to before the race start.

review with the Assistant TD (if there is one) his/her duties and responsibilities, and any special places or activities that the TD would like to have observed.

observe: ski marking and equipment inspection (if required); start procedures; finish line activity; timekeeping; information flow; announcing; and after care of skiers.

normally stay in the stadium area. Be in radio contact with the Chief of Competition, Chief of Course, and Chief of Timekeeping. Be on hand near the finish line to observe any close finishes in mass and pursuit starts.

meet with the Jury after the race to review any infractions, protests and unofficial results. Even if there are no infractions or protests, the Jury may have some feedback to provide on aspects of the race that should be communicated to the Chief of Competition for action in future races.

sign off on officials results

Post competition:

review the race with competition chiefs

seek input from coaches and competitors for race assessment

attend any banquet or end-of-competition activities and, if requested, make a speech. At the banquet, the TD is considered the representative of the sport governing body and should be seated accordingly.

write a detailed report on the preparation, organization and conduct of the competition (the Technical Delegate's Report). Send copies to the EOC and the sport governing body.

If a disqualification or sanction has occurred, provide quality documentation to the Sport Governing Body sufficient for the appeal process.

The Technical Delegate's Report

After each event, the TD should prepare a report to provide feedback to the competition organizers on how well they did, where they did well, where they did not do well, where and how they could improve, and any suggestions concerning changes that are recommended to any of the sport sanctioning organizations. The report must be **constructive** in all phases, well balanced noting successful and not so successful areas, noting and congratulating things done very well, indicating where processes fell down or were

weak with suggestions as to how they could be corrected or improved, facilities and their quality, etc. The following list indicates some of the areas that should be discussed (more items may be added if applicable):

1: Pre-Race Preparation: Was the TD kept up-to-date on the preparation of the competition from the time he/she was appointed until he/she left for the site? Through what form of communications was this done? – e.g., e-mail, fax, telephone, etc.? Did the TD comment on and reply to the Competition Committee when material was received? Which major officials did the TD communicate with prior to the competition? How well did the TD feel that his/her comments were taken – accepted? not acknowledged? often rejected or objected to? Did the TD read the whole rule book before leaving for the competition? Did the TD read the Technical Package for the competition before leaving for the competition? Did the TD have any questions concerning it and who did the TD contact to determine the answers?

2. Race Organization (comment on quality and effectiveness): Race Notice (timing, form). What was the form of registration (e-mail? Fax? Mail? Etc.)? Course Maps & Profiles. Team Captains' Meetings. Draws. Start Lists (when available?). Jury -Was it formed according to the rules?
Were there serious problems or protests brought to the Jury? Were minutes taken, etc.? Publicity -media coverage, spectator turnout?

3. Site Facilities (comment on suitability and availability): (a) Administrative - meeting rooms, public address system, results display board. (b) Technical - waxing rooms, course layout, track preparation (snow depth and condition), track setting equipment, timing equipment (primary, back-up), overall stadium area and setup, start & finish area, relay start, pursuit start, trail marking and signage, warm-up track, wax testing, feeding stations

4. Performance Of Officials: Were there enough officials? Did they know their duties? What electronics were used? What was done manually? Were they done correctly? Did the races run on time? Who had radio communications? Was the course secure from spectators, etc.? What problems did the officials have during the races and why did they have them? What was the overall atmosphere?

5. Medical: What medical services were available? Were there any accidents that needed medical treatment? If so, explain.

6. Recommendations: (a)To the Organizers (b) To Officials' Committee and Sport Governing Body (c) Any Rules and Regulations Amendments/Interpretations (d) Provincial Sport Governing Body (e) other sport bodies, e.g., Canada Winter Games Committee, OFSAA, etc (choose/delete as necessary)

7. Conclusion: a statement summarizing the detail above, e.g., it was a fair competition, safe, but the officials could use a Level 2 update.

Other Technical Delegate Considerations
Were medical services are available, the TD should be concerned with any accidents that happen, and how people were treated for injuries. The purpose of this inquiry is not to second guess the medical processes that were followed, or the competence of the medical services, but to receive feedback on the what and how these services were carried out and to be able to defend and improve the organization's efforts in attending to any people who were injured. Often, the medical personnel do not wish to reveal anything about these incidents as some of them believe that such information may need to remain confidential (patient-doctor relationships), or that privacy of information may be in play. However, the TD should attempt to assure any medical staff (including first aid staff) that any information will remain confidential, but the TD should have an overview of at least the non-medical processes that took place, since it may be necessary information to have should there be some repercussions that arise later on from the incident. Some medical information could be revealed by the medical staff, such as if and when a broken bone was set, how the person was transported to a hospital, etc., without compromising any patient-doctor confidentialities. The TD should try to evaluate if the processes seemed reasonable, and attempt to work with the medical staff to improve those processes that could perhaps be done better the next time. It can be a tricky road to go down, but as the representative of the sanctioning body and tasked with a great deal of responsibility for the safety of the competitors and officials, some knowledge is required, and should be documented for potential future reference. Most likely, most of the information that is obtained will not become public knowledge, i.e., not included in the TD's Report, unless it is to make suggestions as to how improvements could be made.

The Jury

The Jury is the governing body, established at each competition, responsible for ensuring that the competition is organized and carried out according to FIS and/or Cross Country Canada rules. In addition, while adhering to the rules, the Jury may effect minor modifications to the rules providing the word "must' has not been used in formulating the rule. The issues which give juries much concern are weather (both hot and cold), and course preparation and safety. Decisions around these issues may result in course changes or postponement or cancellation of the competition.
The composition of the Jury is governed by Rule 303.1. For Continental Cups (COC), e.g., NORAM, and other FIS competitions, the jury is composed of the TD who is the chairperson of the Jury, the Chief of Competition, and the National Assistant TD (appointed by the host NSA) – Rule 303.1.3. In Canada, our National Championships are FIS sanctioned and fall under this same definition for all categories. For other CCC sanctioned events, the jury will consist of the TD, the Chief of Competition, and a Visiting Team Coach. However, these rules do change over time, so it is best to refer to the Rule Book for current definitions.
The Competition Committee is represented on the Jury by the Chief of Competition (or Loppet Chairperson). The athletes are represented by coaches or team captains when appropriate per the rules. The sport governing body is represented by the Technical Delegate; it is usually the TD who will set out the "legal" framework and possible alternative actions, based on the Rules, against which the Jury members will consider any items brought to their attention, since the TD is usually the most knowledgeable person on the Jury with respect to the Rules. All members of the Jury have voting rights and decisions are made by a simple majority. The TD does not vote except in the event of a tie among the other Jury members.

The Jury may invite non-voting participants such as the Competition Secretary, Recording Secretary, Chief of Controllers, Controllers, or the Chief Medical Officer, to act as professional advisers or to provide support services. Athletes named in a protest also have the right to be heard if they wish, or if the Jury wishes to hear from these athletes to obtain a more complete picture of the events surrounding a protest or incident.

Juries meet immediately after the Team Captains' meeting, if required, and one hour before and after (normally) the race start and finish. Special meetings to consider extraordinary circumstances such as sudden weather changes, appeal hearings, or emergencies may also be called at any time. Remember that the Jury is the main deciding body at the competition site, not the TD, and so must be prepared to meet to solve any problems that arise; however, it is often the TD who will announce/publicize any decisions take by the Jury.

Specific responsibilities and rules of the Jury are referenced in the Rule Book, Section 303.2.

Probably the situation that occurs most often for a Jury to decide upon is the one concerning the holding of a race when the temperature is below that stated in the rules. Rule 303.2.2 (note that this rule is in the Duties of the Jury) states that if the temperature is below –20 degrees Celcius, measured at the coldest point of the course, a competition will be postponed or cancelled by the Jury. It goes on to say that if there are difficult weather conditions, the Jury may, in consultation with the team leaders and the doctor responsible to the competition, postpone or cancel the competition. CCC goes on to say that the –20 degree Celcius limit is for competitions equal to or less than 15 km; for competitions greater than 15 km, the Jury must postpone or cancel the competition if the temperature is less than -18 degrees Celcius. Now, we all know that skiers come to competitions to race, and officials do all the preparation and setup of the race site in order to hold a race, so they usually hate to have a race cancelled. However, the rule book has put the "stake in the sand", and –20 C means just that, not around –20 C (such as –21c or –22C). Serious health concerns can easily arise below –20 C (such as hypothermia, and lung damage from rapidly breathing the very cold air during a race). It is not a pleasant decision to have to make, but it must be made and done according to the rules. Otherwise, it is possible for the TD and the Jury to be held liable for any injury that might occur during the race to any of the competitors, coaches, or officials due to the extremely cold weather. Also, the TD and Jury may get some pressure from special interest groups (e.g., TV) not to cancel a race, but the Jury must be extremely careful how they handle the proper decision.

Competitors and their entourage expect a fair and safe competition, and the TD and Jury must do everything that they can to ensure that it is safe, and fair.

Protests

A competitor who believes that he/she has been wronged, according to the Rules, by another competitor, coach, official, or spectator has the right to file a protest stating their position, and asking the Jury to take some remedial action against the person who did the wrong. According to Rule 392, the Jury must consider a protest provided that it has been received within the time limit specified (see Rule 392 for these time limits), the protest has not been deliberately delayed to obtain an advantage, and that the protest is accompanied by a payment. First, the Jury must consider all the facts of the situation, and obtain as much evidence from as many credible sources as is reasonably possible. These sources may include other competitors, coaches, officials, videos, etc. The Jury, however, should remember that trying to review too much evidence can delay unduly the results of a competition and take away the enjoyment that everyone has had. Therefore, a Jury, before a competition, should decide what evidence it will review so that it doesn't become burdened with too much evidence. For example, a Jury may not likely be able to find the time to review a dozen or so videos provided by spectators out on the course, as it may be too time consuming. Second, all of the possibly applicable rules should be reviewed. Third, the review should be kept impersonal, i.e., the names and/or personalities of competitors should not be revealed while the protest is under consideration, since such information may cloud any decision.

If the Jury finds that a person has wronged someone else, or has done something against the rules, the Jury must consider possible sanctions against that person. Rules 390 and 391 set out some of the possible sanctions that may be issued, while Rule 223 and 226 sets out sanctions in more detail, along with who may be sanctioned. Sanctions may be given orally or in written form. Rule 224 sets out the procedural guidelines surrounding sanctions, and Rule 225 sets out the appeal process that a sanctioned person may follow if they wish.

Protests during Sprint Competitions

In sprint competitions, due to the timeline pressure of running successive heats, it is <u>not</u> possible to allow protests during heats and semi-finals. Protests will only be accepted after the finals (as it is in normal competitions). This implies that, as in all sporting events, trained officials (referees) make the difficult calls to the best of their ability and within the physical restrictions of the venue. So the TD and the Jury will call it the way they see it. The fact that we already accept official video footage of incidents out on the course is more than is done in some other sports. That process definitely comes at great expense in terms of the time delays and infrastructure needs. We must accept that there will be differences of opinion on judgement situations but that is part of sport and that is why officials' training is extremely important for some of the key positions.

Before a sprint competition begins, the TD should meet with the Jury to ensure that there is clarity on what constitutes obstruction to ensure consistency of application of the rules during the race. It should also meet to decide what evidence sources will be considered during the review of any protests; such considerations include only certain video cameras, certain officials on the course and in the stadium, certain experts resources that may be at the race, etc.

The current trend for dealing with competitor behaviour in sprint competitions was reviewed by international TDs in the spring of 2002. The document "TD Operational Guidelines for Sprints" implies that, although obstruction and interference may occur, it is not always intentional. Where it is clearly intentional, then a DSQ should result. Only in very rare circumstances will the skier who was obstructed be given the chance to advance to the next round, as this decision penalizes those who qualified to be there, by having an extra body to contend with on the course and at the finish. Other sanctions other than DSQ can be used individually or in combination to punish poor behaviour. There is now more variety and degree of severity available than in previous years.

During the sprint rounds, it is recommended that the members of the Jury, other than the TD, be positioned on the course in what might be considered potential places where infractions might occur. In particular, the main infraction that is likely to occur is obstruction, because of the tightness of the race, the shortness of the course, and possibly the need to pass competitors during a heat to have a chance of moving on to the next heat round. Each Jury member should be teamed with a controller to assist in verifying and recording any infractions. After each heat round, it might be prudent to poll all the Jury members to determine if there were any observed problems that need to be dealt with before commencing the next heat.

Cross Country Events and Race Formats

Overview of Cross Country Competitions

Preparations for Cross Country Ski races begin many months before the event with publicity, the issuance of a race invitation, registrations and site preparations. Track crew volunteers must clear brush and debris from the trail before the ground freezes. With each snow fall, the surface is successively packed and groomed.

The public accessibility to most race sites poses special problems for security and requires that many finishing touches be added the morning of the event. If possible, the course to be used should be closed to all skiers (including the public) at dusk the evening before a race day. This allows the grooming of the trails to be started, if feasible, and some of the stadium details to begin to be set up.

On race day, as racers or coaches arrive to test their wax (often just after dawn), the Chief of Course and maintenance crew are often finishing the final details of the grooming and tracksetting processes and course marking efforts started the previous night. By the time the morning sun clears the horizon, the Technical Delegate is checking the course to ensure that tracks have been set properly and trail routes are clearly marked, and the stadium area is humming with activity. Colourful displays of flags and banners begin to appear. Soon timekeeping crews will be busy setting up their electronic equipment and checking watches. Meanwhile the Competition Secretary and assistants prepare to distribute the remaining race bibs and start lists. About an hour before the start, a group of warmly-dressed officials (controllers) carrying backpacks assemble near the start for last minute instructions. They disperse to work at assigned destinations on the course. At this same time, the Jury for the competition is meeting to see if there are any reasons why this race cannot proceed and start at the scheduled time. Should there be some legitimate reason why it should be delayed, then the situation is reviewed, the Chiefs concerned are asked to indicate when these items will be fixed, and a new start time is decided upon, and the process of communicating this to all concerned is put in motion.

Just before the time that the race is about to begin, a crowd of officials involving the Chief of Start and Finish, the Starter and Assistant Starters, Technical Delegate, and Chief of Competition (along with any other officials and coaches who wish to run their watches on race time) are poised with their watches awaiting the “start watches” signal. For races that have individual single starts, racer No. 1 will depart at 30 seconds after the signal, and every 30 seconds thereafter, another skier starts. The first skiers are ready and staying warm near the start line.

In Canada, races can be anywhere from one to 50 kilometers in length. In most short races, the racer will leave the stadium following the designated trail, and won’t be seen again until returning to the stadium to cross the finish line. In long races, racers will be seen several times as they pass (or lap) through the stadium before they enter the stadium for the last time and cross the finish line.

Once out on the trail, racers will pass a variety of officials. Controllers will be there to record bib numbers at distant points, while medical aid and course maintenance crews will be nearby at hazardous sections of the track. These officials are usually unnoticed by the racers who concentrate intensely on the track in front and on maintaining effective technique and speed.

As each racer crosses the finish line or passes a designated point on the lap lane through the stadium, the time and bib number are recorded and sent to the timekeeping/results crew for processing and posting. Racers like to know how they are doing in a race, especially if it’s long, so often there are team coaches on the trails to provide “splits” or times that they are behind the category “favourite” (i.e., the racer considered most likely to win); given the nature of an individual start and the remoteness of some sections of the track, it becomes a difficult task. It is little wonder why many wait anxiously at the results board for a hint of how they have done.

As the last racer crosses the finish line and heads to the refreshment table (passing the finish checkers and first aid people) for juice and a friendly smile, the Competition Secretary is well into the process of posting the unofficial results on the official notice board and preparing the final official ones for the awards ceremony to follow. Then, a few hours of work remain for the officials as they clear the site or prepare for the next day of competition.

Techniques

There are a variety of techniques in cross country skiing, but they are all classified into 2 types: classical technique, and free technique.

Classical Technique
Rule 314.1.1 defines the classical technique to include (and be limited to):

> The diagonal techniques, the double poling techniques, herringbone techniques without a glide phase, downhill techniques. Turning techniques – these comprise steps and pushes in order to change direction.

However, it has become quite a fine line between turning techniques with steps and pushes, and skating, so the rule goes on to say that, where there is a set track, turning techniques with pushing are not allowed, and that this applies even to those competitors who might be skiing outside of the set track. This rule is an extremely important one for course controllers to be familiar with.

Free Technique
Rule 314.2.1 defines free technique to include all cross-country skiing techniques. This therefore even includes all classical techniques. And please note that the correct term of technique is NOT "free style", but "free technique". "Free technique" has also come to be known as a ski skate technique.

Types of Cross Country Ski Competitions

Interval Start Competitions

Each skier starts at a given time, usually at 30 second intervals. The time interval between starting racers may be as short as 10 seconds, or as long as one minute. This is the basic, and formerly the most frequent type of race used in cross country skiing. Each racer's skiing time is calculated by subtracting the start time from the finish time to obtain the elapsed time; the one who wins is the one with the shortest elapsed time.

Mass Start Competitions

This start format has become the most common in recent years. In this type of start, the entire field/category/class of racers starts at one time, in parallel start lanes of about 100 metres in length. Therefore, there must be a large number of start officials present at this type of race in order to ensure that each racer is in his/her proper starting position – remember that all the racers in a class will be arriving at their start positions at the same time, so it can be mass confusion unless the starting officials are well prepared and know the proper procedures. Skis and equipment also need to be checked and marked around the same time, so a number of ski marking stations appropriately staffed must be ready. Depending on the number of start lanes, the fastest skiers are assigned positions on the first row, with the slower skiers being assigned starting lane positions in subsequent rows behind the first row of starters.

At 30 seconds before the start of the race, a "30 seconds" warning is announced to the racers. No other signal must be given, until the start signal, or you will find that the racers try to anticipate the start signal and end up being over their start lines before the actual start signals. Should this happen, it is necessary to call a false start, and return the racers to their start lines, and re-start the race.

At the start signal, racers are required to double pole (or can actually do the classic technique in a classic race) to the end of the start lanes, at which time they may then proceed to race using the dictated technique. The first skier across the finish line for the category/class wins. These are exciting events, especially the start, which allow very large numbers to race in a short time period. If the competitors are close in ability, the excitement will continue throughout the course, with the lead changing from time to time, and then a sprint to the finish line. This starting technique allows the competitors and spectators to know who is winning at any point in the race, and all competitors know whom they have to pass in order to win.

Pursuit Competitions – With a Break

A Pursuit Competition – With a Break is a two-race series, conducted usually over two successive days, which provides a test of each skiers' ability in both classic and free technique styles, as well as providing an exciting start for the second race for the media and spectators.

The first race is an interval start race (usually classical technique). From this first race, the time interval behind the winner is calculated for each skier and this becomes the time that each particular skier starts the second race behind the winner of the first race. This is referred to as a pursuit start. The second race is usually free technique (opposite to the first race). For the pursuit start, four or five start lanes are used with a Starter and Assistant Starter for each lane. The first skier starts in lane #1 at time 0:00, with the second skier starting in lane #2 at his/her time interval behind the winner of the first day's race, and so on. If there are 4 lanes, then skier # 5 will start in lane #1 after skier #4 starts in lane #4. This pattern continues until all skiers have started. The winner is the first skier to cross the finish line at the end of the second race.

The logic behind this type of race is that a skier who is very good in one technique may not be as good in the other technique. So even though the skier who won the first day's race starts first, the skiers behind may be faster in the second technique, and so will catch up to the winner and result in a neck-to-neck race to the finish line.

Pursuit Competitions – Without a Break

Pursuit Competitions –Without a Break consist of a classical style race that begins with a mass start (chevron), followed by the changing of skis in an exchange/pit zone in the stadium, and then continues with a second race in the free technique style. There is no break between the two races except in the exchange/pit zone to change skis and poles, and maybe boots; otherwise, it is continuous action through to the end of the second race. The winner of this type of competition is the skier who crosses the finish line first after completing the classical race, has gone through the exchange/pit zone, and completed the free technique race. Both pairs of skis of a

racer must be marked before the start of the competition, and the skis to be used in the second race must be left in the racer's pit before the start of the competition.

The layout of the chevron mass start area is covered in Chapter 8 –Stadium Layout & Grooming. However, it does require a number of parallel start lanes in which the competitors must double pole or use a classical technique to the end of, after which they may start the classic technique. In addition, there needs to be an exchange/pit zone into which the racers ski to change their equipment for the second race. Generally, racers will enter this zone, then split left or right, depending on whether they have an even or odd numbered bib, ski outside the actual pits using any technique to their own numbered pit, change their skis (and poles and boots if they wish), then leave the pit to the inside area between the pits, and ski out of the zone to start the second race. Alternatively, it is possible to make one line of pits, so that skiers will come into the exchange/pit zone, ski along one side to their own pit, change skis (and poles and boots if desired) and ski out the other end of their pit and on to the course of the second race.

This competition is very exciting to watch, since it is a mass start, and so the leader at any point in the race is easily identifiable; the winner is the first one across the finish line. However, it is a competition that requires a large stadium to handle a mass start, an exchange/pit zone for possibly a hundred or so racers, and a finish area that must accommodate a group of skiers racing to the finish line.

Relay Competitions

A relay race consists of teams of three or four skiers, each skier of a team racing a prescribed course (this course is usually the same for all competitors) one after each other, until all team members have finished. Each skier may be required to use the same technique or the race may have mixed techniques. All skiers in the first leg start at the same time (i.e., a mass start) – see the above section on Mass Starts. After each skier completes his/her course, he/she tags off by touching the body of the next teammate. The first team to have all skiers complete the course wins. The start of these races is exciting, and because of the varying skill levels of the team members, the results are often unpredictable, providing high spectator interest.

Individual Sprint Competitions

A sprint competition is another form of cross country ski competition where competitors are ranked through a sprint qualification round that uses an interval start format. Those who advance are then required to ski a number of sprint elimination heats (depending on the number of competitors who qualify). These heats are normally comprised of quarterfinal heats, semi-final heats, a B final heat, and an A final heat. Each race in these heats is a mass start, and those who finish in front of the others in their heat advance to a next round of heats, the others drop out of the competition (thus the number of competitors advancing to the next round of heats is reduced). The winner is the fastest competitor in the final heat. The course is short, the racers ski head-to-head against others, so speed with some strategy is of the essence.

The sprint qualifying round is open to all competitors who wish to compete in the sprint event. It is held as an interval start race on the same course as the sprint competition will be held on, each entrant racing against the clock. The fastest competitors in this round are chosen to move on to the sprint competition; the others will no longer continue in the event but will be ranked on the final results list.

Usually the top 16 qualifiers are advanced to the first round of elimination heats. In the first round, there will be 4 heats each with 4 skiers. The groups are selected according to the rules set out to match competitors according to their finish in the qualifying round. For each group, the 4 competitors line up on the start line, are started all at once (a mass start), and race against each other along the course to the finish line. The first two finishers in the group move on to the next round (to ski in heats again against the winners of other heats) and the other competitors no longer continue in the event (but do have a rank on the final results). So after the quarterfinal round of heats, there will be 8 competitors who will move on to the next (semifinal) round, and 8 who will be dropped from the competition. After the semifinal round of heats, 4 competitors (the fastest 2 from each of the two semifinal heats) will move into an A-Final round, and 4 (the 2 slowest from the two semifinal heats) will move into a consolation final or B-Final round. The A-Final heat determines places 1-4 in the results; the B-Final heat determines places 5-8 in the results.

As competitors are dropped from the competition, they are placed in the results according to specific rules that refer to their performance in the qualifying round. In general, the worse they do, the lower their results position.

A course may be anywhere from 0.4 km to 1.4 km long, depending on the age/level of competition, with the longer distances being for the older and stronger skiers. However, the race distances should be no shorter than 0.8 km, which means that, if the course is only 0.4 km long, it should be skied twice each time. 2-lap courses are not recommended because of the significant logistical issues created, but 2 separate loops can be used to make the full course. It is suggested that the total climb should be no more than 15 m for up to a 0.5 km lap, 30 m for up to a 1.0 km lap, and 45 m for up to a 1.5 km lap.

The width of the trail should be between 6-10 metres, except at the start and finish where it may need to be wider, and on uphills where it should be at least 10 metres wide. It should have some straight stretches on it, some uphills, and some downhills. Generally, the wider the course, the better. The course must be sufficiently wide (see above) and without many sharp corners so that the conditions are equal for all skiers. However, part of the excitement of this type of competition is watching competitors going head-to-head against each other, and watching the strategies and abilities that emerge to pass each other, to navigate curves, to pass competitors on those curves, to pass competitors on the straightaways, etc.

Where there are straight parts on the course, corridors may be marked. The purpose of these corridors is to allow trailing skiers to pass any competitors in their heat if they can, i.e., it forces a leading skier to pick a corridor which he/she must then remain in to allow a trailing skier to try to pass. See also Rule 340.1.4

The stadium has to contain a start area for interval starts using an electronic gate in the qualification round, a start area that accommodates 4-6 racers in each heat of the sprints themselves, and 4 finish corridors. Therefore, it takes some planning. It is suggested that the stadium be set up to handle the sprint heats, and an additional start lane be provided for the qualifying round if space permits. One or two of the finish corridors can be used for the qualification round. See Chapter 8 –Stadium Layout and Grooming for the start area specifications and suggestions.

About 2-3 metres behind the start line, there is a "pre-start" line where the competitors in each heat are positioned before they are ordered to the start line. Behind the pre-start line, there needs to be some space to allow competitors to move about.

There should be at least 4 finish lanes in the finish corridor, with a minimum width of each lane being 3 metres for free technique sprints and 1.2 metres for classical technique sprints. They should be as long as possible (100+ metres) and straight. The best line entry should be to the center lanes.

There should be a heated room or tent near the stadium, where the competitors who move on to the next heat can wait for their next race. Depending on the number of competitors in the sprint round, it does not need to be too large. It does not need to hold waxing benches, etc., just the competitors who have to wait for their heats.

Qualification Round

This round is run to determine the rank by time of each skier for the sprint heats. It is run with interval starts, and is timed to one one-thousandth of a second (Rule 352.1.3), with the results shown to hundredths of a second. Therefore, the timing must be done using an electronic system (a start wand and a finish beam).

The course will be the one that will be used for the sprint heats. It is preferable in this round to not have much passing, so it is recommended that the start intervals be chosen so as to minimize it. However, passing is allowed just as in any normal individual race.

The start intervals may be 10, 15, 20, or 30 seconds but are normally 15 seconds. This will likely be determined as to whether there is TV coverage, how full one wants the course to be, and whether the course is 1 or 2 laps. At domestic events where we tend to have many categories of racers, it is necessary to run all categories that are skiing a particular distance one after the other (from fastest to slowest), then categories that are skiing another distance must be run one after the other, etc. This will minimize the closing off and opening up of parts of the course for the various distances that various categories must ski.

The start order of this round can be determined by draw, or by points, with the best skiers starting first and are followed by the slower ones. This will reduce the chance of overtaking.

Each race category that is having a sprint competition must have a qualification round. The category rounds should be run consecutively as a continuous race,. Short gaps can be set into the start sequence between categories to avoid chances of overtaking or to allow time to change the course.

The break between the end of the qualification round and the beginning of the sprint heats should be a minimum of an hour. This may not be hard to achieve, since there will likely be a few categories to run through the qualification round so the sprint rounds won't be able to start much earlier. The main reason for this gap is to allow for protests to be filed and ruled upon, to print the qualifying round official results list, to prepare the start sheets for the quarter final of heats, and to allow the re-issuance of bibs (highly recommended) for the sprint heats. Also, the competitors moving into the sprint rounds need a rest before starting the head-to-head racing. The qualification round is quite taxing since each competitor must ski as fast as possible throughout the whole course if they are going to have a chance to qualify for the sprint rounds. However, the time between the qualification round and the sprint heats round must not drag or skiers may have to go through their warm-up preparations again.

After the qualifying round has been run, there should be a collection of the bibs and a re-issuance for the sprint heats with the numbers somehow reflecting each person's ranking in the qualifying round (i.e., the first place person would receive bib #1, the second place finisher would receive bib #2, etc.). With a number of categories, the following bib assignment is suggested (where the top 16 skiers move on to the heats): the men could be #1 - #16, the women could be #21 - #36, the Junior Men could be #41 - #56, the Junior Women could be #61 - #76, etc. (Where more skiers move on to the heats, then the bib number allocations will need to be adjusted.) This way, within a category, everyone can tell the competitors' rankings from the qualification round. This would indicate who has the first and subsequent choices of start lanes in the quarter final (the lowest number or fastest qualifier gets first choice, etc.); however, for the second and final rounds, then the results and new start lists for the starts would have to indicate it. This assignment also lets the spectators know the rankings of everyone from the qualifying round, so they can keep track of how racers are doing in each of the heats and rounds.

If possible, the athletes should also wear stick-on bibs on the legs or arms on the photo finish side of the body. This would great assist any video work that is taking place and would help in identifying racers crossing the finish line.

Sprint Elimination Heats

Following the qualification round a specific number of competitors are eligible to continue based on the selected format for the elimination heats. A series of heats, typically Quarter Finals, Semi Finals and Finals (A & B) provide a sequenced set of head-to-head sprints that allow the fastest to advance while the slowest get dropped. Different systems could be used for different age categories at the same sprint event but that would add to the complexity and perhaps push the results software beyond its design, therefore it may be best to have one format used as much as possible within a single. The elimination heat formats are chosen based on how many competitors are to advance from the qualification round, Sprinting as a race format is pretty young and at the moment there are essentially 2 systems emerging for the elimination heats. Each has considerable degrees of flexibility to accommodate a range of numbers of the quarter finalists. Rule 360.3 should be referenced for the finer details of these formats and distributions, however a brief overview follows.

The newest format (6Q-6S-6F) is designed to have 30 competitors advance to the quarter finals. With 2 Semi Finals of 6 and A & B Finals of 6. The process of elimination is illustrated below in Table A

TABLE A Quarter Finals with 6 competitors in 5 heats, maximum 30 advance

Assigned to heats	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**
Distribution 1-20	1	4	5	2	3
	10	7	6	9	8
	11	14	15	12	13
	20	17	16	19	18
Distribution 21-25	21	24	25	22	23
Distribution 26-30	30	27	26	29	28

Table A Continued

Semi Finals (12)		Finals (6 + 6)	
S1	S2	B Final	A Final

Q1 #1	Q4 #1	S1 #4	S1 #1
Q1 #2	Q4 #2	S2 #4	S2 #1
Q2 #1	Q5 #1	S1 #5	S1 #2
Q2 #2	Q5 #2	S2 #5	S2 #2
Q3 #2	Q3 #1	S1#6	S1#3
R3-1*	R3-2*	S2#6	S2#3

The 6th position in the semi-final heats are assigned from the 3rd ranked competitors in all the quarter final heats. The fastest qualifier Q-R3-1 goes to the first semi-final heat S1 and the second best Q-R3-2 is assigned to S2.

The 6-5-4 format can accommodate fewer than 30 competitors advancing to the quarter finals. As low as 20 will still provide a useful competition format but below that number the 4Q-4S-4F is preferable.

The most common format until 2005 was the 4Q-4S-4F model which was oringinally designed to allow 16 competitiors to advance to the quarter finals. This distribution is illustrated below in Table B.

TABLE B Quarter Finals using 4 heats, maximum 24 competitors				
Assigned to Heats	**Q1**	**Q2**	**Q3**	**Q4**
Distribution 1-16	1	4	2	3
	8	5	7	6
	9	12	10	11
	16	13	15	14
Extended Distribution 17-20	17	20	18	19
Extended Distribution 21-24	24	21	23	22

TABLE B continued			
Semi Finals (8)		Finals (4 + 4)	
S1	S2	B Final	A Final
Q1 #1	Q3 #1	S1 #3	S1 #1
Q1 #2	Q3 #2	S1 #4	S1 #2
Q2 #1	Q4 #1	S2 #3	S2 #1
Q2 #2	Q4 #2	S2 #4	S2 #2

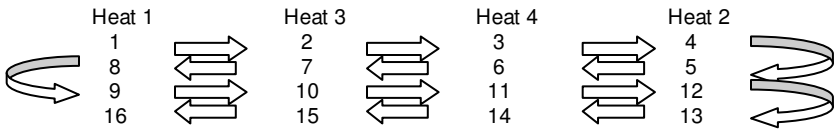
This 4Q-4S-4F format can also be extended beyond 16 as illustrated, however exceeding 24 is not recommended due to course congestion and high risk of obstruction.

In the past there have been situations requiring up to 32 competitors to advance from the qualification round. The optimal solution for this wqs to create an ‘eighth final” and drop the B-Final as a system that follows the same principles as above. It would become a 4E-4F-4S-4F system. With the emergence of the 6Q-6S-6F that accepts 30 into the quarter finals this 4E-4Q-4S-4F concept should be less likely to be used and it will not be detailed here.

In both the above systems it should be noted that the distribution puts the fastest sprinters in heats with slower sprinters thus giving them am “earned advantage” to make it on to the next round of heats. The principle of this distribution is illustrated for the 4Q-4S-4F format in Table C below, note the order of the heats is not in a normal numeric sequence, the same principle applies to the 6Q-5S-4F format.

Table C

4 competitors / heat



Again using the 4Q-4S-4F format the following diagram shows the flow of competitor movement as they advance fromm one set of heats to the nbext as defined above in Table B above. The same principles apply for the 6Q-5S-4F format.Now that we have the competitors into heats, then the order of the heats is as follows:

	Quarter Finals	Semi Finals	Finals
Heat #1	1	<u>Heat #5</u>	
	8	Top 2 Winners	
	9	of heat #1	**<u>B-Finals</u>**
	16		The 3rd and 4th

		plus	place finishers
Heat #2	4		from Heat #5
	5	Top 2 Winners	and Heat #6
	12	of heat #2	(determines places
	13		5-8 in results)
Heat #3	2	Heat #6	
	7	Top 2 Winners	**A-Finals**
	10	of heat #3	The 1st and 2nd
	15		place finishers
		plus	from Heat #5
Heat #4	3		and heat #6
	6	Top 2 Winners	(determines places
	11	of heat #4	1-4 in results)
	14		

Looking carefully at the above schedule, one can see that the top half of the schedule competes within itself to produce the fastest two competitors, and the bottom half of the schedule competes within itself to produce the fastest two competitors, which results in a "final 4" to compete for the first 4 places in the sprint A-Finals event. As a result, # 1 does not meet to challenge # 2 until the finals. And if the qualification round actually resulted in ranking the fastest top 16 racers that day, then in theory, # 1 and # 2 should survive to race in the A-Finals, and #3 and #4 should also survive to race in the A-Finals; and #5, #6, #7, and #8 should also survive to race in the B-Finals. However, in head-to-head racing, lower qualifying racers often find the incentive to ski faster and so advance to the finals, while faster qualifying racers get knocked out early in the competition.

At sprint competitions, there is no ski marking (Rule 342.1.3). The only requirement is that the skis be of legal length (according to the FIS Specifications for Competition Equipment 2002/2003, the minimum ski length must be the height of the skier minus 100 mm).

When the first 4 competitors enter the starting area for the first round of heats, the person with the best qualifying position gets their choice of start lanes; the second best qualifier in this heat gets the next choice, and so on, until the 4 lanes are selected. The start sheet for each round and heat should indicate which competitor has which choice so that the Assistant Start does not have to figure this out at the line. If bibs are reissued for the sprint rounds, then the lane choices are made in ascending order of bib numbers (but this only hold for the quarterfinal round).

For the second heats round, the rankings will be done based on each competitor's finish in the previous round, and where there is a tie (e.g., the 2 first-place finishers), the qualification placing will determine who chooses first (for the 2 second-place finishers, the qualifying placing will determine who chooses first between them). For the final heats round, the starting positions will be chosen according to the ranking from the previous round, and then by the qualifying times. (See rule 360.4.1)

For each heat, the racers must be called, one at a time (with the first racer being the one who has the first choice of start lanes and the second racer being the one who has the second choice of start lanes, etc.) to the "pre-start" line where each will occupy the lane that he/she has chosen, where instructions are given as to what the starter will say to get the racers ready to start, what the start signal will be, and to answer any questions that arise at the moment. Once the Starter is ready to start the heat, he/she will call to the racers to move to the start line, and start them. If there is a false start, the Starter will signal to the False Start Controller, who will in turn step out on to the course, flag the racers to stop, and return them to the start line, where the procedures will be repeated fairly. It is imperative that no one "jump the gun", but it is also imperative that the starter not hold them too long in the ready position, or get into a cadence that is so predictable so that many racers can anticipate the start signal.

While the Starter has the racers under the starting procedure, the Assistant Starter should note/verify the starting lane for each bib number on the start sheet. This can be a double check in the results area that there were no lane problems at the start, in case of any later protest or appeal.

The start of each sprint heat should begin approximately 3-5 minutes following the start of the last one. The determination of this is often made depending on the course (its length and the time required to get around it) and the site where it is held, and whether or not there is TV coverage. Often, the TV staff will wish to have one heat finished before the next one begins, perhaps even to have 30 seconds with each winner for their comments. However, it is also normal for a heat to be started before the previous one has come to the finish line. It is also suggested that the start not coincide with a finish, as there is often too much noise at the finish for starting competitors to concentrate on starting and to hear the "Go" command; a restart because of lack of hearing due to spectator noise should not occur. This competition is full of action, and we don't want to have large gaps of non-action that will not keep the interest of the spectators and teams high.

If there is a men's and a ladies' competition at the same site, the starting order should be:

Qualification women	–	Qualification men		
Quarter-final women	–	Quarter-final men		
Semi-final women		–	Semi-final men	
B-final women		–	A-final women	
B-final men		–	A-final men	

The sprint race format will produce a great deal of excitement for both officials and spectators alike. It is a format that spectators can keep track of racers and their positions fairly easily and so they will be very excited when the racers approach the finish line. However, to ensure a fair finish, a number of aspects must be done correctly and well by the finish officials.

There must be at least 2 finish teams, each on different sides of the finish corridor, who must agree immediately on the finish order of each heat. Since sprint heats are not timed, a competitor's placing in the final results has to be determined by other means. In general, it is determined as to whether he/she moves on to the next heat round, or does not. Remember that a competitor needs to ski only fast enough to be eligible to move on to the next round of heats; whether the competitor wishes to be first or second depends on the worth of the advantages for finishing in these positions. If the competitors against which he/she races is not very fast, then it might be possible to only ski at half speed to finish in a position to move on, thus saving energy for the more important later sprint heats. On the

other hand, the competition might be quite high, and a great deal of effort and tactical thought might have to be expended just to move on.

After the qualification round, each competitor must ski the entire course in each heat for which he qualifies, in order to be ranked. This means that, if for some reason a competitor feels that he has no competition in his heat, he must still ski the course for that heat in order to qualify to move on to the next round and to have a ranking. It also means that, if a skier believes that there is no hope of advancing to the next round either because he falls or his competition is so good and is well ahead of him on the course, he must ski the whole course anyway if he wants to be ranked in the official results; if he drops out, he will be listed as DNF and ranked at the end of the results (not at the end of the top 15!). Of course, any competitor who leaves a race because of injury will be ranked DNF.

As for the final results, those competitors who do not make the cutoff to race in the sprint rounds are given their places that they earned in the qualification round. From the first round of the sprint heats, the 8 skiers who do not advance to the next round are ranked in positions 9 to 16. More specifically, those who finished their quarterfinal heat in 4th place will be ranked in 13th-16th position based on their respective ranking in the qualifying round; those who finished their quarterfinal heat in 3rd place will be ranked in 9th-12th position based on their respective ranking in the qualifying round.

Those who moved on to the semifinals will either move on to the A-Finals or the B-Finals. Those who finish 3rd and 4th in the semifinals will move into the B-Finals heat, and their place on the official results list will be determined based on their order of finish in this B-Final. Those who finish 1st and 2nd in the semifinals will move into the A-Finals heat, and their place on the official results list will be determined based on their order of finish in this A-Final. So, the first 4 positions in the results are determined by the order of finish in the A-Final, the 5-8th positions in the results are determined by the order of finish in the B-Finals, the 9-16th positions in the results are determined by the respective positions in the qualifying round of those competitors who do not race past the quarterfinals, and the rest are given their respective positions as earned in their qualifying round.

As each sprint heat is run and the results determined, this information should be posted immediately on a results board. Often it is first recorded by hand on pre-printed sheets that are ready to accept this data; possibly later on, a full results list showing all the results from each sprint round may also be posted. By posting results as quickly as possible, it allows competitors and coaches to check them and ask for verification if they think that they are not correct. In the vast majority of cases, the athletes know how they finished, so questions from them should be taken seriously and checked.

To facilitate the posting of results, the results from each sprint heat should be brought from the finish line to the Chief of Results, who should verify that these are as correct as possible. Then a copy should be taken to the Results Board for posting. This allows competitors and spectators to keep up-to-date on the action. Obviously, the results should be in large enough print to allow reading from a distance.

Jury

The Jury is composed under Rule 303.1.2 (for Canadian Championships) and Rule 303.1.3 (CCC sanctioned events). Due to the timeline pressure of running successive heats, it is not possible to allow protests during the heats. Protests will only be accepted after the finals (as it is in normal competitions). This implies that, as in all sporting events, trained officials (referees) make the difficult calls to the best of their ability and within the physical restrictions of the venue. So the TD and the Jury will call it the way they see it. The fact that we already accept official video footage of incidents out on the course is more than is done in some other sports. That process definitely comes at great expense in terms of the time delays and infrastructure needs. We must accept that there will be differences of opinion on judgment situations but that is part of sport and that is why officials' training is extremely important for some of the key positions.

During the sprint rounds, it is recommended that the members of the Jury, other than the TD, be positioned on the course in what might be considered potential places where infractions might occur. In particular, the main infraction that is likely to occur is obstruction, because of the tightness of the race, the shortness of the course, and possibly the need to pass competitors during a heat to have a chance of moving on to the next heat round.

The current trend for dealing with competitor behaviour in sprint competitions was reviewed by international TDs in the spring of 2002. The document "TD Operational Guidelines for Sprints" implies that, although obstruction and interference may occur, it is not always intentional. Where it is clearly intentional, then a DSQ should result. Only in very rare circumstances will the skier who was obstructed be given the chance to advance to the next round, as this act penalizes those who qualified to be there by having an extra body to contend with on the course and at the finish. Other sanctions other than DSQ can be used individually or in combination to punish poor behaviour. There is now more variety and degree of severity available than in previous years.

Team Sprint Competitions

This is a competition in which teams of 2 persons each sprint against other teams, with the best 5 from each of the two semifinal heats move on to the finals. The first member of each team starts against the first members of the other teams. These first members then tag off in an exchange zone to their second member, who then skis the course. Then the second members tag off to the first members, who, after skiing the course again, tag off to the second member again, and so on until each member of a team has skied the course 3 times. For each of the two semifinal heats, the top 5 teams move on to the finals.

Rule 361.2.1 states that "The number of teams in one semi-final heat or in the final should not exceed 20." Since this type of race is a newly emerging form and the rules have not quite caught up with the reality of running this format, it is recommended that Race Committees plan, for the time being, to have only up to 10 teams in the finals.

The starting order is determined through a ranking of each team. In FIS competitions, the team with the lowest (best) combined FIS sprint points starts as number 1 team; the team with the second lowest (second best) FIS sprint points starts as number 2 team, and so on. In the event that 2 teams have equal points, the team with the lowest point-holder starts ahead of the other. If the lowest points are equal, the starting order will be drawn by lot. If any team changes its composition after declaring it at least 3 hours before the Team Captains' Meeting, then they will start at the back of the starting order at the end of the field. If more than one team is placed at the back, then their start order (at the back) will be the same as their original starting order. The original start positions will be left empty.

The start is done using a half chevron (left side or right side) mass start, with 3 to 6 parallel tracks, 1.5 m. apart, that are straight for approximately 10 meters past the first starting position. The lanes are numbered from left to right or right to left, beginning at #1 (this is different from the arc and chevron mass start lanes where lane #1 is the middle lane). The starter for team #1 starts in lane #1 on the starting line; the starter for team #2 starts in lane #2 two to three meters behind the starting line, and so on. The starters may not change lanes until they have crossed the starting line.

Any team that is lapped by another team must abandon the race but will be ranked in the results.

The first teams not to advance to the finals will be ranked immediately after the ranked teams in the finals; the second teams not to advance will then be ranked, and so on. All teams in the final heat will be ranked according to the order that they finished in the final heat. For example, if 5 teams from each of the semifinal heats move on to the finals, then the teams that came in 6th in each heat will be given the ranks 11th and 12th according to their times in their respective heats, the teams that came in 7th in each heat will be given the ranks 13th and 14th according to their times in their respective heats, and so on. Of course, the first 10 positions will be awarded to the teams in the final heat according to the order that they finished.

The course will be like the course for an individual sprint, about 8-10 meters wide, and at least 10 meters wide on any uphill to accommodate the extra space require to skate uphill. Sections of the course must be designed straight, wide, and long enough to make overtaking possible. The exchange zone, at least 15 meters wide and 45 meters long and located after the finish line, should be well situated and prepared so that the speed of the competitors is slow enough to permit a clean exchange. Ski preparation pits or stalls must also be provided close to the exchange zone since the competitors and/or a coach are allowed to work on their skis during the semifinal and final heats. There must be a minimum of 3 corridors to the finish, 4 would be better.

Popular Cross-Country Competitions (Loppets)

Popular cross-country competitions are organized for the enjoyment of all participating competitors. Because these competitions involve competitors with a wide range of experience and ability, good sportsmanship and courtesy toward other competitors is essential. This type of competition is usually held over a long distance (generally 30 km up to 90 km or so in some competitions). It is usually held over a large loop of ski trails, where competitors leave from a start area using the mass start method, ski the course, and then finally return to the finish area in the same location as the start. However, in some cases, PCCC are held on a course that starts in one location and ends in another one, many kilometers from the start. For world class competitors, these competitions may take from about 2.5 hours to over 6 hours to complete; for competitors of lesser ability, it may take almost a day to complete. There is usually a couple of set tracks around the whole course to accommodate any classical technique competitors, and there will be a number of feed stations along the course to provide drinks and sometimes something to eat for the competitors (the rules state that there should be a feeding station approximately every 10 km., but in easy terrain, the distance may be increased, and in difficult terrain, the distance may be shortened). Where the competition is longer than 50 km, different types of drink and other appropriate nourishment should be provided.

Since there are often skiers with different abilities, the course layout should accommodate all levels of competitors from recreational racers to elite athletes. There is a timing system that will be operating, so each competitor will receive an elapsed time that it took him/her to complete the course.

Course Design and Homologation

Course design and homologation are included in this manual to outline for event organizers the philosophy and attitude our organization is trying to achieve in setting a competition site standard for the sport of cross country skiing. Homologation aids in this process by evaluating a given trail against a standard set by CCC for that level of competition. There is no attempt to provide a complete manual on either of these subjects as Cross Country Canada has a complete course and manual on “Cross Country Skiing Course Design” and has established homologation standards along with a system to evaluate sites. Detailed information on both subjects should be sought through CCC or through your divisional Cross Country office.

Homologation (from the verb homologate, meaning to approve or confirm officially) is the certification of a product or specification to indicate that it meets regulatory standards. So, in cross country skiing, a ski course is homologated to ensure that it meets the course design standards that the governing body has set.

Course Design

The design of cross country ski trails for competition and recreation purposes has become considerably more complex during the last 10 to 15 years. This change has been brought about, in part, by improved grooming and tracksetting equipment which is now available. In response to improved courses has come improved skiing equipment to take advantage of these trails and to allow for more glide, speed, and excitement in cross country skiing. An added change to cross country skiing is that the sport has developed into three broad but distinct types of skiing.

Back Country Touring

Skiing is done on non-groomed hiking trails, cut lines, forestry roads etc., where the skier is going for an outdoor adventure tour or to travel to a winter cabin or campsite. This type of skiing almost always uses the classic technique.

Recreational Track Skiing

Skiing is done on designed and groomed trails in a given area often associated with a park, a club, or a lodge. Skiers use light touring or competition equipment and either the classic or free technique style for exercise, training or just plain fun on skis.

Competition Skiing

Skiing is done on designed and groomed trails at an appropriate site, which may also be a recreational site. Skiers compete to see who is fastest over a given distance using a specified technique. There are two types of competition skiing: the Olympic style is a high performance competition in which skiers are started using a variety of start techniques and compete one on one to see who is fastest. The Popular Cross-Country Ski Competition (a loppet, or citizen style competition) involves a mass start. In loppets, competitors participate to see how well they race against their peers over what is frequently a long distance.

Courses designed for Olympic style competitions lead the way in the development of new approaches to skiing and to course design philosophy. Today, competition sites are being designed to increase the exposure of the competitors during the race to spectators and officials. The added exposure to race supporters allows the spectators better access to the race course where they can cheer for the racers and be much more in touch with the progress of the race. Racers are encouraged by this support and the increased exposure is increasing interest and enjoyment for the supporters of cross country ski racing. In order that race sites can provide for this additional exposure, they must be designed with several short looping courses of varying lengths and difficulty that enter and leave the stadium a number of times (exposure) rather than a few courses of longer lengths where skiers are seldom seen in the stadium area. The stadium area must be designed with a "thru" track as well as the traditional start /finish area to allow the skiers to ski through the stadium as part of the race. The stadium area and on course areas must have spectator viewing sites to allow viewing of the races.

The course, along with the stadium trails, is the field of play for a cross country ski race, and is of prime consideration in the planning of any cross country event. The course should be designed to run through hilly terrain which may be covered with trees and bush to provide protection for the trails from snow loss by wind and sunshine, although courses that are laid out in a treeless valley allow spectators to see the complete race from the stadium area. The course must be laid out so as to be fun to ski yet must be a technical, tactical and physical test of the competitors’ qualifications. The degree of difficulty should be in accordance with the level of competition. The course should be laid out as naturally as possible, with undulating sections and climbs to avoid monotony.

Rhythm should be broken as little as possible by sharp changes in direction or sudden steep climbs. The downhill sections should be laid out so that they can be negotiated without danger, even on a fast or icy track. The course must be prepared to such a width that the competitors can run safely and pass each other with no obstructions.

The degree of difficulty for race courses is laid down for the various standard race distances and age classes by CCCs’ or FIS’ “homologation standards”. At present only a few courses in Canada are homologated; however, in the future, courses may have to be homologated in order to be eligible to hold major competitions. Master skiers and young people competing on courses designed and built to full CCC/FIS senior level standards are finding the physical demand of some courses too difficult. In addition there is concern that young people racing on a demanding course may suffer burn out and experience difficulty when they reach senior age levels. Technical specifications for younger age classes are currently specified in CCC’s rule book.

Loppet type competition courses are well-established in Canada and vary considerably in the degree of difficulty and the length of course used. Generally the courses are located in large parks or link a series of trails between two towns or centers to provide a touring type experience for the competition. The courses are not as technically demanding as are Olympic type courses but they do frequently have a high endurance component in their design. Loppets are usually mass start events and normally have a large number of entrants. Therefore, wide start areas with long open areas immediately after the start area are required to allow competitors to vie for position

before skiing onto the actual course. Some courses have a number of tracks for several kilometres to allow further sorting of the competitors.

Recreational track skiing venues are often Olympic style competition sites as well. The combination of two types of skiing to utilize such facilities makes good economic sense. However; problems can arise if a competition site is designed only for high level competition. The demands of the long uphill and the speed of the steep downhill sections are often too difficult for recreational skiers. This creates a need for course designers to include less difficult trails for the recreational skier and younger age class competitor in their design. The design changes required to increase the utilization of competition sites for recreation purposes need not be difficult. Sometimes a course can be rendered appropriate for all competitors by simply offering a cutoff from a difficult section. Course designers must be prepared to be creative and flexible.

Homologation

Historical Perspective

Homologation has been part of ski competitions for many years. In the beginning, the process of "certifying a standard" was born out of a need for safety. That consideration led to the determination of "difficulty ratings" which, in turn led to course design criteria. Skiers in other ski disciplines were travelling at much higher speeds and as such, were exposed to high risk. On the other hand, cross country skiing was breaking trail through woodlands with each new snowfall, making sure speeds were never too high. As stated earlier, all this has changed in the last few years and cross country skiers now ski on hard packed tracks at high speeds and on downhill sections where they assume equally as high risks as their counterparts. Homologation has become a needed process for cross country skiing. It will ensure a continued growth in the sport by guaranteeing a continual challenge to all skiers against which they can test their skills in a safe yet exciting environment.

Philosophy of Homologation

Homologation is a "**system of evaluation/certification"** that is designed to guide the development and upgrading of cross country race courses. It is not just a set of numbers but is a process of certification that provides a forum for constructive discussion between organizers, designers and inspectors in the area of course design.

The homologation evaluation process includes the course, the stadium and the infrastructure installations. The resulting certification represents the appropriate level sport governing body "stamp of approval" that the site is physically capable of accommodating the desired level of competition. In addition, homologation helps satisfy the need for course maps that have accurate distances and profiles on them, and that must be published in race invitations and made available to all concerned at the event. In Canada, homologation of a site is done by an appointed and approved Cross Country Canada inspector.

When developing a new competition site, one has an opportunity to design to homologation standards from the beginning. The sequence of events should be that the course designer designs the courses and layouts, then the homologator evaluates it. Often, the pair works together as the course is being designed, so that changes can be made where any courses would not meet homologation standards. Where new courses are being designed, attention should be given to providing trails that service both the elite and novice racers, i.e., multiple use trails. Once it appears that the design would meet standards, then trails/courses can be cut and the stadium prepared so that the two entities fit together. Stadiums must fit the trails, i.e., trails should enter and exit the stadium so as to minimize both cross-overs and athlete choices of which trails to choose during competition events. Too often, the stadium is designed first and then the trail system is fitted to it; doing this can lead to problems of cross-overs, especially when multi-loop trails are to be used as is currently the trend in modern race formats.

Existing sites that are evaluated for homologation certification will usually undergo some design changes to improve their standards.

Homologation Policy for Cross Country Canada

The following competitions require that their course be homologated:

Junior Canadian Championships
Senior Canadian Championships
North American Championships
Canada Winter Games

The standards against which a course is homologated are set out in the CCC Rules and Regulations, sections 311-313. More specifically, courses must be designed to accommodate maximum distances for certain age groups (e.g., in Canada, the maximum competition distance for a Juvenile Girl is 7.5 km, while for a Senior man it is 50 km). The rules also lay out the degree of difficulty that a course must not exceed for each age group; this is done by setting out maximums in Height Difference (the maximum allowable difference in height between the lowest and highest points of a competiion course), the Maximum Climb (the maximum allowable height of a single climb), and the maximum Total Climb of the course (the maximum of the total of all climbs on the course). The homologation standards also set out the description of uphills, where major uphills, short uphills, and steep uphills are defined (see Rule 313.2.2).

Section 313.3 sets out the norms for course profiles, setting out the definitions and limits for major uphills, short uphills, steep uphills, guidelines for uphill design, description of undulating terrain, and guidelines for planning a competition distance. Quite frankly, the specifications are quite interesting, and, after reading them, one acquires a respect for those who set out the standards for a cross country ski course that respects the aims of safety, challenge, and competitiveness.

From the homologation data, a final course map can be produced, that shows the profile of the uphills and downhills along the course, and also sets out the actual distance of the course, all with a a high accuracy rating.

Organizers who wish to design a course that could be used for various levels of competition should contact the CCC office to arrange a visit and meeting with an homologation inspector before actually carving any trails and stadium out of an area. Producing

trails without the help of homologators may result in a set of trails that will only support local low-level races and not high level races such as Canadian Championships, North American Cup competitions, and even World Cup competitions.

Blank

Course Preparation and Tracksetting

Snow Physics

The key to setting good tracks and fast smooth skating lanes lies in the snow grooming which is done before tracksetting. Grooming is the working or reworking of snow using special vehicles and attached equipment in order to provide consistent skiing conditions.

The objective in grooming is to create a smooth level trail bed that is firm enough to support the skiers and their poling and at the same time to have enough loose workable snow to mould tracks and shape skating surfaces.

Why Groom Your Ski Trails

- **Grooming helps to make a skier's visit or race fun from start to end**
- **Grooming helps make a ski race fairer**
- **Grooming demonstrates that cross country skiing is not only good exercise but also fun and exciting.**
- **Grooming puts more glide in cross country skiing.**

There is an ongoing debate as to whether grooming is an art or a science. The fact is that the basic medium, snow, comes in a bewildering variety of states, and groomers, in their attempts to define scientifically what is still a very inexact art, have come up with as many definitions of snow types as have the Inuit. For this manual the basic snow terminology, snow conditions, grooming and tracksetting processes will be presented. For a more detailed discussion of snow physics, grooming and tracksetting please refer to the Cross Country Canada Trail Grooming and Tracksetting Manual.

Snow

A knowledge of how snow is altered due to changes in temperature will allow you to better understand what happens when you groom trails in different conditions. It will help you to:

pack the snow to achieve suitable density for a variety of different users

provide the same track conditions for all skiers in a competitive event

extend your skiing season by working the snow the right amount.

Heat Gain and Loss In The Snow Layer

Temperature Gradient

The temperature gradient is the difference in temperature between the snow surface and the ground expressed in terms of degrees Celsius per meter of depth. For example, consider one meter of snow lying on a ground surface the temperature of which is zero degrees Celsius. If the air temperature drops to minus 20 degrees Celsius there is a difference of 20 degree Celsius in one meter of snow depth, or 20 degree Celsius per meter. Because the temperature gradient influences the movement of water molecules within the snow pack, it has a significant effect on changes in snow structure within the snow pack. The physical processes which cause changes at and beneath the surface of the snow are driven by temperature gradient or the lack thereof and by transfer of heat to the snowpack.

For the purpose of grooming, the interfaces which most concern us are:

the ground and snow surface

the air just above the snow surface and the snow surface

the snow surface and the snow one to two centimeters below the snow surface

Factors which affect the above interfaces are:

Incoming Ultra-violet Radiation (sunlight)

This process will heat up the snow and cause melting within the top few centimeters of the snowpack. The amount of warming depends upon the albedo (reflectivity) of the snow, the amount of impurities (dirt) mixed with the snow, and the granular structure of the surface layers.

Machine groomed snow is not highly reflective and therefore a large percentage of the incoming solar radiation is absorbed which may create a significant temperature gradient within the top two to three centimeters or may cause melting of the surface layers.

Outgoing Infra-red Radiation

This cools the snow surface. In clear conditions, in midwinter, outgoing infra-red radiation may cool the snow surface at the same time as incoming radiation warms the snow beneath the surface, creating or enhancing a significant temperature gradient. During a clear cold night, a crystalline deposit of surface hoar may form on the snow surface.

Rain

Rain transfers heat directly to the snow. It may remain as liquid water in the snowpack.

Wind

A warm moist wind results in heat being transferred to the snowpack. A dry wind, while causing the snow to evaporate at a high rate, transfers little heat into the snowpack.

Metamorphism

Process of Rounding

Snow begins to change as soon as it reaches the ground (or at higher temperatures, in the air before it reaches the ground). The rate at which it changes depends upon the temperature. Close to zero degrees Celsius the change is rapid. Below about -20 degrees Celsius there is little discernable change from day to day.

When outside temperatures are moderate or when the snowpack is deep, the temperature gradients within the snowpack will be small. Snow will then change by a process known as “rounding”. The natural process of minimizing surface area breaks down the intricate crystalline snow structure of the ice crystals into smaller, more rounded ice grains. At the same time, because of the reduction in volume of the snow particles, the snowpack consolidates and settles. When snow is first deposited it is light and fluffy, the crystal branches interlocking to form a cohesive mass. After a period of time, water molecules are transferred by vapour movement from the extremities to the body of the crystal. Eventually, the ice grains lose all sign of their previous crystalline structure and become more and more rounded. The larger ice grains grow at the expense of the smaller particles resulting in a uniformity of size within each snow layer.

How Snow Gains Strength and Density

You have probably noticed that soft new snow, when packed, will harden overnight. The process where snow gains strength by the joining together of ice grains, is called Sintering.

In the case of the ski trail, the snow crystals or ice grains are forced close together by the mechanical compaction of grooming equipment, at which time energy is introduced into the snow by the mechanical action, resulting in a partial melt, and thus increasing the density of the snow. As a result a transfer of water molecules, necks of ice form between adjacent grains, strengthening the snowpack. On re-warming, the necks between the ice grains will be reduced thereby weakening or destroying the bond between grains.

Importance of Density

If your trails are to withstand their intended use, you should pay attention to the density of the groomed snowpack. The following table gives typical snow densities and indicates suitable densities for various levels of use. Kilograms/cubic metre (Kg/m^3) is the usual measure of density.

• New Snow	150 - 200 Kg/m^3
• Wind packed snow	250 - 300 Kg/m^3
• Packed with snowmobile alone	300 - 350 Kg/m^3
• Support required for racing basket	>350 Kg/m^3
• Recreation trails (moderate use)	450 Kg/m^3
• Racing trails	500 Kg/m^3 or greater
• World Cup and higher events	540 - 560 Kg/m^3

Details on equipment and the process required to measure snow densities is available through your Cross Country division office or from Cross Country Canada.

The Melt-Freeze Process

When the sun is sufficiently strong to melt the top layers of the snowpack during the day, and when night-time temperatures fall below zero degrees Celsius, cycles of freezing and thawing will occur. In this process smaller grains will melt before larger ones. During the course of a number of melt-freeze cycles, larger grains will grow at the expense of smaller ones. The meltwater wetting the surface of these larger grains eventually re-freezes and firmly cements the grains together. Melt-freeze grains have a tendency to freeze together in clusters, leaving large pore spaces unless packing is done.

Types Of Snow

Falling or Newly Fallen Snow

In cold conditions (-One degree Celsius and lower): The snow will be low density, highly crystalline, possibly interlocking crystals, matting and building up on trees. The snow will be hard to pack if the new snow is allowed to get too deep. It packs well in 10-15 centimeters (four - six inches), layers at temperatures close to zero degrees Celsius, and becomes more difficult to pack as temperature decreases.

In warmer conditions (zero degrees Celsius and above): The snow will be wet and heavy with little remaining crystalline form. If accompanied by wind, the snow is plastered on trees, signs, buildings, etc. It packs easily into a hard, dense layer at temperatures close to freezing and may turn to slush at higher temperatures.

Partially settled Snow (Fresh Powder)

This type of snow has begun the rounding process and, if left alone, will settle and strengthen naturally over a period of time as pore spaces are reduced and sintering occurs Mechanical disturbances such as blading, tilling or packing will reduce the air spaces by pushing the ice grains closer together allowing better sintering. The snow, now “Machine Groomed Powder” becomes both denser and stronger.

Settled Snow

When snow is settled, the grain size becomes smaller and more uniform. Pore space decreases, sintering increases, and density increases. The ability of the snow to re-crystallize due to large temperature gradients, and hence loosen-up, is reduced due to small pore spaces. In continental snow climates such as Alberta and the Rockies, Saskatchewan, Manitoba, Yukon, and North West Territories, a well packed trail system will not present re-crystallization problems. The snow should be packed early and well.

Dry Granular Snow

This type of snow may present itself in three ways:

faceted surface grains. This is unlikely to occur at low elevations of most Cross Country ski areas.

faceted grains in bottom of snowpack. This is common in continental snow climates, but will not be a problem if trails are well packed.

re-frozen melt-freeze grains. These are enlarged grains produced by several cycles of melting and freezing, often a function of over-grooming the same snow pack. They may present as a loose surface layer, but more likely will be frozen clusters which will break up as temperature rises and skier traffic increases. When partial melting has occurred (free water content less than eight percent) it is known as “Corn Snow". Excessive grooming will tend to loosen and enlarge these grains.

Surface layers of refrozen melt-freeze grains (or sugar snow) can be reconstituted (strengthened) in two ways:

It can be mixed with fresh snow, either new snowfall or old dry snow from layers beneath the granular layer.

A power tiller or, for snowmobile groomers, a compaction drag may be used to mill the snow. This reduces the size of the particles, allowing partial melting and sintering to take place.

If melt-freeze cycles continue, the snow will eventually become sloppier, and renovation will be needed. There is little you can do at this stage to alter the physical characteristics of the snow grains. Tilling will help to dry out the snow by exposing more surface area to evaporation. Wind will speed up this process.

Wet Snow

There is an old field "squeeze" test for the definition of snow moisture levels. A handful of snow is scooped up and squeezed in a gloved hand. Dry snow will crumble when released. Moist snow will compact to form a snowball, and water can be squeezed out of a handful of wet snow.

Wet snow creates special problems for groomers. It should **never** be packed or groomed if there is any chance that temperatures will drop later in the day or night. Wet snow which is compacted and later frozen can become a "bullet proof'" groomer's nightmare.

Wet snow can sometimes be broken up into coarse chunks with a front renovator or rotary hoe or tiller and left loose to aerate for several hours before further grooming. This will allow water to percolate downward and encourage evaporation through the increased surface area. Later, when temperatures have started to drop below freezing point, further renovation and tilling can refine the surface layers.

In wet conditions where there is no chance of freezing prior to a race, snow can again be coarsely renovated or tilled to promote drainage and aeration, but final grooming and tracksetting should be left until just before the race. It is normally difficult to till wet snow as it "balls up" in the tiller.

Basic Grooming

Although the discussion of Snow Physics indicates that snow grooming has a science base, it would be far too simple to describe it as a purely scientific activity. One could argue that there is as much art as there is science in the practice. It is certainly true that much can be learned by studying snow crystals and their change processes under a magnifying glass, but for most experienced groomers a few boot kicks in the trail snow and the weather report will often give them all the information they need for a good grooming job. So much of the work relies on the groomer's practical experience with their area, their knowledge of the local climate, and the site's microclimates. With this comes a sense of intuition that can't be described in any formal manual. This makes it very difficult for any individual to be a true grooming *guru*, or for any manual to be considered as *The Bible*. The following discussion is intended as a brief overview of basic grooming processes for race officials and others who are new to the field.

Grooming can be relatively simple or very complex depending on conditions, the desired end product and the time and equipment available. For simplicity, the whole grooming program can be broken down into several basic processes.

Packing

This is a season long process. Ideally, packing should be done with at least every six inches of new snow (with the understanding that this is not always possible when big dumps come). In low snow areas groomers will carefully pack every time more than 2 cm of snow accumulates to gradually build up a base.

Early season packing usually involves running over trail surfaces with light equipment meaning snowmobiles alone initially, followed by snowmobiles towing rollers or other compaction devices. Even high snow regions which normally groom trails with snowcats will find that snowmobile packing is essential until the initial base is set (this can range from 15 to 30 cm or 6 to 12 inches of packed snow depending on the smoothness of the ground surface).

End Result – An Increase in Snow Density

Snowmobile groomers may have to fall back on track packing with snowmobile only at later times in the season for big dumps of snow which would make towing any implements impossible, and even cat groomers will occasionally find track packing useful with unusually heavy snowfalls. But, normally packing will be done with implements.

Snowmobile groomers can pack with two basic types of equipment – rollers, or compaction pans/bars. Rollers offer the advantage of packing snow without dragging or displacement. They can, however, ice up in warm conditions, and working speed needs to be kept low to keep them from bouncing (creating washboard surfaces). Homebuilt rollers can be produced quite easily using various types of pipe, steel culvert, etc, but some of the most efficient units are produced by grooming suppliers such as YELLOWSTONE TRACKSETTING SYSTEMS, and TIDD TECH.

There are several compaction bar/pan devices available from equipment suppliers. The TIDD TECH *Trail Tenderizer* which has been around for more than a decade is a good example of a useful compaction pan when run with the front cutter teeth cranked up. Many groomers prefer compaction bars and pans to rollers for season long packing because they level and smooth the surfaces as they compact and they don't tend to ice up as readily in warm wet conditions. Working speeds still have to be kept low enough to prevent washboarding.

Compactor bars ("C-Bars") are available for larger snow vehicles. These bladelike bars mount at the rear of snowcats. Down pressure and blade trim (vertical angle) are all hydraulically controlled. "C-Bars" are particularly useful for early season packing (assuming a sub-base packed by smaller vehicles) where rocks, stumps, and other obstructions might still be hazards to power tillers, and they may be handy for later season mega –dumps which would clog tillers. Generally though, most cat groomers will routinely pack recurring snowfalls with tiller passes. If compactor bars aren't available particularly heavy snow dumps may have to be track packed before tilling.

Groomers often have little choice about timing for packing. Normally snow will pack and groom best in a relatively narrow temperature range between -10 and 0 degrees Celsius. Extremely cold dry snow (below -20 C) does not pack well, and as a general rule, all grooming of extremely warm snow (above 0 C) should be avoided. Warm wet snow can be a sticky frustrating mess and if followed by a cold spell the resulting icy surface can be dangerous. But, the pressures applied by an impatient skiing public or an upcoming race may force groomers to pack and groom in less than ideal conditions.

Surface Shaping

Most of the time, careful packing will leave trail surfaces smooth enough for tracksetting and skiing, but this isn't always the case. Packing can leave bumps and dips which should be flattened out. Skier traffic and repeated grooming passes can also gradually push snow to trail sides leaving a concave or dished surface. Periodically all of these irregularities should be flattened out, and snow may have to be moved back from trail sides to the middle. In the past, there has been a grooming theory that the ideal trail surface should be crowned (a convex surface higher in the middle than the sides). This would provide better snow depth in the middle where traffic would be highest. It would also make for more efficient ski skating (every skating thrust from the top of the crown results in a downhill glide) and it would make herringboning steep uphills easier for classical skiers since ski tips would not dig into higher side surfaces. A nice theory on paper - but in practice it has proven to be impractical. The excavation required to shave snow from trail sides to move it to the centre is very difficult to do with snowmobile equipment and in low snow regions the risk of digging up dirt and debris is much too high even if snowcats with skilled blade operators are available. The most practical aim for the majority of groomers is to maintain surfaces as flat and as smooth as possible.

For snowmobile groomers drag graders are the basic tool for surface shaping. These can range from home built devices like the old bed-spring drag to commercial units such as YELLOWSTONE TRACKSETTING SYSTEMS *Compaction Drag* or ADVANCE TRACKSETTING SYSTEMS *Renovating Leveller*. They can be used throughout the season to plane and flatten trails. Both the YELLOWSTONE *Compaction drag* and the *ADVANCE Leveller* are approx seven feet long (excluding the hitch). This seems to be a reasonable length for most snowmobile drag grader work. A number of ski and snowmobile clubs have been using longer bed graders (10-12 ft) originally built by BOMBARDIER and other makers for maintaining snowmobile trails. The extra length makes these very effective surface planers, but they can be brutes to tow in steep terrain and they will scrape high spots bare very quickly. In low snow country they have to be used with caution.

The most efficient tools for surface shaping are snowcat multidirectional front U-blades. U-blades can move massive amounts of snow and skilled operators can shape trails with near surgical precision. Again – as with long bed graders – the limiting factor is snow quantity. In most nordic trail systems outside of the heavy snow belts, operators will have relatively little chance to use the blades during regular grooming. Unless there is more than a foot of compacted snow on the trail surface, anything but the most conservative blade use will scrape snow down to the dirt, and dirt in trail snow packs is a nasty problem. Dirt and debris worked into a trail snowpack early in the winter can turn into a season long headache. Unless it is completely buried by a large dump (50 cm or more) regular grooming will continually work dirt up into the trail surface. Gravel and rock chips can foul expensive race waxes, or damage ski bases. More important to the groomer, the discoloration of the snow will cause rapid melt out patches in warm periods. In spite of this cautionary note, the front U-blade is an indispensable tool. It can flatten out and redistribute drifted snow; it can wing in snow from beside trails to fatten up thin spots (assuming that trail sides are relatively smooth and free from stumps, rocks, etc.). Unfortunately, as noted above, many groomers in low snow areas never have the opportunity to become skilful blade operators. For those who may wish to learn more about the art of blading, the best approach would be to arrange to ride along with an alpine groomer on a few shifts. Alpine groomers are the true masters of blade work.

Conditioning

Further snow conditioning processes will be required during a ski season. The following process definitions are somewhat arbitrary, and - obviously - there is considerable crossover between them.

Aging

This is a term used for a complex set of processes touched on in this chapter's earlier section on Snow Physics. Most types of fresh fallen snow require mechanical aging to turn them into suitable building materials for a ski trail surface. Cold dry snow is light and fluffy; it flows easily and resists compaction. Snow aging is a natural process, but mechanical action can speed it up to produce a consistent snow mass which can be shaped into firm tracks and skating surfaces.

The process is started by packing which reduces air spaces, forces snow crystals together, and promotes sintering. It is continued with the surface shaping which will further mill snow depending on the exact implements used. For most grooming operations packing and shaping will provide all of the aging necessary for good skiing. Groomers in low snow areas will rarely want to go further, because skiing traffic and subsequent grooming passes will harden trail surfaces surprisingly fast when regular snowfalls are a rare commodity. And re-grooming hardened old snow becomes increasingly difficult with each successive grooming shift.

There will be situations requiring additional aging passes. High level ski races require firm surfaces, and in deep snow country where snow comes every week, extra work will be necessary to produce hard fast skating surfaces. In addition to shaping surfaces, simple drag graders such as the YELLOWSTONE *Compaction Drag* mill snow quite effectively as the cutting blades move it inwards and then back out, creating high-speed snow crystal collisions. The friction of these collisions produces heat which promotes sintering and speeds up natural aging. Additional drag passes will gradually harden trail surfaces. Cat groomers have the most efficient aging implement, the power tiller, with its cutting teeth mounted on a shift spinning at 1000 rpm or more.

Mixing

This is another part of the conditioning process which can be considered separately, but which is obviously involved in several of the other conditioning stages (surface shaping, aging, renovation). New snow from surface layers can be mixed with older lower snow to produce an "aged" trail surface which will set up and withstand skier traffic much more readily than fresh snow alone. For an opposite effect - trail surfaces which have been turned to boiler plate or otherwise worn out by skier traffic, natural freeze-thaw cycles, or repeated grooming can be rejuvenated by being mixed with lower layers which have not been overused. Mixing is done with the same deep-cutting implements used in heavy renovation.

Renovation

This is a term for a series of processes whose objective is really the opposite to that of packing and aging. Snow which has been hardened excessively through a combination of skier traffic, grooming, and weather conditions must be loosened and converted back into a more powdery form before it can be reshaped into new tracks or a smoother more forgiving skate surface. Renovation may be required at different levels.

End Result – A Reduction in Snow Density

Surface Scarification

Skier traffic and weather conditions will scar up and glaze rail surfaces, but it may not always be necessary to do a deep renovation to buff them up enough for enjoyable skiing. This is true as long as tracks are still sound and icing is not too deep. Light surface scarification by snowmobile drags will touch up lightly glazed, rutted skate lanes. In low snow country especially, groomers can do much to save their snow packs by minimal use of more aggressive renovation. Many homebuilt drags such as the "Magic Carpet" (a piece of chain-link fence with 2 by 4's nailed across the top) or the "Step Tread" (three or four 4-6 ft wide expanded metal stair treads chained together) can scratch up and re-smooth surfaces enough to bring back pleasant skiing. A number of commercial implements will do the job much more efficiently. The levelling graders (YELLOWSTONE *Compaction Drag*, ADVANCE *Renovating Leveller*) can handle light surface scarification if weighted sufficiently. Another old standby for light surface scarification is the TIDD TECH *Trail Tenderizer* with its double front rows of cutting teeth.

In the past few years, the Swedish **JACA** skate surface *Renovator*, and –more recently- Yellowstone Track Systems *Ginzugroomer* and Tidd Tech's G-2 have added a whole new dimension to light equipment trail grooming. The JACA Renovator uses a horizontal cutter bar, while the *Ginzugroomer* and G-2 feature vertical knives . All use electric rams controlled by switches on the snowmobile to raise or lower cutter units. This means that the days of having to stop and get off the snowmobile to adjust depths are no more (being able to control cutting depths on the go reduces the risk of one of the snowmobile groomer's nastiest old bugbears - getting stuck on steep uphills). They allow snowmobile groomers to produce results as professional in appearance as those of any cat operator, but they do so without having to tear up surfaces to any depth. This can be particularly useful whenever quick touchup grooming is required during events (i.e., cleaning up a sprint course between rounds, or removing classical tracks before a following free technique race). In these situations using a cat would leave trail surfaces hopelessly soft.

Deep Renovation

Sooner or later deep renovation will be required. Old tracks which have become worn and icy, and trail surfaces turned hard and glazed by traffic and weather will need to be broken up and refined into snow soft enough to be moulded into new tracks and skate surfaces which allow ski edges to bite.

This can be one of the most challenging processes for groomers –especially for snowmobile groomers in low snow areas. Tools of agricultural origin (discers, harrows, rotary hoes) have been used to break up hard pack snow with mixed results. Most of these implement types tended to be too heavy and aggressive for dependable use behind snowmobiles. They were usually better suited for use behind heavier vehicles like the "*Bombi*", or some of the older types of snowcat. None of the old "Farmer Jones" type implements for snow grooming are currently available in the regular market.

Fortunately, the current market does offer a small range more efficient renovation implements for snowmobile groomers. Most groomers will be familiar with the old BAECHLER Pull Renovators which first appeared in the early 1970's. Many are still in use and many more sit in "bone yards" around the country. The old PL with its two and a half foot horizontal cutting bar could rip up hard snow, but it came up in big chunks and the machine was a notoriously hard pull for snowmobiles in hard conditions on hilly trails. The BAECHLER renovator is still manufactured under license by YELLOWSTONE TRACKSETTING SYSTEMS. YTS has modified it by replacing the original horizontal teeth with a set of vertical cutting knives, which leave a finer textured product and make the pulling a little easier.

The JACA skate surface renovator mentioned above also uses a horizontal cutter. It produces a beautiful fine-grained skate surface when set at shallow cutting depth, but since it is almost five feet wide it could be an extremely tough pull in hard conditions if set for deep cuts. Groomers would have to make repeated passes at increasing depth settings to renovate to track depth. The same would apply to the Tidd Tech *Trail Tenderizer*. The *Tenderizer* comes in four and six foot widths. Two rows of 2-inch long vertical cutter teeth are deployed by cranking the front of the implement pan up or down. This is normally done by hand with the attached trailer type jack, but an electrically operated depth control device which permits adjustments on the fly from the snowmobile is available as an option.

A small Canadian supplier ADVANCE TRACK SETTING SYTEMS promotes its leveling drag (*Renovating Leveller*) as a renovation tool, and it also sells a *Renovator* for deep cutting in hard and icy snow. It is similar to the old BAECHLER PL in width (2-3ft). Again, it would probably require several passes to tear up extremely hard snow to any considerable depth, and depth adjustments are manual (although an electrical control was rumoured to be on the way as of the summer of 2004).

YELLOWSTONE TRACK SYSTEMS' *Ginzugroomer* - already noted for its shallow scarification abilities - also works for deeper renovation. The Ginzu's vertical cutter teeth are mounted on a rotatable spring-tensioned pipe which permits the teeth to pivot out of the way when rocks, stumps or other obstacles are hit. This spring tensioning also produces a cutter action which leaves behind a relatively fine textured loose snow layer quite similar to that produced by power tilling. In very hard conditions – again- multiple passes would probably be needed to get down to depths of 5 cm or more. TIDD TECH's "G-2" which appears to be close to the Ginzu in principle should produce similar results (at the time of writing the writer had not yet had a chance to test a G-2).

Power Tilling

To many skiers and for groomers in deep snow country the whole art and science of snow grooming relies on one tool – the hydraulic tiller. In the right conditions, power tillers mounted behind modern snowcats can handle the whole series of grooming processes from initial packing to light or deep renovation. In areas where fresh snowfalls can be counted on every week, nothing more is needed. Grooming in the snow-rich Okanagan (i.e. Silver Star) is done throughout the winter by sending a big cat with tiller and tracksetters out on the trails every day. In drier parts of the BC interior, and other areas not so blessed tillers have to be used with much more caution. Repeated tilling passes in snow which is not being renewed by fresh snowfalls can do a lot of damage. Tilling is an extremely aggressive process. Snow crystals are rapidly reshaped into smaller more rounded forms, resulting in a more compact denser snow pack. If carried to extremes, tilling can actually reduce snow depth on trails. Snow particles repeatedly ground down to finer size leaving a denser and thinner snow pack. Carried on further, excessive tilling can leave "dead" snow. In this case rather than being too hard trail surfaces become sugary. Snow crystals have been altered so much that they will no longer compact. The only thing that will rejuvenate "dead snow" is an infusion of fresher snow which can come from snowfalls or snowmaking from above – or by bringing up and mixing in fresher snow from lower layers.

The most efficient tool for breaking up old hard pack and mixing with sub layers is the *front renovator*. A wide (2.5 – 4+ m) horizontal cutting blade front mounted on a snowcat cuts and lifts hardpack, leaving a loose chunky layer which is then refined by tilling into a smooth finish surface. The original *Front Renovator* introduced by the Swiss firm, BAECHLER TOP TRACK, is still being manufactured and sold under license by YELLOWSTONE TRACK SYSTEMS. A front renovator variation (an attachment to the snowcat front U-blade) is available from the German *Pisten Bully* maker, KASSBOHRER.

When to Groom ?

There is no single answer to the question of "When to groom?" Generally grooming should be done at times when skiers aren't around. Aside from the obvious safety issues raised by the possibility of skiers running into grooming machinery on trails, fresh groomed snow normally needs time to set up before it is ready to take skier traffic (usually 2 hours minimum - as little as 1 hour in areas with high snow humidity). This normally means grooming at night or very early in the morning. There are also other considerations such as current weather and temperature conditions, and the general condition of the snow pack. As noted previously in the section on packing, grooming is most effective in a relatively narrow temperature range just below the freezing point (0 to -10 C.). Cold dry snow doesn't pack well, so grooming in extreme cold won't be completely productive, but it also won't do any real damage if it must be done. Warm, wet snow is another matter. Whenever possible the best course of action in extremely sloppy conditions is to leave it alone. This is especially true if cold weather is predicted for the immediate future. The extra compaction produced by grooming melting snow can turn trails into armour plate if temperatures drop suddenly.

Still, there will be times when grooming in the slop has to be done, and in some areas (coastal zones, for example) where warm and wet are the norm, there will be no choice. Even in warm periods there may be times when temperatures and surface moisture levels drop enough for productive grooming (usually late night or very early morning). Snowmobile groomers with their limited horsepower will often have to time their work for a small window when snow has cooled and dried enough, but not yet frozen solid.

For ski races grooming should usually be done in the evening before the event, allowing maximum time for set up. Obviously, final grooming and tracksetting may have to be delayed until early morning with completion planned for just before the race if heavy snowfall is predicted

Manual Grooming

Although machines do most of the work there will often be a need for some manual labour in competition and recreational grooming. In thin snow conditions shovellers may have to fatten up thin spots , especially in high wear areas such as tight downhill corners. Cat growser marks and other rough spots left by machines should be raked smooth. During competitions manual groomers with rakes and shovels should be stationed at high speed corners and downhills where hazards (rocks, bare patches, icing) can be expected to turn up under racer traffic. Extra lookouts may be needed on blind corners.

There is an ongoing debate among race groomers about the ruts which form in downhill corners during races. Some argue that ruts should be regularly flattened out before they can become hazards to less competent skiers. Others maintain that they should be left alone (unless obvious hazards such as rocks turn up), since they can actually be useful to high-level skiers. There is no absolute answer to this debate, but the general trend in high-level races (FIS sanctioned events) is to leave ruts alone unless hazards appear.

Tracksetting

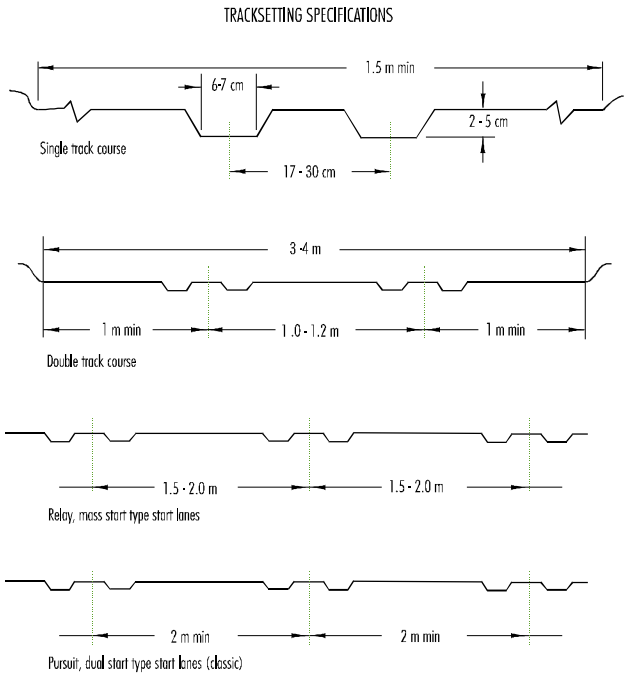
Setting tracks is normally the final step in the whole process of trail grooming. However, with modern equipment it is often done as part of a single grooming pass.

Although skating and the recent shift toward mass starts for most events on the international calendar have reduced somewhat the significance of track setting in competition skiing it is still an important element for many competitions and an essential element for the recreational sport of cross country skiing.

TRACK SPECIFICATIONS

The FIS and Cross Country Canada rules specify standards for track depth, width, and separation for competition track setting. FIS Rule 315.3.2 (ICR 2004) reads as follows:

> "The ski tracks must be prepared so that ski control and gliding are possible without a lateral braking effect by any parts of the bindings. The two tracks should be set 17-30 cm. apart, measured from the middle of each track. The depth of the track should be 2-5 cm, even in hard or frozen snow."



Most tracksetters being marketed today have track moulds which will set tracks within the FIS specification range. On some, distances between track moulds are adjustable. There used to be different specifications for distances between tracks for men's and women's races or for children's races, but these spec's are usually ignored now, and most setting is done by equipment with mould blocks positioned at the factory settings.

Track depths are determined by the thickness of the track moulds. The BAECHLER tracksetters (snowmobile and cat versions) in common use around the country use moulds at the deep end of the FIS specifications (5 cm or 2 in.). YELLOWSTONE TRACK SYSTEMS moulds are usually at the shallow extreme (deeper moulds are available from YTS). In practice skiers seem to notice little difference between shallow or deep tracks, as long as they are well formed. For competition or recreational trails, any of the tracksetters currently being marketed will produce acceptable tracks in the right conditions.

Tracksetting Equipment

There have been some changes in the market over the past decade, especially in the snowmobile equipment lines, but there are still less than a dozen suppliers and the basic types of setter haven't changed very much. There are only two suppliers of snowcat tracksetters ,YELLOWSTONE and BAECHLER . The pan type tracksetter introduced into North America by BAECHLER in the 1970's is still the most common snowmobile setter. BAECHLER is no longer marketing its snowmobile setters in Canada (its snowcat versions often come with KASSBOHRER cats), but YELLOWSTONE TRACK SYTEMS, TIDD TECH, ADVANCE TRACKSETTING, and others manufacture and sell pan type snowmobile track setters. There used to be several sled-type setters around, but the only one now on sale in Canada is the JACA built in Sweden, but sold by a Canadian distributor, (FIRST TRACKS).

All of the current commercial tracksetters use plastic mould blocks to shape and compress snow into tracks. Most of the moulds produce tracks with smooth sloped sidewalls wider at the top to allow for boot/binding clearance. A few tracksetters such as the JACA use a stepped profile mould to provide boot/binding clearance and extra sidewall compression. Most of the modern setters also use metal precutters to slice up and –in some cases- to direct snow towards the outer sidewalls before final shaping by the mould blocks.

Additional Considerations for Snowmobile Tracksetters.

Down Pressure - Weight

The amount of pressure required to mould acceptable tracks will vary with snow conditions. Very little pressure will be needed to shape perfect tracks into soft snow, but as snow hardens more will be needed. Snowcat tracksetters use hydraulic down pressure, but most snowmobile tracksetters have to rely on auxiliary weights to increase pressure.

Since snowmobile groomers have to manhandle their equipment, tracksetters should not be too heavy to haul around. Removable weights can add the extra down pressure needed for tracksetting in harder snow conditions. These can be in the form of steel plates (YTS), concrete blocks (JACA), lead (older BAECHLER), and in dire extremes *homo sapiens* (much of the track set for the 1988 Olympic races was done with an assistant sitting on the tracksetter - primitive, but effective).

Track Removal

All race courses and many recreational trails have sections which should not be trackset (sharp downhill curves, for example). Tracksetters which can lift or scrub out tracks eliminate the tedium of having to get off and manually rake out tracks. There are two ways to leave untracked sections while tracksetting. One is to lift the moulding blocks off the snow. The other is to rake out tracks after they have been set.

Snowrakes-Scrubbing Track after Setting

The older BAECHLER track pans could be fitted with a manually operated flip-down snowrake. JACA 's latest model tracksetter (since year 2000) also uses a rear rake device to wipe out tracks, but it is electrically controlled . The operator can scrub out or begin resetting tracks on the move.

While track rakes are relatively simple and relatively fast-acting, the process of scrubbing out track after setting does have some drawbacks. There is always a danger of stirring up dirt in thin snow sections. And, in some cases, while tracks may appear to have been wiped out the compacted tracks may simply have been filled in with loose snow which will sometimes melt out or evaporate (sublimate) after a few days reopen, allowing the tracks to reappear.

Tracksetter Lifting Devices

A number of devices for raising track moulds out of the snow have been available for some time (i.e. the YELLOWSTONE *Lever lift* , and BAECHLER *Compactor* pan – both of which tilted the pan to elevate track moulds). TIDD TECH's *Trail Tenderizer* uses a light weight track pan mounted on hinges at the rear, with a simple cable and lever to pivot the setter up out of the snow. All of these are manual systems requiring the operator to stop and get off the snowmobile. The track pans available with the newer *Ginzugroomer* and G-2 groomers allow operators to set or remove tracks on the move. Electric rams raise or lower the pans with the flip of a switch on the snowmobile. Being able to take out and reset tracks on the move is particularly helpful when setting competition courses where having to stop to lower the track moulds at the bottom of a steep downhill corner often brings the danger of getting stuck on the following tough uphill.

When to Trackset

As noted above in the grooming section, tracks should be allowed time to set up and harden before skiers use them. This normally means grooming at night or early in the morning. If separate grooming passes are required before tracking the setting should be done shortly after grooming before the groomed snow has hardened. This timing will vary with conditions, but it will usually be within two hours (less in conditions of high humidity).

To provide maximum set up time, competition tracks should be set in the evening before the race. Extremely warm wet conditions may force a delay in tracksetting if there is a chance that a temperature drop in the very early morning hours could freeze tracks into dangerously icy ruts. In such cases grooming and tracksetting may have to be delayed until temperatures have fallen to near the freezing point. A forecast for snow the night before a race may also suggest a delay in tracksetting until just before event start time. If tracks set earlier in the evening have been covered by 5 cm or more new snow resetting may be necessary. If tracks have been hit with less than 5 cm of fresh snow and the race start is near it is usually best to have forerunners or volunteers ski in the tracks rather than attempting a fresh trackset

General Points on Snowmobile Tracksetting

because most tracksetting is done at night the snowmobile should have a rear work light.

tracksetting speeds should be moderate (10-12 km/hr)

on straight sections the driver can keep tracks flowing straight by aiming for a fixed point down the trail.

when setting competition tracks it is useful to have a helper "riding shotgun" to keep an eye on tracks behind while the driver concentrates on the track line ahead. If raking with one of the older pan setters with manual rake or lifter the helper can handle these chores.

if working alone, a kneeling position on the snowmobile is usually best (one knee on the seat, one on the deck). This allows the operator to shift weight as needed and to do quick shoulder checks backwards.

competition tracksetters should carry a hand rake to erase footprints and machine marks.

normally, old tracks should be removed before new tracks are set. It is possible to set over old tracks if tracksetting is done with a renovator. The old BAECHLER Pull Renovator or the TIDD TECH *Trail Tenderizer* with cutter teeth lowered would work. The newer electrically controlled units such as the JACA tracksetter with built in renovator or the tracksetter equipped *Ginzugroomer* make the job much easier.

consider using shallow mould blocks for setting track in low snow conditions.

Competition Tracksetting – Classic Technique

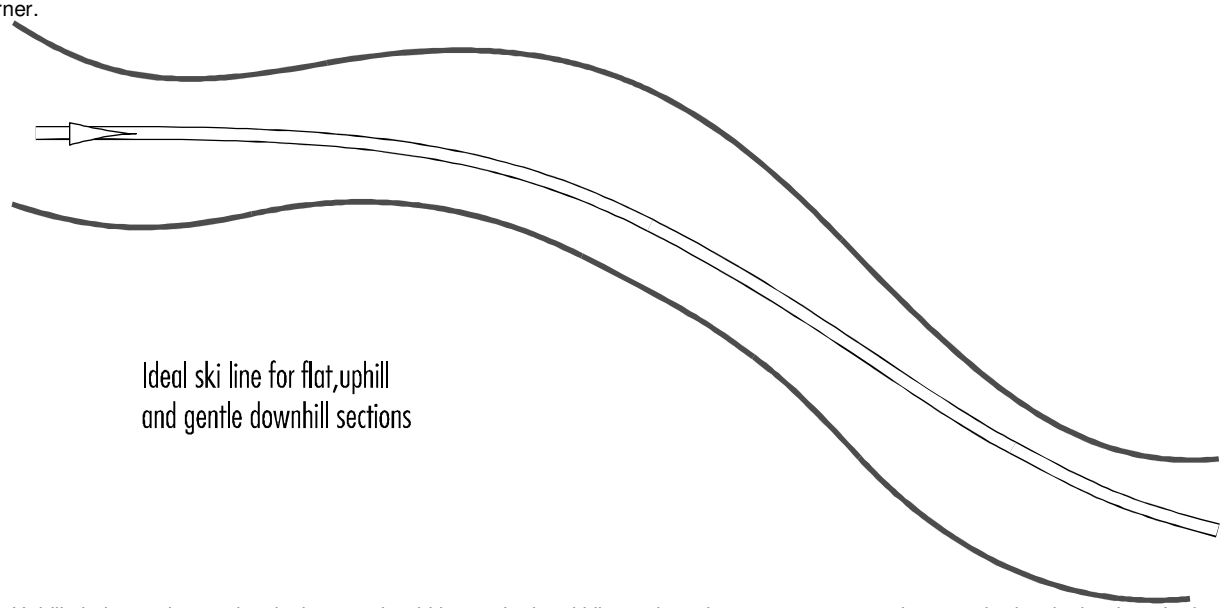
Competition tracksetting has been evolving along with race formats over the past two decades. In the late '70's and early '80's as trails widened and more sophisticated equipment was brought into trail grooming there was a general practice to double track race courses. The arrival of skating in the mid-'80's changed this. The FIS introduced a number of rules and practices in an effort to keep classical skiing alive in international competition. One of these was to specify that classical race courses be set with single tracks in the "ideal skiing line". This meant that groomers could no longer set race tracks with big cats. In what seemed a technological step backwards, they had to go back to using snowmobiles., because only small machines could follow the "ideal ski line" (often called "best line") as it flowed from side to side along the winding course. In the past five years things have changed again. Confronted with falling TV viewer ratings for traditional ski races in Europe, the FIS has changed most races on the international calendar from interval to mass start events in an attempt to increase spectator (and TV advertiser) appeal. At the most recent Olympics and World Championships

there was only a single interval start race for men and one for women. At the same time courses have become shorter and much wider (4 -9 m or more throughout). The general practice now for mass start classical competitions is to double or even triple track courses throughout, leaving steep downhills and corners untracked. Tracksetting can now be done again by big cats with double, triple, or even quadruple tracksetters mounted on rear tillers.

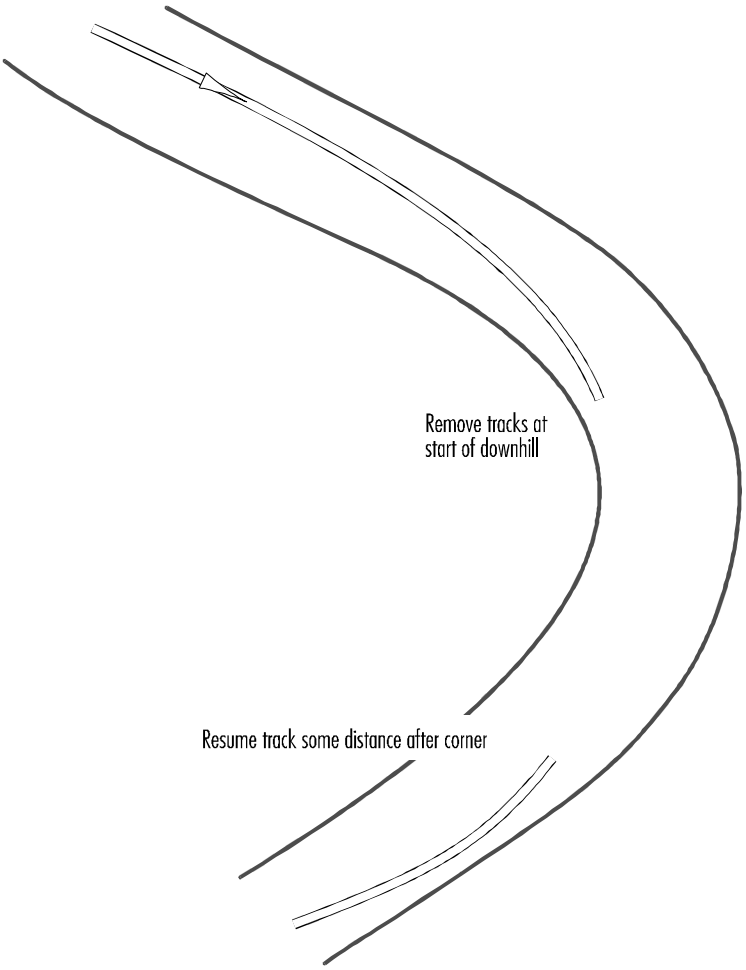
The concept of the "ideal ski line" hasn't completely died. There are still interval start classical races. FIS Rule 315.3.1 (ICR 2004) reads:

> For interval competitions in classical technique a single track should be set along the ideal skiing line of the competition course. The track is normally set in the middle of the course except through curves. In curves there should only be set track where skis can glide unrestrained in the set track. Where the curves are too sharp and the speed is considered to be too high to stay in the track, the track should be removed. To decide the proper course preparation and track setting, the best competitors and highest possible speed must be taken into consideration. In curves the track is to be set close to the fence to avoid the possibility to ski between the track and the fence. (The FIS recommends setting "close to the fence" as a deterrent to skating)

The "ideal ski line" is partly an attempt to discourage skating in classical races, but it also makes sense in a practical way. Perhaps the best way to describe it is to say that it is the line a skier in a hurry would take on a winding course. It is the shortest most direct line. When setting track through a flat "S" section, tracks should flow in as straight a line as possible, cutting corners like a Grand Prix race car driver. The FIS rule specifies that the track be set "close to the fence" to discourage racers from skiing outside the tracks to shorten the distance around the course (when competitors ski outside the course on a curve, it is common to see them take a few skating strides, which is illegal). However, it must not be so close to a corner that the skiers could snag any trailside obstacles. V boards along the inside of such a curve can also be used to prevent the cutting of corners if track grooming equipment is not able to snug up to an inside corner.

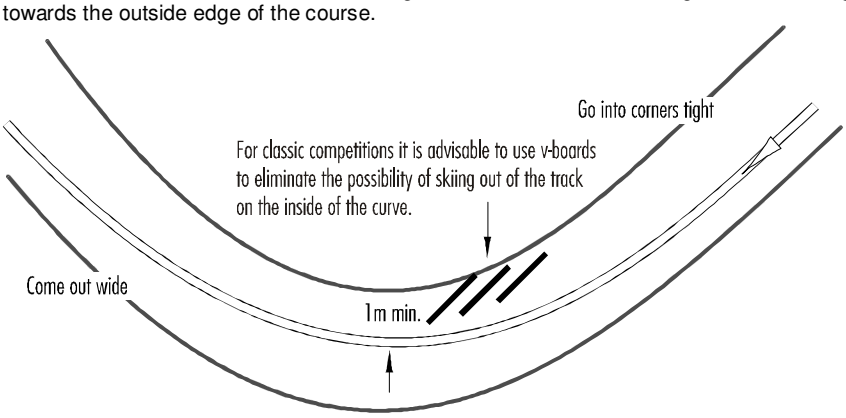


Uphills in interval start classical races should be set in the ski line unless they are steep enough to require herringboning. In that case they are best left untracked. Downhill corners present the biggest challenges of judgment for tracksetting. Sharp downhill corners should not be tracked. Experience is required to determine just where to take tracks out and when to resume them coming out of tight corners. As a general rule track is set following the best line to the upper inside of the corner. Tracks are removed around the corner, and they should not be started again until some distance after the corner. This is to allow skiers to see the tracks and to get themselves set up to step back into them. In fast conditions the untracked zone may have to be lengthened to give skiers more room to see the tracks and prepare for reentry.



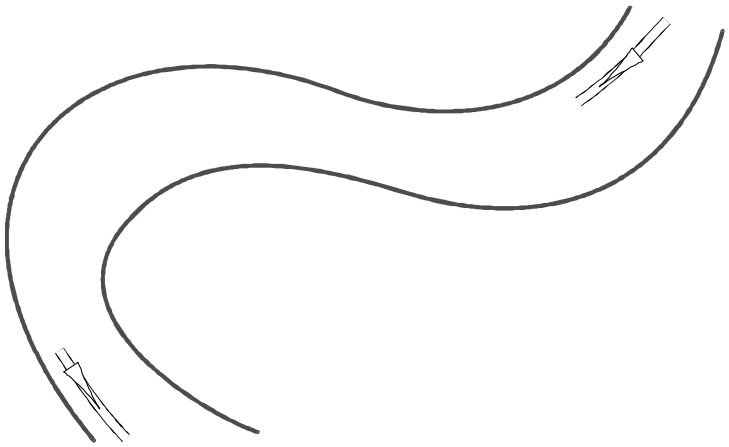
Trackable Downhill Turns

Downhill corners which are moderate enough for skiing in tracks should be set in the ideal ski line. This used to be the norm for both classical and free technique races, but now it tends to be done for interval start classical races only since so many come together in a mass start format. The general rule for setting downhill curves is to go into the corners tight (toward the inside), but to come out wide. (Some of these considerations must be applied in the actual design of the course.) Skiers at race speeds cannot stay in tracks which are set too tightly around curves. This is another one of the areas in which judgment based on the tracksetter's experience and skiing ability is vital. In fast conditions, track lines through curves will have to be straightened, meaning that they will come out of the corners more towards the outside edge of the course.



Trackable Downhill

Short straight sections (30 m. or less) between untrackable corners are best left untracked.



Untrackable Downhill

Competition Tracksetting – Free Technique

In recent years tracksetting for free technique races has practically been eliminated. As little as five years ago the FIS and CCC rules still specified that a single continuous track should be set along the side of free technique race courses (theoretically to accommodate marathon skate technique). The normal practice since the mid 1980's has been to set track only on some downhills. The FIS rule 315.4.1 (ICR 2004) reads:

> For interval start competitions in free technique the course must be well-packed for a width of at least 4 meters. On downhill sections where the tracks are set they must follow the ideal line of the course.

Most free technique race courses are now prepared with no set tracks. An argument can be made for setting track on certain long downhill sections for long races (20km or more) where gliding in the tracks might offer a rest break to some skiers. In that case, at least for interval start races ski line tracks on a few of the longer downhills might be a good idea. The wide courses (4-9m) now required for World Cup, World Championships and Olympic races have enough room to fit in downhill tracked sections without getting in the way of skaters even in mass start events. With mass start races tracks should be considered only for long distance events (20km or more), and only on the longest downhills. It would probably also be best to keep track slightly to the side off the ideal ski line. At the 2002 Olympic courses downhills often had track to the side in the free technique events and many skiers did use them. Local race organizers will have to make their own decisions about setting track in lower level skating races where less proficient skiers might appreciate some track for rest breaks. There are no hard and fast rules about this issue.

Sprint Courses

A course may be anywhere from 0.4 km to 1.4 km long, depending on the age/level of competition, with the longer distances being for the older and stronger skiers. However, the race distances should be no shorter than 0.8 km, which means that, if the course is only 0.4 km long, it should be skied twice each time. 2-lap courses are not recommended because of the significant logistical issues created, but 2 separate loops can be used to make the full course.

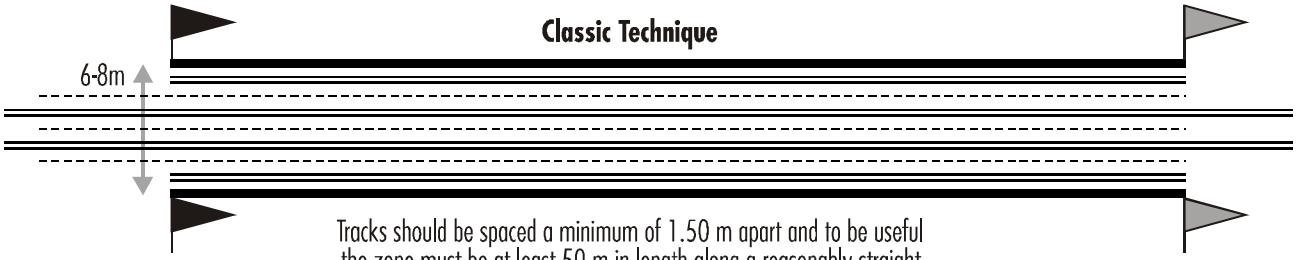
The total climb can be between 0 m and 60 m. It is suggested that the total climb should be no more than 15 m for up to a 0.5 km lap, 30 m for up to a 1.0 km lap, and 45 m for up to a 1.5 km lap.

The width of the trail should be between 6-10 metres, except at the start and finish where it may need to be wider, and on uphills where it should be at least 10 metres wide. It should have some straight stretches on it, some uphills, and some downhills. Generally, the wider the course, the better. The course must be sufficiently wide (see above) and without many sharp corners so that the conditions are equal for all skiers. However, part of the excitement of this type of competition is watching competitors going head-to-head against each other, and watching the strategies and abilities that emerge to pass each other, to navigate curves, to pass competitors on those curves, to pass competitors on the straightaways, etc.

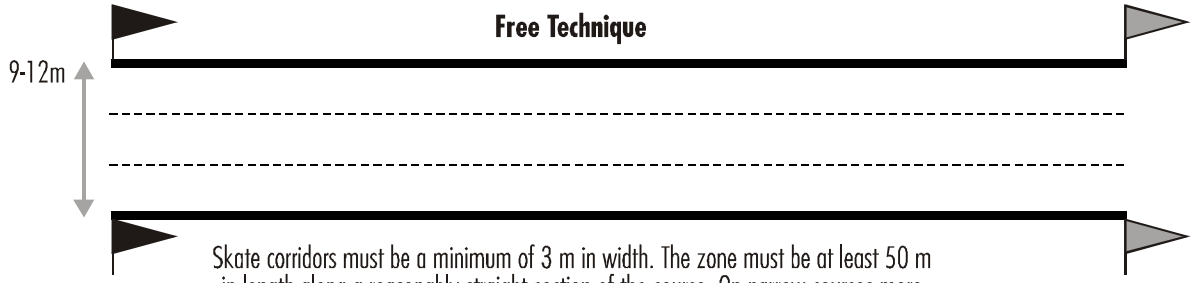
Where there are straight parts on the course, corridors may be marked. The purpose of these corridors is to allow trailing skiers to pass any competitors in their heat if they can, i.e., it forces a leading skier to pick a corridor which he/she must then remain in to allow a trailing skier to try to pass. Rule 340.1.4 forces a competitor who enters a zone where corridors are marked (start area, finish area, and any special corridors outside of the stadium) to remain in their chosen corridor unless they are overtaking another competitor. This rule supports the setting up of corridors on the course to enable passing; otherwise, it is possible for the lead racer to occupy the middle of the trail (which might be the best line) and thus not allow anyone to pass. The corridors should be marked with "stake chasers" (obtainable from survey companies) or sprigs of pine or spruce, anything as long as they are flexible in case they get skied over or hit by skis. They should not be rigid items, such as small flags on wooden sticks, or tape on sticks, etc. as they can catch a ski and trip the skiers.

Overtaking Corridors - sprints, mass starts, relays and pursuit competitions

Intended for courses that do not offer adequate opportunity for overtaking.



Tracks should be spaced a minimum of 1.50 m apart and to be useful the zone must be at least 50 m in length along a reasonably straight section of the course. On narrow courses more of these corridors should be provided. Rules for changing lanes is the same as it is at the finish. Signs must clearly mark the beginning and ending of the corridors.



Skate corridors must be a minimum of 3 m in width. The zone must be at least 50 m in length along a reasonably straight section of the course. On narrow courses more of these corridors should be provided. Rules for changing corridors is the same as it is at the finish corridors. Competitors can be sanctioned for interference if they Intentionaly attempt to block more than one corridor.

Stadium Tracksetting

Interval Start and Finish

This subject is covered in some detail in the chapter on Stadium Layout and Grooming. There has been little change in this aspect of race grooming.

Mass Starts

Mass starts are now used for many international races including new race types such as the pursuit competition –without a break. As a result, the basic rules and methods for setting up mass start zones have some commonality. The usual start for classical and free technique races is still a trackset grid 75 – 100m long with tracks a minimum of 1.2 meters apart (from centre to centre). From this base, the start positions for the chevron and arc formations are laid out. Relays use the arc formation, while other mass start races use the chevron formation if the competitors are seeded into the grid from fastest to slowest. Since this topic is also covered in detail in the Stadium Grooming chapter of this manual, readers should refer to that chapter for fuller details and illustrations.

Setting aesthetically pleasing mass start grids can be a tricky exercise. It is most easily done with snowcats. The large machines will steer in a straight line much more accurately than snowmobiles (they aren't as easily shifted around by small dips and rolls in the snow) and they back up, whereas snowmobiles have to turn around at each end (which can leave quite a mess). Depending on how the track pans are spaced, it may be possible to set 2 or more tracks of the grid on each pass (4 tracks would be possible with one of the new 5 meter cats with quad tracksetters). Even with cats, setting perfectly straight parallel tracks requires skill and patience. At the 2002 Olympics, the Chief of Grooming had to work out a sophisticated laser sighting system to steer the cat and cut tracks which would look perfectly straight and parallel on TV (as demanded by the host broadcaster). Fortunately, most races don't require this level of perfection for a set of tracks which will only be used for a few seconds.

Getting mass start grids aligned perfectly straight and parallel by snowmobile can be a much greater challenge. Many different methods have been used over the years. One of the most effective is to stretch a rope the length of each lane (80-100m), marking the centre of each set of tracks with flags. Flags are set in each lane every 15-20 meters. The tracksetter then drives down the row of flags aiming for each successive flag in front. A helper runs along just ahead of the snowmobile pulling flags just before they are run over.

The start area following the mass start grid can take several forms. If the race is free technique no further tracks will be necessary. An untracked "scramble zone" will lead skiers onto the course. If the race is classical, it becomes much more complicated. There should be a short (10 m.) untracked scramble zone followed by another trackset grid containing roughly half the number of tracks set in the start grid. Another short untracked scramble zone would be followed by two to four tracks exiting onto the course. There are no precise rules

for the length of the tracked sections following the initial grid. This will vary depending on how much room is available in the stadium area and other factors. For most races the chiefs of stadium and course along with the TD will have to work out the details.

Mixed Technique Relays and Pursuits

In the past decade, relays using classical technique for the first two legs and free technique for the last legs have become standard for the Olympic Winter Games and World Championships. At the same time the old pursuit format using a Gunderson start for the second free technique race (now called a Pursuit Competition – With a Break) has been supplemented by the Pursuit Competition – Without A Break, in which skiers use both techniques in a single non-stop race.

For relays, the course into the stadium would have to be tracked to the exchange zone. If this portion of the course is also to be used by a following free technique leg, the tracks should be set to the side. Normally no tracks should be set within the exchange zone, a track to the side (for the second classical leg) should lead to the course. For pursuit competitions –without a break, tracks should be continued from the course to the beginning of the transition zone where skiers switch from classical to skating equipment. Obviously, from this point on no tracks should be set.

Mixed technique races at the high level races work well only if separate course loops are available – one for each technique. This allows the classical loop to be set with multiple tracks (downhills untracked), while the free technique course is completely untracked. This is standard procedure for all top-level international events. If separate courses aren't possible, organizers will have to compromise by setting tracks to the side (again leaving downhills untracked). This would work only with exceptionally wide courses (10-12m).

Popular Ski Competitions (Loppets)

Stadium and course preparation for loppets is covered in both the FIS and Cross Country Canada rules in Section G, Guidelines for Popular Cross-Country Competitions. The start area is prescribed (Rule 384.2.1) as follows:

> The start area should be flat or nearly flat. It should lead directly into the course and should be wide enough to avoid excessive crowding. The start should gradually narrow to the width of the course over a distance sufficient in length to allow competitors to spread out before entering the tracks.

There is no mention of tracksetting. In practice, most loppet organizers find that a trackset mass start grid (100-200 m. long depending on room available) is helpful in organizing the start. This applies to both classical and free technique events. Whether or not the initial grid is followed by sections with reduced numbers of tracked lanes is completely optional. This may be desirable in classical loppets if space permits. In free technique, the narrowing of the mass start fan should be untracked (tracks at the side for classical skiers would be OK if there's room). On course for classical races, double tracks should be set (more if there's room). Downhill corners should be untracked. There used to be some argument for ideal ski line track on downhills, but it would normally be safest to follow the pattern of current elite level mass start competitions and allow skiers who may be traveling in groups to pick their own routes on downhills. The FIS and CCC rules are quite flexible about tracksetting for free technique loppets, suggesting that one single track be set to the side "where possible". Generally it is a good idea to set a side of course track for loppets. It is still not uncommon to see a few classical skiers enter free technique citizen races.

Equipment
Tracked Grooming Equipment

It should be clear from the preceding sections that there are two types of snow grooming – one using small vehicles (snowmobiles), and the other using large vehicles (snowcats). In the past decade, most clubs and other operators maintaining trail systems of 20 km or more have moved into "cat" grooming. Smaller operators still have to put up with freezing their backsides on snowmobiles, and even the cat people have to fall back on snowmobiles at times.

There is no question that snowcats are the most efficient vehicles for snow grooming provided that several conditions are in place. The first, of course, is money. There is a huge difference between the startup costs for snowmobile and cat grooming. A new cat, large or small, will start at around $200,000, and rise depending on the exact size and attachments. And then, of course, there are ongoing maintenance costs, which can also approach the stratospheric. On the other hand, a decent grooming snowmobile can be picked up for $10,000-$12,000, and even relatively sophisticated grooming implements such as the YTS Ginzugroomer will set you back around $4,000 Canadian. In the long term, of course, the efficiency of cats in terms of manpower savings will more than offset the initial costs.

The second major condition which must be satisfied to justify acquiring a cat is snowfall. Groomers in low snowfall regions such as Yellowknife or much of the prairie region will probably encounter one year out of ten in which there is enough snow to use a cat. At the opposite extreme, anyone attempting to maintain a trail system of 20 km or more in the west coast snowbelt can expect nothing but worn out backs and endless frustration if they have to rely on snowmobiles. A final consideration is trail width; if trails aren't wide enough to handle cats, snowmobiles will have to do.

Annoying as it may be, even the best-equipped cat groomers will have to fall back on snowmobiles at times. Early season work, best-line tracksetting, snow drought periods – all demand small machines. At the Canmore Nordic Centre, for example, in five out of six of the years from 1997-2003, snowmobiles did most of the natural snow trail grooming for most of the winters. There simply wasn't enough snow to use the cats. This then raises the problem of finding a suitable small grooming machine.

Since 1995 , when BOMBARDIER stopped production of the Alpine II twin track, finding a suitable grooming snowmobile has been a challenge. Grooming requires a machine with low gearing, able to pull heavy loads at low speeds, without overheating. Most machines currently on the market are geared for speed rather than pulling power. Many groomers are still getting yeoman service from the Alpine twin tracks even though spare parts are no longer carried by the regular dealer network (often meaning that long hunts in the aftermarket

are required). As of 2004 the most successful widely available grooming sled has been the BOMBARDIER Skandic Super Wide Track (24" single track). The Skandic has excellent pulling power (exceeding the Alpine II even), and it has become the basic workhorse snowmobile (even though it is light in the front end which makes steering with a load problematic at times, and there can be overheating). Several powerful liquid-cooled snowmobiles (i.e. the Skandic Wide Track 600, Arctic Cat's Bearcat 640) have also been used for grooming, although many operators have experienced serious overheating problems with liquid-cooled machines. None of the single-track snowmobiles on the market (as of 2004) have been completely satisfactory for trail grooming. An Italian twin track machine, the Alpina, being sold in the U.S. by dealers in Michigan and the east coast, does appear to have some potential. It is a massive snowmobile (approx. 4 ft. wide), with a four cylinder automotive engine (Peugeot), and reports indicate that it will pull impressive loads at low speeds. Unfortunately, costs (approx. $40,000 Can.), the lack of any Canadian dealers, and general questions about parts supplies and service raise questions about its practicality at this time. (Note -- During the 2003-04 season Bombardier introduced a new twin track to the market. The Elite is a touring machine, providing side by side seating for the driver and a passenger. Equipped with twin tracks and a four stroke engine, it should have more than adequate power for trail grooming, but at the time of writing, no field test results had come in.)

Moving beyond snowmobiles, a number of larger tracked vehicles have been used for trail grooming with varying degrees of success. They have included half-track machines such as the TRACK TRUCK, and larger ATV's (i.e. the ARGO). A few of the older differential drive snowcats (various models of the BOMBARDIER Bombi, and SkiDozer, or the THIOKOL cats) are still working trails in spots across the country.

While the old differential drive cats could handle front blades and pull much heavier drags than snowmobiles, trail grooming really entered the modern age with the introduction of hydrostatic drive cats in the mid 1980's. Hydrostatic drive machines are powered by a system of hydraulic pumps and motors. They are much more maneuverable than the older technology cats and they can be fitted with power tillers. There are two general size ranges -small cats (2.5-3 m wide) with power ratings under 200 HP, and big cats (4-5 m width) with 200-300 plus HP. As of 2004 only two major brands were being marketed in Canada, the yellow machines of BOMBARDIER, and the red Pisten Bully's from KASSBOHRER. A few clubs around the country are still running LMC (LOGAN MANUFACTURING CORP) cats, although there hasn't been an active LMC dealership in Canada since the mid '90's.

Small cats (BR 180 and the small Pisten Bully's ranging from the PB130, PB150, PB 160 to the new PB100) would appear to be the best choice for many nordic operations. They can obviously run on narrower trails and in lesser snow depths than big cats, but they are not nearly as common as the big machines. The big units are manufactured in much higher numbers for the alpine ski industry. As a result, the small cats are relatively much more expensive and, since there isn't a major user like the alpine industry sending used cats back into the market, they are much harder to find. Most nordic centres in Canada run with used alpine hill cats. A big cat which may be a little long in the tooth for alpine hill grooming may still have many years of life left for nordic trails, and they can be purchased for prices ranging from $45,000-75,000 (as opposed to $180,000-$200,000 for a new small cat).

Snowmobile Grooming and Tracksetting Equipment

Among small nordic ski clubs there has long been a tradition of making do with homebuilt equipment for trail grooming and tracksetting. While this may still be necessary for some, there are some good products available on the commercial market. Following is a small sampling as of the autumn of 2004. Readers can check the websites listed for further information. It can also be useful to take a look at the website of the Cross Country Ski Areas Association. CCSAA's website provides links to a number of equipment suppliers, and its newsletter often includes advertisements for used equipment.

ADVANCE TRACKSETTING SYSTEMS (www.advancetrack.ca)

The owner has been a snowmobile groomer at the Strathcona Wilderness Centre, east of Edmonton, for several years. They offer a small line of simple, but useful grooming drags and tracksetters. Since they are Canadian, their pricing is in Canadian dollars – a significant cost advantage.

FIRST TRACKS (www.jacatrax.com)

The Canadian distributor for JACA.

MOUNTAIN SNOW EQUIPMENT INC. (www.mtnequipment.com)

A Quebec firm which produces a line of grooming drags for snowmobile and ski trails.

SNOWGROOMERS.NET (www.xcskigroomers.com)

A sample of one of the entries pulled from the CCSAA web. This company sells a line of lightweight drags and tracksetters which it claims can be used with lighter snowmobiles.

TIDD TECH LTD. (www.tiddtech.com)

One of the old timers; started twenty odd years ago in New England, now based in Colorado. Producers of the "Trail Tenderizer" and the new G-2, plus a line of accessories.

YELLOWSTONE TRACK SYSTEMS INC. (www.yellowstonetrack.com)

Doug Edgerton has long sold one of the most complete lines of snowmobile grooming and tracksetting equipment available anywhere. Especially interesting is the new “Ginzugroomer”.

Blank

Course Officials

Chief of Competition

Chief of Course

— Chief of Mechanical Grooming
— Chief of Manual Grooming
— Chief of Controllers
— Chief of Forerunners
— Chief of Temperature Stations

The Chief of Course is responsible for preparing, maintaining, and controlling the race course to satisfy the needs of the competitor and to meet the technical and safety standards applicable to the competition. This person also works closely with the Chief of Stadium in the grooming and tracksetting within the stadium itself.

Duties:

Pre Race:

- recommend appropriate courses for the competition
- design trail layout
- verify course length and homologation standards
- produce course map and profiles
- plan on-course First Aid and evacuation of the injured
- prepare the course for official training and race days
- organize course markings and signage
- prepare warm-up trail and wax testing area
- provide training for his/her officials
- organize grooming and track setting, both on the courses and in the stadium
- position controllers in consultation with TD and Chief of Competition
- attend team captains meetings and provide course briefings
- ski the course with the TD if possible and forward the TD's concerns for adjustments to the appropriate member of his/her crew

During Race:

- supervise all course personnel
- maintain course security through the Chief of Competition Security
- dispatch forerunners and course closers
- maintain radio / verbal communication with TD, Chief of Competition, Course Preparation Officials, and Chief of Controllers.

Post Race:

- meet with Chief of Controllers concerning any infractions seen by any controllers
- ensure Controller report forms are delivered to Chief of Results
- ensure that the course sweep is done
- arrange for dismantling of equipment and transportation of same to storage
- arrange on-going course preparation during multi day events.

Equipment:

- radios, start list, course maps

Procedure

The Chief of Course has one of the most demanding positions on the Competition Committee. Technical knowledge and experience in the tasks of designing, preparing, and tracksetting the race course must be applied. Fortunately there are few situations where one must start from scratch and certainly in such cases the Chief of Course, with the aid of the Chief of Competition, would solicit outside opinions and assistance as needed. Regardless of the state of preparedness of a site, the finishing touches and co-ordination of final preparations can be very time consuming. The race course is only one area of responsibility which the Chief of Course must oversee. The general list of duties in the job description gives some indication as to why this position often requires a number of Assistant Chiefs. Due to the fact that the design, preparation and tracksetting of a race course represents such an important element of race organization, Chapter 6 provides a discussion on major considerations and technical information related to these tasks. Those officials currently

active, or considering becoming active, in course preparation and tracksetting should take CCC's "Trail Grooming and Tracksetting" course.

Course preparation for the event must start several weeks in advance with snow compacting, snow grooming and tracksetting for training days. The major state of preparedness for the course must be groomed to competition standards and marked and signed to provide clear direction all the way around. The course must be rejuvenated, trackset and fully signed for race day.

The Chief of Course must supply a course map and profile for each course that will be used in the event to the Competition Secretary for distribution. This map should contain the information as illustrated in **Appendix 6-5.** The use of aerial photos, survey and topographical maps can be employed in this process or it can be surveyed on the ground. It is advisable for the survey to be professionally done.

An important responsibility of the Chief of Course is instructing and training course officials for their respective duties. This training can usually be coordinated with the officials training program, arranged by the Volunteer Coordinator.

It is very important that the Manual Preparation Group understands its importance and be taught to groom the course so that safe and stable conditions will result. The individual duties of these officials are listed separately in this chapter. The Chief of Course should know all of these responsibilities thoroughly and understand their purpose and relative importance.

The placing of signs, flags, and barricades used to control the racers' path during the course of the race is a task which must be well thought out. Because officials are not allowed to give trail directions to anyone, large signs or barriers must provide the skier with a clearly marked path to follow, thus eliminating verbal misunderstanding. Wherever the trail splits, advanced warning should be given prior to the split, again at the actual split, and then confirmed after the split (See page 7-5).

In a race with multiple categories using different courses it is generally desirable that the only course open is the one in use. Movable barriers such as V-boards or ropes can be used and moved according to a pre-established schedule. The schedule can be developed based on the start list, distance of the location from the start and the estimated speed of the slowest skier in the category

The Chief of Course should try to obtain feedback about the course throughout the preparation and race periods. Coaches and the racers themselves are an excellent source of feedback. As racers finish, where possible, the Chief of Course should ask a few of them if they had any problems concerning the trails, tracks, and/or signage while they were racing. Any comments should be carefully noted and either immediately fixed, or fixed in time for the next race.

Observing and controlling the activities of skiers, coaches and spectators, both on and adjacent to the race course, represents the bulk of the Chief 's responsibilities while the race is in progress. In addition, the Chief of Course should obtain feedback on the course and its condition by talking with competitors who have finished the race, and by talking with coaches. This feedback is generally very detailed, of high value, constructive, and will identify areas/locations and grooming techniques that have been both very successful or not well done; the parts identified as not well done can be checked and improvements can then be made to future tracksetting and grooming.

Chief of Course

Chief of Mechanical Grooming

— Machine Operators

The Chief of Mechanical Grooming is responsible for the mechanical grooming and tracksetting of the race course and stadium area.

Duties:

packing of snow on the trail system to be used for the event on an on-going basis throughout the season

grooming the races courses so as to achieve a smooth, correctly shaped surface

tracksetting as required by the rules and regulations to the satisfaction of the Chief of Course, Chief of Competition, and the TD

Equipment:

snowmobiles and/or snow track vehicles with matching snow grooming and tracksetting equipment.

NOTE: Sites which have snowmaking equipment and/or are involved with major amounts of snow transportation usually have a special events crew which manages mechanical grooming and tracksetting. This crew is trained in mechanical tracksetting and is supervised by the site management.

Chief of Mechanical Grooming

Machine Operators

Machine operators are responsible for the operation of the grooming equipment required to produce a high quality race course regardless of temperature and snow conditions.

Duties:

Groom and trackset as required by the event schedule. Most mechanical grooming is done between 4:00 pm and 8:00 am

The time of day at which snow is groomed and tracks are set is extremely important. The situation varies with weather conditions and snow composition. The questions of what to use and when to use it are best answered by training and experience. Spend time experimenting before the event and try to acquire other experienced opinions.

Detailed procedures for grooming and tracksetting are discussed in Chapter 6. Of particular importance is the situation of grooming while there is high moisture content in the snow. If the snow is wet, and the temperature is expected to go below freezing during the night, it is imperative that the grooming be postponed until the temperature has fallen and a large amount of the water has drained from the snow. If it is groomed before this has happened, the trail will freeze into a chunk of ice and be impossible to set a track into, and will be too dangerous to race on. Thus the reason for not grooming and tracking it too soon. However, if the temperature is not supposed to fall below freezing overnight, then the course can be groomed early and left to set as best it can in the above-zero temperatures.

Chief of Course

Chief of Manual Grooming

— Manual Groomers
— Course Markers and Fencers

The Chief of Manual Grooming is responsible for supervising the touch up of the groomed surface and tracks after the mechanical tracksetting has been done, and for maintaining the course in a safe condition during the race. Touch ups should include ensuring that, where trails meet, any tracks join with each other so that the transition from one trail to another is flawless.

Duties:

inspects the course after grooming and tracksetting to determine areas needing touch-up.

supervise manual groomers to maintain the track during the race in a safe condition in varying weather conditions

supervise placement of fences, barricades and flagging for identifying and securing the course

supervise changes requested by the TD or Jury

Equipment:

Skis or snowmobile, course maps

Chief of Manual Grooming

Manual Groomers

Manual Groomers are responsible for finishing the course after grooming and tracksetting activities have been completed and modifying the course, if required, after the TD inspection is completed.

Equipment:

shovels, rakes, snow moving equipment, skis and/or snow machine, snow machine sled

General Procedures

During the process of mechanical grooming and tracksetting, ruts and clumps of snow may be left in the track and must be raked and packed smooth. Areas of concern are at tight turns where machines have difficulty turning or where the tracksetter has been lifted. The change from tracks to no tracks can be too abrupt and create a potential hazard for the skier. The tracks may have started too early in a corner or downhill or have been left in too long, and must be raked out to reduce danger. Sharp corners require banking by hand before the event if they are not naturally banked. Intersections, where one trail was trackset after the other, the tracks of the first trail may not join with the final setting – the join must be made manually (one way to do this to simply put one's boots in the tracks and chisel the joining track by shuffling one's feet to the track ahead; a second way is to use a small sand/beach shovel or garden trowel (a narrow digging tool) and dig out the track). During an event, if snow conditions are soft and snow cover is minimal, the Manual Grooming Crew must watch potential problem areas and ensure an adequate snow cover is maintained.

Manual groomers finish the job and make mechanical grooming look great!

Workers should be familiar with the methods and rationale of good trail grooming and tracksetting (See Chapter 6) so that their efforts will not detract from the skiability of the course. Also remember that, once a competition begins, a course should not be groomed between racers, unless not doing so would make the situation dangerous. Competitors know how a course might change during a race, and doing grooming that an official might believe will make the course better might in fact make it slower. In general, leave the course alone once the grooming has taken place.

Chief of Manual Grooming

Course Markers and Fencers

Course Markers and Fencers are responsible for the placement of fencing and barricades to secure the course and eliminate places where skiers' might go off course. In addition, they position the appropriate course signage and distance markers around the course.

Equipment:

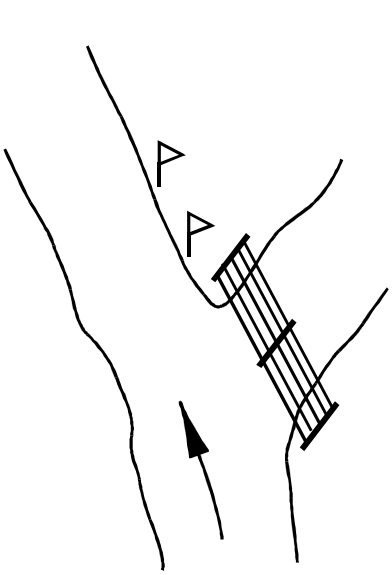
Pop up fencing, distance signs, direction signs, colour flagging, wide plastic tape, skis and carrying bag, snowmobile and sled, course map(s), Start List, Course change schedule and radio.

General procedures

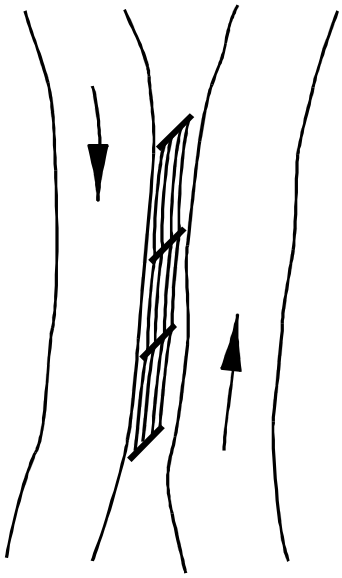
Course Markers are usually some of the first officials to go on course in the morning on official training and race days. Their job is to set up fences and barricades to secure the course, and to eliminate places where skiers may go off course. They should sign any intersections in accordance to guidelines outlined in Chapter 6 and to CCC rules, and post course length and distance signs showing distance skied. In order to do all of the above effectively, snowmobile transportation of fencing and signage is usually required, most of which should be done in the days before the race. When short distances and light loads are involved, skis will suffice.

As a course marking official, it is important to always look at the signs, markers, and barriers as if you were a novice racer who has never skied the track before. They should be very clear and easily readable from a reasonable distance. Signage must be at least in character form, since racers who are colourblind may not be able to distinguish colours of trails if that is all that they are marked in.

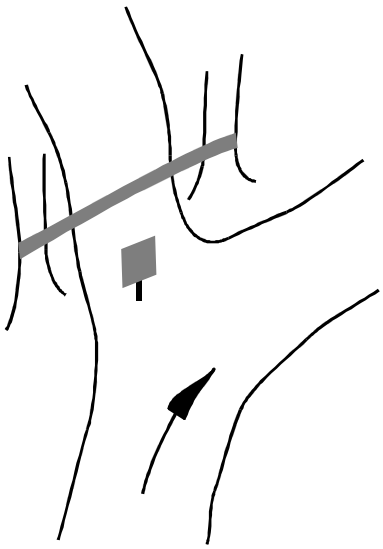
Two course markers should be at each location schedule for a change and mark off skiers on the start list as they pass. Once the category prior to the course change has passed the barrier(s) may be changed. Course markers need to be informed of non-starters and late starters to perform their job correctly.



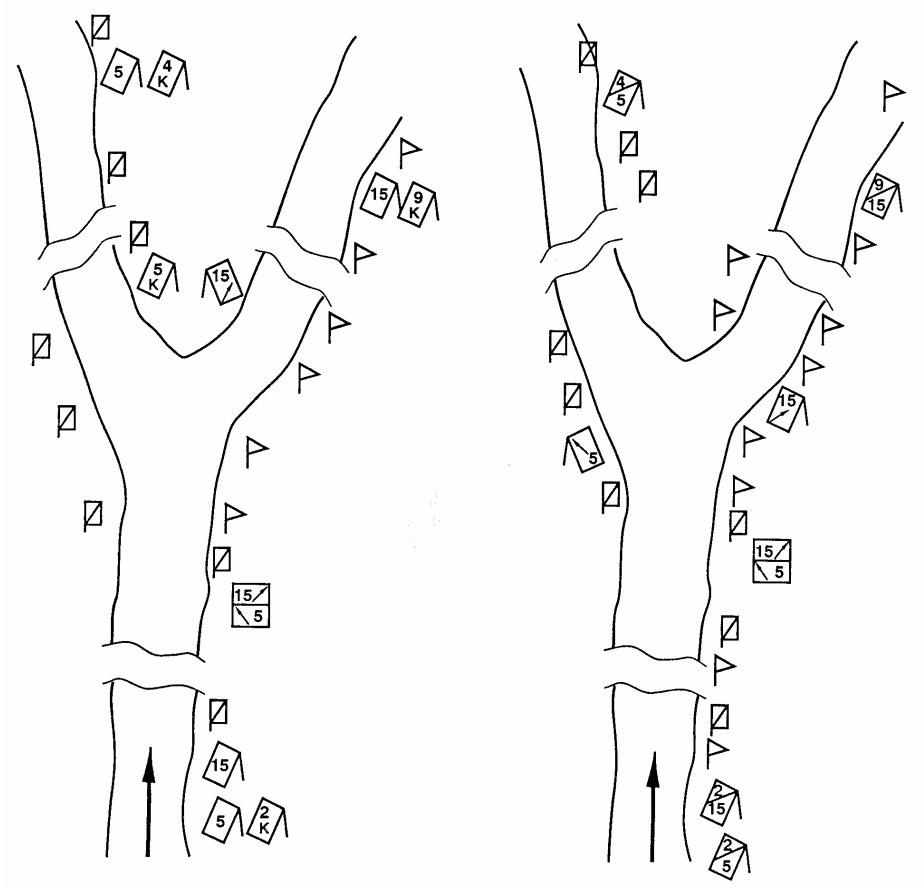
Intersection Fence



Course Divider



Wide Ribbon



Chief of Course

Chief of Controllers

— Controllers

The Chief of Controllers is responsible for coordinating the activities of the Course Controllers.

Duties:

train controllers in their duties (this includes training in the legal way to do classical technique)

obtain all the required controller forms and course maps

set up clip boards and forms, maps and pencils for each controller

consult with the Chief of Course for positioning of each controller team

deploy the controllers with their necessary equipment

conduct radio checks

collect and verify the control cards, after the race, and deliver them to the Chief of Results, pointing out any notations of problems or infractions of the rules.

Equipment:

radio, clipboards, pencils, knife (to sharpen pencils), control forms, course maps, start lists.

General procedures

The use of controllers on a course provides a method of ensuring that all skiers: 1) complete the correct trail; 2) comply with the “no skating” rule where required; 3) comply with equipment exchange rules; and 4) comply with fair manner and overtaking rules.

Controllers should be positioned such that any short-cuts taken would be noticed when the control forms are compared to see if the skier’s bib number is recorded on all the required forms the required number of times. This means that generally their positions should be at the far end of a course or a loop on a course, not at the beginning or end (i.e., at an intersection) of a loop. If the latter positions are used, then it is possible for a competitor to cut off part of a loop and thus gain an unfair advantage. Neither should controllers be required to keep two control sheets for two different control points, such as at an intersection where some competitors may have to ski a

different route than others. The controllers must be located along one of the trails, and therefore will record anyone who passes them, whether the competitor is on the correct course or not.

Controllers should be checked in on their arrival at the race, issued with their equipment, and given their assigned location. **Prior** to going on the course, a radio check should be performed to ensure all radios are transmitting and receiving correctly.

Controllers are the on-course referees!

Do not give racers directions on course!

Controllers should be deployed in pairs, and should work as a team to record bib numbers and to note, record, and substantiate any rules infractions. This also enables the sharing of the duties when radio communications are involved. Radios should be employed at many but not necessarily all check points. They can be used to monitor the progress of the first and last skiers as they pass through the course. This information is often useful in preparing for the arrival of skiers at the finish line and the deployment of course closers. **Note:** these communication lines are for official business only; not for casual conversation.

Be sure to have at least one or two extra controllers on standby in the event that officials do not report for duty or, in the case of severe weather, to relieve controllers during the race. The controllers should depart from the start area and proceed to their control point, where possible, on skis or on foot (machines such as snowmobiles give off a great deal of exhaust which is very detrimental to the race conditions of athletes who breathe in this exhaust), so that they will be in place five to ten minutes before the race starts. This will allow time for an on course radio check between all stations before the competition starts.

The Chief of Controllers notifies each station when they are able to close and return to the stadium area. Upon their return, the Chief of Controllers collects the controller forms and verifies if any skiers have not passed by the controller's location, if any infraction were committed or rules broken. This data is checked against the list of DNS and DNF skiers. If a finishing skier's number is not on one of the control sheets or the skier has committed a rule infraction, then it must be reported to the Chief of Results and through him/her to the Competition Secretary. Should a skier's number not appear on the forms, and the skier is also not accounted for, the Chief of Course must be notified and the course checked for the missing skier. It is very important that these missing bib numbers and infractions be identified **by** the controllers **to** the Chief of Controllers quickly so that they may then be immediately passed on to the Chief of Results for verification and identification to the TD and Jury as possibly requiring penalization.

Chief of Controllers

Controllers

Controllers are responsible for recording bib numbers of all racers passing their control station and any rule infractions applicable to the race being observed. Controllers reporting rule infractions may be called by the jury to further explain details and must remain available for this duty after the race. But remember, the controller's duties do not include seeing how many skiers one can disqualify, but rather ensuring that no one has an unfair advantage in a race because he/she has contravened the rules.

Duties:

collect clip board, controller forms required, infraction report forms, course map, at least two pencils (the use of pens by Controllers should be discouraged as the ink in them tends to freeze and then will not write)

fill in all information listed on the top of each form including your "on course" location

ski or walk to assigned station

record skiers' bib numbers as each one passes the control point, both in the sequence/order that they pass the control point and by laps (see below for technique suggestions)

record observed infractions as you see them, giving a short description of each. A sketch may be used if it can better explain the situation

keep in touch with your Chief if you have a radio and report any infractions recorded as soon as possible during the race, and especially as the race end draws near. If you have any infractions to report, your forms must be turned in ASAP.

Equipment:

clipboard, control forms, course maps, start list, pencils, knife, lunch, racing or light track ski equipment, radio, possibly additional warm clothing.

General procedures

When skiing to their assigned position, it is essential that controllers do not herringbone up hills where racers will ski straight up. This action and the use of wide skis and wide boots or bindings will lead to rapid deterioration of the track. Remember to carry warm clothing and boots as you will be standing for a long time on the snow. A wooden board or insulating material to stand on protects feet from getting cold too quickly.

Procedure for recording bib numbers

Using the Bib Order forms shown in Appendix 6, the controller records each skier's bib number in the order that they pass by the control point (this recording is absolutely mandatory!). When more than one lap is skied, the bib numbers continue to be recorded as each skier passes the controller, again in the order that they pass by. This information is used to ensure that each racer has passed each control point the correct number of times; the sequence is important to help sort out possible infractions. If, for some reason, a skier is missed because the bib number could not be read, then make a note of the bib numbers before and after that skier, and obtain and record some identification of the particular skier, such as the uniform color, the type or colour of the boots, a name that might have been shouted, etc.

The second recording of bib numbers is done from the first recording. This is the recoding of bib numbers on a form that is in bib number order, such as the lap count form; this records the number of times each skier has passed the control point. A check mark is placed in the box corresponding to the bib number of each skier each time a skier passes the control point. This form must be completed very carefully as it contains a great deal of information that is highly useable very quickly, but primarily shows which bibs have not been seen the correct number of times at that control point. See below as to how to perform this double recording.

Bib recording should never be done at an intersection where some racers will be turning off the trail to ski a different course. It should be done past this point, so that there is no question as to whether the racers skied the course or not. It is too easy to record a bib number of an on-coming racer, believing that the racer will continue along your trail, and then find that he/she turned down the other trail and didn't ski the correct and full course. It could result in a skier being awarded first place when he/she didn't ski the full course, when your control sheets shows the person as having passed the control point.

This double recording is usually easy to do when skiers pass the control spot one at a time with time between consecutive skiers. But when they come in a train or group, the double recording is more difficult. Therefore, since there should be two controllers, one controller (the person with the lap count form) should call out loudly the bib numbers to the second controller who will be recording the numbers on the Bib Order Form (Page A6-1) in the sequence that they pass the control point. Once there is a gap in the arrival of skiers, then the second controller can call the last train of bib numbers back to the first controller who will write/check them on the Lap Count Form (Page A6-2). The controller calling out the bib numbers from the Skier Sequence Form should tick off each bib called to the other controller to ensure that all bibs have been recorded on both forms, and only for the number of times that the bib numbers have been recorded on the Skier Sequence Form. Sometimes another train of skiers will interrupt this process, so it is important that any periods of time without skiers arriving should be used to get both forms in synch with each other. The checking off of each bib number transferred from the Skier Sequence Form to the Lap Count Form at the time of transfer will ensure that, should this process be interrupted with arriving skiers, the controllers will know where to start again in transferring the bib numbers to the Lap Count Form.

The Skier Sequence Form is very important in settling disputes as to whether a racer skied the full course. The Lap Count Form is used to ensure that each racer skied the required number of laps, and is used toward the end of a race to see how many racers are still on the course and what their bib numbers are. Sometimes, skiers drop out of a race, and Controllers will not know this until they see a missing lap for those skiers and so these bib numbers must be identified to the Chief of Controllers so that it can be determined what happened. Any missing bib numbers must be brought to the attention of the Chief of Controllers immediately upon returning to the stadium after the race.

Procedure for recording infractions

If the controller feels that some infraction of the rules has been committed, a detailed description of the infraction should be noted on the appropriate form. The recording must include the bib number of the skier who committed the supposed infraction, the time of the infraction (a wristwatch time is fine), a description of the infraction, and any bib numbers of racers who were near the infraction or might have been disadvantaged by it. All of this may be very useful to the Jury in determining if an infraction was in fact committed, or in the event of a protest or disqualification. It is very important that controllers do their job conscientiously and that numbers are not misinterpreted or missed completely as this may result in a skier being falsely accused. By working in pairs, if both officials see the infraction, then it provides more evidence for the jury. However, if the second controller does not see the infraction, then the first controller should note the infraction and report it to the Chief of Controllers anyway. The controllers reporting and witnessing any supposed infraction must remain around the stadium area in case the Jury decides it wishes to review the facts with them or wishes to confirm any information.

The post of Controller can be a very busy one, having to record bib numbers and infractions quickly. As an aid, the use of a battery operated dictaphone (or transcriber) can be very useful. But remember that the cold can affect the batteries, so absolute trust should not be place in its workability. It should only be used if the tape is fresh, and the batteries are fully charged. Recording of bibs and infractions should be written on paper in pencil (which won't freeze in the below-zero weather as a ball-point pen might) as soon as possible.

Chief of Course

Chief of Forerunners

—Forerunners
—Course Closers

The Chief of Forerunners manages forerunning and course closing activities. First and foremost, forerunners are used to "ski in" the course before the first racer starts. Skiing in the course ensures that the tracks are packed and firm for the beginning skiers. Forerunners are also tasked with ensuring that the course markings are in place and are clear, that trails not being used are clearly cordoned off, that tracks have been removed or not set in the first place on difficult parts of the course, and that the course is safe. However, any problems that are discovered should not be fixed by a forerunner but must be reported immediately upon returning to the stadium to the Chief of Forerunners who will arrange for the appropriate personnel to remedy the situation.

Duties:

must ensure that the Forerunners know the course and are suitably equipped and waxed for the technique being used for the event.

start the Forerunners at the time given by the Chief of Competition.

organizing the Forerunners to provide ceremony for the beginning of the race if so required.

Equipment:

course map, radio

Chief of Forerunners

Forerunners

Forerunners are competent skiers who have the responsibility of skiing the tracks just prior to the race so that early skiers are not disadvantaged. It is generally acknowledged that skiers go faster on tracks that has been fairly recently packed (or skied in), particularly if snow has fallen after the tracks have been set and before the race. It is not necessary that each forerunner ski the complete course; rather, it is strategically better to split the forerunners up so that various parts of the course can be skied at the same time which shortens the time taken to ski in the whole course and return to the stadium area. Of course, the forerunners must ski the course in the proper direction.

Equipment:

Racing skis, special bib

Traditionally forerunners are the last stage of track preparation for a classic technique race. This is still true today, although with modern tracksetting equipment, fewer forerunners are required for present day races. Forerunners fulfill a number of other functions during the race: they are a part of the opening ceremony at the start of major events; they alert officials on-course that the race has begun and that racers will soon follow; and they review the preparation and signage of the course and report to the Chief of Forerunners any situations that are inadequate or wrong, are confusing, or require improvements. In addition, they are often used to ski up and down the stadium tracks to ski in the start and lap lanes.

Forerunners ski the course in numbers dictated by the track conditions. Two or three are adequate if the course is in good shape and possibly up to twelve are required if there is a heavy snow fall and the race is important, or if there are a number of different courses being run during the competition, making it too onerous and time-consuming for each forerunner to ski each course. The skiers must leave on the direction of the Chief of Forerunners, working with the Chief of Competition, so that they will not interfere with the actual racers. It is important that these skiers do not herringbone up the hills where racers will ski straight up. They should move off to the side if needed. The width of the skis and boots they use must be of racing standard so as not to break down the walls of the track. When more that one trail system is in use, each trail must be skied in by forerunners. This may result in using more than one group of forerunners.

Chief of Forerunners

Course Closers

Course Closers are competent skiers (often forerunners) or snowmobilers who have the responsibility of skiing or touring the course to ensure that the course is clear of all racers.

Equipment:

radio, course map, racing skis or snowmobile

General procedure

The Course Closers enter the course on the direction of the Chief of Forerunners, behind the last skier who is starting their last lap in the race. Their main purpose is to check for injured skiers who may be stranded on the trail. Course controllers and first aid personnel are often used for this purpose. Course Closures must ensure that all sections of the track are checked. They may also be asked to remove temporary barriers and flags etc. and in these situations would best travel by snowmobile. It is often faster and simpler to send a good skier around immediately behind the last racer, but at a distance behind that won't interfere or bother the last racer.

Chief of Course for most domestic events

Chief of Course Marshals

See Chapter 14 "Competition Security"

National Championships and World Cups may require that a Competition Security Committee be organized. The criteria for the establishment of a Competition Security Committee are the level of competition, number of spectators expected, and the individual site requirements.

Chief of Course

Chief of Temperature Stations

— Temperature recorders.

The Chief of Temperature Stations is responsible for maintaining the current weather information and forecasts on the weather board (**See Chapter 8-15**) in the starting warmup area and adjacent to the waxing facilities.

Duties:

supervise and position temperature recorders
post all snow and air temperatures on weather boards and weather forms
post wind and humidity readings on weather boards
turn in weather information form at end of race to Chief of Results

Equipment:

temperature recording boards (2), radio, thermometers (six required in ℃ - one for snow and one for air at each location), barometer, temperature recording form, wind chill chart.

General procedure

Temperature is an important factor that affects many decisions during the race day by officials and coaches. Almost as important is the wind speed and humidity; however, equipment to measure wind speed is expensive and is not generally available for use. To provide a good cross-section of the weather condition found on the course, it is necessary in major competitions to provide air and snow temperature readings from the:

high point on the course
low point on the course
stadium area.

Readings which should be taken for a thorough study include:

air temperature in a shady location one (1) m above the snow at each station.
snow temperature in a shady location one (1) cm into the snow at each station.
relative humidity (may not be possible without special equipment).
wind velocity at the stadium (may not be possible without special equipment).

These measurements should be recorded at half-hourly intervals commencing two hours prior to the start of the first race. The readings should be taken away from the effects of adjacent buildings and direct sunlight. This recorded data provides valuable information to the Jury in the event of deciding postponements of start times if it is too cold (below –20C). Temperatures below –20 C can cause hypothermia, severe frostbite, and/or lung damage due to breathing in large and rapid quantities of the very cold air. Coaches use the weather board information to monitor any changes and trends in the temperature and can then adjust their waxing for later skiers.

The Chief of Temperature Stations may request a controller (with the permission of the Chief of Controllers) to take the necessary temperature readings at the high point or low point providing they are suitably located and can go out early enough. If not, Recorders will have to be sent out to do these duties. The Chief of Temperature Stations is responsible for taking the readings in the stadium area.

Chief of Temperature Stations

Temperature Recorders

Temperature Recorders locate themselves at either the high or low point on the course to record the snow and air temperature every half hour, starting two hours before the start of the first race. They continue to report the temperatures to the Chief of Temperature Stations until the last racer has started.

Equipment:

two thermometers, temperature recording form, course map, radio, light track or racing skis, warm footwear and clothing

General procedure

Temperature recorders usually ski to their locations on the course early enough to record their first temperature readings at least two hours before the start of the first racer. Their location on course is usually decided by the Chief of Course. They locate their

thermometers as described under the Chief of Temperature Stations to provide consistent temperature readings and maintain regular radio contact with the Chief of Temperature Stations. Temperature Recorders must ensure that they do not affect the true temperature of the thermometers by handling them with warm hands, breathing on them, or letting them remain in the sun too long while reading them.

Chief or Temperature Stations

Temparature/Weather Board Recorder

The temperatures that the Temperature Recorders gather at each of the measurement points must be radioed to the Temperature/Weather Board Recorder who will write them on the large board in the stadium area each half hour, beginning at least 2 hours before the start of the race and continuing until the last skier has started. For Sprints and Pursuit Competitions –Without a Break, the recording on the board should be continued until all heats are finished or the last competitor has left the exchange/pit area to ski the second race. The information on the board, especially the temperature trends, is very important information for waxing, which often continues right up until each racer's start.

Stadium Layout & Grooming

General Layout

The stadium and its tracks are part of the field of play for a cross country ski race and as such they and the support areas around them must receive major consideration when planning and designing a stadium. The ideal area required for the actual competition requires an open flat space 60+ meters wide and 160+ meters long for the most demanding formats at the international level of World Cups. Additional space for timing facilities and spectator viewing is required along each side. The end zone, behind the start line and after the finish line, requires an additional 30 to 40 meters. The actual size for the stadium area will depend on the space available as well as the level, size and type of competitions planned to be hosted on the race site, e.g., local club races vs. loppets vs. Olympic type events. Other sports using the stadium may also affect the size and design. A day lodge is often located in the stadium area providing additional services and conveniences.

Grooming and tracksetting of the course in the stadium is the responsibility of the Chief of Course working in close liaison with the Chief of Stadium. Course grooming and tracksetting details are covered in Section 6.

Stadium Layout Designs

When considering the layout design of a stadium, one needs to take into consideration the following points. The layout of cross country ski racing stadiums is influenced by the access to the course racing trails. The layouts fall into two general design types, the first being the STRAIGHT “THRU” design, in which the start lanes or tracks access the course at one end of the stadium and the returning course tracks enter the finish lanes or “thru” tracks from the opposite end of the stadium, and the second stadium design being the HORSESHOE, in which the start and finish tracks leave and return to the stadium at the same end while the “thru” lanes enter and leave the stadium from this same end but follow the “U” shaped edge of the stadium. The Horseshoe design is more popular for high performance racing sites because of the exposure offered to the spectators while the racers ski through the stadium on the “thru” or lap track. Note also that the Horseshoe generally has a competitor entrance at the curved end of the “U”, either beneath or over the lap/thru lane. Stadium security tends to be a bit easier with this latter design since the start, finish and “thru” lanes are enclosed from spectators.

The stadium design sketches below show the flow of skiers through the stadium area and the location of the various support services for the two major type of events. You will notice that both stadium designs accommodate interval start races, and mass start ones also.

Generally, the start line, the finish line, and the line where times will be taken for skiers lapping through the stadium should be aligned approximately beside each other in the same area of the stadium. It should be in front of the timing building so that the timing staff can view all three areas from it and be able to note bib numbers, etc. It is not necessary to have the lines perfectly aligned, just be in the same general area of the stadium.

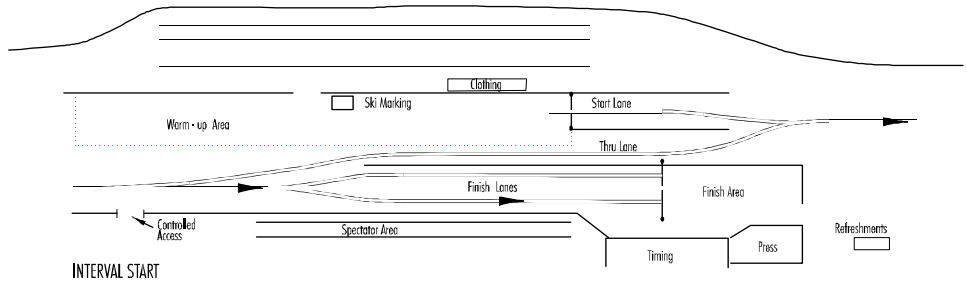
The “Thru” design can have more skier control problems than the Horseshoe one, simply because access into and out of the stadium is all done on one side of it, usually requiring the crossing of one or more lanes by skiers moving to the start area or those finishing. Judicious positioning of the start, finish, and lap corridors can reduce/minimize this traffic problem. More will be said about this aspect later on. With the Horseshoe layout, if the entrance to the inside of the “U” is beneath or over the through/lap lane, traffic control is much less a problem. But if the entrance is actually across the lap lane, then there will be a need for at least two marshals stationed at the point of cross-over to control the traffic in and out, so that this traffic does not interfere with any skiers on the lap lane.

In setting out the stadium for a competition, it is generally advised that a somewhat “permanent” type of barrier be erected to separate the spectators from the competitors and officials. This may be a truly permanent fencing, or temporary fencing that cannot be moved easily by spectators, thus possibly compromising the competitors. Examples of the latter type of fencing includes the metal sections of fence that hook together (often used by police for crowd control in non-skiing situations) or snow fencing (ensure that there are no parts of such a fence that can injure anyone who comes in contact with it). However, within the stadium, it is highly recommended that the fencing be quite moveable so that stadium grooming and tracksetting can be performed quickly and easily. The use of V boards are highly recommended. Also note that, where space is at a premium in a stadium, one can centre the V boards (or similar type of fencing) exactly on any dimension mark, rather than having to allow additional space to accommodate the dimensions of the boards. Likewise, survey whiskers (stake chasers) and/or short stick flagging can be used to delineate lanes and lines.

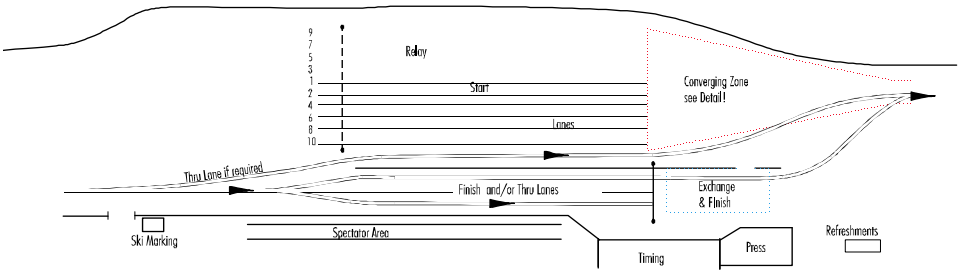
The following pages show diagrams of properly set stadiums for various start and finish configurations. These should be studied carefully, and adapted as closely as possible to the stadium space and design that is to be used for a competition.

Thru Design Stadium

THROUGH STYLE STADIUM LAYOUTS



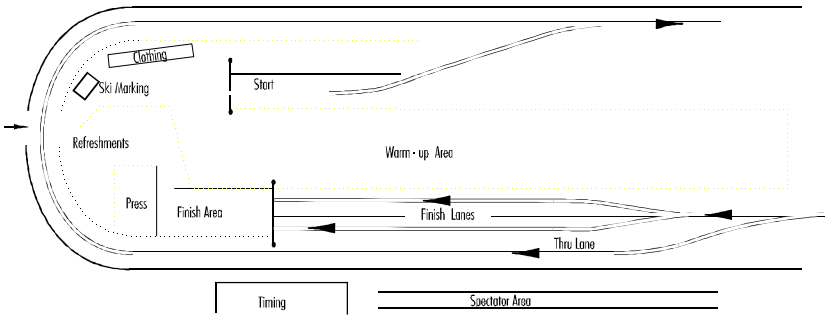
INTERVAL START



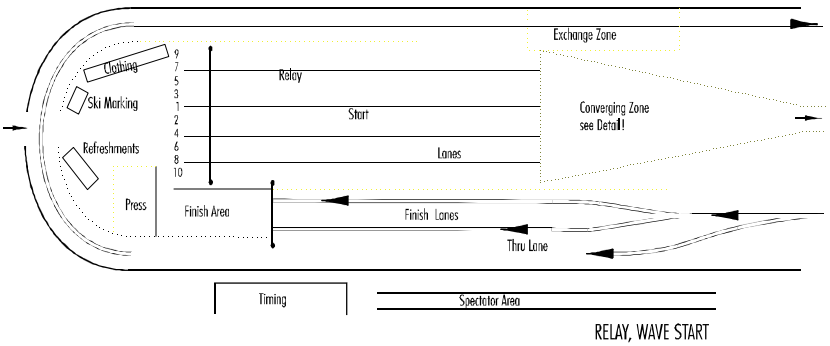
RELAY, WAVE START

Horseshoe Design Stadium

HORSESHOE STYLE STADIUM LAYOUTS



INTERVAL START



RELAY, WAVE START

Note: These layouts date back to the Calgary '88 Olympics and the recent changes in 2005 have removed the ramp on the horseshoe and have relocated the Finish Corridor so that it is adjacent to the Timing building. These changes provide more flexibility for stadium layout and better exiting flow for athletes,coaches and media for post race activities.

Stadium Layouts - Starts

Overview

The start area of a stadium has a number of common areas, no matter what the start format is. Competitors should enter the stadium into an area where they go through equipment check and ski marking, except for all sprint competitions in which ski marking is not done. After passing through ski marking, there should be an area where skiers can ski about to stay warm before they enter the start chute. In this area, there should be a place to check the warm-up clothing that they will shed just before the race. This area should be strictly controlled, because this is where the skiers will do their final preparations for the race, so the fewer the disturbances, the better. Each skier's clothing should be placed in a bag (white or beige translucent plastic) and the skier's bib number put on it using a black or dark felt marking pen, and then transferred to the finish area for pickup by each skier at the end of the race. The bags should be arranged in bib number order so that a skier can locate his/her bag quickly. Finally, within a couple of minutes of their start time, they will enter the start chute and be ready to go within a very short period of time.

Ski Marking and Equipment Control

Upon entering the stadium, a competitor who is about to begin the day's race must go through a check of the racing suit, the skis and the poles that he/she will be using. It is done to ensure that these items conform to the rules and regulations governing dimensions and commercial markings (see www.fis-ski.com/, under Rules and Regulations, FIS General Rules, Equipment, and the CCC website) that govern the race. This check is performed as the competitor enters the start area of the stadium

The first check that is performed is the commercial markings one. The competitor must remove any warm-up clothing that is being worn so that the clothing and equipment checkers can see what commercial markings are on the racing suit and then has the opportunity to verify that they either conform or don't conform to the rules. If the suit does not conform with commercial marking rules, the competitor must be informed of such, and asked to rectify the situation before he/she starts (they can be covered with something that will last the duration of the race, or perhaps the non-conforming markings can be covered by wearing the suit inside out). If the situation is not rectified, the competitor may start the race, but this infraction must be reported to the Competition Secretary who will bring it to the attention of the TD and the Jury.

Then the skis and poles must be checked, again to conform to the rules. Skis must be no shorter than 10 cm less than the person's height, standing on a flat and firm surface; there is no maximum length. Each ski of the pair must also be constructed in the same way, and must be the same length. Poles must be no taller than the person's height nor any shorter than the person's hips, measured by placing the tip of the pole on the ski in front of the binding. They also must have a constant length (i.e., may not possess a telescopic system) and may not have any ability to create a foreign energy to favour push-off (e.g., springs or mechanical devices). If the skis and poles pass inspection, then the skis are marked with the bib number and a special mark, after which the competitor can proceed to the warm-up area.

Generally, for all races except sprint races, the skis are each marked with the skier's bib number and a special mark that makes the marking unique for that particular race (the ski marker should ask the competitor to show his/her bib to verify the number to be marked on the skis). Ideally, the bib number should be placed within the special mark. The reason for the special mark is so that another pair of skis can't be easily marked by a non-official for use later out on the course, to make it look like the skier skied the whole course on the same pair of skis. The use of different coloured markers, or specially designed stamps, also helps in this process. Only 1 pair of skis per race may be marked. Also, a list must be kept that records which racers have had their skis marked; usually a start list is used by simply putting a check mark beside the bib number which indicates that the skis were marked. This list will then be sent to the finish line where another mark will be put beside each racer's name indicating that he/she crossed the finish line with the marked skis. Should a person race on unmarked skis, this fact must be reported to the Chief of Start and Finish who will bring it to the attention of the Jury.

For a Pursuit Competition - Without a Break, both pairs of skis must be marked prior to the mass start since there will be no time to mark them in the exchange zone. The second pair of skis are not allowed to be handled (except to put them on) in the exchange zone or removed until the competitor has finished the competition (Rule 342.1.4). However, in domestic races, skis may be removed by designated officials so that subsequent categories can be started before the last skier in the current category is finished and is able to remove his/her skies; but they need to be kept somehow by bib number in a secure area so that they can be reclaimed without confusion.

Skiers should arrive on a continuing basis instead of all at the same time. Skiers are notified prior to their start time if they have neglected to have their skis marked. **The ski marking team must be aware that, for some races, skiers start either all together (mass starts), or at a much faster rate than a normal interval start (e.g., a pursuit start), and therefore the ski marking process must be either started much sooner before the start of the race or there must be multiple marking stations available (therefore more staff required) to maintain a smooth operation of the race.**

Interval Starts

Races using interval starts will have a start line where each racer will come to, stop, and wait for their start time and/or signal. Preceding this line, there will be a waiting area for the next few skiers waiting to start, then preceding this a warmup area, and before that a ski marking and clothing area. At the start signal, each skier will follow the start track out of the stadium where it will merge with the lap lane, and so continue on.

Where double starts are being done, there must be two start lanes, beside each other, that will converge with the lap lane about 30-50 metres from the start line. For a classical race, the start tracks should be about 1.5m – 2 m apart. For free technique races, the start lanes should each be 3 metres wide and their separation marked, with survey whiskers or other flexible markers, to the start of the convergence zone. Free technique races require more space for starters, so it must be provided.

Beside the start line, on a line that is the extension of the start line, there needs to be a late or false start line and area. This ""starting lane" is used for skiers who are late in arriving at the start line at their proper start time (since they must not interfere with other starting skiers who arrived on time), or who have started early and are recalled to pass the starting lane again (see the False Start Controller position description for details of these situations). So not only must there be enough space to start someone from this position, but there must also be additional space to provide a return lane for a recalled skier to return to the extended start line and cross the false start line.

In the diagrams in this section, it generally shows the lap lanes to be through the middle of the “Thru” design. This is so that, when skiers are on their last lap, they simply have to veer off the main track into the stadium to the finish lanes, while the lap lane continues on to merge with the start lanes. Therefore, the location of the start lanes, by default, are shown to be on the far side of the stadium away from the spectators side. However, there is an argument to be made that, if the lap lane were put on the far side of the stadium (instead of the start area), then the start area would occupy the middle of the stadium. Since the finish lanes should be located next to the spectator/facilities side (for high spectator appeal, for better finish timing, and for exiting tired racers from the stadium after their finish), then it is possible to have the central area for the start area. This would also minimize any interfering traffic of the lap lane (no crossing required), and if the entrance to the start area was from the end near the finish area, then no crossover traffic would occur. Racers entering the stadium to start would enter between the finish and start lanes to the ski marking and warm-up areas, and with proper fencing would not interfere with either the start or the finish. With the Horseshoe design, the start and finish will occupy the inside of the “U”.

All this having been said, there are many possible combinations of start, lap, and finish layouts within the stadium and the best must be selected for each of the various race formats.

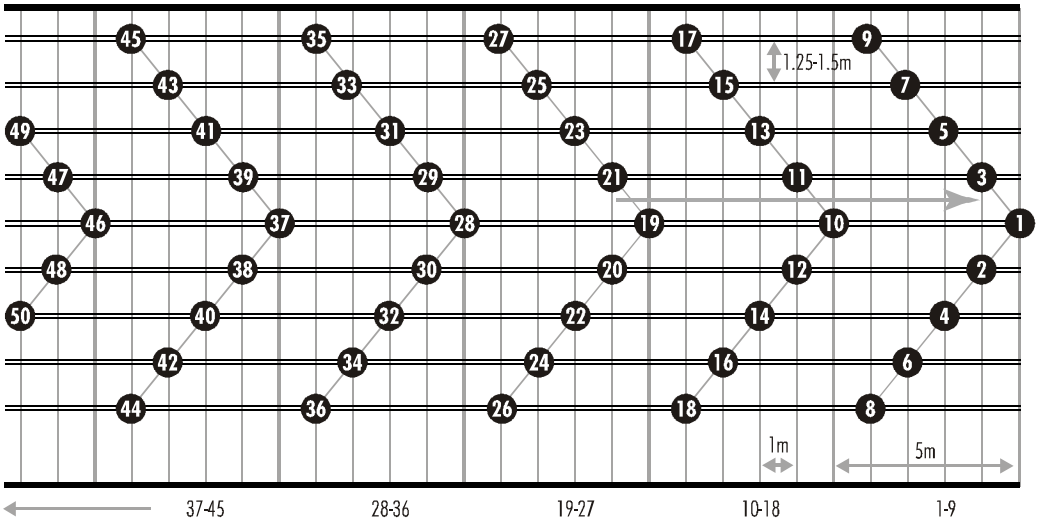
Mass Starts

The mass start is usually a very exciting one, but it requires a great deal of space. At this time the chevron layout is used for all mass start races.

(a) Mass Start layout –Chevron

Mass Start - Arrowhead - Classic Technique

Layout: 10 x 5 m = 50 m = 90 Start positions
The angle of the sides of the arrow can be adjusted to compensate for a curve to the tracks as the tracks lead into the course. This layout establishes the relative distance that each competitor must ski if the course was straight ahead. Each row can have an odd number from 7-15 racers.
Tracks normally continue 15-20m past position #1 prior to the first converging zone.

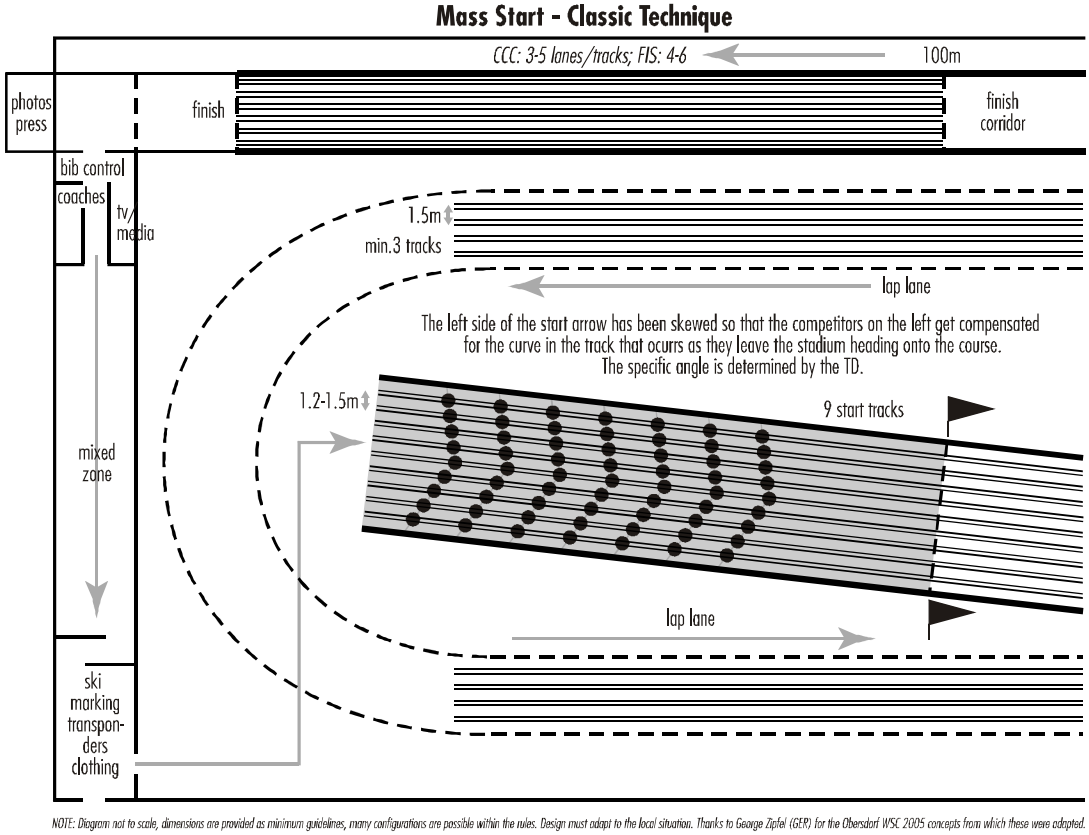


The chevron layout resembles a series of arrowheads, all pointing toward the front or start line, and all in parallel one behind the other. To obtain symmetrical arrowheads, one should start with an odd number of lanes. It is laid out as follows. The lanes are numbered from the centre lane, this being #1, with the 2nd lane being the lane next to it on the right, the 3rd lane being the first lane to the left of lane #1, the 4th lane being to the right of lane #2, the 5th lane being to the left of lane #3, and so on (so the even numbered lanes are on the right side and the odd numbered lanes are on the left side of the centre lane). The first skier is given the starting position in lane #1 right on the start line; the second skier is placed in lane #2, 1 metre behind the 1st skier; the 3rd skier is given lane #3, 1 metre behind the 1st skier; the 4th skier is given lane #4, 1 metre behind the skier in lane #2; the 5th skier is given lane #5, 1 metre behind the skier in lane #3; the 6th skier is given lane #6, 1 metre behind the skier in lane #4, and so on. As each row is filled, each skier is 1 metre behind the skier beside him/her in the same row. So the first "row" of the chevron is like an arrowhead. Now the second "row"/chevron is filled, and the first skier of the second row is placed in lane #1, either even with the last person placed in "row" #1 (i.e., no 1 metre separation behind the last person placed in the arrowhead ahead but rather even across the grid), or 1 metre behind the last person placed in the arrowhead ahead (check the applicable Technical Package and/or rules of the particular event). The rest of the positions are filled as they were for the first arrowhead in the chevron. Remember, the purpose of the chevron is not to be equally fair; it is to merely to spread out the field of skiers to provide a safer transition on to the course with the highest possible speed and to minimize the time in the grid for those at the back.

The use of the chevron start design has been encouraged since, if everyone holds their position relative to those around them as they move toward the start line, upon convergence, there are only 2 skiers vying for the same spot on the trail rather than 10 or so others in the row if the arc design were used (since all the skiers in each row of the arc are equidistant from the centre lane of convergence). This has reduced the incidence of broken equipment in the mass start process, which is considered something good. It has also resulted in a more organized convergence into the initial train of skiers as they move into the much narrower trail system.

This chevron design is also much easier to lay out in the start area than the arc design. First, the desired number of lanes, each with a set track, must be set in the snow, each set of tracks 1.2-1.5 metres apart. Then, the start line is marked at the head of the first lane at the point where it is desired. Then the point on each of the outside lanes that will position the skier in the lane is marked. Taking a rope (or even the tape measure that is being used to do all the measuring), hold one end at the head of the first lane, and the other end at the point on the outside lane where the outside skier will be positioned, and mark each spot where the rope crosses the lanes between these two points. Do the same on the other side of the start area. These will be the positions of the skiers who will fill in the first chevron. Then, move back to lane #1 at the point of the last chevron, and measure along lane #1 the number of metres that the farthest outside skier of the previous chevron was from the point of his/her chevron, and mark this spot. This will be the starting position of the first person in the second chevron. Repeat the above process for each chevron.

It is possible to start the creation of the chevron from the back of the mass start area if the maximum amount of double poling distance before the end of the lanes is desired. This time, mark the position in the middle lane of the skier who will be positioned in the outside lane. Extend this point 90 degrees to the outside lanes. Measure up the middle lane the number of metres to find the position of the skier at the head of the last chevron, hold the rope between this middle point and the outside points, and mark each point where the rope crosses each lane. For the next chevron in front, go to the "first" position of the last chevron, extend this point 90 degrees to the outside lanes, and carry on as above. Continue to do this for as many arrowheads as are required.

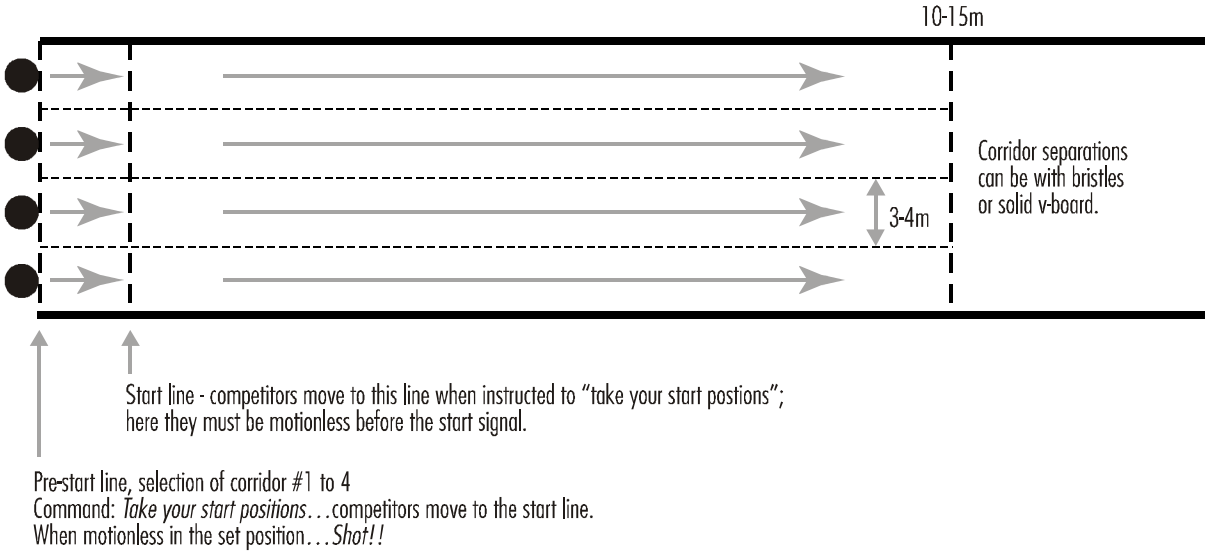


(b) Relay Start layout – Arc Design Removed.

The chevron design has a line where all of the start lanes end. This line is the end of the mass start lanes, and it should be marked in colour on the snow so that each racer is well aware of where he/she can leave their lane and continue in the technique of the particular race. Then, there is a convergence zone to the actual race course. For a free technique race, it should be about 75-100 metres long, at the end of which the skiers should be into the normal trail width. For a classical race, the convergence zone has a number of sub-zones. Following the end of the mass start lanes, there is a 5-10 metre gap with no tracks set, but the classic technique must continue to be used. Then there is a distance of about 30-45 metres where the number of set tracks is half the number of start lanes. This is followed by another gap of 5-10 metres with no set track, followed by another distance of about 30-40 metres with half again the number of tracks. Then there should be a third gap of about 5-10 metres after which the skiers are into the main trail. These gaps are indicators to the skiers that the number of set tracks are continuing to decrease, so they need to be concentrating on making the transition to the reduced number.

Individual Sprint Starts

Individual Sprint Start Line Setup - Free Technique
(up to 6 corridors can be required)



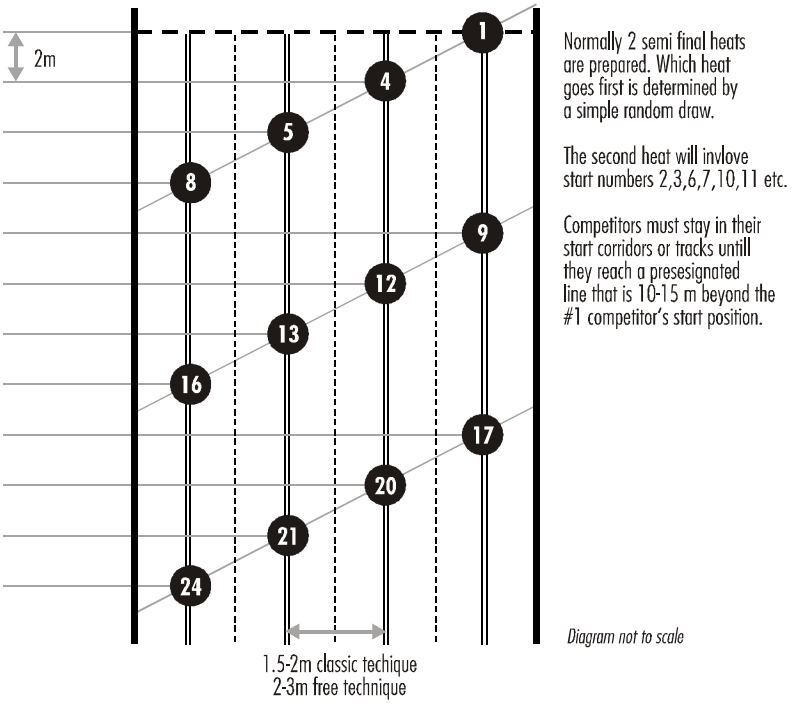
The stadium has to contain a start area for individual wand-timed starts in the qualification race, a start area that accommodates 4 or 5 racers in each heat of the quarter-finals, 4 racers in the semi-finals and finals, and 4 finish corridors (there should be the same number of corridors at the finish as there are racers in the heat). Therefore, it takes some planning. It is suggested that the stadium be set up to handle the sprint heats, and that one additional lane be established to be used to start the qualification round.

There needs to be a start line from which each heat of competitors leaves after the starter yells "GO" (or fires a gun), and another line about 2-3 metres behind the start line, where the competitors in each heat are positioned before they are ordered to the start line. This line is called the "pre-start" line. Behind the pre-start line, there needs to be some space to allow competitors to move about while they put on skis and poles, and stay warm.

For individual sprint competitions, it is suggested that the start be organized with straight corridors or straight set tracks for the first 50 metres before ending where the racers can then converge to the best line of the course (it is important that the best line be toward the middle of the start corridors so that no competitor is unduly penalized by having to ski noticeably farther to arrive at the best line of the course – this is particularly so for the outside start lanes). These corridors may be a bit shorter (minimum 30 metres) if space is a problem. They should be each 3 metres wide for free technique races, and 1.5 metres for classical technique races, and flagged as corridors.

Team Sprint Starts

Team Sprints Semi Finals



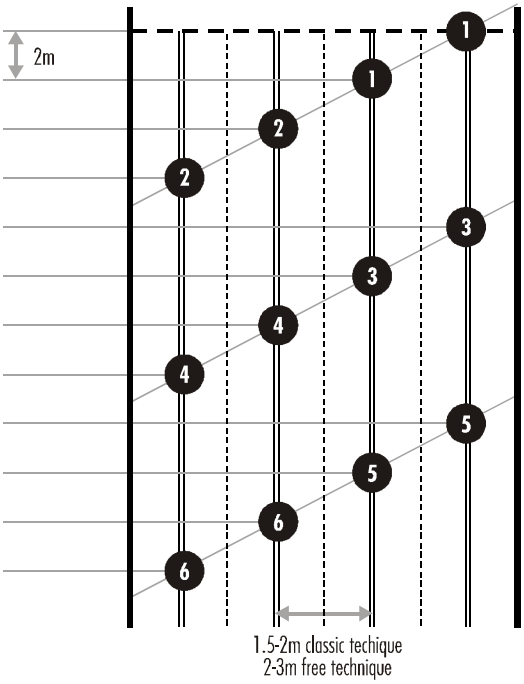
Normally 2 semi final heats are prepared. Which heat goes first is determined by a simple random draw.

The second heat will invlove start numbers 2,3,6,7,10,11 etc.

Competitors must stay in their start corridors or tracks untill they reach a presesignated line that is 10-15 m beyond the #1 competitor's start position.

Diagram not to scale

Team Sprints Final



The best 5 finishers from each semi final are placed into the start grid based on their rank in the semi finals and ordered by their total team sprint points. Since this is how the bibs were assigned origonally the lowest bib number will be ahead in each of the paired start positions.

Diagram not to scale

A team sprint involves teams of 2 skiers each who ski as if in a relay, with each skier tagging off to his/her team member, and with each team member skiing alternately between 3 – 4 legs each (e.g., skiers A and B ski in turns A, B, A, B, A, B). As shown above the start area needs to be set up for a mass start using a half-chevron. It is normally 4 to 5 lanes wide. Straight parallel tracks2-3 metres apart (depending on technique), running at least 10 m in front of the first start position, should be established, followed by convergence zones as described above in the relay section Normally a half chevron start is used since seeding is based on the teams' total sprint

points. The starter for team #1 starts in lane #1 on the starting line. The starter for team #2 starts in lane #2 and so on. These positions need to be marked before the start of the competition, and this area must be protected from traffic since it may be used for a number of heats and the finals. It is recommended that a maximum of 10 teams be placed in a heat and in the final.

Pursuit Competition – With a Break

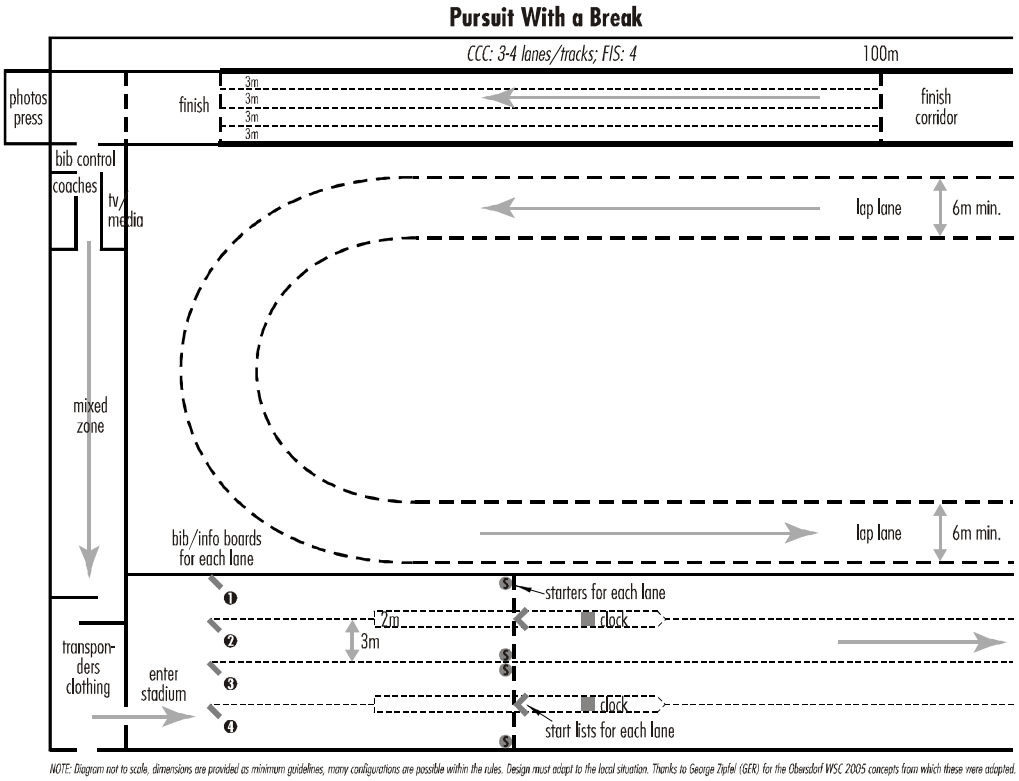
The first race of a pursuit is a standard interval start race. The results of this race determine the starting time of each racer in the second pursuit start race.

Each skier in the pursuit (i.e., the second race) will start as an individual in his/her designated start lane. But in the second competition, the trick is to determine how many start lanes that one needs to ensure that each racer is able to advance to the start line, and start without being so pressed for time that he/she does not start on time. This means that, in order to determine how many lanes are needed, one needs to look at the start times and determine if it is possible for a skier to move into the starting position and then leave in a very short period of time. For example, if skiers # 7-13 have the following times behind the winner of 45, 45, 45, 45, 46, 49, and 53 seconds, how many start lanes are required? If there are four lanes, and if skier #7 is leaving from lane 1, he/she will go out at 45 seconds (as will skiers #8 from lane2, #9 from lane 3, and #10 from lane 4), and skier #11 will go out at 46 seconds from lane 1. #11 will be leaving 1 second after the skier ahead in his/her start lane #1, i.e., #7. Will the starter in lane # 1 be able to get skier #11 into the starting gate and off in 1 second after #7? Not likely!

There are a couple of solutions. At the highest level in the sport, 4 lanes has become the maximum and normal number of lanes. So it would be basically a grab and release for #11, and while they are lined up prior to the start, this competitor would be advised that he needs to be ready to go immediately following #7. This situation needs to be rehearsed with the starter and assistant starter in any lane that would have starts very close together. The second solution would be to have 5 start lanes. This would then have #11 starting from lane 5, and the next starter (in the above example) in lane 1 would therefore be #12 at 49 seconds, quite doable from the starter's point of view with a gap of 4 seconds between #7 and #12.

So how many lanes should there be? That choice can be left to the Jury, but more than five start lanes begins to create an issue with everyone being able to see the start display clocks. The determining factor is whether there is sufficient time in any lane to get each skier into position, then off in a reasonable amount of time using 4 start lanes. If not, then an extra (fifth) lane must be added to the start procedure. It may be necessary to try a number of lanes and then see how close each racer is behind the one on front to determine if there are sufficient lanes to start everyone adequately. Practice on the part of the starters and assistant starters can make 4 start lanes doable.

So, once the number of start lanes has been decided upon, they should merge into one after a short distance of about 20 m. and then flow into the race course.



NOTE: Diagram not to scale, dimensions are provided as minimum guidelines, many configurations are possible within the rules. Design must adapt to the local situation. Thanks to George Zipfel (GER) for the Obersdorf WSC 2005 concepts from which these were adapted.

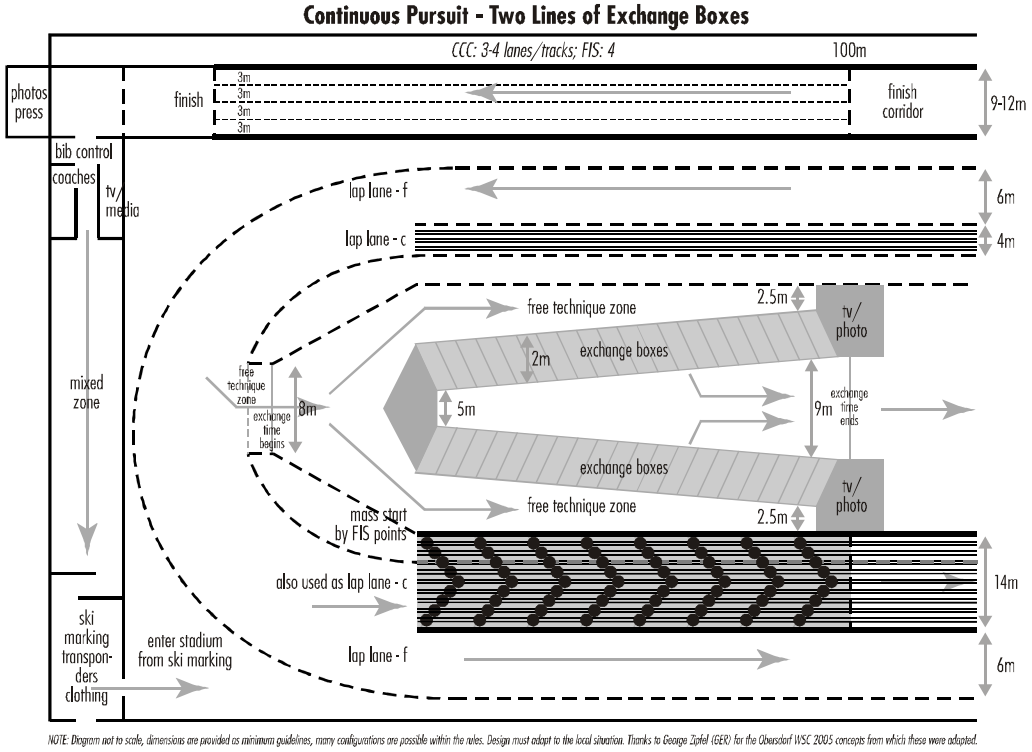
Pursuit Start (Pursuit with a Break)

use four or five lanes depending on the time gaps between racers in each lane or the ability of the starters to start racers very quickly.

converging zone - classic technique, reduce the number of tracks by half.

free technique, no tracks in lanes or in converging zone. Lanes are a minimum three meters wide.

At the head of each lane in view of both the starting skiers and start officials, there should be a display board listing each skier's bib number and his/her start time, in start time order. A flip chart will work providing there is little wind or rain or snow falling. As a skier leave the start, a quick checkmark is placed against the starting skier's entry on the flip chart. Likewise, two display clocks (one as backup) must be placed in front of the start line and be visible to the competitors and starters so that the starters can release the skiers when the clock time equals the times on the flip charts. Pursuit Competition – Without a Break



NOTE: Diagram not to scale, dimensions are provided as minimum guidelines, many configurations are possible within the rules. Design must adapt to the local situation. Thanks to George Zipfel (GER) for the Oberstdorf WSC 2005 concepts from which these were adapted.

A pursuit competition without a break consists of a classical part with a mass start, followed by the changing of skis in an exchange/pit zone in the stadium, and then continues with a second part using free technique. Therefore, the mass start setup will be used and the chevron layout is the norm (see above). This mass start grid is smaller than for regular mass start races due to the fact that lap lanes required for each technique and the special exchange pits consume large amounts of stadium space. 7, 9 or 11 start lanes is a normal upper limit.

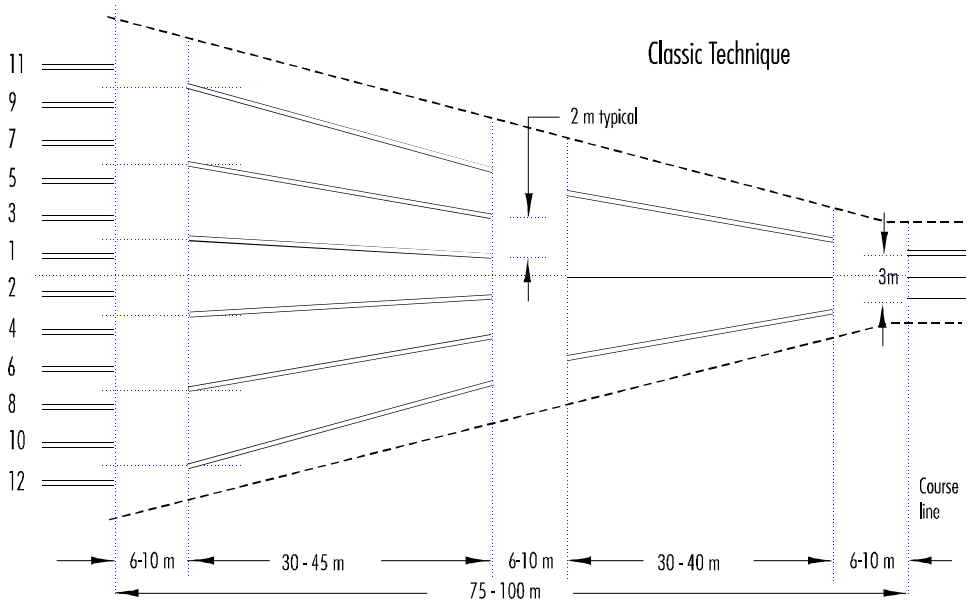
Popular Cross-Country Competition (Loppet)

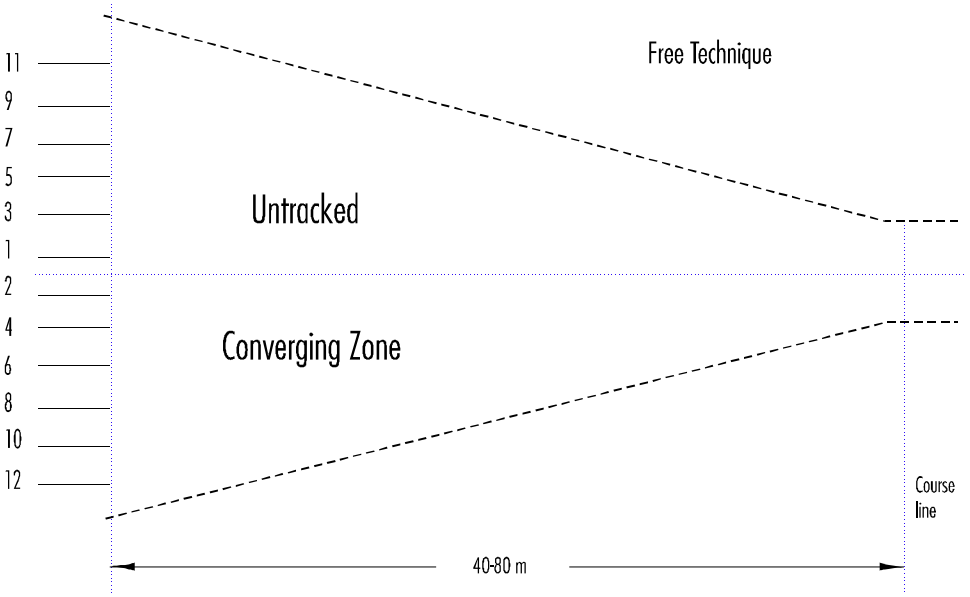
A loppet starts with a mass start. It also has the convergence zone, but does not converge down to 1 or 2 lanes but rather goes down to 5-6 lanes and stays that way over a distance that will allow competitors to spread out before entering the final tracks. For exceptionally large events, the number of tracks/lanes will be a minimum of two throughout the course, with possibly 3 or even more if necessary. The arc start is the most commonly used as it is easier to get the first competitors into proper lanes by seed to allow the fastest ones not to be held up or to "run over" slower skiers ahead.

Converging Zone for Loppet Event

Note that the length and number of start lanes and converging tracks is governed by the number of entries.

Mass Start Olympic Style Competition Converging Zones





Stadium Layout – Exchange Zones

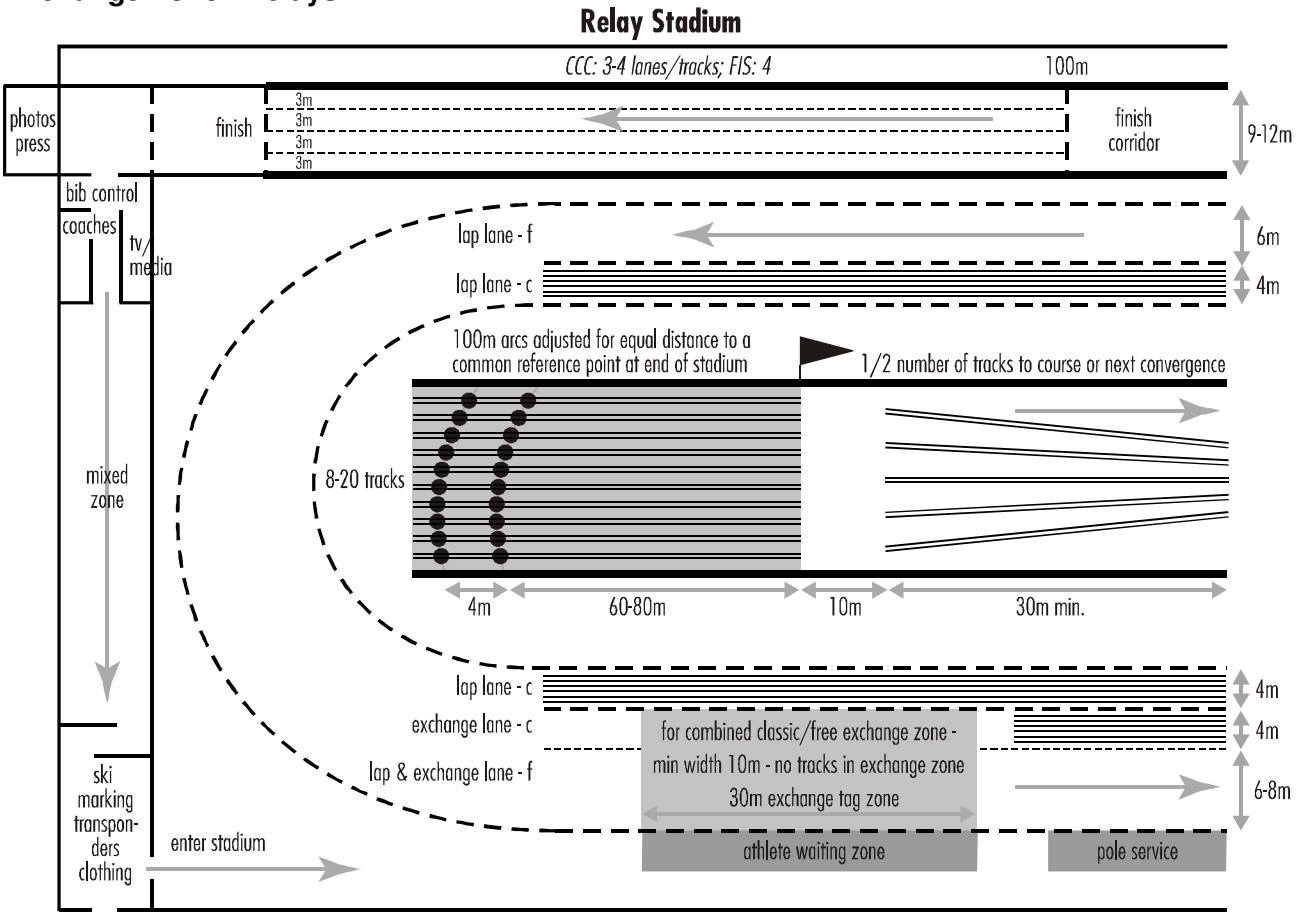
General

The placement of exchange zones must take into account the speed at which racers will arrive, the slower the better in order to minimize potential crashes and maximize the chance of a successful tag. As well, the zone cannot be placed too soon after a U-turn in the stadium. Competitors need time to set up their direction as they enter the exchange; after a curve, everyone is lined up on the inside so a short straight-of-way is needed for them to locate their teammates position.

If the competition is a classical technique one, then it is suggested that a couple of tracks be set that come into the exchange zone and stop just at the end of it. Then there needs to be a couple of tracks that start at the beginning of the exchange zone that parallel the incoming ones and continue out of the exchange zone on to the course. The incoming tracks must be paired with the outgoing tracks and close to each other, so that the incoming skier can ski alongside his/her outgoing teammate in the outgoing track and facilitate a good exchange. Otherwise, there may be collisions occurring if a skier and his/her teammate tries to share the same lane at the time of a tag, or if the incoming skier steps out of the track to come alongside his/her teammate and interferes with another team's skier.

Bordering each exchange zone, there must be a protected corridor to provide control of the racers entering and exiting the course

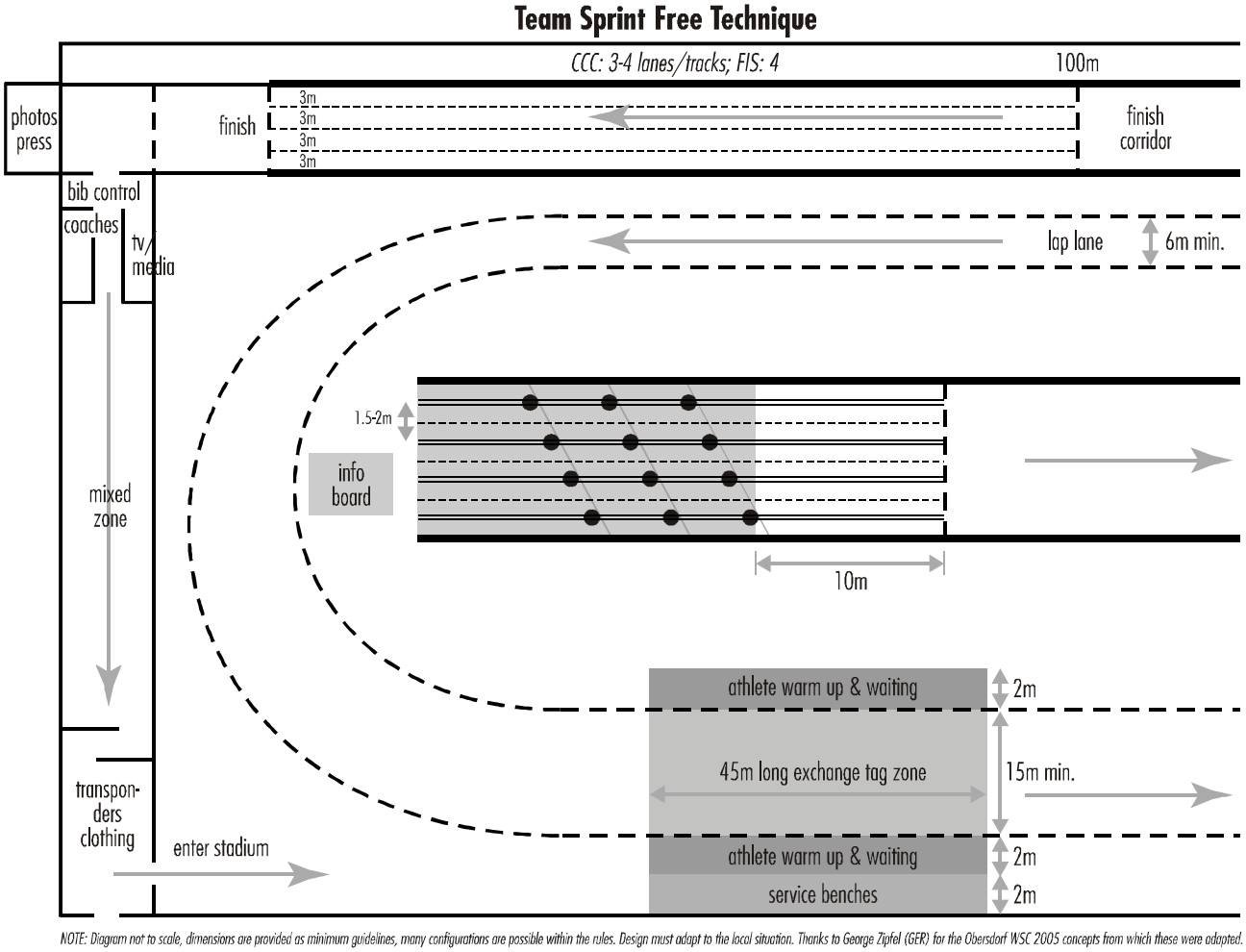
Exchange Zone –Relays



NOTE: Diagram not to scale, dimensions are provided as minimum guidelines, many configurations are possible within the rules. Design must adopt to the local situation. Thanks to George Zipfel (GER) for the Oberstdorf WSC 2005 concepts from which these were adopted.

Where an exchange zone is required, such as in a relay, an area must be set out in which to tag off to the next skier. The relay exchange zone should be 30 metres in length, and 10 metres in width. It is within this zone that each incoming racer must tag off to the next skier on their team. The beginning and end of the exchange zone must be marked on the snow in contrasting colours, preferably green for the beginning, and red for the end. If a tag is not done within this area, the fact is recorded and reported to the Jury without delay. The Jury may apply a sanction.

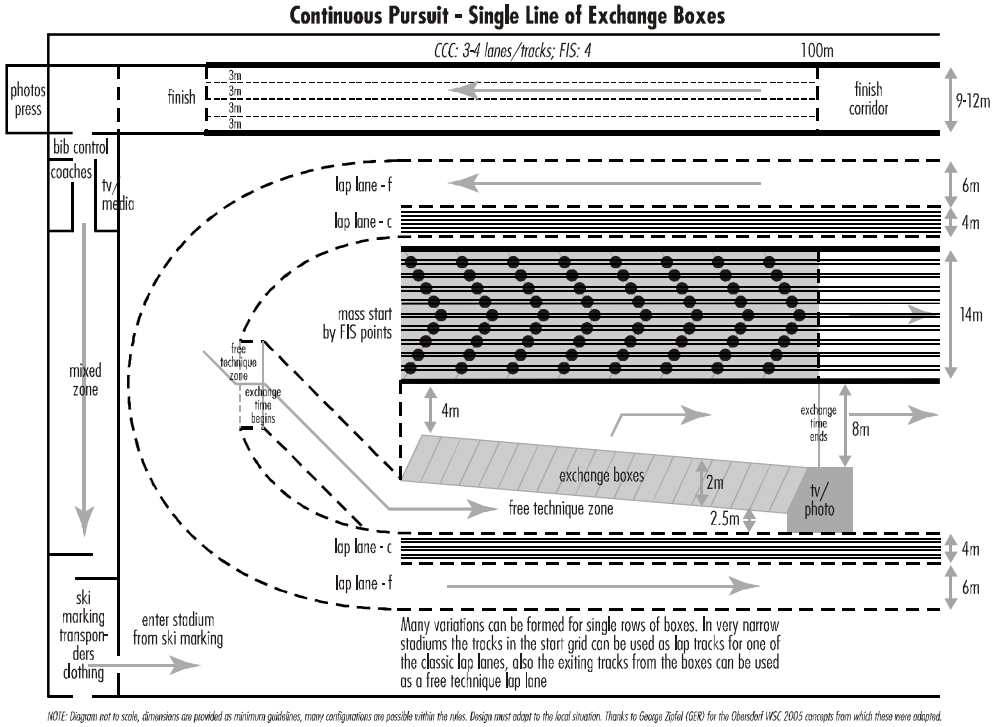
Exchange Zone – Team Sprint Competition



NOTE: Diagram not to scale, dimensions are provided as minimum guidelines, many configurations are possible within the rules. Design must adapt to the local situation. Thanks to George Zipfel (GER) for the Obersdorf WSC 2005 concepts from which these were adapted.

For team sprint competitions, an exchange zone must be set up, preferably in close proximity to the start area, measuring at least 45 metres long and 15 metres wide. The beginning (green) and end (red) of the exchange zone must be marked on the snow in contrasting colours. In addition, there must be prepared a ski preparation zone close to the exchange zone where the competitors and/or coaches are allowed to work on their skis during the semifinal and final competition. In fact, each team is currently allowed to have one service person in this area to work on their racers' skis.

Exchange/Pit Zone –Pursuit Competition – Without a Break



NOTE: Diagram not to scale, dimensions are provided as minimum guidelines, many configurations are possible within the rules. Design must adapt to the local situation. Thanks to George Zafiol (GER) for the Oberisdorf WSC 2005 concepts from which these were adapted.

For this competition, an exchange zone or "pit" area must be constructed. This is where the skiers change their skis to continue the second part of the competition. Each pit must be 2-2.5 metres in length and 1.2-1.5 metres wide; the V-boards separating the pits should be placed on the 1.5 metre mark, and placed at an angle toward the exit end of the pit area to better align the competitors coming into and exiting the pits. It is here that the skis and poles (and possibly boots) for the second technique race are left. The pit should have a non-slip material in it so that skis don't escape and slide unmanned somewhere else; it also provides a non-snow footing for changing boots and/or skis. The pits are positioned beside each other but slanted on a diagonal towards the exit of the exchange zone to facilitate skiing into them and skiing out again. There are usually 2 rows of pits (numbered with the odd numbers for either the left of right side, and with the even numbers for the other side) but there can be 1 long row if there is not the width for 2 rows or if there are not too many competitors. There must be one pit to accommodate each competitor. Each pit must be numbered with large visible numerals, and according to the numbers of the racers in the race. Pits are assigned by draw or points with the best skiers assigned the pits the furthest from the entry point of the zone and therefore the closest to the exit point.

The skiers will enter the exchange zone at one end, and depending on their bib number, will either turn left or right to the outside of the line of pits, and ski along the access corridor to their own pit location. This corridor, beginning at the entrance to the exchange zone and continuing to the pits, does not have any tracks set in it, even though the first part of the race is classical technique. After changing skis, the skiers will ski out into the area between the pit rows, and continue to the opposite end of the exchange zone from where they entered it. Again, this exit corridor in the exchange zone will not have any tracks set in it.

Along the entry side of the exchange/pit zone, the course must be a minimum of 4 metres wide, and along the exit side of the pit row, the course must be a minimum of 6 metres wide. This is to allow space for competitors to get to their pit without having to wait for slowing skiers about to enter their pits. The space requirement between the pits where skiers exit the pits and race to the course needs to be wide to accommodate a potentially large number of competitors emerging from the pits so that collisions do not happen. Remember also that, as they exit the pits, they will be doing free technique, which requires more space that the classical technique. So, for a 2-row pit area, the total width should be a minimum of 4+2.5+6+2.5+4 metres or 19 metres, and for a single row of pits, the total width should be a minimum of 4+2.5+6 metres, or 12.5 metres.

Stadium Area – Finishes

The last 80-100 metres before the finish line is designated as the finish corridors. The beginning of these corridors must be clearly marked on the snow with a contrasting colour line; a sign should also be placed on the side indicating the beginning of the finish corridors. Usually it simply reads "100 m". The corridors must be straight and preferably placed on a slight uphill grade (2%-4%) is ideal). A minimum of 3 corridors must be provided (4 for sprints); the edges of the corridors must be clearly marked and highly visible, but not marked with anything that might interfere with the skis; many race sites are using things called "stake chasers" or "stake whiskers", used by surveyors to mark lines and boundaries. They are like long nails that have a coloured stiff tassel that sticks straight up about 12-15 cm. They are pushed into the snow to mark the edge of each lane. A portable drill with an auger bit, or even a large nail driven into the snow with a hammer, is often used to make a hole to receive the whiskers.

For classical technique races, each corridor should be about 1.5 metres wide, with a track set down the middle. For free technique races, the corridors should be 3 metres wide thus requiring a minimum width of 9 metres.

It is extremely important that the transition from the course to the finish corridors be set so that the best line to the finish line is in the middle of the finish corridors. This means that the 2 outside finish corridors will be only very slightly less advantageous (slightly further to get into) to the racers. What should not be done is to have the best line to the finish be one of the outside lanes, which then means that the other outside lane is much further to get to, thus requiring a racer to have to ski further to get to the finish line. In setting up the finish zone, it is mandatory that one stand back on the trail at the entrance to the stadium as if he/she were a racer, and mark the direct line to the finish first; this will be the middle corridor, and the other two corridors can then be added to each side of this middle one. There can be no compromise on this aspect of setting up the finish corridor.

The Horseshoe stadium layout may make this difficult to achieve. If the finish corridor is located after the competitors ski into the stadium and around the curved end of the horseshoe (i.e., at the open end of the horseshoe), then it is necessary that there be a 100 metre straight section following the curve around the horseshoe and before the finish corridors start to accommodate a fair alignment of the corridors as stated above.

The finish line must be marked either on the snow or with a strip of solid straight material set below the surface of the snow so that it doesn't touch the skis as they cross it. The finish line can be a maximum 10 cm wide and should present a sharp leading edge to the viewer and camera.

A control line is marked about 10-15 metres after the finish line, and is marked with a sign "ski control". This area between the finish line and the ski control line is called the Red Zone and where the finish controller checks each competitor's skis to ensure that he/she has crossed the finish line with at least one marked ski. Competitors are not allowed to take off their skis until after the control line. Bibs and transponders can be collected here as well. Beyond the ski control line, there should be a refreshment station providing appropriate refreshment for finishing skiers.

The finish area after the finish line should be fenced to keep out spectators, to provide an area for checking skis, first aid, refreshment, clothing retrieval. There needs to be a gate, strategically positioned, to allow the racers who have finished to exit the area but not exiting them into any of the other stadium areas where skiers about to start their race would be interfered with. In major races, this exit usually leads the racers toward the press area, referred to by FIS as the Mixed Zone, so that the press members can interview any of the racers as they move out of the stadium area.

[Diagrams – some typical finish area setups, with ski control area, refreshment area, mixed zone]

Finish Corridors – Sprints

The finish corridors should be about 80-100 metres long (the shorter length is acceptable if the finish is on an up hill slope which will reduce the speeds of the finishers). For the finals in individual sprints there are 4 competitors in each heat, there must be 4 finish corridors, in case the race is close and all 4 racers are neck-and-neck with each other toward the end of the race. A good design principle is to have all of these corridors set out so that any one of them can be considered the fastest way to the finish line. In theory, the best line should lead equally to the middle 2 lanes, with the 2 outside lanes being the second-best ones. If the course has a curve just before reaching the first finish corridor (such as in a Horseshoe layout where the finish is after navigating the "U" bend), the fastest lanes to the finish will likely be the 2 inside lanes (next to the inside of the curve), which is considered quite acceptable. If one wants to have the centre lanes be the best ones to the finish after a curve, then setting "fencing" or markers along the edge of the curve and out into the course just after the curve, thus forcing the competitors out from the inside corner of the curve to the centre lanes could be tried. For Team Sprints in classic technique it is possible to have more than 4 finish corridors.

The width of the finish corridor will be determined by the skiing technique of the race. The finish corridors must be marked as corridors, and must be at least 3 metres wide for free technique races, and 1.5 metres for classical technique races. Remember that it is possible that 4 racers could cross the finish line at the same time, so the width of the corridors, especially for free technique races, is very important so that racers do not interfere with anyone beside them. There needs to be room in the stadium near the finish line to position video cameras to help with the determination of the finish order. Therefore fencing should be positioned to allow for this so that a clear view is afforded to the cameras, and so that spectators and officials do not interfere with the camera views.

Stadium Layouts – Lap/Through Area

The lap lane(s) or though lane(s) are necessary in order for skiers to pass though the stadium area so that the spectators can see them a number of times, and so that the spectators and other interested people can obtain an elapsed time and therefore know how each person is doing in the race (i.e., who is first at this point, who is second, etc, who is gaining on other skiers). However, remember that there may still be skiers who are about to start, and some may also be finishing, so the placement of the lap lane(s) should be carefully thought out. If racers about to start and racers about to finish are also in the stadium, then it is imperative that the lapping racers not be interfered with. So this lane must be placed in a location that provides spectators with a good view but does not interfere with starting and finishing racers. The diagrams on stadium design should be studied to determine the best layout of this lane with respect to the shape of the stadium that is on the site.

For the Horseshoe stadium, the lap lane is generally situated around the outside of the "U", thus not interfering with the start and finish. Where the entrance to the stadium for starting and finished skiers is from the end of the "U" under, over, or across the lap lane, then there should be no interference with the lapping skiers. However, where the stadium is of the Straight "Thru" design, then it is possible that the starting or finished racers could interfere with this lane as they enter the stadium to start or exit the stadium after finishing. Therefore, if possible, perhaps the lap lane could be placed along the area of the stadium farthest from the spectator area, so that the entering and exiting of the stadium would not involve crossing the lap lane. Otherwise, the crossover point will need to be staffed by sufficient marshals to ensure no interference with lapping skiers.

Stadium Layouts – Other Areas

Refreshment Stations

The location of the refreshment station (sometimes referred to as a feeding station) at the finish is a rather easy one – it must be after the Ski Control line, but not too far away as there are usually a number of times during a race that some liquid must be quickly obtained for racers. Some will finish having a great deal of difficulty breathing, and often the first thing that can help them is to have them slowly drink some warm liquid, which tends to open the throat and allow better breathing. So this area must be close, but not in the way, so that skiers can take liquids to replenish those lost during the race.

On-course refreshment stations must be provided during any race longer than 15 km. According to the rules (Rule 317), on courses up to 30 km, there must be 3 stations; for courses up to 50 km, there must be 6 stations. Ideally, there should be a refreshment station every 7 or so kilometres (plus one in the stadium) and they must be in accordance with CCC rules for Refreshment Stations (See Section 6, 7) for site preparation. The stadium lap lane can be considered as an option for a feeding station but it is better to have a location with a long gradual (fairly straight) downhill section that follows the feed. This allows the racer to take in his fluids while relaxed and not needing to worry about losing too much speed.

With the increase of mass starts in the long distance races “high capacity feeding” has become a common requirement. See the diagram at the end of this chapter that illustrates one such solution for a classic competition. Longer and wider spaces are required with the accommodation for through lanes off to the side.

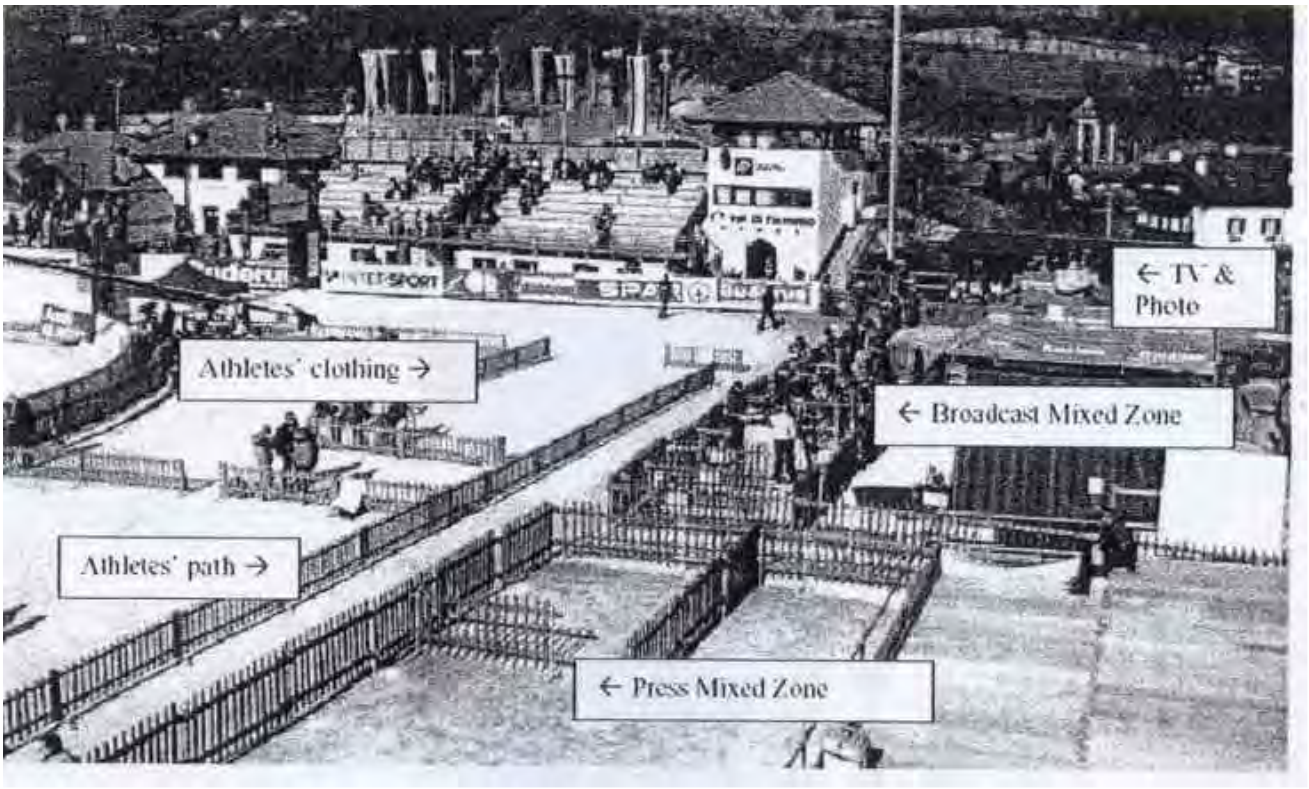
Clothing Pickup Area

A clothing station must be established in the finish are after the Red Zone. Clothing should be transported from the start area in plastic bags numbered with the skiers’ bib numbers. Another setup could be a vertical pigeon-hole structure set up in the end zone and numbered appropriately, where the plastic bags could be stored for retrieval.

Mixed Zone (“Press Corral”)

In larger events, the Mixed Zone is an important feature of the inner stadium area which must be well planned to allow the press to have controlled contact with the racers immediately following their finishes. In their enthusiasm, reporters and photographers may invade the finish area to get better access for a photograph opportunity or to interview a skier. This intrusion may interfere with other skiers with whom the press are not interested. The racers must be allowed space to finish the race properly and in safety.

The design of the press corral must be located near the finish area to allow photographers to get their shots and to allow reporters to contact the skiers. As the skiers exit the finish area reporters will want to get or arrange for an interview. The fence must be at least one meter high to try and persuade the press not to jump over it. A bleacher stand with three to five levels located off the end of the finish provides a place for the press to sit down and to see over top front row press. A stadium marshal with a determined attitude and a good sense of humour is also an asset to keep the situation under control.



Ski Preparation, Testing, and Warmup Areas

Ski Preparation

The athletes' compound should be located near the stadium, the wax testing area, the warm-up area, and should be fenced off and made secure from non-team personnel. Over-night security should be provided. The athletes' wax cabins may consist of permanent rooms, cabins or trailers, or tents. Inside, there should be several electric power outlets, adequate heating and ventilation, shelves, and if possible, the ability to attached ski holders to the walls. Below are suggestions event organizers must keep in mind when planning and setting up ski preparation areas:

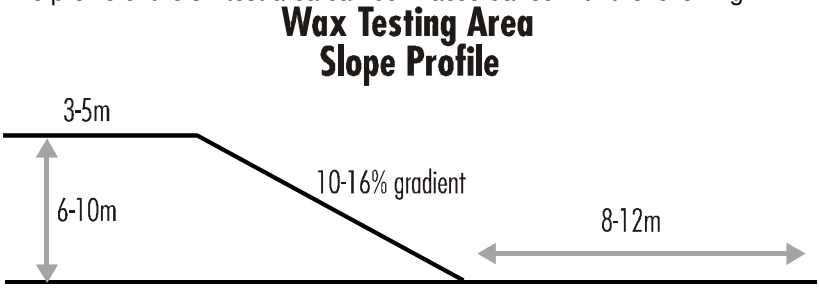
- an outdoor area adjacent to the stadium should have a fence or rail along which electrical outlets can be mounted to provide power for waxing irons
- enclosed tents or team rooms must be well (force) ventilated for waxing smoke and fumes from fluorocarbon waxes. If fluorocarbons are being applied, access must be restricted and approved masks must be worn.
- Power is required for ski preparation, for irons, power brushes, etc. There should be at least two 15-amp receptacles per team for their use.
- no open flames are to be used around or with fluorocarbons, and waxing iron temperatures must be kept down to the manufacturer's recommendations
- no open flames in tents; fire extinguishers should be located in each team room or tent
- toilets should be adjacent to waxing areas or team rooms in sufficient numbers
- ensure that there is sufficient space around the outside of any waxing rooms or tents in case there is a fire. This will allow people the space to get away from the immediate area of the fire.

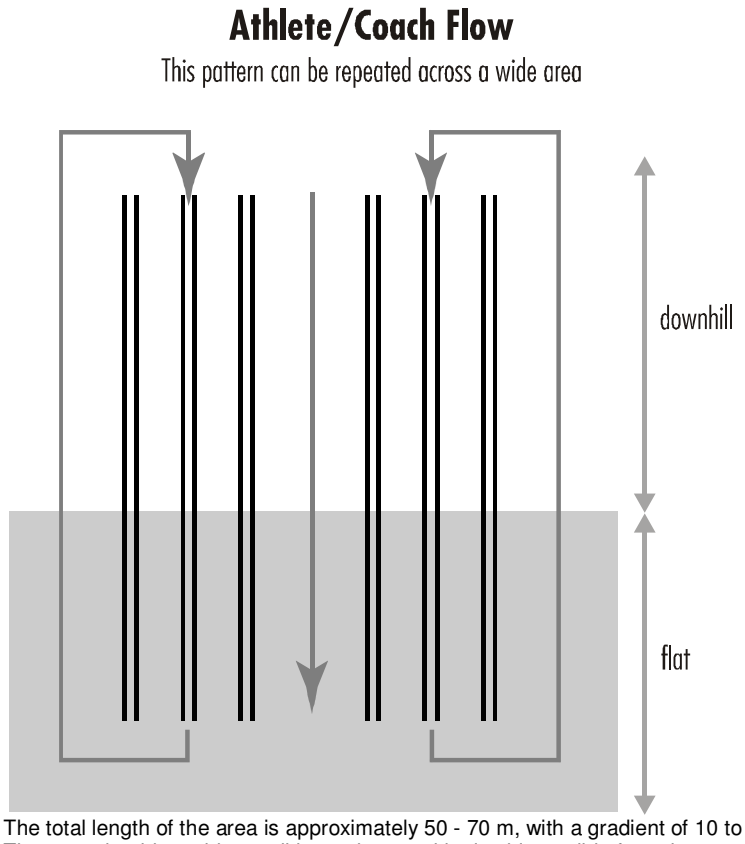
Glide Test Area

The glide test area should be sufficiently large to accommodate all entered teams. Each team should have a track or lane available. The optimal slope for a ski test track is between 10 – 16 % gradient, steepest at the top, and with a flat area to stop at the bottom. A flat platform of snow should be constructed at the top of the slope. An optimal ski test area size for a large World Cup, World Ski Championship or Olympic event is 65 m wide x 50 m long since the number of participating nations is approximately 30 - 40, in addition to 10 - 15 equipment suppliers.

It is important that the ski test area is prepared with the same snow, groomed at the same time and with the same equipment as the competition courses.

The profile of the ski test area can be in accordance with the following:





The total length of the area is approximately 50 - 70 m, with a gradient of 10 to 16 %

The area should provide conditions where a skier is able to glide for at least 10 seconds and gain speed of 25 – 30 km/h in fresh snow conditions. The out run must have ample space for ski storage on the snow without interference by descending skiers.

Warm Up Course

Skiers preparing for a race require a section of course on which they can do their warm up and do final testing of waxes before going to the start area. The best option is to have a 1-2 kilometer loop adjacent to the stadium area and having a short and easy access from the ski preparation area. This course must be groomed to match the race course conditions with tracks set for the technique being used. Should the site not have a loop as described, a straight section of trail not being used for the races scheduled could be suitable. The straight stretch should be wide enough to allow two way traffic between skiers exiting and returning to the preparation area. A site not having a warm up course will have to manage skiers warming up on the race course. If racers are out on the course warming up, they should be notified to clear the race course, as per the rules and as announced at the team captains' meetings, prior to the start of the race. Signs directing racers to the warm up course will encourage its use.

Stadium Equipment Details

Weather Board

The weather board should be constructed out of material such as G1S plywood or corrugated plastic or Corplast. The surface must be made weather proof and be suitable for writing on. The use of a high gloss white enamel paint serves both purposes. Draw lines and headings in black on the board. Cover the board with clear polyethylene and write weather information on the poly with a felt pen or a wax pencil. The plastic can be cleaned later using lighter fluid or varsol for reuse, or replaced; the wax pencil can be dry-rubbed off with a piece of facial tissue. (See also Results Board note.) A minimum of eight 8-centimeter (3.5 inches) rows are required.

The weather boards are located near the ski waxing area(s) and in the stadium warm up area.

Time	Air Temp			Snow Temp			Humidity	Wind Speed/Direction
	Stadium	High	Low	Stadium	High	Low		

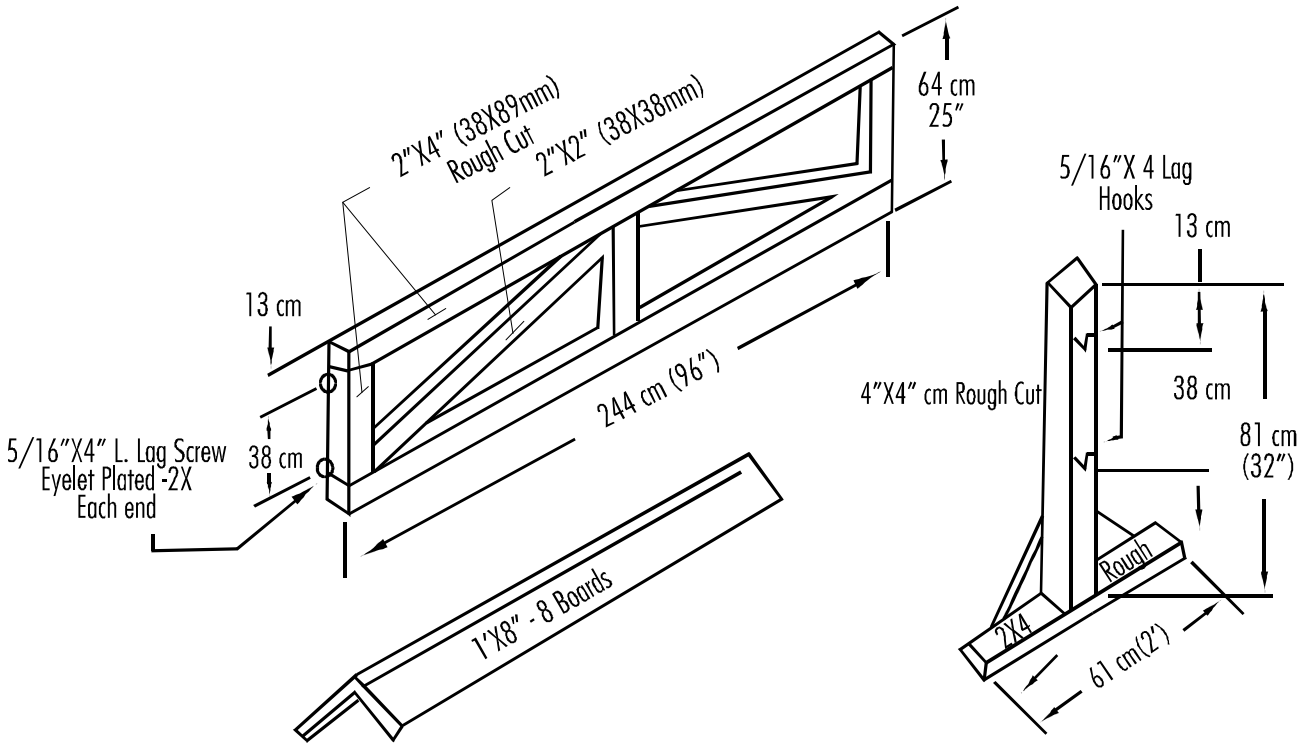
Official Notice Board

An Official Notice Board is required to post the unofficial and official results listings at the end of each race. This board must be in a prominent location having easy access for competitors, coaches and spectators. The board should be approximately 122 centimeters (48 inches) square and made out of a soft plywood or cork board to accept thumb tacks or staples. A sign “OFFICIAL NOTICE BOARD” must be positioned across the top.

Fencing and Dividers

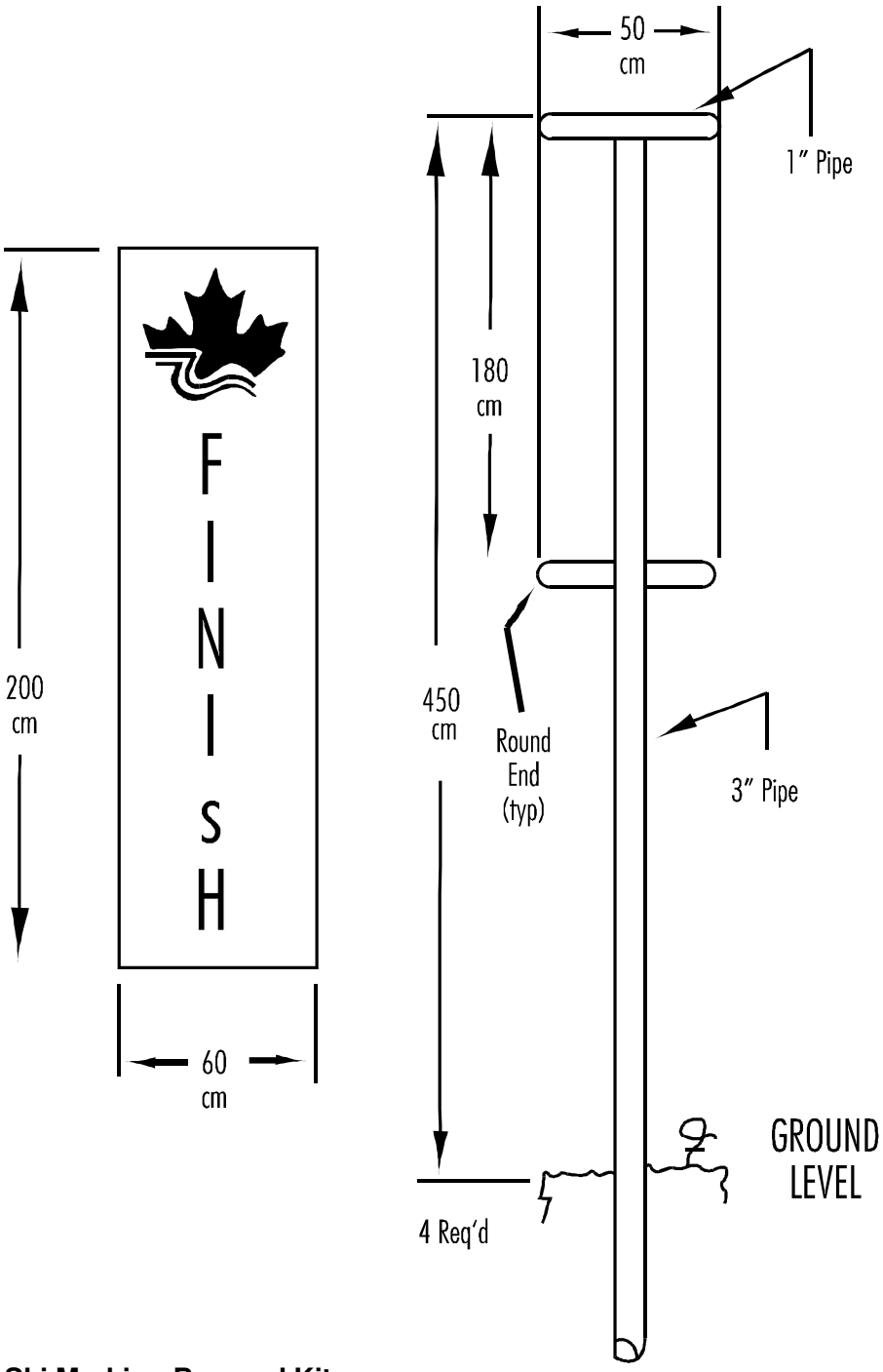
Fencing is good around the outside of the stadium to keep spectators and other non-competitors out of the stadium area. It provides a security barrier that helps control the stadium area. This fencing, though heavy, is quick to set up, move and take down. The sections are stackable making them easily moved on a trailer and stored. Banners may be hung on this fencing (although the fences must be sufficiently well supported to ensure that they do not blow over if there is any wind) and it provides good people control. Suggested fencing includes the type in the diagram below, or the metal sectional fencing that link to each other, often used for crowd control by police and security agencies. With the latter type of fencing, it can be easily moved by turning it upside down and sliding it along the snow.

The inside of the stadium should be marked with the use of V-Boards. These are boards made into an upside down V approximately 4 feet long, and painted in highly visible colours (red, blue, black, green, etc.); often, they will have one end closed – this end faces the direction of the oncoming skiers who can see them better. They can be stacked for easy storage, are easily movable, and can be positioned anywhere quickly. It is hard to imagine a stadium setup without the use of V-Boards. With their ease of mobility, they can be quickly moved to the edge of the stadium so that the large grooming equipment can groom the stadium quickly, and any tracks can be set also. Then the V-Boards can be moved back into place.



Start / Finish Posts and Banner

Start and finish banners can be either a vertical or horizontal design. The latter is often stretched across the start and finish lines between poles. These poles must be very well anchored so that any wind does not topple them on top of competitors or officials. The vertical ones are each on their own vertical support structure. In any case, having wind holes in various places on the banners themselves will cut down on the wind drag and reduce the chances of them being blown over.



Ski Marking Box and Kit

poster marker ink, permanent type, from Artline in 60 milliliter bottles - relay colours plus black including red, blue, green and yellow

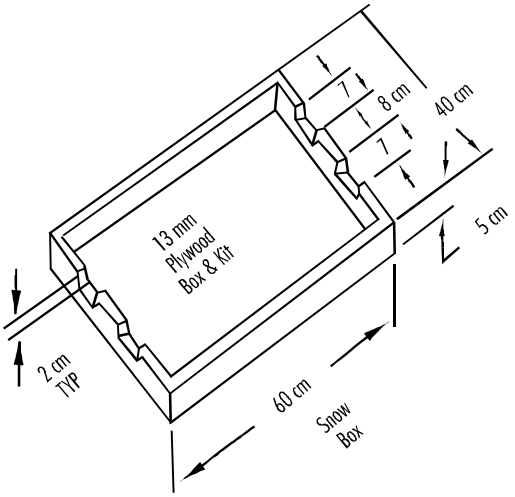
felt stamp pads, un-inked, minimum one for each colour. Size: 70 x 11 millimeters

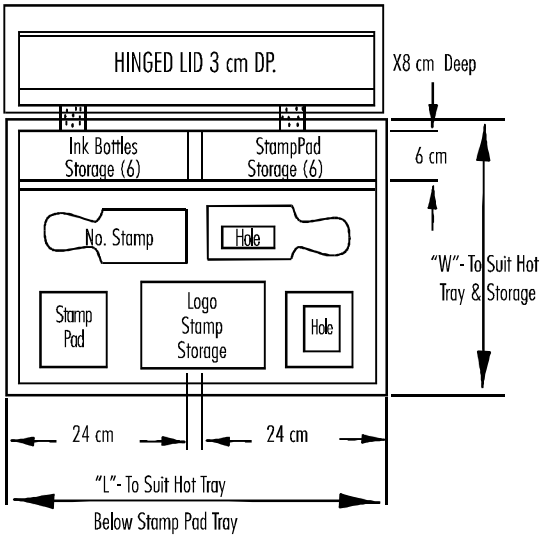
number stamp, roller type, 10 millimeter number size, two required.

logo stamp (width 40 millimeter maximum). Use event logo.

felt pen, permanent ink type

A ski marking table may also be constructed approximately 122 centimeters (48 inches) long, 40 centimeters (16 inches) wide and 100 centimeters (40 inches) high. The table should have five centimeter (two inch) high edges along each side to hold snow on top. A shelf is hung on one side to hold the stamp pads, stamps, pens etc.





Ski Measurement

The problem of measuring skis shorter than the racer is simplified by the following method. Basically, a block of rigid material (e.g., wood, pressed board, etc., but not something that will expand or contract with changes in temperature) 10 cm (100 mm) long should be made. Then, having the skier standing on a solid and level surface, place the block on top of the tip of the skis, and, holding it in place, determine if the skis plus the block is equal to or greater than the height of the skier. If not, then the skies are not legal.

Poles may be no longer than the height of the skier nor shorter than the person's hips, measured by placing the tip of the pole on the ski in front of the binding..

Sponsor Banners and Signage

Signage located in the stadium area for the competition must include the following:

"Thru/Lap lane - Finish lane" sign for the finish intersection, preferably with arrows also.

Relay "Exchange Zone" warning sign for positioning 40 to 60 meters before the exchange zone.

2 signs: "Start of Exchange Zone" and "End of Exchange Zone"

"Ski Marking" area sign

The beginning of the finish corridors (80-100 metres before the finish line). There could also be signs every 10 metres to the finish line.

"Weather Board" sign if not on the weather board.

"Results Board" sign if not on the results board.

"Official Notice Board" sign on the Official Notice Board

Directions to and from the "Wax Testing Area"

Start and Finish banners.

Nation or team signs in Team Sprints

Lane/row markers for mass starts

"Refreshments" in finish zone

Start and Finish banners may be made in two designs, the horizontal banner, and the post or column banner. The two designs each have advantages and disadvantages. The horizontal banner is strung across the start and finish lines. They must be strung high enough to allow grooming equipment as well as skiers to travel under them. The horizontal banners present some problems in wind. Extra bracing may be required where light-weight posts have been used. Horizontal banners do provide a great atmosphere. The post style banners are made in the shape of a sack and slip over a frame built on the post. The post style is easier and quicker to set up, provides no overhead obstruction, and is less affected by the wind.

Sponsor banners are traditionally strung along the permanent fencing of the stadium and at prominent places around the course. Those people tasked with hanging the banners must be aware of the location criteria in that larger sponsors are put in positions providing the best exposure. For example, if the event is televised, the largest sponsor's banners should be hung on the fence just past the start area where the cameras will pick up the banner with each passing skier. It is important that all sponsors get the best exposure possible. These are often put up with plastic zip ties that can later be cut with snipper pliers for quick removal.

Timing Buildings and Placement

For major race venues, it is often the case that a special timing building is on site. It must be built in such fashion to allow for the finish timing crew to have a front window view of the finish line, to be able to see the bibs of the racers who cross the finish line, to verify signals that come through from the finish line, etc. It is also often used to house the announcing team since they will be able to have an excellent view of the whole stadium area and be able to create the excitement during the race. At other sites, there may instead be a few smaller buildings spread around the site to provide the same functions.

In this sport, protection from the elements, the distractions of the traffic, and the bustle of the race are the most common reasons for providing these buildings. The electronic equipment that is now being used, such as computers, printing timers, stopwatches, telephones, radios, etc. do not perform as well and as long outdoors in below zero temperatures as they do in warmer areas. So these buildings provide warmth for not only the timing and results equipment but also for the people who operate and/or monitor them. The buildings should have some kind of heat in them, and often it is electric heat, or sometimes indoor propane heaters. If direct hardwired electricity is not available in these buildings, then electric generators operating outside are usually used. This apparatus will at least take the chill off the place.

In some cases, some sites have a few small buildings, ones that can be placed in certain locations. The most popular locations are looking over the finish line, at the start line, at the intermediate timing line, where the computers are setup and where the results will be produced, and perhaps one for the announcers. These buildings do not have to be too large, just large enough to comfortably hold the crew that should be there. If they are too large, then other people end up there, and the noise level from their talking and chatting can be a major interference to the timing officials doing their functions flawlessly. So the Chief of Timekeeping must control to a certain extent those who are allowed to be in the buildings. And with a number of buildings, it may be necessary to have runners who can transfer information among the appropriate buildings.

The one function that can be very disturbing to the timing and results people is the announcing team. With powerful loudspeakers broadcasting results, music, information about various competitors, upcoming events, etc., the noise can be a huge distraction and disruption. So be careful where the building sheltering the announcing team is located in the stadium area so that it does not become a distraction.

Announcer Area

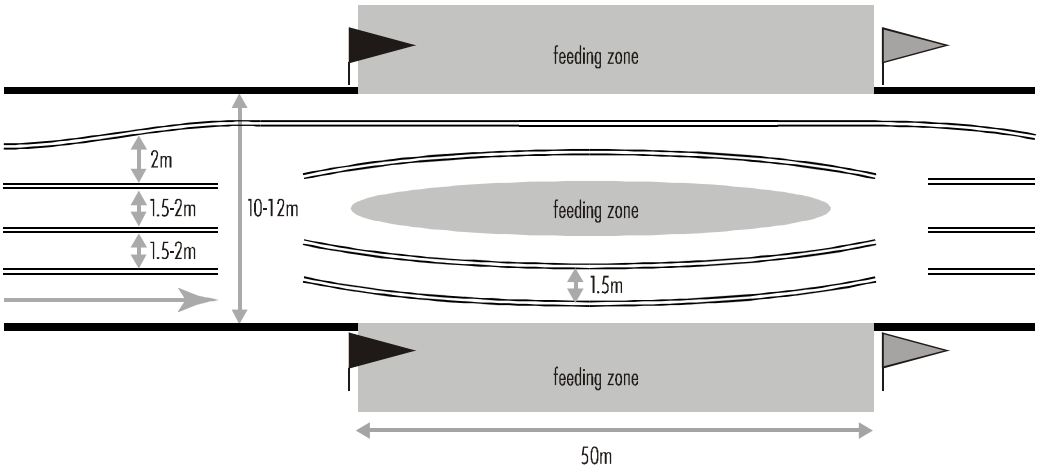
An announcer with a support team can add a great deal of excitement to a race. If used well, the announcer can keep the spectators current on who is leading the race, can point out the leaders as they pass through the stadium, and can give some very interesting biographical information about competitors. In addition, the announcer can keep the competitors who are waiting to start up-to-date as to the time of the race so that they can be ready on time. When such functions are carried out well by this team, the announcing function is a great asset.

However, it does create a lot of noise, and if it bothers the timing aspect of the competition, then something needs to be done. Some of the possible solutions are to locate the announcer at a bit of distance to those functions that require little distractions, to direct the speakers away from the location of the important functions, or to even turn down the volume a bit. The announcing area needs some very serious plans to make it successful but to minimize the disturbances in the timing and results area.

Feed Stations

High-Capacity Feeding Station - Classic

Long Distance Mass Starts and Pursuits



Coaches and support personell are not allowed to move between feeding zones when there is a heavy flow of competitors

Refreshment stations must be provided during any race longer than 15 km. According to the rules (Rule 317), on courses up to 30 km, there must be 3 stations; for courses up to 50 km, there must be 6 stations. Ideally, there should be a refreshment station every 7 or so kilometres (plus one in the stadium) and they must be in accordance with CCC rules for Refreshment Stations.

Stadium Officials

The stadium area is always a hive of activity, and a variety of Chiefs operate in or around this facility. Therefore, it is mandatory that each stadium function have only one Chief, so that officials know who they are to take their instructions from. It is not being suggested here that there are battles over whose turf items belong to, as cooperation is very important. But having too many people directing too few people can be a problem.

Some of the Chiefs who do operate here include:

Chief of Stadium – responsible for overseeing the stadium planning, setup, grooming, and security.

Chief of Course – will do the grooming and tracksetting in the stadium and will ensure that there is a smooth transition from the course to the stadium and back out on to the course.

Chief of Timekeeping – responsible for ensuring that the timing equipment is set up and working in the stadium area, and assigns people to the timekeeping and results positions.

Chief of Start/Finish – assigns people to the start and finish positions in coordination with the Chief of Timekeeping

Chief of Competition Security – assigns marshals around the stadium area in coordination with the Chief of Stadium

Competition Secretary – Works within the stadium area, handling bibs, protests, minutes and record keeping

Manager of Medical Services – coordinates the first aid teams, any other medical services that seem appropriate.

Chief of Competition

Chief Of Stadium

—Chief of Stadium Preparation
—Chief of Ski Marking & Equipment Checking
—Chief of Finish Line
—Chief of Refreshment Station(s)
- Chief of Exchange Zone
—Close liaison with Chief of Competition Equipment

The Chief of Stadium is responsible for overseeing the stadium planning, setup, grooming, and security to meet the competition's technical and safety standards. Of prime importance is the smooth flow of skiers to and from the start and finish area.

Duties

Pre Race

design of stadium layouts, in coordination with the Chief of Course and the Chief of Timekeeping
produce stadium layout sketches
coordinate stadium grooming with Chief of Course
assign banner posting space
supervise competition equipment procurement with Chief of Competition Equipment and Chiefs' committee.
develop budget for equipment and supplies required
provide training for stadium officials
position marshals in stadium area in coordination with the Chief of Competition Security
assist with wiring installations for timekeeping and announcing in coordination with the Chief of Timekeeping
plan medical services and if required, doping control operations, with the Chief of Medical Services
plan for awards podium, etc.
coordinate TV and press placements in the stadium area
supervise stadium setup for official training days
supervise stadium setup for competition days

During Race

supervise stadium personnel/troubleshoot problems
maintain stadium security through the Chief of Competition Security
maintain verbal or radio communication with Chief of Competition, Chief of Timekeeping, Chief of Course, Competition Secretary, and for a major competition ,Chief of Competition Security

keep a close tab on racer progression to the start line

Post Race

arrange future stadium preparation
dismantle facilities and provide for storage or transportation
arrange for next day grooming
debrief with all sub-chiefs

Equipment

clipboard, radio, start list

The Stadium is the showplace for the sport of cross country skiing. The Chief of Stadium has the job of setting the stage to show the speed and excitement of the sport!

General procedure

This job requires attention to detail to arrange the start, finish, and thru lanes (tracks) to allow the skiers to be as close to the spectators as possible yet ensure effective officiating of the competition. (See Section 8 for stadium design information). The effective placing of banners, flags and stadium fencing and dividers provides an attractive site for spectators, skiers, officials and media and makes a cross country ski race an enjoyable ski experience for all involved. A well-arranged and organized stadium provides a smooth flow of skiers to and from the start and finish area.

The Chief of Stadium must plan carefully the layout for each type of race including tracks, start and finish areas, press areas, ski marking, refreshments, clothing storage and handling and the warm-up area before the start line. The number of fences should be to a minimum, but should provide good control of all areas. Once the skier enters the stadium and ski marking area he/she should never be in doubt as to how to get to the warm up and start areas.

Two levels of stadium setup are required for any event. On the official training day(s) prior to race day the stadium must be set up to show the racers exactly where the start, finish and thru lanes will be for the race. In addition, basic fencing and all directional signing should be in place identifying ski marking and exchange zones, etc. On race day the full stadium setup is required with all signage, fencing and support facilities in place.

Skiers who are not competing and spectators must be kept out of the inside stadium area. Officials having no official stadium job must also clear this area to allow an unobstructed view of the racers and reduce distractions for the stadium officials. To help effect this, the stadium is often closed to all traffic at some appointed time prior to the race start, e.g., 10-15 minutes before the first skier is started. This allows the stadium officials to get and be organized, and to begin the process of getting racers into and through the pre-race preparations that precede their actual starts.

Chief of Stadium

Chief Of Stadium Preparation

— Chief of Competition Equipment
— Set Up Crew
— Chief of Refreshment Station

The Chief of Stadium Preparation manages the physical setup of the stadium area according to the designs prepared by the Chief of Stadium.

Duties

work with Chief of Competition Equipment for the procurement of equipment for the competition and race site
arrange with work crews for the installation of semi-permanent and permanent facilities
arrange for equipment and supplies; secure storage facilities
responsible for set up of stadium fencing, barricades, stands etc. according to plan
set up refreshment serving tables etc.
responsible for hanging all sponsor banners in stadium area according to plan
manage stadium changes during the race
monitor the stadium setup during the race to maintain operational effectiveness
responsible for dismantling the stadium area at the end of the competition and returning all equipment to its required place

Equipment

clipboard, radio, snow or solid fencing, pop-fencing, start and finish posts and signs, flagging, signage, shovels, rakes, basic carpenter tools, open end wrench set, screwdriver set, sledge hammer, snow drill and rechargeable electric hand drill, snowmobile or ATV, trailers, sleds, line marking liquid

Remote, non-serviced sites - electric generators, transport toboggans, small heated buildings (for timing, calculations and Competition Secretary), waxing tents, volunteer tents, transport van(s) if not done by the Chairperson of Venue Planning & Services.

General procedure

The Chief of Stadium Preparation duties may start very early in the preparation for an event depending on its size and the state of readiness of the stadium and equipment already available. Tasks such as the burying of wire for timing and sound systems may necessitate digging ditches in the summer or fall prior to the event and running plastic pipe and pulling wire or pull cords to install the wire later. Permanent fencing to secure the stadium periphery should also be installed during frost-free periods. It is his/her responsibility to oversee the installation of this equipment. The Chief of Stadium Preparation must do a thorough analysis of the equipment required for the event(s) planned, take inventory of stored equipment and supplies and check the availability of needed items. The Chief of Stadium and Chief of Competition Equipment must be notified of the required items. He/she must organize the setup of the stadium area for training and competition days and work closely with the stadium setup crew ensure that all is completed on time and correctly.

Chief of Stadium Preparation
liaises closely with the Chief of Stadium

Chief Of Competition Equipment

The Chief of Competition Equipment is responsible for acquiring the necessary stadium and course equipment for the event as requested by major officials.

Duties

Pre Race

procure the equipment assigned

organize the transportation of equipment and supplies to the race site

organize the secure storage of equipment and supplies on site

check operation of stored and procured equipment

check for and secure backup equipment and supplies as required

distribute tools, equipment and supplies to the required areas or to volunteers and officials for use and set up on training and race days

During Race

trouble shoot any equipment problems and arrange for maintenance if necessary

check fuel supplies in operating equipment

check in equipment not needed during and after race

maintain radio contact for problem solving.

After Race

check in equipment, return it to storage or arrange transport back to suppliers

check radios and recharge if needed for the following day(s)

check all returned equipment for damage and arrange for repair

Equipment

clip board, inventory record book or system, radio. This list will include any equipment the Chief of Competition Equipment must manage. It can include items as large as tents, grooming and tracksetting equipment to items as small as office supplies and drink cups.

General procedure

This position is of major importance for large events where a lot of special equipment is needed. Early in the organizing process (at least six months before the race) the Chief of Competition Equipment must meet with the Competition Committee to discuss the following points:

review equipment list (See Appendix 1).

determine who is responsible for acquiring needed equipment.

determine quantities needed.

establish sources of equipment and budget for rentals and purchases.

At the beginning of each training and/or race day set up to distribute supplies and equipment in an organized manner. Check to be sure there is some back-up or extra equipment for the critical areas; for example, extra batteries, shovels, ropes, flags, posts and tools to do the jobs. When issuing the equipment, ensure it is in good working order. At the end of the day, check that the equipment is returned and stored in good working order. Equipment should be recharged and tested or sent for maintenance, when necessary. Rented equipment must be returned promptly to minimize costs.

Chief of Stadium Preparation

Stadium Set Up Crew

The Front Line Crew sets up all of the fencing, flagging, barricades, stands, and banners required in the stadium area prior to the competition. This is a physical job requiring people who will arrive early and stay through to the end of the race day when everything is dismantled and returned to storage.

Equipment

See Chief of Stadium Preparation

Procedure

The Front Line Crew normally arrive two to three hours before time on training days and at least three hours before start time on race days to first set up the stadium fences, barricades and lane dividers to give shape to the stadium.

On race day they set up tables for equipment checking and ski marking, the refreshment areas, start and finish banners and signage required for the day. All banners are hung in the designated places. When requested to do so, they assist with setting up the electronic timing area and undertake any special tasks to complete the stadium preparations. This crew also sets in place the start line posts on which the timing equipment will be placed. In addition, they set up signage for directing racers through the stadium (i.e., the “lap lane” signs, etc.), and establish all extra lines in the snow in the stadium area, such as the ski control line at the end of the Red Zone, the exchange zone lines, the lap timing lines, etc.

Stadium setup must be complete a minimum of one hour before start time

---

During the competition, the crew monitors any special requests as the race progresses. When the start is completed, dismantle or adjust fencing in this area and return what can be returned to storage. After the competition or training is complete, dismantle the stadium to the appropriate level and store equipment. The crew assists with the setting up of awards ceremonies as required.

Chief of Stadium

Chief Of Ski marking & Equipment Checking

Clothing and Equipment Checkers
Clothing Stewards
Ski Markers

The Chief of Ski Marking & Equipment Checking is responsible for ensuring that: (1) all of the competitors’ clothing markings are within FIS/CCC regulations; (2) that the equipment to be used meets FIS/CCC rules and regulations; and (3) that each competitor’s skis are marked, prior to each skier starting to race. A record (usually a check mark on a start list) must be kept which indicates that the clothing and equipment conform to the rules and regulations; any infractions must be noted. The check mark also signifies that the skis have been marked. This list will later be used by the Finish Ski Marking Controller who ensures that each skier finishes with the same skis that were marked before the start line. In addition, he/she is responsible for managing the collection, storage, and return of skiers’ clothing.

Clothing and equipment checks are always done before ski marking!

Clothing checks include warm-up and competition

clothing which may be checked at any time.

Equipment

standing board minimum 50cm (2 ft.) square, clear plastic measuring templates representing the maximum area allowed for each size of crest (two or three configurations for each size area), copy of latest regulations, 15 cm metric ruler and/or a 10 cm (100 mm) block of material.

Procedure

The Chief of Ski Marking & Equipment Checking, with his team of Clothing and Equipment Checkers, ensures that all clothing that racers wear and the skis that they will use conform to the rules and regulations of the sanctioning body for the competition. He/she also works with the Chief of Start /Finish to organize and set up a system for the collection, storage and return of racers' clothing during the event. After equipment and clothing checks and ski marking, the skiers proceed to a stadium warm up area to continue warming up until start time. The checking of clothing and equipment is the area where the Chief of Ski Marking & Equipment Checking often works directly with the racers as the rules governing these areas must be strictly enforced. Clothing cresting and logos are checked for legal sizing and location to ensure that it is within regulations.

When skiers return from the warmup area to the start line, they will take off warm up suits and extra clothing and give them to a Clothing Steward. The system for storing this clothing may be:

plastic shopping bags with a sponsor's name on it and **the skier's bib number written on** with a broad point felt pen.

The bags are then hung on a secure storage rail with spikes or pins to keep them out of the snow; or

storage shelving units with a cubby hole for each skier's clothing and a place to write the bib number on the shelf or any other similar system.

Chief of Ski Marking & Equipment Checking

Clothing and Equipment Checkers

Clothing and Equipment Checkers are responsible for ensuring that all clothing worn and equipment used by the skier conforms to race regulations.

Procedure

Clothing and Equipment Checkers physically measure the various crests on the skier's clothing and check the location and number of crests on the clothing. If any clothing or equipment checked does not conform to regulations, the skier must be warned that his/her clothing/equipment do not conform to regulations, and, if not rectified before the race, may result in being disqualified from the competition.

Skis must conform to the FIS Specifications for Competition Equipment and Commercial Markings, current version. This specification sets out very detailed specifications that most, if not all, ski manufacturers follow to have their ski products deemed legal for racing. The one that should be of main concern at the ski marking area is that skis must have a minimum height of the height of the skier less 100 mm. This, then, requires a measurement to be done.

First, have the skier stand on a board (a minimum of 50 cm (2 feet) square) so that the skier does not sink into the snow nor do his/her skis. Then, using a block of rigid material (e.g., wood, pressed board, etc., but not something that will expand or contract with changes in temperature) 10 cm (100 mm) long, place it on top of the tip of the skis, and, holding it in place, determine if the skis plus the block is equal to or greater than the height of the skier. If not, then the skis are not legal. The use of a level or straight pole or rod may help in sighting whether the skis are long enough.

Poles may be no longer than the height of the skier, nor shorter than his/her hips, with the poles standing on the skis just in front of the bindings.

For sprint competitions, there is no ski marking (Rule 342.1.3). Generally, it is felt that, if a skier tries to change skis during a race, he/she will be out of the competition since he/she will not be able to make up the lost ground sufficiently to move forward to the next heat. There is also no reason why a competitor may not ski on different skis with different wax in each of the heats. The only requirement is that the skis be of legal length. This rule also applies to Team Sprint Competitions.

For Pursuit Competitions - Without a Break, both pairs of skis must be marked prior to the mass start since there will be no time to mark them in the exchange zone. The second pair of skis is not allowed to be handled (except to put them on) in the exchange zone or nor is the first pair of skis allowed to be removed from a box or pit in the exchange zone until the competitor has finished the competition (Rule 342.1.4). However, in domestic races, skis may be removed by designated officials so that subsequent categories can be started before the last skier in the current category is finished and is able to remove his/her skies; but they need to be kept somehow by bib number, in a secure area, so that they can be reclaimed without confusion.

If any item is marginally outside the applicable regulations, the Chief of Start/Finish is consulted for a second opinion or the Technical Delegate is asked to rule on the situation.

Equipment markings should also be checked to ensure that they are in the same form as on products sold to the public.

The Chief of Ski Marking & Equipment Checking (or his/her designate) records each skier who has their pair of skis marked to ensure that only one pair are marked for the race. Skiers should arrive on a continuing basis instead of all at the same time. Skiers are notified prior to their start time if they have neglected to have their skis marked. **The ski marking team must be aware that for races such as relay starts and day two of the pursuit race, skiers start either all together (mass starts), or at a much faster rate than a normal interval start (e.g., a pursuit start), and therefore the ski marking process should be either started much sooner before the start of the race and there should be multiple marking stations available (therefore more staff required) to maintain a smooth operation of the race.**

The number of ski marking stations required depends on:

the number of competitors

the type of start

Chief of Ski Marking & Equipment Checking

Ski Markers

Ski Markers dry and stamp an area on each of the competitors' skis with a distinctive mark and bib number, one pair allowed per competitor.

Equipment

• rags or facial tissues or paper towels, felt pen (permanent ink type), ski marking kit

Procedure

The skis are marked on a table on which a shallow wooden box is used that is filled with snow to protect the bottom of the skis. (**See page 8-23**). Where skiers have klister wax on their skis, extra precautions must be taken to ensure that the bottom of the skis are not touched in any way, nor should the skis at the klister section touch the snow on the table or the table itself. The design of the box and an adjustment in the quantity of snow in the box should allow for this.

An area is cleaned and dried on the top of each ski and a logo or skier bib number is stamped on each ski. In lower level events, ski marking may consist of writing the skier's bib number on the skis with a felt pen of a distinct colour. The markings are placed on the same general area of the skis in order to facilitate easy checking at the finish area. A different colour marking is used for each day of a multi day event.

Note: Do not use solvent unless required. Be careful to not use too much cleaner as it could run onto the waxed portion of the ski bottom. Use a dry cloth, paper towel or facial tissue to dry the spot.

The Chief of Ski Marking & Equipment Checking controls skiers throughout the ski marking process and records the bib number of the skier as the skis are marked. The lists of marked skis must then be sent/delivered securely to the Finish Ski Marking Controller who checks the skis of finishing racers to ensure that these skis are marked, i.e., that they finished on the skis on which they started the race.

Chief of Ski Marking & Equipment Checking

Clothing Stewards

Clothing Stewards are responsible for collecting and bagging the skiers' clothing prior to the race and returning it to the skier after the race. The clothing is put in storage where the area is secured (see above). The clothing is handed back to the skiers on request. While skiers are on course, the stored clothing must be supervised to ensure that it does not get wet nor is stolen.

Equipment

official start list, clip board, pencil, loudhailer

Procedure

In competitions where ski marking is in effect, it is required that each skier, prior to starting, have their skis marked with some unique identifiable symbol. Often the skier's bib number is used in conjunction with a stamp or stencil.

Once the skis are marked, the skier should proceed into the final warm up area and then to the start chute where an assistant starter checks that the skis are properly marked. After the race is under way and all skis have been marked, the Chief of Ski Marking & Equipment Checking proceeds to assist the Ski Marking Controllers at the finish line where the skis are checked.

In relay races and mass start formats it may be advisable to do the marking adjacent to the start line. All skiers must be warned that if they start with unmarked skis , they or their team may be disqualified.

Chief of Ski Marking & Equipment Checking

Finish Ski Marking Controller

The Finish Ski Marking Controller has the responsibility to position himself/herself near the finish line and check each finisher's skis to ensure that the ski(s) are properly marked with the official mark from ski marking. This ski checking takes place in the Red Zone between the finish line and the ski control line. The skier must wear the skis across the ski control line before taking them off (See Rule 353.1.7).

Equipment

clipboard, pencil, ski marking list from start area, notepad

Procedure

As the skier finishes the race, check the skis and mark them as being “ok” on a start list. Any discrepancies are brought to the attention of the Chief of Ski Marking & Equipment Checking or the Chief of Competition immediately. In such instances, the skis must be held for evidence.

Chief of Stadium

Chief of Finish Line

—Finish Line Stewards

Chief of Finish Line supervises the finish area and the Finish Line Stewards in maintaining a clear finish area once the skiers have finished the race and recovered sufficiently to move out of the area. (Sometimes called "after care").

Equipment

paper towels or facial tissue, blankets (cold days), bib box, garbage container

Procedure

The maintenance of an organized and clear finish area is important for the integrity of the competition and safety of the skiers and to allow the final checking of the racers' skis. Skiers must not be allowed to re-cross the finish line to warm down or visit a fellow skier. A patient support of the skier struggling to catch his/her breath and in some cases, recover, is what is required, but the skiers must be removed as soon as possible from the finish area for safety reasons.

Chief of Finish Line

Finish Line Stewards

Finish Line Stewards are responsible to remove the bibs from the finishing skiers and to offer and provide support to exhausted skiers and usher them out of the finish area toward the clothing and refreshment area. Stewards may be asked to assist with removing the racers' skis.

Equipment

See Chief of Finish Line

Procedure

The main concern is to move the skiers away from the finish line and toward the refreshment area where their bibs are collected, and where their clothing and equipment are located. When conditions are such that skiers may be subject to frost bite, hypothermia or exhaustion, medical aid and blankets should be readily available adjacent to the finish area. Skiers who collapse should be left for a moment to catch their breath, then aided to their feet to have skis removed. Provide facial tissues or paper towels to skiers who wish to wipe mucus from their faces.

In competitions where bibs are to be collected at the finish, it is sometimes a chore to obtain the bib from a very exhausted competitor. They are very willing to return the bib, but it can be a chore to remove it if they still have their poles on and a drink or two in their hands. When you ask for the bib, offer to hold, and reach out for, anything that they have in their hands, especially their poles, and let them remove the bib. Then hand back the poles and drink while obtaining the bib.

Chief of Stadium

Chief Of Refreshment Stations

—Drink Pourers

—Servers

The Chief of Refreshment Stations is responsible for the operation of the stadium refreshment station and any ones on the courses. Since many races do not require a refreshment/feeding station on course because of the shorter course distances, this position reports to the Chief of Stadium. The Chief may assign a person to look after the on-course refreshment stations if there are any, but the supplies are generally the same at any station.

It Is very Important that, prior to the competition, the Chief of Refreshment Stations research any sport drinks that might be served to ensure that they don't contain any banned substances that might be caught during doping control. At high-level events, athletes prefer sealed bottled drinks to ensure the absence of banned substances. The drinks that are going to be served should be announced at the Team Captains' meetings so that the athletes can be advised before hand what to expect.

Equipment & Supplies

Large 20 liter insulated jugs, environmentally friendly or reusable drink cups (preferred), table(s), garbage bags, large containers for cut oranges, muffins etc., paper towels, water, juice.

Bottled drinks with complete product labeling

General Procedure

In Stadium

organize provisions and equipment for both stadium and course stations

every competition should have a refreshment station in the stadium to provide racers with replacement fluids as well as to offer hospitality and fun for young racers.

provisions must be purchased and transported to the race site in sufficient quantity for the number of entrants. This will vary with the length of race and the air temperature. ie: cold day: more warm drinks etc.

a ready supply of water must be available or the water must be transported to the race site. If the water must be transported be sure and bring some hot water from a main supply source to reduce or eliminate heating water on site. It is easier to cool water down than it is to heat up.

a minimum of two drinks should be offered: plain water and an electrolytic replacement product. If electrolytic replacements are not available, juice type drinks such as apple, peach, or orange juice may be used. Juice drinks should be mixed with water and served as a diluted solution.

drinks are to be served in (preferred) environmentally friendly or reusable bright plastic containers both cold and warm 21° - 27°C (70°- 80°F).

orange slices or other fruit are also often provided

drinks are stored in large insulated jugs and drawn as needed.

On-Course

On-course refreshment stations must be provided during any race longer than 15 km. According to the rules (Rule 317), on courses up to 30 km, there must be 3 stations; for courses up to 50 km, there must be 6 stations. Ideally, there should be a refreshment station every 7 or so kilometres (plus one in the stadium) and they must be in accordance with CCC rules for Refreshment Stations (See Section 6, 7) for site preparation.

The liquids are stored in the insulated jugs, or kept warm in pots over gas burners. As skiers begin to appear, two people pour the cups/containers 1/2 full while three or four servers offer drinks at various points along the track at the station.

Beverages are served in bright coloured, environmentally friendly, containers such as plastic cups or bottles at a recommended temperature of between 21 - 27°C (70 - 80°F), i.e., lukewarm.

Normally the skier is responsible to call out which drink they desire but servers must call to them as they enter the refreshment area (i.e., water or juice).

Be sure to have your servers practise under simulated on-snow conditions. Warn them to be prepared to get covered with spilled juice and to dress accordingly.

Chief of Refreshment Stations

Drink pourers

Drink Pourers are responsible for keeping the servers supplied with sufficient feeding containers (bottles or cups) to serve competitors arriving at the feeding station.

Procedure for pouring drinks

Drinks must be served at the correct temperature. In cold weather, don't fill the feeding containers too far in advance of the skier's arrival. If the drinks get cold, either dump them out or return them to the large thermal jug. It is best to start out with liquid a little too warm as it can always be cooled. Feeding containers should be half-filled to avoid spillage by fast-moving skiers.

Chief of Refreshment Stations

Servers – On Course

Servers deliver drinks to moving skiers so that they are able to maintain a reasonable speed as they pass through the refreshment station. **The regulations require that servers be still when serving in mass start races.**

General procedure

It is important for a skier to take fluids during a long race. Missing a "feed" can seriously disadvantage a skier, especially in warm conditions. Servers must be able to move quickly and with good balance in order to efficiently deliver the drink container to a fast-moving skier. Practice is required. Servers should be positioned along the track **as per Section 8.** This spacing avoids skier pile-up and provides a last chance to serve a skier who has missed their feed.

Procedure for serving skiers

In order to serve drinks without spillage, the container should be traveling at the same speed as the skier is moving and at an appropriate (shoulder) height so that it can be taken gently. The delivery of the drink is best achieved by holding the top of the cup with the hand closest to the track while facing the oncoming skier so that the skier can grab almost the entire drink container. The container should be tilted away from the skier about 20° so that any spillage is away from the skier. The server should take a few short running steps as the skier passes by and must sweep their arm along with the skier to get the container with liquid up to the speed of the skier.

Servers – Finish Area

Servers in the finish area often bring drinks to the finishing skiers. Sometimes, these skiers seem to be unable to catch their breath. Try to give these people, as quickly as possible, a drink of a warm liquid, which seems to open the throat passage and assist breathing. Let them sip it slowly until their problem is over. In many cases, skiers will want more than one drink, so there should be plenty of fluids on hand.

Procedure

mix warm and cold drinks in appropriate quantities and put in insulated jugs

slice oranges, other fruit, and put muffins or cookies on trays for serving

transport supplies to refreshment area and setup

serve drinks and food to skiers as they finish

clean up after race finishes

Chief of Stadium

Chief Of Exchange Zone

—Exchange Zone Controllers
—Exchange Zone Pre-Caller
—Exchange Zone Judge

The Chief of Exchange Zone ensures that the zone is the proper size according to the rules, that it has been groomed and trackset correctly, that the start and finish lines of the exchange zones have been marked, that the zone is sufficiently fenced to both allow skiers to enter and exit the zone before and after being tagged, and that sufficient officials are trained and available to handle the amount of activity expected. During the competition, this chief must supervise the various functions to ensure that they are being correctly handled.

According to Rule 376.8, the exchange is achieved by the arriving competitor, with a tap of the hand on any part of the next competitor's body while both competitors are in the relay exchange zone. Note that tagging with the ski pole is **not** considered to be an exchange tag. If the exchange contravenes the rules, the incident must be recorded and the Jury informed. The Jury may apply a sanction.

Chief of Exchange Zone

Exchange Zone Pre-Caller

The Exchange Zone Pre-Caller calls out the bib numbers of the approaching skiers to help the next competitors to move into the exchange zone to accept the tag.

Chief of Exchange Zone

Exchange Zone Controller

Exchange Zone Controllers help to organize the waiting team member of each relay team, ensuring that they do not enter the exchange zone until their currently-skiing team member can be seen to be approaching the exchange zone. Often, waiting relay members can identify their team members as they are approaching the exchange zone, and they often move in at that time. Team members entering the exchange zone to await the tag must not interfere in any way with other teams' members who are entering the exchange zone before their team mate. After the tag is made, the finishing team members must stay the course (i.e., must not move across in front of another competing team member thus interfering with that person) until it is safe to move to the side of the exchange zone or course. The controllers should also ensure that finishing team members exit the exchange zone.

Procedure

Try to ensure that only the next team competitors are waiting near the exchange zone in order to eliminate congestion around the entrance of the exchange zone.

Ensure that teams do not enter the exchange zone unless their team members can be seen to be arriving momentarily, to avoid congestion in the exchange zone.

Ensure that finishing team members exit the exchange zone or course without interfering with other teams' members. They should not be allowed to be near the entrance to the exchange zone.

Chief of Exchange Zone

Exchange Zone judge

The Exchange Zone Judge ensures that a proper tag is made on the next skier. The tag must be made by the incoming skier's hand, it must be made on the body of the outgoing skier (there is no definition of body, so any part, such as a hand, back, head, bottom, leg, etc. is legitimate), and it must not be made so vigorously so as to constitute pushing the starting competitor (the rule states that "any way of pushing the starting competitor is forbidden). So, a tag on the next skier's ski pole, or ski is not considered a legal tag. Nor can the incoming skier put his/her hand on the back of the outgoing competitor and push this person forward while tagging.

Because the exchange zone is quite large, it is suggested that there be 4 judges, 2 on each side, spaced along the zone. This way, it is possible for judging to take place anywhere along the zone.

Should a legal tag not take place before the next competitor exits the exchange zone, a judge must record the fact and report it to the Jury as soon as possible.

Procedure - Relays

Spread the judges along each side of the exchange zone, ensuring that the whole zone is covered by a judge.

When a tag is legally made, the judge should signal such, usually by raising his/her hand in the air, and pointing to the team member.

Should a proper tag not be made, then the judge must record the incident and report it to the Jury as soon as possible.

Pursuit without a Break

The Judge is responsible for monitoring equipment exchange boxes to ensure skis and poles are not left outside the box after an exchange of equipment. The procedure is to record the bib or box number if equipment is not left entirely within the box, estimating its protrusion beyond the box. The record may be used by the jury to review possible sanctions. When it is safe to do so without interfering with any skiers, return the equipment to the confines of the box

Blank

Competition Secretariat

Introduction

The Competition Secretary and the Race Office team are key to a successful event at any level. They must be identified early in the event planning, given all the human and technical resources possible, and, in the case of the Competition Secretary, be involved in all possible pre-event meetings. The role of the Competition Secretary can often be extended at smaller events to include financial responsibility as well as general administrative activity beyond his/her core task. (A word of caution here: a good Chief of Competition makes sure that the tasks likely to distract the Secretary from the core responsibilities are allocated elsewhere.)

More than for any other position, except perhaps for the Chief of Competition, the art of delegation by the Competition Secretary is a mandatory talent. There are too many tasks in this function to be done by one person, so delegating many of them to other competent volunteers must be done. For example, the Competition Secretary cannot be in the race office, at the Team Captains' meeting, sorting bibs, collecting money, etc. all at the same time. So this person must delegate some of the tasks to others.

The art of delegation is not one of simply passing certain duties to people and never having to worry about them again. It is assigning certain duties to others, giving them guidelines under which to perform the functions, checking with these people from time to time to answer any questions that may have arisen, ensuring that progress is being made on the tasks, showing support for the staff, obtaining information from them to solve certain problems that have some priority, etc. By delegating, the Competition Secretary can accomplish, in a short period of time, a span of tasks that would be impossible to do by oneself that will ensure the success of the event.

The responsibilities of the Competition Secretary include (but are not limited to): receiving race entries (often in the form of team and entrant lists), ensuring the eligibility of every race entrant, collecting and disseminating appropriate race-related information, attending and taking minutes of Team Captains' meetings, providing accurate data on the competitors to the Chief of Timekeeping and Data Processing, preparing the start lists, publishing interim results, and official results, and publishing and distributing official results both in hard copy and electronically. In this section, additional tasks and responsibilities may be identified as will the potential for their being delegated to others in the organization. For example while the Race Invitation and web site may list local accommodation during the event, the Competition Secretary should play no part in arranging accommodation. This is squarely in the area of an Athlete Services Chair, or is done by the team captains themselves.

General Description of Responsibilities

Where possible this description will be chronological and refer to the performance of a team led by the Competition Secretary. More details of the duties of individual officials may be found in Chapter 11 – Competition Secretariat Officials.

Pre-event Planning and Communication

In attending all pre-event planning meetings of the Competition Committee, the Competition Secretary will become familiar with the rules and guidelines under which the event will be run. This information takes the form of Rules (with any specific rules for Canadian mullti-category situations), a Technical Package which sets out specific details concerning the race, including the eligibility of competitors, and the Officials' Handbook. All of this information must be reviewed to become aware of any specific situations or processes that are particular to the Competition Secretary's responsibilities. Then a Race Invitation must be assembled and approved by the Chief of Competition and the Technical Delegate. The Race Invitation may be mailed in hard copy, or e-mailed in soft copy, to CCC divisions, clubs and athletes, and must also be posted to the event web site. The essential contents of a Race Invitation and web site are shown in Appendix 4-1. The Race Secretary should also ensure that the Event Organizing Committee has arranged for the event's inclusion in all appropriate calendars, and that any sanction fees required by FIS, CCC or a Division are submitted.

If on-line registration is to be used, the web site with all the information that is on the race invitation should be available at least 2 months in advance. The web site registration system must be tested to ensure that it works properly, and that the other information is correct. Race event web sites are becoming the norm for providing information on the event, its sponsors, accommodation, vehicle rental, meetings dates and times, entry fees, late entry fees, etc. Experience is showing that racers typically register within the last two weeks preceding the event, when they are confident of their state of health and fitness, and the impending weather.

For any multi-day event, the Competition Secretary needs to arrange a suitable location for a competition office, team captains' meetings, etc. Once the competition office and meeting rooms have been decided upon, then it is necessary to arrange for the other equipment to be obtained for the office, such as telephones, fax machine, high speed photocopier with collating ability, internet access, tables, mail boxes for the teams at more formal events, etc. While most of this can be 'rented', it may be possible to obtain them from specific companies and then to "pay" for them by offering to make them sponsors, thus giving them a marketing opportunity. All of this must be arranged well in advance of the event, to ensure that it will be in place in time.

With the assistance of the Chief of Competition, ask that each Chief submit a request for lists and forms, so that enough copies can be prepare/printed. The format of the race, the courses and general schedule are known. Each Chief should be able to estimate the number of start lists, lane assignment, bib and time recording forms required each day. The Competition Secretary will have 'masters' of each form that can be reproduced on the appropriate coloured paper for each day. This is a job that should not be left to race day, and it can and should be delegated to someone to look after this function.

Acceptance and Checking of Entries

This task has been made simpler and faster through the use of electronic communications and race management systems. Registration can be done by athletes or team captains from their home location, confirmation of receipt by the Competition Secretary can be obtained, feedback that the entries were received and processed correctly can be requested, the acceptable methods and timing for payment of race entry fees, and special situations can be communicated quickly before the competition and cleared up before people begin to travel to the site. For large national and divisional events, eligibility is usually limited to licensed competitors and may also require Canadian citizenship for eligibility to win championship medals. Databases of these skiers can be directly interfaced from the national or divisional body to the race management computer systems. If any form of Supporting Member Licence ("day licence") is acceptable, it must be clearly stated on the race invitation, along with any exceptions such as the eligibility of any foreign skiers or those under juvenile age. These exceptions then need to be entered into the race management system, often using a fictitious racing license

number. Even if there is automation, a list of eligible license holders is a good thing to have. Remember that any competitors' information that is received is subject to the current privacy of information legislation, and therefore it must be protected from unwarranted use, or only used for the event.

The Competition Secretary must ensure that skiers are registered in the correct category. In general, skiers younger than those in the senior category may ski in an older-aged category up to the senior level ("skiing up a category") while skiers older than those in the senior category (masters) may ski in the senior category ("skiing down"). So juveniles and juniors can ski up categories up to the senior category, and Master skiers may ski down as seniors. If an entry is sent in showing a skier either skiing up or down a category, an email/telephone call to the competitor or coach is a good idea, just to confirm the data. This "skiing up" situation has caused coaches and team managers to "forget" about checking skiers registered in higher categories. And, unless the race management system checks, it is not too difficult to input the wrong gender of a person, which would put them in a wrong category. A final check is done at the first Team Captains' meeting.

In most cases the Competition Secretary will be directly responsible for the collection and accounting of entry fees (and any applicable day licenses) whether cash, cheque or on-line credit transaction. It is appropriate for the Secretary to collect fees for banquet tickets, event memorabilia such as T-shirts, but this task should be delegated to someone. However, the distribution of that material should be removed to an organization outside the Competition Committee, such as the Athlete Services Committee in the Event Organizing Committee.

Finally, It is important that skiers sign a Waiver of Liability of the organizers, absolving the race officials, its sponsors, and suppliers of any liability should a competitor decide to sue for negligence or any other reason. In Canada, we usually make the waiver a part of the race entry form (see Appendix 4-3). Competitors under the age of 18 will need to have the form signed by a parent or guardian, while those 18 years of age or older may sign it on their own behalf. Coaches or Team Managers who have power of attorney may also sign the waiver form on behalf of a competitor for which they hold the power of attorney. Remember: no waiver, no fee, NO RACE! And this is applicable right from the first race. If the Competition Secretary, or his/her delegate, does not receive the signed waiver, entry form, and the applicable fees for any competitor, then the bib for that competitor must be withheld until they are received. Please also check the CCC Race Sanctioning Policy for specific demands that should be in a waiver.

Entry forms, especially those that are received in hard copy, should be sorted by name, and put in a binder (a 3-hole binder is excellent for this) in case there is a future need to refer to any of them. For example, if a coach says that one of his/her competitors is in the wrong category, then it is an easy matter to obtain the competitor's name, look up the form, and determine if the entry was incorrectly input, or was incorrectly put on the form and sent in. If the competitor has registered to "ski up" a category, then this should be verified by the coach with the competitor, and the final answer given to the Competition Secretary, with the answer being written on the entry form and signed and dated by the coach. Often the Competition Secretary has a long list of questions for specific coaches when they arrive for training. These details are best sorted out on the days prior to the actual competition and definitely before or at the Team Captains meeting if the detail affects the seeding of competitors.

Late Entries

Whether or not late entries will be accepted should be decided at the time of issuing the race invitation, and wording to this effect should be in it. They must be handled in accordance with the technical package (if there is one); if there is no technical package, then it will be at the discretion of the Event Organizing Committee. At major events, they are usually not permitted. The value of putting every submitted entry onto a web site for review/verification is considerable in identifying missed mail, faxes or emails, even if on-line entry is not used. If late entries are permitted, the fees (if additional) must be clearly indicated on the entry form (web site or paper). The Competition Committee, Jury and the Competition Secretary must be equally clear on how late entries will be treated on the day of the competition since a start list will have been produced the night before. Gaps in bib sequences and 'starters times' between categories could be considered. The late entry should not be given any special consideration/advantage unless the race organizer is at fault. That is to say, they start at the front of an interval start (i.e., with the slowest group), and the back of a mass start.

Pre-event On-site Activities

The operation of a race office prior to an event is usually guided by the Technical Package. For National Championships, the office should be open 2 days before the first competition, but for a Division Cup the previous afternoon may be enough. For a club race, a very early morning start may suffice. The Race Office must be constantly staffed by people knowledgeable on all aspects of the Competition.

As soon as the race office opens, clearly post a list of registered competitors complete with their category, club, and respective points (See Appendix 4-5) as well as a schedule of events. This schedule should include the time and location of any meetings and the required time for any submissions such as seeding submissions, relay team declarations, medical forms, protest forms, etc.

If race kits have been made up for athletes, coaches and team managers, they should be distributed from the office or at the first Team Captains' meeting. Do not distribute them at the same time as they pick up their race bibs, because they will not be kept safely, and they will likely end up all over the race site, becoming garbage. Make allowances for extra kits beyond your estimate, as someone will always come back to replace one that has been mislaid. Although the package should be put together by Athlete Services, it is most likely that the Race Office will end up distributing them. Typical contents are as follows:

- Schedule of Events, both competitive and social
- Maps and brochures for local attractions
- Vouchers for restaurants and local attractions
- Course maps
- Stadium diagrams
- Pins, advertising trinkets, etc.
- Banquet tickets

As team managers, coaches and athletes arrive for the event, encourage them to check race entries and schedules. Usually the draw has not been done so additions and scratches can be accommodated as can changes in category. If a change is required because of a clerical error (the entry form was correct but it was entered incorrectly), there should be no need to obtain any authorization. But if the change is being requested by an athlete or coach after receipt of the entry form, make sure a record is kept of any changes and the requestor, and that the requestor is identified as representing the athlete, i.e. they are from the correct club or division. Have the requestor print his/her name and sign the change form. All of this should not be necessary, but too often a coach (the requestor) will

request a change of category for a competitor without conferring with the competitor; the competitor will complain, and we must make sure that the competition officials are not seen to be making changes without being able to prove who requested them.

Other duties might include the signing out of keys to wax rooms to team captains and service personnel, and troubleshooting other team requirements, etc.

Team Captains' Meeting

Team Captains' meetings are held a day or so prior to a competition and usually the day before each race during a multi-day event. They are not technically open to the public, but only to the Team Captains and major officials who will be making presentations; they are not reunions for long lost coaches or acquaintances, nor is it a party! However, in practice (particularly for low level competitions), other interested parties are often allowed to attend, but only in an observer capacity – only the team captains have the right to speak or ask questions. Proper decorum must be expected by all, and observers should be reminded that talking in the meeting room while the meeting is in progress is not allowed. As such, the chairperson, usually the Chief of Competition, should establish those who are in attendance as team captains, ensure that their names and teams are recorded in the minutes, and ensure that only these official representatives speak and ask questions. Dealing just with Team Captains simplifies a great deal how many people the Competition Secretary must deal with on administrative matters – dealing with all coaches can be a very time-consuming process! Seating the Team Captains at the front of the room can help establish their authority, and allow closer contact between the officials and the captains during the meeting. Each team is allowed 2 persons at a table, the position of which is assigned by signs in alphabetical order. At high level events, it is the custom to have flags and/or name tags on the team tables for each team represented. Only one person can speak on behalf of a team, and the Competition Secretary should know who that person is at the start of the meeting.

The meetings are called to order and chaired by the Chief of Competition to review detailed pertinent information with the team captains (usually the coaches). All major officials should be in attendance. These meetings are normally followed by a draw. The host club, or the event committee, may provide light refreshments for the team captains before or after the meeting. These meetings **must** start on time. This sets the tone for the whole event – that the organizers and officials are on time, business-like, ready, competent, and know their business. Don't lose this opportunity to set the tone! Coaches or team captains who are late will then know not to be late for the next meetings. Make sure that all equipment is set up in advance, and that it works, particularly the overhead projector and any computer projector. Remember also that coaches would really like to be with their athletes helping to wax skis and doing the final coaching tasks, rather than being in a meeting that doesn't start on time, drags along, and ends much too late.

The chairperson must also ensure that the meeting moves along smartly; does not allow large gaps of silent time to occur during or between topics, covers the material concisely and clearly, asks for questions but does not wait too long because this will encourage "stupid" questions just to break the silence – let them interrupt if they have a question. The Chief of Course should not drag out every bend, hill and valley on the course, only the particularly hard ones, etc. The Chief of Stadium should have the stadium layout diagram quite accurate as to the relative location of the various stadium areas, and explain the coming and going of the competitors quickly but clearly. Apologies should not be necessary, as the situation that requires the apology should have been fixed before the event started. Again, how this aspect is handled will set the tone for how coaches will think about the competency of the officials in the performance of their duties. Athletes and coaches come to an event expecting good quality courses, stadium and timing, and the performance of officials during the Team Captains' meetings will solidify their belief (and hope) that the officials are competent.

The following list shows the main participants and the topics for which they are responsible. A detailed agenda is shown in Appendix 4-2:

- Competition Secretary (CS)- distribution of results.
- CS - role call of teams (coaches).
- Chief of Competition (CoComp)- introductions: Technical Delegate, Major Officials, Team Captains or Coaches.
- CoComp - congratulations to winners.
- TD – review any new rules or recent rule changes. Also, may want to emphasize a particular rule, e.g., no skating in classical races, etc.
- TD - Establish the Jury, or make its pre-determined composition clear
- TD – assign one jury member to observe the preparation of start lists
- CoComp - weather report, including present day and forecast for race day temperatures, winds, relative humidity, atmospheric pressure with possible percentage of precipitation and amount expected. Correlate the regional weather forecast to the uniqueness of the race site weather.
- CoComp – review the start order of the race categories, and the tracks to be skied (with the Chief of Course)
- Chief of Course (CoC)- review course(s) maps and conditions for the next days race and point out any possible concerns, refreshment station(s) if required, tracksetting procedure used, etc. Use an overhead transparency.
- CoComp - start times, schedule, length of race(s), course closure times, stadium closure times, etc.
- CoComp - set final category race order
- CS – prepare start lists including review of entries, seeding, grouping and the conduct of a draw if required.
- Chief of Stadium (CoS)- review stadium area layout and support services in stadium area. Use overhead transparency.
- CoS - weather boards; where located, temperature taken when and where.
- CoS - report on warm-up area or rules and wax testing area.
- CS - explain when and where interim, unofficial and official results will be posted and the location of the Official Notice Board.
- CS - protest proceedings.
- CoC - refreshment station and type of beverages served.
- Athlete Services (AS) - information on transportation.

- CS - distribution of start lists (where, when).
- CS - identify time and place for distribution of bibs (e.g. On-site Race Office 2 hours before race start, or a special room in a chalet, or a special tent)
- CS - times and place of subsequent meetings.
- CoComp – Award Ceremony details

In high level races, often the courses, the category order of start, and the seeding details have been set beforehand. If so, then it is possible to prepare the start lists and distribute them to the Team Captains at the beginning of the meeting. However, where the start order of categories may come under discussion and review at the meeting, then the start list cannot be prepared by the start of the meeting, and so will have to be done once these matters have been decided upon, and the start lists distributed as soon as possible thereafter.

Preparation of Start Lists - The Draw and Seeding Process

The draw for start positions is normally conducted following or during a Team Captains' meeting. The Technical Delegate or appointed jury member must be in attendance to ensure that the procedures are fair, accurate, and in accordance with the rules governing the competition. The draw process serves two purposes: it attempts to ensure skiers start close to others of equal ability; and it assures that no one team enjoys an advantage over others with respect to the starting order of competitors in their category. Therefore, the draw process must be absolutely fair and in accordance with the Rules and the Technical Package guidelines.

Establishing the order of start within a category

Mass Start Races – for this format it is better for the faster skiers to be at the front where they will be impeded less.

Sprint Qualifying – it is best to start the fastest first to reduce overtaking and ensure the individual gets a clear course to make the best time. In addition it can provide excitement of knowing the time to beat to get into the Sprint Heats after the first 16 skiers have finished.

The procedure differs significantly depending on the level of competition, the race format, and should be described in the Technical Package if there is one. Otherwise it will be done according to the Rules.

The preferred order of start varies with the type of race being run and, in some case the condition of the course. However, for example, in the sprint qualification race, it is best if the course can be forerun by a number of forerunners, or if, for the first category starting, the slower skiers can be sent out first followed by the faster ones. This would allow the course to be better packed for the following skiers since a well packed course usually skis faster.

Interval Start Races - it is normal that the faster skiers are placed later in the start order by "Grouping" (see below). This is done with the expectation that the course will become quicker as more skiers pass over it. In the event that it is likely the course will quickly deteriorate (e.g. quickly rising temperature), the jury may change the order of start where the group with faster skiers may leave first.

Verification of Entries

IF this phase of the meeting is necessary (it should be done before the Team Captains' Meeting, ideally as soon as the team arrives at the race site before the competition starts), the Competition Secretary will confirm the number of skiers and their names to be entered in each race, with each team captain. When a registration deadline has been set, it serves to allow the Competition Secretary to finalize any input to the race management system, and then to confirm that all the athletes names and categories are correct; if the registration system is closed very close to the race, it does not allow sufficient time to verify the competitors' lists. The Competition Secretary can speed the verification process up by posting a list of entries by team and asking the Team Captains to verify their athlete entries and sign off on this a few hours before the first Team Captains' Meeting. If the race is a small and informal one, without a technical package, there may be changes and additions to the list of athletes, particularly if late registration is permitted; the later the close of registrations, the more chance there is of errors, and the less chance there is of doing proper verification of the entries. It is strongly suggested that registrations be closed a few days prior to the start of an event to allow the Competition Secretary to finish the data input and to produce lists to be verified before or at the first Team Captains' meeting.

Grouping

The procedure of grouping is designed to ensure that skiers in a category will be starting in close proximity to other skiers of equal ability. This procedure splits the entire field of skiers into groups. The number of Groups is determined strictly by the number of participants entered in the category.

FIS/CCC Rules provides the following details as to numbers of participants in each Group (see Rule # 333.3 and 334):

20 or fewer	2 Groups
21-40	3 Groups
Over 40	4 Groups

The starting order is normally Group 1, 2, 3, 4 for interval start races and the reverse for mass start races (so that the faster racers are out first). Groups are drawn in the order 1, 2, 3, 4; in special circumstances, the Jury may change the start order (for example, with an interval start if it is expected that the race conditions will deteriorate quickly as the day wears on, so getting the best skiers out first gives them the course at its best time).

If the Technical Package specifies that grouping will be done by a points list, this simplifies the process significantly. FIS points show the best skier having the lowest number of points, with the number of points increasing for each slower skier; Canadian points lists show the best skier having the highest number of points, with subsequently slower skiers having fewer points. Many technical packages require that a "Seeding Points List" be secured from CCC immediately prior to the events. But be careful - there is a points list for

distance results and one for sprint events – make sure that you obtain and use the correct list! These lists are updated 2-3 times during the competition season and at the end of the season, so it is important to have an up-to-date version of the lists when running an event.

Normally the race management software will handle seeding by points. It does so by first establishing the number of groups required from the number of entries in the category (e.g., 35 skiers will divide into 3 groups), and then allocating the skiers to groups done in ascending order of points (CPL) or descending order of points (FIS) (e.g., Group 1 will have 11 skiers, Groups 2 and 3 will have 12 skiers each).

If seeding by points is not used, the Competition Secretary must provide each team captain with lists of the team's skiers, and indicate the number of groups per category that there will be. See Appendix 4-6 for an example.

NOTE: The information on these lists must be considered confidential until such time as they are handed in and the groups have been drawn. This allows coaches to possibly apply special tactical grouping schemes which they may consider as part of their overall race tactics. However, as race officials, we simply tell the team captains how many groups there will be in each category, and the start order of the groups within each category.

The criteria for distributing skiers among groups is quite simple. The coach must distribute his/her skiers equally within the groups. If a coach has extra skiers left over, then these must then be placed, one per group, in whichever groups he/she prefers. In this way, a coach could never have more than one additional skier in a group compared to the number he/she has in any other group. The following chart illustrates the possibilities.

Teams		Groups			
		1	2	3	4
Team A	10 entries	2	2	3	3
Team B	8 entries	2	2	2	2
Team C	6 entries	1	2	1	2
Team D	7 entries	1	2	2	2
Team E	10 entries	2	2	3	3

For larger multi-day events, it may be more expedient for the Competition Secretary to ask each team captain to submit the groups of his/her skiers 2-4 hours before each draw meeting. The seeding form in Appendix 4-6 is useful for both the coach and Competition Secretary.

The jury member appointed to oversee the preparation of start lists must verify that the seeding given by team captains is correctly entered into the race management computer.

Finally, after the grouping is done, the actual selection or draw of the starting order will take place. The categories are drawn in the order that they will race. Each group within each category is drawn in the order in which they will start until the entire field of skiers for that category has been given starting positions.

The Double Random Draw Process

For any competition where the start order is to be decided by a draw, the process is called "double random". This process can be done manually, although a computer race management package is more usual. In the list shown below each skier has been assigned a number between 1 and 10. One of these numbers is randomly selected (whether by numbered 'bingo' balls or by a computer). In this example the skier chosen first is number 3.

Skier #	Skier	
1	12889	ALTA Ammar, Amanda
2	13275	BC Dow, Nellie
3	13247	NFLD Corbett, Jessica
4	13141	NWT Lennie, Holly
5	13269	ONT Brennan, Kate
6	13130	QUE Bedard, Karine
7	13108	YUK Enders, Heather
8	13446	BC Thomas, Kelsey
9	13061	ONT Deyne, Mallory
10	13278	QUE Boyer, Sophie

Start Position	Skier	
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

There are also Start Positions between 1 and 10 for this group of skiers. One of these start position numbers is randomly drawn to represent the chosen person's start position. In the example below the start position is 7. Therefore Skier 3 will start in position 7.

Skier #	Skier	
1	12889	ALTA Ammar, Amanda
2	13275	BC Dow, Nellie
3		
4	13141	NWT Lennie, Holly
5	13269	ONT Brennan, Kate
6	13130	QUE Bedard, Karine

Start Position	Skier	
1		
2		
3		
4		
5		
6		

7	13108	YUK Enders, Heather	7	13247	NFLD Corbett, Jessica
8	13446	BC Thomas, Kelsey	8		
9	13061	ONT Deyne, Mallory	9		
10	13278	QUE Boyer, Sophie	10		

This procedure will be repeated for this group until all in the group have been assigned start positions. Then, all other groups will be drawn using the same method until the start order is established for each skier in each race category. Thus, the double random draw is a random draw to pick a skier, and another random draw to assign a start position.

Draw by Points

The technical package for the race must specify that the draw will be done using a specific points list as of a specific date. Skiers are placed into groups according to their points standing provided by CCC or FIS. Skiers without points should be placed in a separate group. Then skiers are subjected to a double random draw within each group to establish their start order.

Draw for Mass Start – Team Captains' Seeding

When the coaches can assign their racers to groups for a mass start race then the grouping and the draw process is the same as it is for interval start. A skiers start position (bib) will then translate into a start position on the grid as indicated in Appendix 4-9 & 4-9. This coach-influenced method permits slower skiers from small teams to be mixed with faster ones on larger teams in the front rows of the grid. Therefore the design advantages of the chevron start grid may be lost and it may be preferable to use the arced line layout. The Start Lane Assignment chart may be prepared manually or be output from the Race Management system. The Start Lane Assignments should then be posted in the stadium on race day and enough copies be available for the Start Controllers loading the grid. It is important to remember that the lanes are numbered beginning in the middle and are consecutively numbered alternately to the right and to the left.

Mass Start - Points Seeding

The technical package for many events (e.g. Canadian Nationals) will specify that some categories (usually Open Men and Open Women) will not be drawn. Rather, they will start in CPL points order, i.e., skier with the highest points standing (the best skier) will start in position 1, the second best skier will start in position 2, and so on. This method lends itself to benefiting from the chevron start layout and it should be used. The start order will not be randomized within groups except in the case of those who have no points, who will be grouped and drawn.

Draw for Sprint Qualifications

The technical package for the competition may specify the type of draw (e.g. group by points or coaches selection). It may also specify that no draw takes place and skiers are started in the order of points they hold. It is essential that the seeding here sends the fastest skiers out ahead of slower ones so that there is minimal chance of overtaking. (See qualifying remarks in previous section "Establishing the order of start within a category")

Relay Draw

The draw procedure for relay team events is designed to assign start lanes for the teams, rather than for the individuals. The team captain is responsible for submitting the relay team lists to the Competition Secretary before the draw. The latest time for submission should be stated in the Technical Package, in the Event Notice, in the Event Schedule, and posted in the Race Office. The rules give complete details regarding late entries, reserves, and team order. These details should be explained to the team captains in either the event Technical Package or at a team captains' meeting. The Competition Secretary should initial and time stamp relay declarations both when first submitted and when the final order of competitors is submitted. This should avoid any potential for protests concerning when this information was submitted. Team start positions are determined by either a previous set of results (i.e., team standings at the previous year's national championships) or by a prescribed draw procedure. Details should be clearly stated in the race technical package.

The simplest method of doing a draw treats all teams equally, and the draw is made from one large group of teams. Another approach is to set up groups, allowing each club or division to have one team in each group and subsequently do a random draw for lanes for Group 1, Group 2, etc. Lane #1 is always the middle lane and the remaining lanes are numbered alternating to the right and to the left of Lane #1; the lanes are filled in order by descending order of start position. A second and third row of starters can be added behind row 1 if needed to accommodate all teams. See Appendix 4-7 for sample relay entry and Appendix 4-11 for start position forms.

Pursuit Start Race – with a break

The pursuit start race is the second race of a two-race competition whereby the competitors have their start order and start times determined by their placing and finish time in the first race. (See Appendix 7-3). However, the start order of the race categories and the start times (time of day) need to be decided before bib allocation. Usually, the Chief of Competition and the TD, along with the Chief of Course, will consult and decide the start order to minimize merging skiers, lapping skiers, congestion on the course, and so on. Often, time gaps are left between categories to allow the course to be cleared of the last category before the next one starts.

Bib Allocation

Bibs for all races are normally allocated in the order that each person starts his/her race. This, of course, is usually determined through a draw, or through the use of points lists. There need not be any gaps left in the bib numbers between categories, but there may be circumstances that would make it prudent to do so.

Allocation of specific bib number ranges to different categories in a race needs to be made in consultation with the Chief of Competition, Chief of Course, and Chief of Timekeeping and Data Processing. First, a complete continuous bib set is essential (I.e.,

there must be no missing bibs). There is nothing of less use than an incomplete set of bibs. Then, if it is decided that some bib numbers should be left between categories to accommodate late-registering skiers, this can be done.

If Intervals of time are left between the start times of categories, then it may be desirable to start the next category with a bib number ending in the digit "1", e.g. 51 to help organize the start, although there is nothing wrong with leaving a few bib numbers out and then picking up the next one, whatever it might be. However, since there is an unwritten convention that even-numbered bibs should correspond to start times on an exact minute and odd-numbered bibs should correspond to a start time 30 seconds after any minute, then the next bib should relate to its corresponding time.

If a multi-coloured bib set is used, it can help course controllers if certain coloured bibs (e.g., red) are used for those racers skiing on course "A", and a second coloured set of bibs (e.g., green) are used on course "B".

With the plan for bib allocation in hand along with the intervals between starts of categories, the Competition Secretary can have the Computer Operator assemble the start list. The first printed copy should be checked by the TD and Chief of Competition, and then, once approved, enough copies for the Team Captains and officials need to be made. Arrangements may be necessary to deliver or fax copies to team hotels, and place it on the web site as soon as possible. The "race" is now official, so the correct file backup must now be passed to Timekeeping to score the race. Copy the race file onto either floppy disk or CD. Even if only one computer is being used to run the race, there must be a backup computer available in the event of a failure. As a general recommendation the file should be proactively named with a date and time (example Nationals20040302-1710). Relying on identifying the correct version of a single filename by operating system timestamp is somewhat risky.

For elimination sprints, it is definitely beneficial to have two sets of bibs. The first can be used for qualification round, and then bibs from the other set can be used for heats elimination round. It is much easier for the skiers and starters if the bibs reflects the ranks in qualifying round, e.g., qualifiers in the first category have bibs 1-16 and in the next 21-36 and so on. In this way, the numbers reflect the finish order of the qualifying round and help in knowing the order of lane selection for each of the heats. Collecting the qualifying bibs and redistributing them is much more of a chore than collecting the first set and issuing new bibs from a second set; however, if there is only one set of bibs, then the collection process must occur immediately after each competitor crosses the finish line in the qualification round, and they must be re-distributed for the heat rounds.

Bib Sorting

Once the start list has been finalized, then the process of sorting the bibs for distribution must begin. The best way is to sort the bibs by club/team (or even division if it is not too large) and be prepared to issue the clubs a bundle of bibs that contains one for each of their club racers. Where there might not be a critical mass of skiers from a club, these can be put together in bib number order and be issued one at a time before the race. Having to contend with issuing 350 bibs individually the morning of a race is too big a job to be feasible; try to group the bibs and issue them by groups.

Armed with "Bibs by Team" lists (1 page per team) from the Race Management system, the Competition Secretary's team can now sort the bibs and bag them by team. Find sufficient space so that bibs can be laid out in piles of 10. 300 bibs in piles of 10 will need at least 7.5 square metres of table space or 15 metres of linear bench space. Operating in teams of two, one person calls the bib number and the second picks it from the pile. When the whole list for a team has been picked, place them in a bag. Put a copy of the list in the bag. Attach another copy of the list to the outside of the bag and place the bags in alphabetical order on benches arranged behind the tables which will be used for registration and bib pickup on race day. Bibs for individual racers do not need to be bagged, but must be left in order on the benches behind the registration table. It is likely the numbers will be smaller and the piles consolidated to say, 6 piles of what is left in 1-50, 51-100 and so on.

If space is very limited and the competitors represent a small number of teams (less than 10), there is an alternative. This solution would require about 5 linear metres of bench space for the sorted piles and less than 5 square metres to lay out the bibs to be pulled. Decide for which teams bibs will be sorted. Make a sign with the team name above a bench or table. Operating again with teams of two use a start list to go through the bibs from start to finish. For each bib belonging to a skier who is part of a team, pull that bib and place it in the 'Team' pile. It is definitely beneficial to have the same lists available as described in the previous method.

Preparation of Lists and Forms

The lists and forms required will vary with race format. Examples of most, if not all can be found in the appendices to this handbook. While this will have been started before the eve of the race, some cannot be done until close to the start of a race, e.g., Mass Start Lane Assignments which can only be completed once the start list has been produced. With the Chiefs' requests for the numbers of copies required in hand, duplication of the start list for race day can now be done, along with the setting out of clipboards and pencils for the race.

For an event that takes place over a number of days with a number of races, the paper work and keeping track of it will become a huge function of the Race Office. For large events, it is possible to have 5 start lists, and 5 results lists, and if it is all printed/copied on white paper, people may end up using the wrong list for a race. To avoid competitors, coaches, team captains, officials, announcers, etc. from mistakenly looking at and using a previous race day's start list, both the start list and the results list for a particular day's races should be copied on to a specific colour of paper. For example, let the first day's races be printed on white paper, then use pale blue for the second day's races, and pale yellow for the third day's races, etc. Keep the colours pale since copying dark coloured paper results in a very dark photocopy, almost impossible to read. So use pale blue, yellow, pink, green, mauve, etc. By doing this, if an official sees a competitor checking a start list that is not printed on the current day's coloured paper, it is easy to warn the competitor and have them consult the proper day's start list. This use of colour can also be extended to the Controllers' sheets out on the course, so that when they are returned to the Competition Secretary, they can be filed with the other paper and lists from the same day – they will all be on the same coloured paper.

Race Day Activities

The Competition Secretary and members of the Race Office Team must be at the race site in the race office at least 30 minutes before the announced time for bib pick-up. At the bib pickup location, set up a table or two with the bib packages behind and multiple lists taped to the table, and have enough volunteers to be able to serve a number of clubs/teams at one time. This will allow them to pick

up their bibs quickly. On the second list with each bib package, have the person picking them up print his/her name on the sheet, sign it, and, if possible, time stamp it. It is possible that local racers will not arrive at the competition until the morning of the first race, so they might need to complete their registrations and payments. Have the volunteer team make sure that the registrations of any of these skiers is complete before issuing bibs. It is the one way of ensuring only eligible skiers start. Remember: no waiver, no fee, no bib, NO RACE!

If bibs are collected by a team representative, have them check that the bib package is correct (i.e. the bibs are all for their team of skiers) and sign a copy of the "Bibs by Team" list. At this time, they may inform you of last minute 'scratches' (competitors on the start list who will not be racing). Record them so that the start list can be modified for Start and Announcing crews. Retain the bib in the race office for any pre-determined scratches and note it on the "Bibs by Team" form that the team representative signed.

The most effective way to collect the bibs at the end of the race is to have volunteers waiting past the finish line to collect them immediately. Competitors usually know that they need to return the bibs, so are happy to give them up. But often, competitors are quite tired at the end. Just wait a minute (or less) until they catch their breath , then volunteer to hold their poles, maybe skis, and perhaps their drink while they get out of their bibs, then hand them back their poles, etc. If they object, just explain nicely that if they give you the bib now, you will leave them alone to do whatever they want afterwards. Be pleasant, but firm – they can't leave the finish zone without giving in their bibs! If they are needed very soon afterwards, then a sorting process, with other volunteers, will need to take place at the same time; otherwise, the bibs can be sorted indoors later on, but not too late as there may be a missing bib and it needs to be located immediately before the racers leave the race site. Also, in walking around the race site afterwards, if you see a bib, approach the person and request it. Again, don't leave this person until you get it.

Protests

In the unfortunate event that a protest is filed, the Competition Secretary and team must know the correct procedure. A sample protest form can be found in Appendix 4-12. A supply of blank forms must be available at the Competition Secretary's on-site race office. Protests have to be filed within certain time constraints, so check Section 392 of the rules under which the race is being conducted for the time limit for filing any protests.

The protest must be in writing, be accompanied by $50 (this amount is subject to change by the race organizers) and contain the following:

Name of the complainant
Date and time of the protest submission
Time of the incident being protested
Full description of the incident, the name or bib number of the person against whom the protest is being lodged, and the grounds for the protest
Names of any material witnesses

Sign and date the protest as accepted and immediately contact the TD and Chief of Competition so that it can begin to be researched, verified, and any relevant information gathered for consideration by the Jury. If the Jury issues a written reprimand then a standard format should be followed.

Unofficial Results

Post unofficial results as soon as they become available. If the Race Management system has not printed a date and timestamp on them, add it manually to each page. Then post it on the Results Boards so that the competitors and coaches can review them and inform the Competition Secretary of any seemingly incorrect situations. Also, pass the necessary computer files to any on-site webmaster for immediate posting on the web-site.

Official Results

Official results require that the Jury has dealt with any infractions or protests before they can be published. This is usually completed within one hour of the completion of the race. The publication of the official results does require the signature of the TD on the last page, thus indicating that all protests have been reviewed and decided upon and that the results are correct. Make sure all required computer files get to the web site, the official responsible for media liaison, CCC, and the various other bodies identified in the technical package that are to receive a copy of the official results. When posting official results to the web, the web-master should remove any unofficial results that are there.

Minutes of Meetings

Whenever a meeting is held, minutes should be taken so that a record of the decisions made will exist. Minutes should be taken at each Team Captains' meeting, and at each Jury meeting. Minutes of the former should record the members of the Jury, and any changes to the race that the Jury decided were legitimate. For Jury meetings, even if no decisions are required to be made, this should be noted. The minutes can be kept quite simple. Where the Jury has to decide on a protest, more details should be noted concerning the evidence considered, and the decision of the Jury (and the number of votes for and against the decision).

Competition Secretariat Officials

Description of Roles and Responsibilities

Chief of Competition

Competition Secretary

-Recording Secretary
-Competition Office Manager
-Race Office Assistant(s)
-Webmaster

The Competition Secretary is responsible for communication between the competition committee and the competitors. The Competition Secretary sets up and staffs a race office, manages registration, organizes Team Captains' meetings and draws and produces start lists and distributes results.

General procedure

The Competition Secretary should:

Be very knowledgeable about the entire structure of the event and the competition organization.
Know the majority of the people who are working on the competition, especially chiefs and assistants.
Be very well organized and able to work under pressure.

NOTE: The number of office assistants and the detail of the organization needed by the Competition Secretary will depend on the size and complexity of the event. For a small event many of the duties can be combined and performed by the Competition Secretary. For larger events, the duties may be delegated and/or shared as outlined under duties below.

DUTIES:

Pre-event:

- record minutes of the Competition Committee meetings and distribute same to the committee members.
- prepare race sanction applications for governing bodies
- Communicate event information to the webmaster
- prepare and send the race invitation information package and /or registration forms to teams, clubs, athletes.
- receive the race registration forms and the corresponding fee.
- maintain the financial records for the entry fees received.
- prepare the various record keeping forms for the race officials.
- verify the eligibility of the entrants against applicable license lists.
- ensure the Race Management system has the correct skier names, club, division and race category along with any points necessary for the draw.
- maintain an orderly file of the race entry forms for future and quick reference.
- ensure that race bibs have been ordered and are available. Verify the number sequence of the bibs (i.e.. 1-300 or 201-400). Make sure they are suitable for the competition e.g. relay bibs or a second set for Sprint Elimination
- verify the acquisition of awards and prizes with the Event Committee Chairperson for Protocol and Hospitality
- make arrangements for the site of the Competition Office and for the acquisition of all equipment and supplies necessary for its efficient operation.
- for larger events set up team mailboxes/mailslots to facilitate circulation. The team has the responsibility to check it. This can't be the only means of distribution for urgent matters with deadlines but it can be useful to keep official notices available. Teams should be encouraged to check their boxes each morning upon arrival and prior to departing at the end of the day
- make arrangements for a room with appropriate facilities for the draw/team captains' meeting(s).
- arrange to train all personnel who will be working in areas responsible to the Competition Secretary. This training should include some conflict resolution skills to aid in diffusing frustrations of athletes and coaches when things are not going their way!

During the event:

maintain a competition office which will be the focal point of information distribution for all personnel involved with the event.

prepare information for the draw.

If necessary, distribute, collect and organize the seeding lists.

Prepare, with the Chief of Competition, and duplicate agenda(s) for Team Captains' and draw meeting(s).

arrange to have sufficient supply of medical declaration forms and waiver forms if necessary, and distribute these forms to all team captains or coaches at the beginning of the event. Collect and keep completed forms in a confidential file for use by the Technical Delegate or for Doping Control should a test be made. Forms must be collected before the skiers race.

conduct the draw.

prepare start lists.

duplicate and distribute start lists to coaches, race officials, press, media and others who require them.

sort and distribute bibs and arrange for bib collection after the race.

prepare and distribute the various forms required in the stadium, on course and in timing

check, sign, time-stamp and post unofficial results on the Official Notice Board.

receive protests and inform the TD and Chief of Competition of any protests.

attend and take minutes at all jury meetings.

have the TD verify what is typed up as being accurate

prepare, copy and distribute official results.

post the official results on the Official Notice Board, and arrange to have them posted to the website as quickly as possible.

After the event:

send official results to sanctioning body (i.e.. Division Office(s); CCC; TD or TA etc.) and to any teams who did not receive them at the event.

Ensure with the Chief of Timekeeping and Data Processing that all electronic dispersal of results has happened as required by the technical package (e.g. XML file available for FIS Results submission).

receive the various record keeping forms from race officials and maintain them in a file for future reference. These records should be kept until there is no further possibility for any appeal to take place. Contacting Cross Country Canada should determine if there is any appeal being considered for the race concerned; if there is, there records must continue to be kept. If no appeal is on record, then the records can be destroyed after 2 years from the date of the event.

send letters of thanks to all sponsors; dignitaries; etc.

arrange for the return of all equipment used by the Competition Secretary's committee.

send official results to Technical Delegate and/or Technical Adviser.

regional, national and international events - send or hand over minutes of team captains meetings and jury meetings to TD.

Competition Secretary

Recording Secretary

The Recording Secretary is responsible for taking and distributing minutes of all competition committee, team captains and jury meetings. Distribution is very limited and filed copies are kept available for review by coaches etc.

Duties

take minutes at all race committee meetings and distribute the minutes.
take minutes at all team captains meetings.
take minutes at all jury meetings.
prepare and have the draft checked by the TD before making copies.

Competition Secretary

Competition Office Manager

-Race Office Assistant(s)

The Competition Office Manager is responsible for setting up, staffing and supervising the competition office. The number of assistants needed in the competition office will depend on the size, number of days, and complexity of the event.

Duties:

plan the organization and layout of the Competition Office.
in consultation with the Competition Secretary, organize the office logistics, i.e, number of assistants and respective training required for their assigned duties, office hours etc.
maintain the race office where athletes, coaches and press can come for information regarding the event.
provide a venue for information flow within the event for officials, race committee members, etc.
arrange for computer and printer, photocopier, fax machine, telephone(s), paper supplies and office supplies necessary to run an efficient office.
obtain, copy and prepare for distribution all the forms needed by the various race officials. Keep on file all original forms.
receive and keep all completed medical declaration forms in a confidential file for the Technical Delegate,
copy and prepare for distribution sufficient numbers of copies of the official race results. Keep on file all original results which had to be signed by the TD.
receive and file for future consultation all forms used by the various race officials.
arrange a mail box and message board system in the competition office.
keep copies of all logos, letterhead etc. for use during competition.
copy logos on a transparency for duplicating purposes.
set up an efficient filing system for forms, results, etc.

Use logos on transparency for duplicating on result covers

Competition Office Manager

Race Office Assistant(s)

Duties

assist the Competition Office Manager in arranging a room with appropriate facilities for the team captains' meeting(s).
set up the room with chairs, tables, agendas, etc. for the meeting(s). See checklist.
assist the Competition Secretary in distributing and collecting seeding request
coordinate with the Competition Office Manager to produce the required number of start lists for coaches, officials and spectators.

sort the bibs into groups by country, division, team etc. and distribute them to team managers/coaches.
assist in the distribution of bibs to teams and the collection of registration forms, waivers, and fees on race day where necessary
assist in the preparation of the various forms required in the stadium, on course, and in timing
assist in checking the bib set after the competition to ensure that no bibs are missing.
launder bibs for next competition (somebody has to!)
keep a key registry for the wax rooms

Competition Secretary

Webmaster

Duties

Post all information required prior to the competition (see Appendix 4-1)
Add updates as soon as possible prior to the race
Post race entries by category as they arrive
Post start lists immediately they are available
Post unofficial results as soon as possible
Post official results when authorized, and remove any unofficial results.
Add photos and athlete stories when available.

HELPFUL HINTS

Use coloured paper for many of the forms and use different colours for different days.
Keep a three-ring binder with all the entry forms, copies of forms, etc. This becomes the Competition Secretary's "Bible".
Do the cover sheet for results before the race when you have time to set it up with sponsors' logos; etc.

Timekeeping and Results Systems

Introduction

The principal objective of timekeeping is to provide prompt and accurate results. This statement supports the adage that: “give the racers good tracks and fast accurate results and they will be happy”. This may not be the entire story for the organization of Cross Country Ski races but it does state the two most important functions from a racer’s point of view. To ensure that fast and accurate results can be prepared requires attention to detail and the organization of at least two independent timing systems with dedicated teams. Having two or more systems insures against failure and ensures that there are times with which to produce results and to provide a means of confirming results by comparing the times of each system. Any number of unforeseen problems can occur on race day and it is always wise to have a back-up timing system. Cold temperatures, snow, moisture and wind can affect electronic equipment and stop watches. Power failures shut down electronic systems and computers. Bibs which are rolled up and/or hard to read or several racers finishing simultaneously make recording difficult on course and at the finish line. Timing teams must therefore be well trained, organized and equipped for the job.

Technology is constantly improving, is easier to operate and is becoming more readily available at more reasonable cost. Therefore, this manual assumes that all competitions from division cups up and sanctioned Loppets will be run with electronic timing as the primary system and manual timing as backup. This is not to suggest that manual timing should be dropped completely for it has been proven many times that electronic timing systems fail and manual timing is there to provide the results needed.

Sprints and various forms of mass and pursuit start present the finish crew with the challenge of close finishes and high rates of arrival of skiers. As a result the use of video aids such as cameras and the FinishLynx® are essential for races such as National Championships. Once again training in use and interpretation of results is essential.

Tools of the Timing Trade

Electronic Timers

The electronic timing system offers improved accuracy and efficiency to the production of competition results and is a requirement at major competitions.

This equipment is expensive to purchase, and clubs may choose to work in partnership with other community sport groups such as track and field or swimming to acquire some or all of the equipment necessary to meet their needs. Another way to access equipment is to contact your Division office. Some Divisions of Cross Country Canada have timing equipment available for the use of their member clubs.

Organizers should use timing equipment compatible with a race management system specific to our sport. An additional benefit of electronic timing equipment is that it can be directly connected to the results computer. This saves time and eliminates inaccuracies caused by key entering times.

Automatic backup battery power is strongly recommended for any devices such as PC’s using AC power. The backup power ensures that power failure or temporary power fluctuations will not affect the timing accuracy.

To time a cross country race times have to be taken from several locations like start, lap and finish. Until recently multi-channel timers were used connected by cables to each of the required locations. The most commonly used models in our sport have been made by Chronomix in California. Chronomix ceased new production December 2007. Tag Heuer and Alge products from Europe are extremely sophisticated. They are used in alpine ski racing and auto racing. TimeTech Sprint 8’s made in Oregon offer good functionality at a reasonable price. These units all have certain features in common. They have very accurate clocks which can measure to a resolution of 1/100 second or more. They can have up to 10 devices attached to signal a time. They are battery powered and can be recharged and all have built-in printers.

An excellent recent development is the availability of wireless timers from Summit Systems in Salt Lake City, Utah. A timer can be placed at each of the timing points, communicates by wireless signal to a modem which can put times directly into a PC. The PC can be equipped with Zone 4 or Summit Systems Data Acquisition software and all that is required is to relate a Bib to a time. This is made even easier by the Summit’s ability to ‘post’ a Bib number on its keypad and have that go directly to the PC. Additional benefits are the ability to synchronize all the timers from one PC signal, and they can be started several minutes early if desired. Summits are powered by AA batteries which can be changed while the timer is running. In the following description of deploying Electronic timing devices where a multi-channel timer would be wired to a channel, a single Summit is deployed. They are essentially weather proof and can be used at any temperature we would allow for ski racing.

What devices and channels are used?

The start gate (or wand) is positioned over the start line and connected to the 'start channel' on the timer. It is positioned approximately 25cms above the snow, and the skier 'opens' the gate when they move forward at the start. A switch inside the start gate causes a time to be registered in the timer. The best type of start gate is FIS approved and swings completely open on a spring once they have been opened beyond about 15%. The wand then needs to be pulled back into the 'set' position by the Starter. Spring loaded industrial switches may seem to provide the same function, but they are susceptible to bounce and producing multiple signals.

Precautions need to be taken with the start gate in free technique races. A fixed post needs to positioned within one metre of the start gate post on the start line to force the skier close to the start gate post. If this is not done it is possible for a skier to move their leading leg forward, fail to open the gate sufficiently and then have their trailing leg entirely miss the gate.

At one end of the finish line there is a photo cell or laser light beam. At the other end of the finish line is a reflector or another light source. When the beam is broken a signal is sent to the timing unit to register a time. The beam is required to be set 25cms above the snow, so any features like a laser aiming aid is definitely a benefit. Ensure the beam equipment is compatible with the timing unit before purchasing and remember it needs a range of at least 12 meters to cover 4 lanes of 3 metres for Sprints, and it needs to work down to –20 C.

All other signals to the timer are usually made by gripswitches, more commonly called plungers. The plunger is cylindrical, is a little larger than your thumb and fits in the palm of the hand. On one end is a spring loaded button which requires some pressure to close the internal switch. Some have a guard ring around the switch. This means in winter a thickly gloved hand may not break the switch. If you are wearing mitts, put the plunger inside and work it with a finger. Elsewhere we will describe in detail how to time using plunger. Typical uses would be to capture lap times, backup finish beam signals and start gate signals.

The only other device which may have some applicability to our sport is a sound transducer which can capture the firing of a start gun and generate a signal to the timer.

Display Clocks

The primary use of a display clock is to show officials and skiers the precise race time during interval start or pursuit start competitions. Digital display clocks need to show H:MM:SS as a minimum and it is preferable they can be connected to the Electronic Timer to synchronize starts. Recommended display size is a minimum of 10cms. If an analogue clock is used they need to be specifically designed for our sport like the Alge ASC1 or Tag Heuer HL920.

Printing Timers

These hand held timing devices make excellent backup to the electronic timer. They print times on a thermal print roll 3.5cms wide. The most widely used is the Seiko range of products. While they only have one channel they can be operated with a plunger and they have the additional feature of a lock to prevent stoppage of the watch once started.

Stopwatch (non-printing)

Regardless of the more sophisticated equipment in use there is always room for conventional stopwatches, the more the merrier. Starters and Assistant Starters need them in case a display clock fails. They are needed at the finish line in the event of failure of any other device, and can be used to time the whole race. One important point: in the context of cross country skiing, they must not be STOPPED until instructed by the Chief of Timekeeping. Once started, it is best to protect the 'stop' button with a lock. 'Locks' can be added to watches by drilling a hole in the shaft of the start/stop button and inserting a paperclip. If electronic devices fail for a short time, they can be restarted at a given time from a stopwatch.

Timekeeping Equipment Sources

Summit Systems	www.summittiming.com
Chronomix	www.**chronomix**.com
TimeTech	www.**timetech**usa.com
Alge	www.**alge**-timing.com
Tag Heuer	www.tagheuer-timing.com

Headsets

Although the wiring for headsets is an extra task, there are major benefits for some communication to be completely open rather than one way as would be the case with a radio. As we will describe later, the Assistant Starter needs open communication with the Electronic Timing Operator who can tell the Assistant Starter or False Start Controller when the last skier who started has false started and needs to be recalled to start again. Because a headset network is always open, emphasize discipline to communicate necessary race information only, and not carry on long conversations.

Radio communication is less suitable for the information flow needed for timekeeping and results. For some roles like Finish Bib Caller, a radio with voice activated transmit can be useful, but this requires a word of preamble to activate the line, such as “Bib Number’ followed by the actual number.

Radio discipline must be established and officials trained. A caller should identify him/herself and the person or position they are trying to raise. It is acceptable to repeat to wake folks up, e.g., “Chief of Course calling Chief of Stadium, Chief of Course to Chief of Stadium. Come in”. Allow 20 seconds for the radio to be retrieved from inside outdoor clothing. Call again if no answer. If the conversation needs more than 10 seconds of questioning with a straight answer, request switching to a different previously agreed channel for a lengthy discussions. This keeps ‘race radio’ open for other urgent discussions.

Set Up of Equipment

Following are some additional considerations:

All systems should be synchronized to the same master clock.

Nicad battery units require special care. They should be drained and recharged , as instructed.

Electronic timing equipment must be kept in a heated environment prior to and during the event. Do not leave it in your car the night before the competition.

Timing units must be placed in a position so the operator has a clear view of the finish line.

The plunger buttons should be kept warm, dry and free from snow.

Setup fencing or guard posts to prevent start/finish area skiers and officials from interfering with the finish beam and protect the start wand from skiers.

Check the recording resolution of the finish beam (photo cells)

Check the operation of all timing input units including; plungers (buttons), start gate(s), radio headset operation from each location.

If a start clock and display clocks are used for countdown purposes in interval starts, they must be placed so that they are in view of the starter and the skier in the start gate.

A display clock must not be visible to skiers in mass/relay starts but should be placed at the finish line where timekeeping officials and finishing skiers can both see it clearly.

The crowd display unit (if a second display unit is available) should be placed so that it can be viewed by announcers and spectators. This clock must not be in view of skiers during mass/relay starts. If this clock is used as a time of day clock, it should be set very early in the morning so that coaches and athletes can set time according to it.

For a pursuit start, the display clocks (two clocks for five lanes) should be positioned outside the outer lanes on stands or tripods as high as is practical ten meters beyond the start line.

The cables for the start gate, finish beam etc. must be protected from skiers, officials and grooming equipment. Unless the competition site has permanent lines or underground tubes in place, it would be best to route the cables along fencing and over the course using flagpoles/dwv tubes at least 4 metres high. (suggestion-if local conditions permit, drive t-posts and attach the flagpoles with tie-wraps or duct tape).

Use duct-tape or insulating tape as strain relief at connection points. Someone will always trip on a cable.

Be aware that Duct Tape is not very effective at adhering to aluminum or itself at temperatures below -10.

Outside connector boxes or receptacles must be fastened to a post, building or fence above the snow line and adjacent to the required time recording area.

Two timing units should be installed for high level events. One unit is then part of a back-up system.

In the event of equipment failure, (start gates or beams) plunger buttons should be installed for a backup at all levels of events where electronic timing is used. In certain situations such as the finish of Popular Ski Competitions, intermediate timing, relay starts etc., the plunger button is often the primary timing input device.

Storage: all equipment must be carefully inventoried and well maintained.

Operation of Electronic Timing Equipment

It is essential to rehearse the electronic timing procedures, communications and information flow. These rehearsals should include practice for equipment failure and other unexpected circumstances. Practice will allow efficient operation in difficult situations including multiple finishes and power failures.

Specific use of electronic timing systems will vary with race format but the operator and timing team should rehearse race starts. As previously mentioned a feature of Summit timers and the software used with them is they can be started say 10 minutes before the scheduled race start. In order to start backup manual timers zero the Chief of Electronic Timing should gather the manual timers around the Summit deployed to the start, and as it counts down to zero, call out the count down so the manual timers can be started. At the time of writing transponder (commonly known as ‘chip’) technology is used at World Cup and Olympic levels for the TV feed. It does not however, give the official result. Start gate and Finish Beams prevail for Interval Start races and ‘order of finish’ races are judged by photofinish judges. With this technology a unique signal is produced when the first of the two transponders worn on the skier’s ankles passes over an antenna in the snow.

Roles change significantly with race format and these changes will be highlighted in the description of the roles of officials.

Plan for contingencies in case any part of the system fails.

Timer Modes and Reading the Results

Electronic Timers have multiple modes of operation and it is important the operator be familiar with their unit. In the vast majority of cases timers will now be connected to the Race Management PC. The most suitable mode gives times in a string of characters consisting of a channel number corresponding to the timing station (start, lap, finsh) and a time string. Modes which allow the insertion of bib numbers are not required as the bib number is keyed in to the PC against the captured time. These modes are called “Cross Country” or “Road Running” to signify they just output a channel and a time. Examples of the output from a Chronomix 737 and TimeTech Sprint 8 are given below. The first example shows ‘start’ times being recorded on Channel 1.

CHRONOMIX
CROSS COUNTRY
CUM FINISH TIMES

START TIME: 00:00:00

CHANNEL	*PLACE*	*OVERALL PLACE*	*TIME*	*SELECT*
1	*1*	*1*	*: :30.371*	
1	*2*	*2*	*: 1:00.640*	
1	*3*	*3*	*: 1:29.266*	
1	*4*	*4*	*: 2:00.119*	
1	*5*	*5*	*: 2:26.762*	*FS*
1	*6*	*6*	*: 3:00.443*	

Time Tech

SPRINT8 v9.00

Time Tech

Road Race

S 0 00:00.00

	1	1	00:30.37
	2	1	01:00.64
	3	1	01:29:26
	4	1	02:00.11
FS	5	1	02:26.76
	6	1	03:00.44

Note: the time marked “FS” above represents a False Start because it is more than 3 seconds in advance of 0:02:30. On both the timers illustrated observation of times immediately after they are recorded requires that the cover be removed from the printer. Otherwise two more times need to be printed before the offending time is visible representing, in this case, one minute. Note also: the timer does not make this mark. The author did!

In the following example the race has progressed so that start times are still being recorded (marked “S” by the author), but finish times (marked “F”) are appearing in lane 4.

Chronomix

1	*30*	*30*	*:15:00.371*	*S*
1	*31*	*31*	*:15:30.640*	*S*
4	*1*	*32*	*:15:32.266*	*F*
4	*2*	*33*	*:15:45.219*	*F*
1	*32*	*34*	*:16:00.213*	*S*
4	*3*	*35*	*:16:10.443*	*F*

Time Tech

S	30	1	15:00.37
S	31	1	15:30.64
F	1	4	15:32:26
F	2	4	15:45.21
S	32	1	16:00.21
F	3	4	16:10.44

It is a good practice to write Bib numbers on the tape for Intermediate and Finish times as frequently as possible even when the timer is linked directly to the Race Management PC. If the link fails, little time will then be lost in reverting to key entry of numbers and times. There should be no need to note start times as they should be sequential according to the start list.

N.B. These processes are not necessary with Summit Timer. Each timer’s times are clearly identified on the PC screen with their function. For early false starts an Assistant Starter can monitor the start gate Summit and immediately see if the time on the second line in the display window (the last recorded time) is more than 3 seconds prior to the required start time for the skier.

Starting Procedures

The start of the timing system is usually carried out by the Chief of Start and Finish.

Interval Starts

The recommended method is for the Chief of Start and Finish (or a designate) to give the countdown 5-4-3-2-1-GO at which time all timing systems are started. The best way to start the electronic timer is by using a plunger at the start line. Printing timers and stopwatches should be started at the same time. NOTE: when electronic and manual timing are started simultaneously, a “Visual Aid” must be used for those starting the timer and watches. One method is the person doing the countdown dropping an arm to their side on the word “GO”. The Chief of Start and Finish should then read from their own watch “One”, “Two” “Three” and check if any timers failed to start. If the electronic timer and backup failed to start, the clocks must be re-started.

A box designed to hold multiple stopwatches in a suitable position for a hinged bar to be used to press all of the start buttons at one time is a good aid for watch synchronization. All the watches must be the same make and model.

Electronic timing display clocks can be put into reverse count down to “Zero” time from which all other timing devices are started. This start time represents “Zero” minutes and “Zero” seconds on the start list. The Assistant Starter should now present the first skier to the Starter. The first skier departs at 30 seconds (or whatever start interval is chosen). This practice is used to ensure timers are all running before the first skier departs. Skiers continue to depart at the chosen interval unless a break in the start sequence has been scheduled into the official start list.

If a skier fails to come to the Assistant Starter before their Start Time, the Assistant should stand in the place of the missing skier until the ‘missed’ start time is passed. In that way there is no chance of a skier starting early in place of another skier.

When a start gate with wand is used, the skier’s start time is measured accurately to 1/100 second. The skier is permitted to start up to 3 seconds before their designated start time and up to 3 seconds later than their designated start time. If the skier starts more than 3 seconds early, it is a false start. The incident must be recorded and reported to the Jury. The skiers race start time is now that time on the start list. If the skier starts more than 3 seconds late, their race start time is that on the start list.

15 or 20 second start intervals can be used where it is desirable to start the race in a short time. For example, the qualification round for a sprint race can be done this way. If it is necessary to use one of these interval times, rehearse carefully ahead of time.

Mass/Relay Starts

Skiers will be told to take their positions 2 minutes before the scheduled start. They will then be given a 1 minute warning and must assume their start position. The starter will announce “30 seconds”, and to follow this with the sounding of the start signal (shot or horn) to start the competition. A countdown (5, 4, 3, 2, 1) is not used so as to avoid false starts.

When the start signal is sounded, the electronic timing system and manual watches are activated by whichever method has been selected.

If a number of mass starts are scheduled on the official start list, the same procedures are followed for each group of departing skiers.

Pursuit Starts – with a break

The tenths of seconds are removed from the times in the official results of the first competition to provide start times for the second competition (pursuit start).

Start list by lane must be prepared to ease the task of ‘loading the grid’ (see PURSUIT SECOND LEG – LANE ASSIGNMENTS AND START TIMES Appendix 7-4)

Start order charts (with suitable stands) for each start lane must be prepared in advance with pre-determined bib numbers with start times (several per page with large, easy to read digits). At the bottom right hand corner of each page, note the first start time on the following page. Try to find a significant gap (>20 seconds) between start times in a lane to chose where to start a new page on the chart. It is a good practice to use a colour marker distinct from that used for the other information on the page. There may be only a few seconds between subsequent starts in any lane so there may not be sufficient time to flip the chart at the end of each page.

The recommended procedure is for the Starter to begin the event by firing the starting pistol.

There is no countdown, and the start signal (shot or horn) is the signal to release the first skier and to activate both the electronic and manual timing systems.

The actual start time of the first skier represents “Zero” minutes and “Zero” seconds on the start list.

Skiers continue to depart at start times predetermined by the results of the first of the two events that comprise a pursuit competition.

The Assistant Starters in each lane need to be vigilant for skiers who do not show up for the start of the second leg. They need a Lane Assignment sheet and should stand in the lane as for an Interval Start until the missing skiers start time has passed.

Sprint Heats

When the first 4 competitors enter the starting area for the first round of heats, the person with the best qualifying position gets their choice of start lanes; the second best qualifier in this heat gets the next choice, and so on, until the 4 lanes are selected. The start sheet for each round and heat should indicate which competitor has which choice so that the Assistant Starter does not have to figure this out at the line. Ideally bibs were re-issued in order of qualifying so for the first round of heats the skiers choose in bib order.

For the subsequent heats (semi-finals and finals), the start lane selection will be done based on each competitor's rank in their previous heat in combination with their rank in the qualifying round. . (See rule 360.4.1)[1].

For each heat, the racers must be called to the pre-start line where the racers (in order) choose their start lanes. Instructions are given as to what the starter will say to get the racers ready to start, what the start signal will be, and to answer any questions that arise at the moment.

Once the Starter is ready to start the heat, he/she will call to the racers to move to the start line by the instruction "Take your positions", and give them a chance to settle into their start positions. Once the Starter sees that the racers are set and motionless, he/she shouts "SET" and within 2-5 seconds fires a gun or horn to start them. If there is a false start, the Starter will signal to the False Start Controller, who will in turn step out on to the course, flag the racers to stop, and return them to the start line, where the procedures will be repeated fairly. It is imperative that no one "jump the gun", but it is also imperative that the starter not hold them too long in the ready position, or get into a cadence that is so predictable so that many racers can anticipate the start signal.

While the Starter has the racers under the starting procedure, the Assistant Starter should note the starting lane for each bib number on the start sheet.

Determination of the interval between sprint heats is made depending on the course (its length and the time required to get around it) and the site where it is held, and whether or not there is TV coverage. Often, the TV staff will wish to have one heat finished before the next one begins, perhaps even to have 30 seconds with each winner for their comments. However, it is also normal for a heat to be started before the previous one has come to the finish line. It is also suggested that the start of a heat not coincide with the finish of a previous heat, as there is often too much noise at the finish for starting competitors to concentrate on starting and to hear the "Go" command; a restart because of lack of hearing due to spectator noise should not occur. This competition is full of action, and we don't want to have large gaps of non-action that will not keep the interest of the spectators and teams high.

[1] Rule 360.4.1 states: "In the finals the starting positions are chosen according to the following:
- qualification time for the first round and then
- ranking from the previous round and qualification time"

Finish Line Procedures

Before giving detail about each type of race, a note about precision. All races results are given to a precision of 1/10 second except Sprint qualification which uses 1/100 second. At most races, skiers travel across finish lines at between 4 metres per second for midgets and 10 metres per second for Olympic Sprinters. 1/10 second represents 40 to 100 cms and it is usually not difficult to determine which signal from the finish beam belongs to which skier. If two or more skiers only give one signal, they have the same finish time. 1/100th of a second represents 4 to 10cms of travel and that could be less then the 'width' of a skiers shin. This is one reason why it is best to arrange the start order of sprint qualifications with the fastest skiers starting first. Each skier needs their own time so any steps taken to avoid overtaking are beneficial.

If there is no finish beam in use, 'normal' fingers cannot generate repeated 'plunger' signals closer than 2/10th second. If plungers are the signal of choice, it may be advisable to use separate plungers for each finish lane.

Interval Start Races

Electronic Timing

The makeup of timing teams is described in detail in the Officials Deployment diagrams. However there are certain key points that need to be made. The Electronic Timer Operator should concentrate on the finish line to make sure that the correct signal is given to the correct skier. Poles close to the beam source can cause a signal. Skiers alongside each other may only make one signal for two or three. They all get the same finish time but remember they started at different times and their elapsed time for the race is now known to the nearest one tenth second. In order to keep the number of recorded finish signals the same as the number of finished skiers, a plunger operator can be positioned by the finish line with instructions to plunge once for each finisher. Bear in mind, however, their times are taken from the beam as a 'plunger finger' would separate the skiers by about 0.2 seconds which represents 80-200 cms.

Manual Timing – Printing Timers.

Form at least two independent teams of 3. Position teams on opposite sides side of the finish lanes. One person is the Bib Caller who calls the bib numbers in the order in which skiers cross the finish line. The Bib Recorder captures the bib callers order on a Time Record form. The Manual Timer concentrates on the finish line and presses the 'Split' or 'Lap' button when a skier's toe reaches the line If traffic is low, the time can be transcribed onto the "Time Record" but this is not strictly necessary. The best form (see sample at Appendix 5-2) has room for 10 skiers and their times, and which provides large enough spaces for the gloved hand to write when working outside. Forms for use inside a timing hut can have smaller squares and accommodate 20. The Bib Recorder should write at least one time on each sheet to maintain synchronization, and also to keep forms in order if the recorder omitted the page number and the forms are dropped. When the printing timer paper is advanced for tear off, it is important to check that the number of times equals the number of bibs. It is possible for even the best of timers to miss one or capture extra times but they usually know when they have made an error. Mark the timer tape to show any such errors. Staple the timer tape to the Time Record since this tape is very flimsy and can be carried great distances by the wind if it gets loose. Then have a runner carry the forms and tape to Calculations. (A precaution against wet snow and rain is to have a plastic bag for the runner.)

. If two or more skiers are very close (say within 1 metre), they have the same time. However the ordinary human finger records in two tenths of a second or up to 200 cms of skier travel. 'Click' twice to record two skiers, but note on the Time Record the skiers should have the same time.

Manual Timing – non-Printing Timers (i.e. a stopwatch).

Use of non-printing timers as the primary means of timing a race is not recommended. Form 2 independent timing teams of 4. Position teams on each side of the finish lanes. One person is the Bib Caller who calls the bib numbers in the order in which skiers cross the finish line. The Bib Recorder captures the bib callers order on a Bib Record form. The Manual Timer concentrates on the stop watch and read aloud the times on the stopwatch as a skier approaches. For example, they will read: "twenty minute four seconds, five, six, seven, eight, etc.". If another skier is close behind, the Manual Timer should keep reading the seconds aloud until no more skiers are approaching. The Finish Time Recorder writes on a form the time (initially the second) that he/she hears at the exact moment when a skier's toe hits the line. For example, he/she writes 20:07 on a Time Record form (more likely, the Finish Time Recorder writes "07" and then, when there is a lull, goes back and writes the minutes in front of the seconds (in this case, "20"). When the traffic dies down, transcribe the Bib Recorder's information on to the Time Recorder's form and you have a Time Record that is complete. Complete the transcription as frequently as possible. The reason the watch is not 'split' (i.e., the split/lap button is not pressed is because there is little likelihood it can be reset and recalled if several skiers arrive within, say, 2 seconds. However they likely started at different times and their elapsed times for the race are now known to the nearest second. Unless the skiers are well spread out, there will be more bibs than times as some skiers may finish in the same second.

Mass/Relay and Pursuit Start Races

Electronic Timing

Although the result of this type of race is determined by order of finish, in most races time is also critical. Skiers are frequently awarded point based on their times relative to the winner and these points can be used foir team selection. Timing teams must be acutely aware that a finish beam will not create a separate signal for every racer. The beam can only 'see' transitions from 'dark' to 'light'. Racers close together may only produce a single signal for several 'lead legs', with more signals generated for 'trailing legs'. Order of finish must be correct and times may best be captured by having one plunger per lane. Each plunger may be connected to a different channel on the timer. This changes the electronic timer into a multi-channel printing timer. For very high rates of finishes, add a Bib Caller and a Bib Recorder to each lane in addition to a Finish Referee, a Recorder and video.

If a skier falls on the finish line this is a very good example of why backup is necessary. Until the finish beam is 'unblocked' no times will register. Plunger backup for the finish along with manual printing timers will enable every time to be captured. As a last resort, the time between the last good signal and the first after restoration could be divided by the number of skiers (Plus 1) who finished while the beam was blocked

Manual Timing – Printing Timers.

The procedure is the same as for Interval starts but the result is the order of finish with the time being of secondary importance. There is no magic, just vigilance, and practice on the part of the Finish Referee with video backup. If a high rate of arrival is expected (over 10 skiers per minute) make a timing team for each lane. There would be three finish lanes for most Olympic style races. For Popular Ski Competitions, consider making chutes as is done in running races and have the timing team between the chutes.

Manual Timing – non-Printing Timers (i.e. a stopwatch).

This type of watch is not suitable as the primary timing system where order of finish matters since times can only be given to a precision of one second. It can however be used as a 'last resort' backup timing system.

Sprint Heats

The results of sprint heats should be decided by the Finish Referee calling the order of finish since sprint heats are not timed. However, close finishes sometimes require assistance. A Finish Referee may be able to decide order of finish by lane by concentrating on the feet to the finish line. They can then call the order of finish by lane to their recorder. To ensure the correct finishers in each lane are captured, Finish Lane Recorders should be used. Their input should be consolidated onto a Finish Lane Record and passed to the Bib Recorder assisting the Finish Referee. If the Finish Referee wants a second opinion without resorting to video replay, a Bib Caller on the opposite side of the course should also call order of finish by lane to their own Bib Recorder. Video should be deployed as described below.

Because the result of each heat influences the progress of skiers to more heats, results need to be posted immediately. Heat results should be collected in the Timing Hut which is now functioning as Race Control. The results can be entered into a PC and relayed by headset or radio to the Results Board. At the end of a round (e.g. quarter final, semi final), the next heats would be printed and passed to the announcers and start line officials.

Camera Technology

There are currently several methods of recording the finish order, each with a varying precision and expense. At some events (OWG, WSC, JWSC, WC, NAC, and NC), you may be required to use one of more of the methods described here.

Use of Standard Consumer Video Equipment

Standard consumer video equipment at the finish line is used to establish or confirm an order of finish in close races. Technology continues to advance so there are no specifications listed here. However here is a list of requirements:

two cameras with compatible digital recording media will be required along with spare media and a playback monitor.

Camera 1 is placed just past the finish line at an angle of approximately 5° to the Finish Line opposite a Finish Post to establish which skier (boot) arrived at the finish line first. The camera is not exactly perpendicular to the finish line so that a foot or leg of a skier nearer the camera cannot block the view of a foot further away. This camera position is not used when a photofinish system is in place.

Camera 2 is placed 20 metres before the finish looking at the backs of finishing skiers to establish which skier finished in which lane (the finish line camera only shows feet).

Alternatively, Camera 2 may be place 20 metres past the finish line, looking toward the approaching skiers, to avoid recording into a bright sun or background. This method is not as desirable, as the bibs often get pushed up in the front, but are clearly visible from behind; the skiers may also be bent over forward in their push to the finish, which also obscures the bib numbers.

Rule 353 strongly recommends the use of a camera before the finish line looking at the backs of the finishing skiers to identify the bib numbers..

A playback monitor is used to view media from Cameras 1 and 2 so that races may continue as the officials review video images.

Make sure that any tape removed for playback is immediately replaced by a blank tape for the next heats' recording.

Set aside appropriate indoor space for reviewing video without impact from other activity such as the Timing and Results crew, First Aid, or the Race Secretariat. A runner will bring the video to this location.

Use appropriate precautions to keep the cameras functioning in poor weather and for long periods, such as using waterproof cases, spare batteries, or AC power. In some cases, the cameras may not function in sub-zero temperatures, so they must be installed indoors.

Reflecting on the comments above about precision, skiers may be given the same finish time since scoring is to 1/10 second, but order of finish is paramount. Skiers need to be confident that the finish order is correct even if they are a few centimetres apart and are given the same time. This is where video equipment comes in to play.

Video Camera Set-up Detail

It is very important to ensure that the camera is positioned correctly to ensure a good clear image. Experience shows that there should be a camera placed just behind the finish line so that the line of sight is about 5 degrees off the line of sight along the finish line. It also needs to be set about 30-60 centimetres above the ground so that it can capture the whole finish line (remember that the finish line is about 12 metres wide). In setting up the camera, have 4 volunteers put one toe of a boot on the finish line, and wear a brightly coloured article (such as a piece of red or yellow warning tape) just below the knee to see that the camera will capture from the toe of the person in the closest lane to the knee of the person in the farthest lane.

Ensure the camera used for lane determination captures all the finish lanes.

Reflecting on the comments above about precision, skiers may be given the same finish time since scoring is to 1/10 second, but the order of finish is paramount. Skiers need to be confident that the finish order is correct even if they are a few centimetres apart and are given the same time. This is where video equipment comes in to play. For some races, resolution to 1/1000th of a second is required, such as the sprint qualification round. The photofinish system may aid in ensuring the correct precision here, also.

Unfortunately, the maximum resolution available with a standard video camera is, at best, a little more than 3/100^{ths} of a second (some record up to 30 frames per second) and, at worst, a little more than 4/100^{ths} (1/25th) of a second (standard NTSC video is recorded at 24 frames per second). As mentioned above, this can account for up to 40cm of travel by a fast skier. Further to this, with consumer-grade equipment, it is often difficult to stop or pause the playback at the exact instant the first toe crosses the finish line.

Use of Photofinish Equipment

As the sport advances, skiers are traveling at faster speeds every year. This has made the use of standard video equipment somewhat obsolete, since the maximum resolution is so great and a great deal can happen in 30-40 cm of snow. As a result, we have had to look at newer technology that can record finishes at up to 1000 frames per second, though it is typically configured to work at 500 fps. At 500 fps, we can account for 2/1000^{ths} of a second, which is no more than 2 cm. of travel. Additionally, due to the technology involved, we can be certain of the finish order and the finish time.

Though other systems exist, the one that is currently most readily available to rent or purchase is the FinishLynx system from Lynx System Developers (http://www.finishlynx.com/). These cameras act as network devices, and are connected to a computer that records the data. The connections to these cameras are done through the use of a 10BASE-T Ethernet network. It is recommended that this be a separate network from your other applications due to the bandwidth requirements.

As the setup and operation of the system is not like anything else, the photofinish operator must have received training on the specific equipment to be used. This individual must also coordinate his/her efforts with the Chief of Stadium to ensure there is adequate space available for the equipment.

Photofinish Setup

The physical setup of the cameras is relatively simple. Using two cameras (one from each side of the finish line), you must align the cameras with the front edge of the finish line marking (Rule 353.1.5), which is accomplished in a precision method using the built-in viewfinder. Each camera must be capable of capturing, at the very least, all but the furthest lane, but ideally, all lanes should be visible.

Each camera is then connected to the network and electrical power. The computer software is then started up and the correct operation and alignment is verified. The capture feature is enabled and synchronized to the timing system.

Once this is complete, the areas between the cameras and the finish line area must be cordoned off, and the finish area officials, along with the TD and Chief of Competition, must also be advised of this “no-go” zone. This should be completed no later than one half-hour before the race starts.

This synopsis is not intended to replace training on the equipment, but to provide a rough guideline on its use. The photofinish camera operator **must** receive training specific to the brand of equipment in use at the race, with sufficient time to be able to coordinate his/her efforts with the relevant race personnel (e.g. Chief of Stadium).

Intermediate Times

It is required by the rules that intermediate times be taken for races of 10 kilometres or more. Specifically, one time for 10kms., two for 15kms., two or three for 30kms. And at least three times for 50kms. This is usually done when skiers lap through the stadium and ski over a line marked in the snow designated as the lap line. This location, if placed judiciously, has the advantage that plungers can be wired to the Electronics timer(s).

The procedure for Electronic timing is as follows:

The Lap Referee determines and calls out the order. One option is for this person to wear a headset and the recording be done in the timing hut. As a backup they should have a Bib Recorder assigned to them outside and also have a voice recorder to record the order of a ‘train’, which can be played back when the traffic dies down.

Alongside the Referee should be a Timer signaling with a plunger the time for each skier.

For backup, a Lap Timer with a printing timer should also be at the lap line.

As a further backup, manual watches can be used. In that event, a Timer and a Time Recorder would operate in the same way as describe for the finish line.

Results Systems

The production of prompt and accurate official results is the primary purpose of timekeeping and the results system. The results system is now expected to provide continuous, up to the minute, unofficial results while the race is in progress.

The official results are produced by timing the racers as they pass the various timing points and cross the finish line. The elapsed times between start and finish are then calculated. Once the skiers' times are calculated, they are then sorted from fastest (least elapsed time) to slowest (greatest elapsed time), checked for accuracy by the results checker, and posted (unofficial) for scrutiny by the racers and coaches. The unofficial results are then corrected, if required, and forwarded to the Jury for approval and to be made official. This activity meets the formal requirement for the competition but does little to tell the skiers, officials, and most importantly the spectators what is happening while the competition is in progress.

The second purpose for the results system is to inform all those attending the competition of what is going on in an "up to the minute" and exciting fashion. The unofficial results boards, scoreboards, and the announcing team are responsible for distributing this information. The recent changes in course and race formats are also helping to raise spectator awareness and make it easier for them to follow a competition. This is done by bringing the racers through the stadium more often and by using mass starts and the pursuit events.

Sprint Qualification Round

The results of the qualification round are very important, especially for the last one or two competitors who just make the cut-off to move to the sprint heats. So, there can be no shortcuts to the results production process that is gone through, similar to a normal interval start race. The times must be accurate to one one-hundredth of a second, they must be posted as soon as possible for their verification and the lodging of protests by athletes and coaches, the results should be verified as usual within the results production function, protests must be ruled on, etc. For it is from the final official results list that those who move to the sprints are chosen.

Cross country ski competition organizers must pay more attention to the unofficial "in progress" results system to:

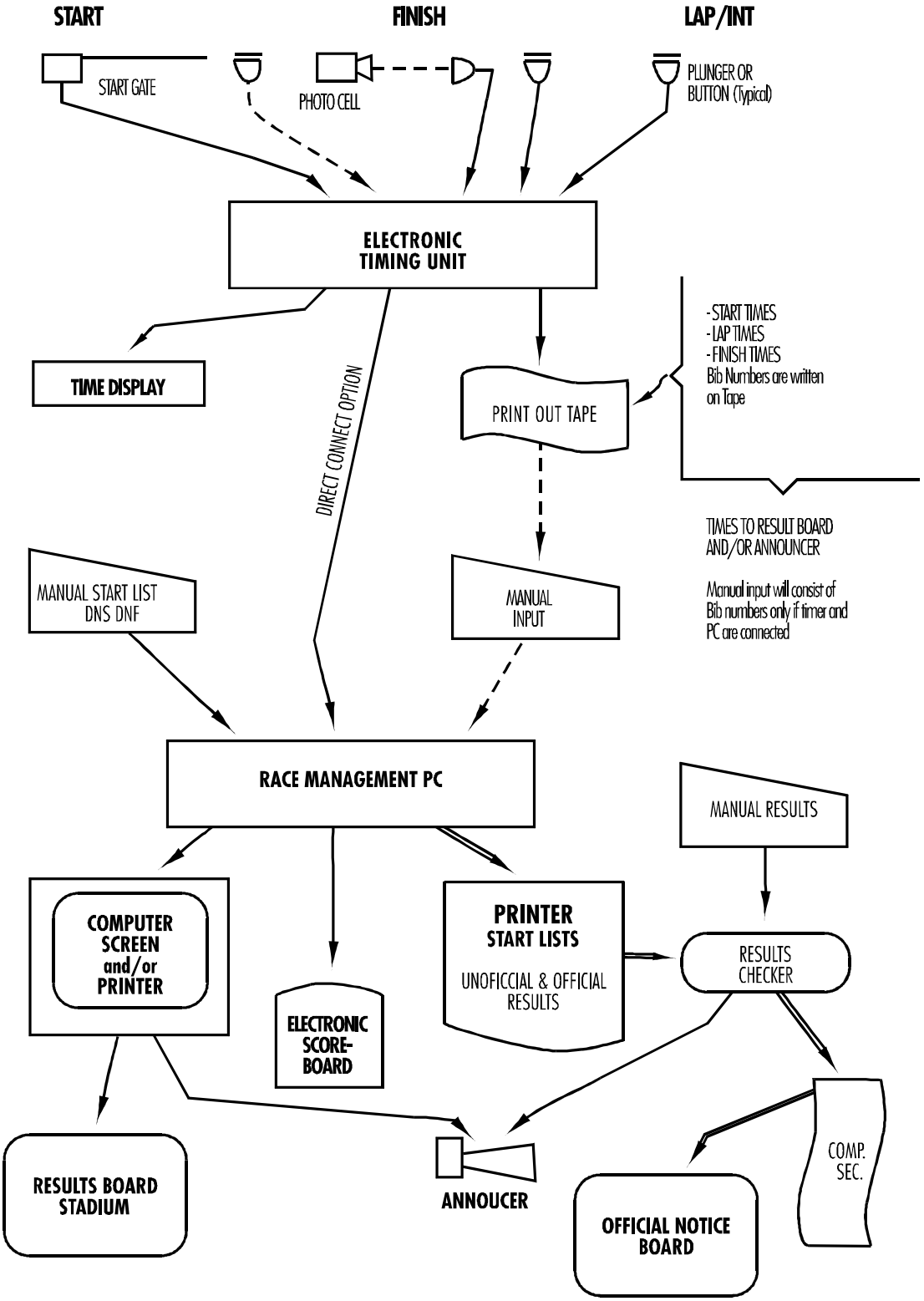
increase knowledge of the sport
increase excitement in the sport
increase marketability of Cross Country Skiing for improved sport reporting and sponsorships
increase enjoyment and support for our racers
encourage more people to Cross Country Ski and to compete for fun and/or glory

The level of organization for an unofficial "in progress" results system depends on the level of competition being organized and should be as sophisticated as possible.

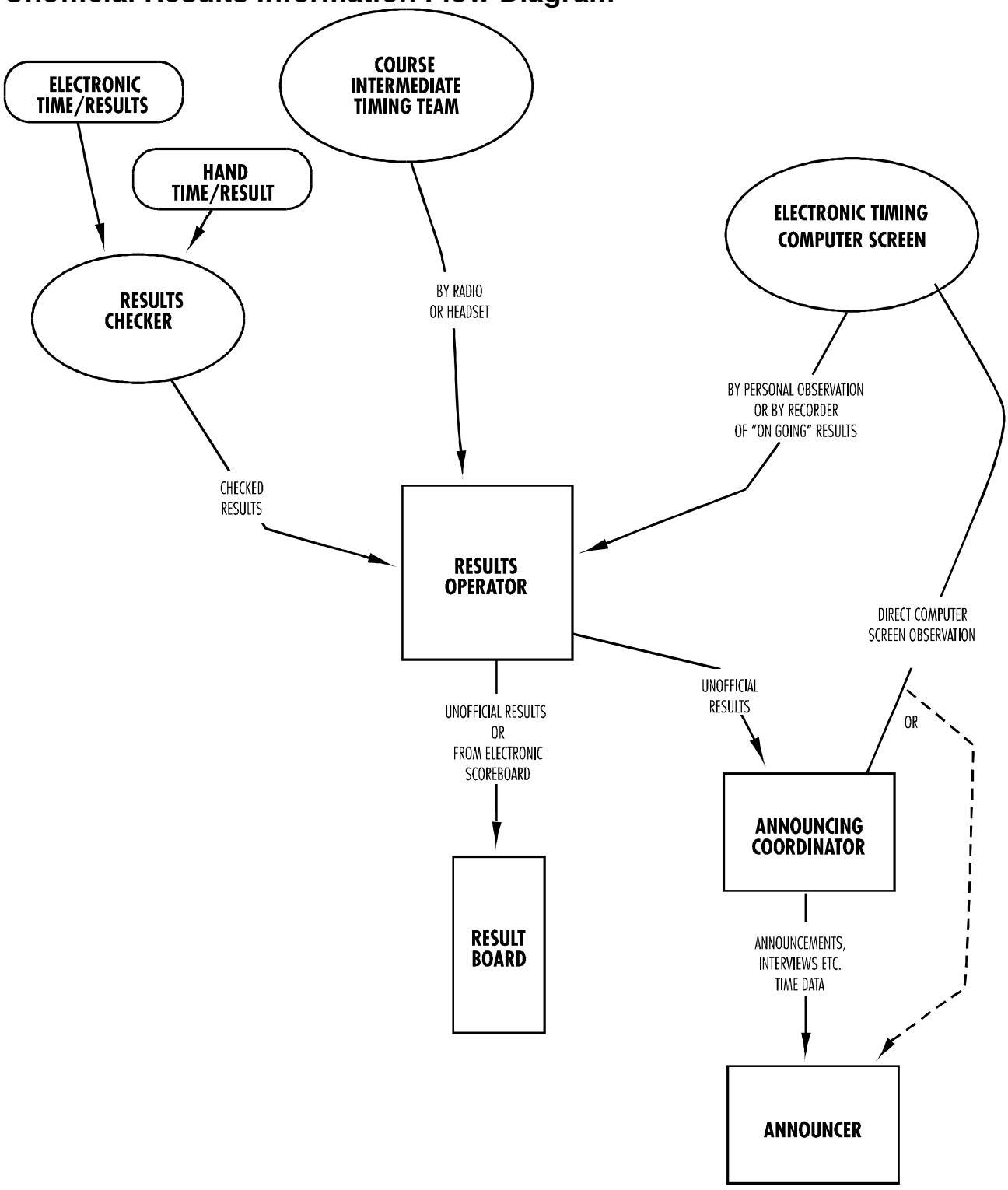
Division Cup or Loppet - an Official Notice board and an Announcer.
Canada Cup/NORAM - an Unofficial Results Board, Official Notice Board, Announcer, Colour Commentator and a Splits Calculator.
National Championship - an Unofficial Results Board, an Official Notice Board and a full announcing team.

A diagram of an unofficial "in progress" results system for a national level competition follows. The information is communicated by radio, headsets, computer screen, and by hard copy (whichever is most suitable for the race organizers system and the equipment available).

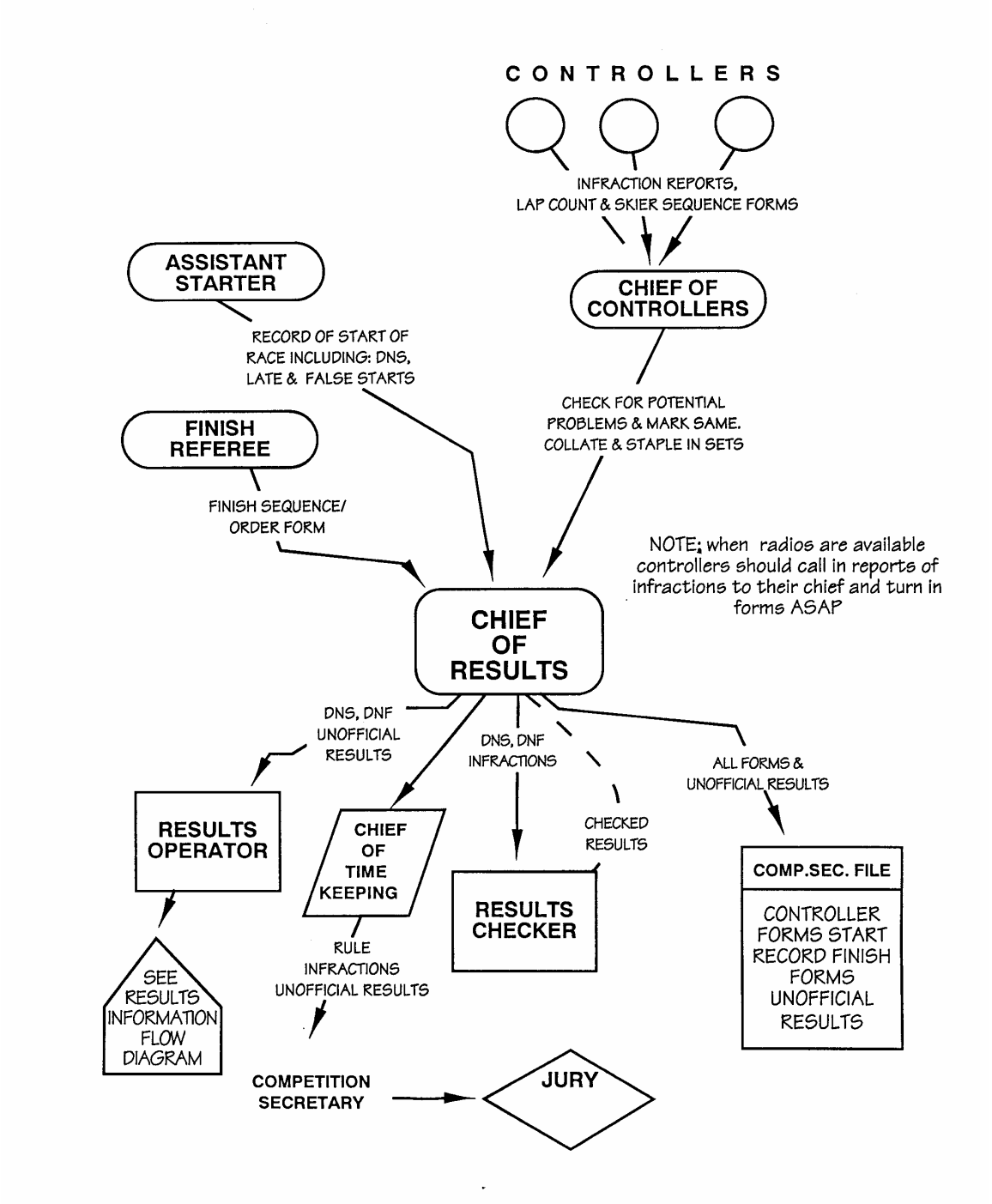
Electronic Timing System Information Flow



Unofficial Results Information Flow Diagram



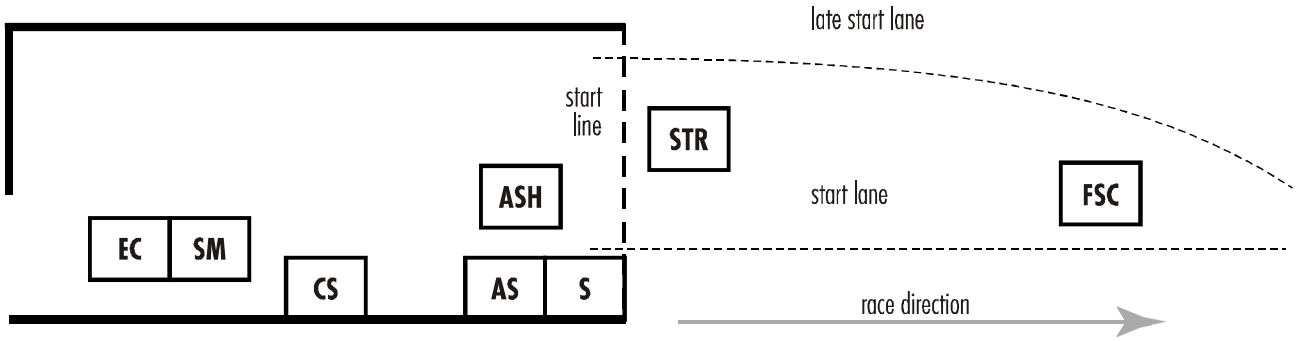
Stadium and Course Competition Forms & Information Flow Diagram



Officials Deployment

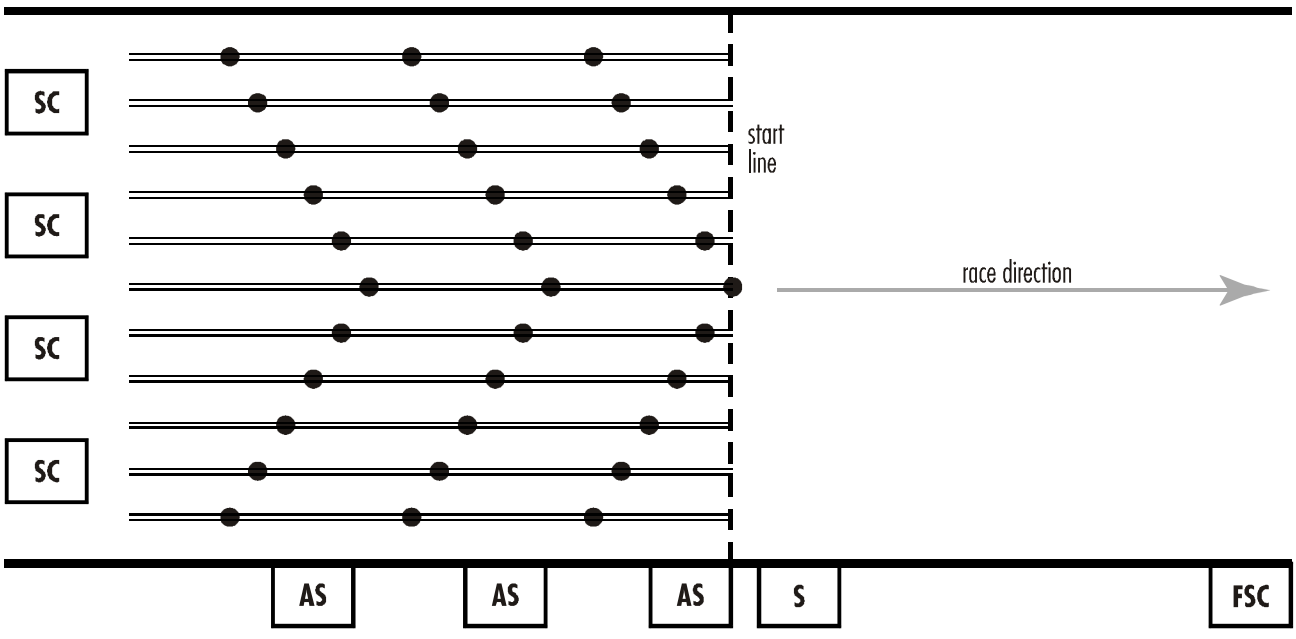
(not to scale)

Interval Start



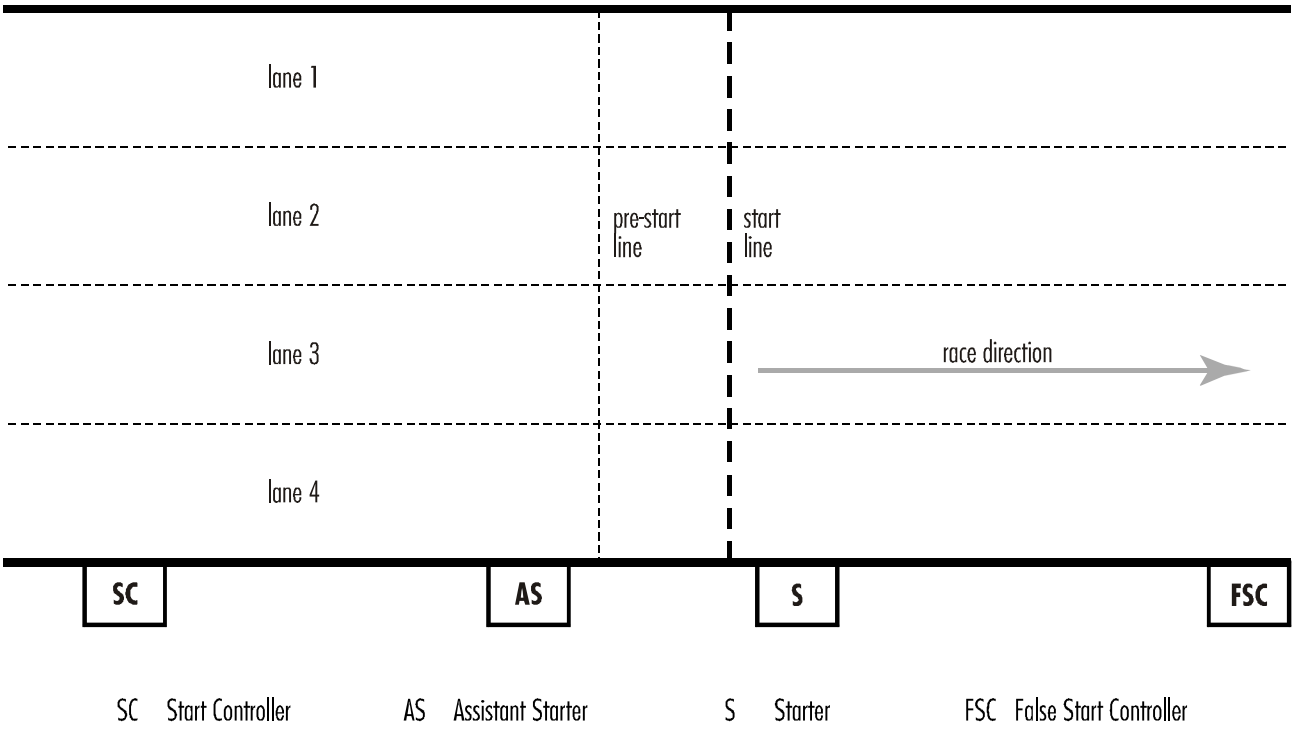
EC Equipment Check
ASH Assistant Starter - Headset
SM Ski Marking
AS Assistant Starter
STR Start Time Recorder
CS Clothing Steward(s)
S Starter
FSC False Start Controller

Mass Start



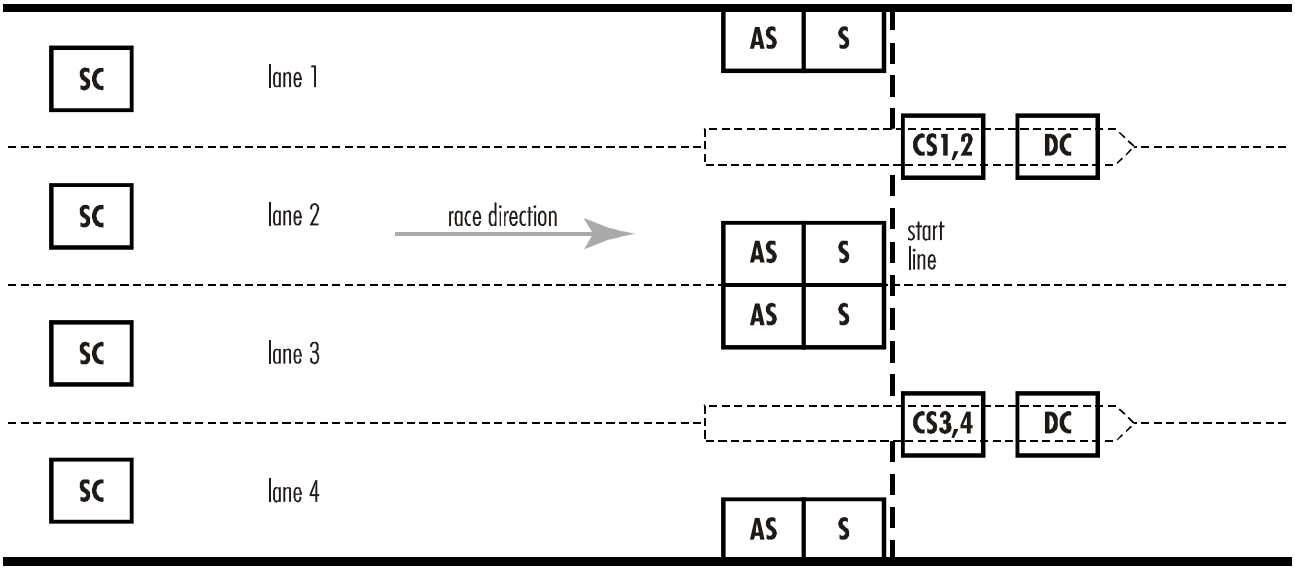
SC Start Controller
AS Assistant Starter
S Starter
FSC False Start Controller

Sprint Heats Start



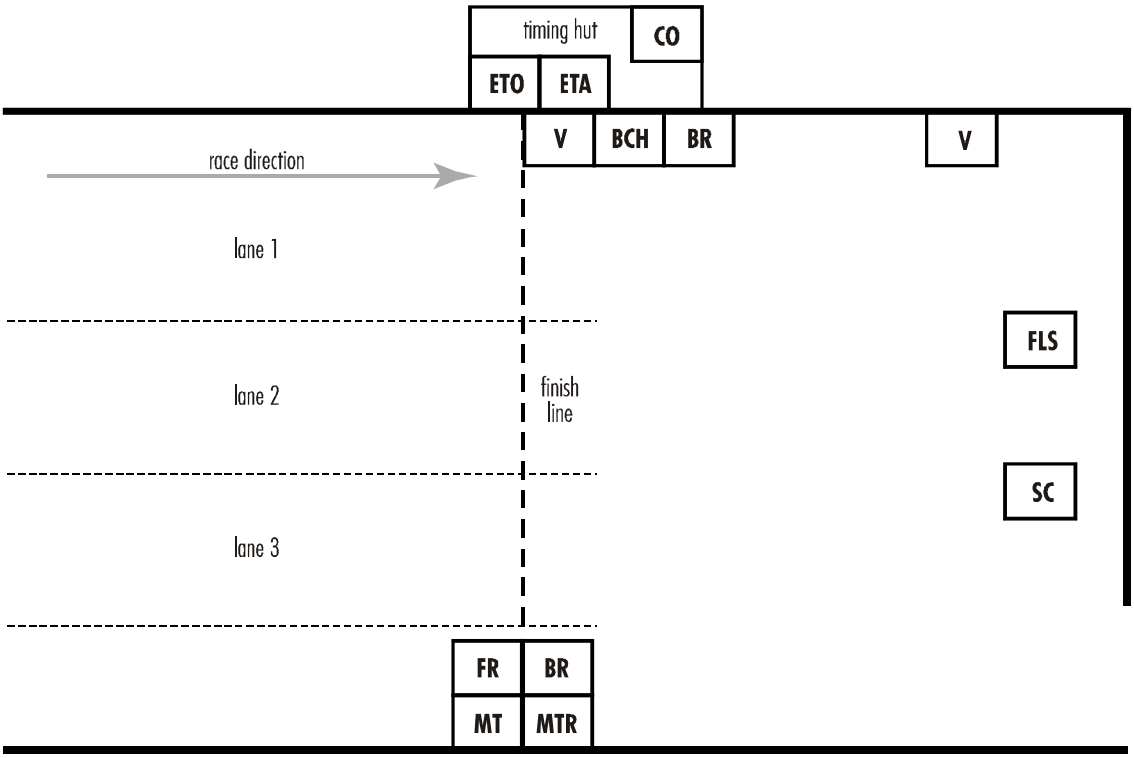
SC Start Controller AS Assistant Starter S Starter FSC False Start Controller

Pursuit Start



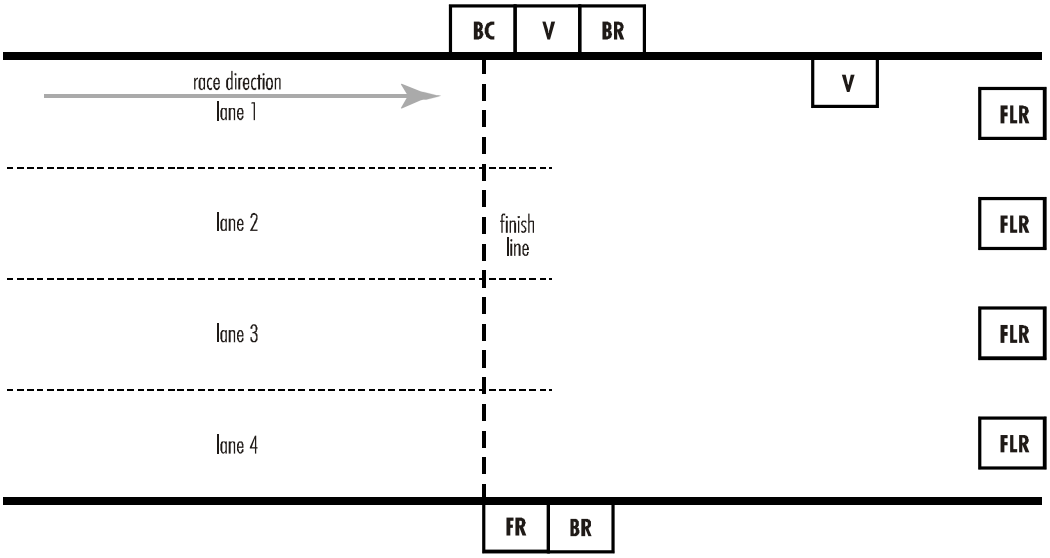
SC Start Controller
S Starter
DC Display Clock
AS Assistant Starter
CS# Chart Steward Lane #

Finish – Electronic Beam



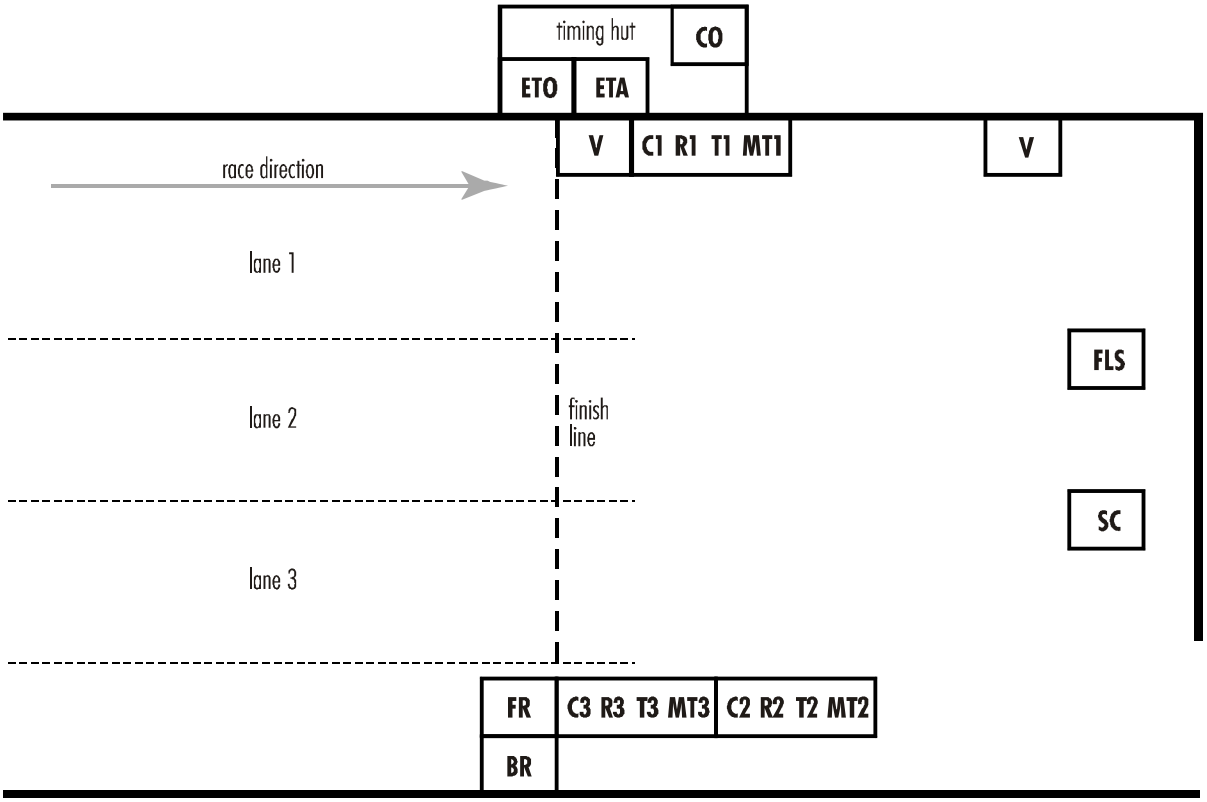
ETO Electronic Timer Operator
ETA Electronic Timer Assistant
CO Computer Operator
FR Finish Referee
BR Bib Recorder
V Video
SC Ski Checking
FLS Finish Line Steward
BCH Bib Caller with Headset
MT Manual Timer
MTR Manual Timer Recorder

Sprint Heats Finish



FR Finish Referee
BR Bib Recorder
BC Bib Caller
FLR Finish Lane Recorder
V Video

Finish – Very High Traffic
(not to scale)



ETO	Electronic Timer Operator	BR	Bib Recorder	MT#	Manual Timer Lane #
ETA	Electronic Timer Assistant	C#	Caller Lane #	V	Video
CO	Computer Operator	R#	Recorder Lane #	SC	Ski Checker
FR	Finish Referee	T#	Timer (plunger) Lane #	FLS	Finish Line Steward

Timekeeping Officials

Chief of Competition

Chief of Timekeeping & Data Processing

-Chief of Electronic Timing
-Chief of Manual Timing
-Chief of Start
-Chief of Results

The Chief of Timekeeping and Data Processing (a.k.a. Chief of Timing) is responsible for the direction and coordination of the officials working in the timing area including manual timers, electronic timers, intermediate timekeepers and calculations officials. This person also coordinates the work of the Starter, Finish referee, Finish Controllers and Finish Line Video

General Duties:

plan and set-up all facilities required for timekeeping
review current policies and rules applicable to timing the event
train the team of timekeeping sub-chiefs and then develop a detailed task timeline with each team
train timing, calculations, results and announcing teams
prepare all timekeeping forms
procure timekeeping materials with the assistance of the Chief of Equipment
acquire and install timing, calculations and announcer equipment suitable for the level of event
co-ordinate the flow of all timekeeping information
produce prompt and accurate results
liaise with Chief of Competition and other Competition Committee Chiefs
review the integration of video use in determining order of finish and assisting Jury decisions

To Achieve Efficiency and Accuracy:

keep the number of Timekeeping Officials to a minimum
keep the number of operating procedures to a minimum
rehearse timing procedures

Pre Race:

ensure Computer Operator is present at the draw
ensure distribution of start lists to all timekeeping officials
oversee testing of the interface between computer and timing unit
test the communications network as it pertains to timekeeping (headsets, radios, telephones)
rehearse the start-up of the timing system with the Electronic Timing team and Manual Timing teams.
establish with The Chief of Controllers and other officials an information flow plan for reporting “did not start (DNS)” and did not finish (DNF)” and rule infraction reports of skiers to Chief of Results or Manual Calculations.

The principal objective of timekeeping is to provide prompt and accurate results by providing each skier with an interval finish time, and promptly providing unofficial results.

During Race:

check synchronization of electronic timing unit, start/display clocks, manual watches (check with Chief of Manual Timing, etc.). Check immediately after the start and check, throughout the race, approximately every 10 to 20 minutes
start race at direction of Chief of Competition

be alert for potential problems

check with The Timing Bib Recorder, The Chief of Controllers and Finish Referee to determine that all skiers are accounted for, and authorize the closure of the timing system.

Post Race

evaluate validity of timing results with Chief of Results

The procedures will vary according to the nature of the competition and the communications equipment in use, but is important to collect controller report sheets for the Competition Secretary and the reporting of DNS and DNF skiers for timekeeping purposes.

Equipment:

Start list, stop watch (synchronized with the timing system), master officials list, pencil, pad, clipboard, radio/headset.

Keep the start line as clear as possible

Keep the stadium area clear of all but the most necessary Timekeeping Officials

---

Chief of Timekeeping & Data Processing

Chief of Electronic Timing

-Timing Unit Operator
-Intermediate Timing Teams
-Finish Referee
-Electronic Technician

The Chief of Electronic Timing oversees all aspects of electronic timekeeping operations.

When electronic timing is used to time an interval start race the skier triggers the electronic timing device opening a start gate or and generates a finish signal breaking a photo cell or light beam with his body. The competition rules require that:

when a start gate is used, the skier may start up to 3 seconds early and retain their recorded start time up to 3 seconds 'late'

if the start gate fails, the Chief of Electronic Timing must determine with the Chief of Timing and the TD before the race how many missed start gate signals are acceptable before the race reverts to 'Manual Start" rules, at which time the gate will be left open and the Starter calls "Go" at the listed Start Time.

when a competition's "Technical Package" stipulates electronic timekeeping is required, interval start/finish procedures need a start gate and finish photo cell or beam, and mass starts require an electronic start connection to the starting pistol and a finish photo cell.

Duties:

acquire, install and test all electronic timing equipment

arrange back-up power supply and power surge protection

ensure that equipment is kept at a suitable temperature before and during the competition

maintain strict control of movement of personnel around the timing equipment

supervise the Starting team, Finish Referee, Stadium Timing team, and Intermediate Timing team.

Equipment:

electronic timing unit with necessary cables, start gate, beam, plunger buttons, starter clock, display clocks; back-up power supply, electronic repairman's tools (a screwdriver set is a must), spare paper for the printer, a heated timing building with adequate windows, pencils, pad of paper, headset/radio. A surge protector is desirable if power fluctuations occur at the race site.

Chief of Electronic Timing

Chief of Start

-Starter
-Assistant Starter(s)
-False Start Controller
-Start Controller(s)
-Chart Steward(s)

The Chief of Start is responsible the layout and positioning of officials in the start area. He/she is also responsible for the positioning of the start wand, the location of the finish beam and any plungers, etc., but must work with the Electronic Technician to ensure that the locations are feasible for electronic timing. This Chief also ensures that the timing equipment is operated properly and the correct recording and reporting of necessary data (bib numbers, lanes, etc.) takes place while identifying and solving any procedural issues in the start, lap, and finish areas while the race is progressing.

Chief of Start

Starter

Duties:

start competitors in the procedure prescribed for the race

Procedure for Interval Start:

the Starter is positioned at the start line with a manual watch (in case the electronic clocks fail). He/she is NOT responsible for calling skiers to the start line.

the Starter starts every skier sent to the start line by the Assistant Starter. If time permits, the Starter can verify that the skier on the start line is the correct one for the time.

the Starter will use a manual watch to start competitors unless a starter clock or display clock is available, in which case the clock becomes the primary timing source and the manual watch is a back-up

the start must be well executed, because efficient starting gives competitors and spectators confidence that the race will be well run

---

The Starter must be very focused on the task at hand

---

the competition start time is “Zero” seconds and the first skier usually departs at 0:30 seconds

skiers normally start every 30 seconds, therefore skiers with even number bibs starts on the full minute and odd bib numbers start on the 30 second time point.

approximately 15 seconds before the skier’s scheduled start time, the Starter places a hand in front of the competitor at waist level and behind his ski poles. The Starter should not come in contact with, and should avoid unnecessary conversation with, the skier.

ten seconds prior to a skier’s departure time, the Starter announces “TEN SECONDS” and then counts down the last five seconds, “FIVE, FOUR, THREE, TWO, ONE - GO”

if electronic timing is the primary timing system, the Starter will drop his/her hand at the count of “THREE” (3 seconds before the start time)

if manual timing is the primary timing system, the starter will drop the hand at the word “GO”

in the case of a false start any time prior to the word “GO” in manual timing the Starter declares a False Start which is recorded and reported to the Jury. A false (early) start with Electronic Timing is typically detected by the timer operator. It should be recorded by the Start Time Recorder and reported to theJury.

in the case of a missing skier, the Starter must ensure that the skier’s position remains empty in the start sequence and that all the following competitors start at their pre-assigned times. It is a good practice for the countdown to be carried out as usual, even when there is no skier on the start line. The Start Time Recorder records “did not start (DNS)”. If electronic timing is being used, the start gate may be activated at the pre-assigned departure time if it is necessary to keep the sequence on the start channel pure on the timing device (this detail MUST be worked out with the Chief of Electronic Timing before the competitions commences).

if the missing skier is actually a “late start”, it is expected that they will be directed to and depart from the recall/late-start lane. The Assistant Starter will ensure that this skier does not interfere with the next starting skier.

Equipment:

stop watch, (start list)

Procedures for handling late starters should be well rehearsed until responses are automatic

---

Procedure for Relay/Mass Start:

the Starter, Assistant Starters and Start Line Controllers must ensure that the skiers are lined up according to the start list. Relays and mass start competitions will have a designated track for each team/competitor, according to a selection procedure and shown on a Lane Assignment sheet.

at the start of the competition, the Starter should be positioned beside the tracks and should be approximately ten meters beyond the start line

the Starter summons all skiers to the start area three to five minutes prior to the start, depending on the size of entry, and reminds them that all skis must be marked (when applicable) and the consequences of competing with unmarked skis

a two minute warning is provided to further encourage skiers to remove their outer clothing and get in line

the Starter instructs skiers as to: the start procedures, the start signal to be used (pistol, horn etc.), false start procedures, starting area ski techniques, and the significance of any flags or marking in the start area

the starter issues the one minute summons bringing the skiers to their start positions

the official start procedure of a 30 second warning is given.

The Starter sounds the shot or horn, or yells “GO” at time “zero” to start the race. In the event of a false start, the Starter will sound the start signal again and call “false start”, on which signal the False Start Controller takes action.

if a number of mass/relay starts are scheduled on the official start list, the above start procedures are repeated.

Equipment:

start list, starting pistol, red flag, loudhailer.

Procedure for Pursuit Start – with a Break:

one Starter is required for each lane (up to five lanes). Each Starter is positioned beside the next starting skier, holding the skier firmly with one hand on the shoulder and with the other hand in front of the skier’s waist

the Starter is required to eliminate all possibility of a false start by physically restraining the skier until the skier’s start time

the Chief of Competition begins the competition by sounding the start signal. This is the signal to activate the timing system and release the FIRST skier only. The start time is “zero” minutes

the start times for subsequent skiers are determined by using the display clock positioned beyond the start line as well as the skier’s pre-determined start time as presented on the start order chart

each skier is released at the exact time shown on their start order chart. There is no countdown; the Starter simply releases the skier by removing his arm from in front of the skier. Avoid saying “GO” as this may cause a false start in an adjacent lane.

early starters are not expected but should a skier break loose and start ahead of the start signal, the Assistant Starter records the bib number and the infraction to be reported to the Jury. The skier is not stopped and restarted, and is normally disqualified.

Procedure for Sprint Heat Start:

Start Controllers summon the skiers to the start area.

the Assistant Starter brings the skiers forward allowing the skiers, one at a time, to select lanes according to the rules (see ICR 360.3.3).The skiers are ‘staged’ to a pre-start line 2 metres before the start line, where any instructions are given to the skiers.

the Starter then calls the skiers to the start line with “take your positions” and, when the skiers are at the start line calls “SET” for them to remain motionless. Within 2-5 seconds signals the start by sounding the start signal (shot or horn), or yelling “GO”.

In the event of a false start, the Starter will signal again and call “false start”. The False Start Controller will flag the skiers to stop, and send them back to the start line to be re-started. In sprints a second false start by any competitor in the same heat causes them to be retired from the heat.

Chief of Start

Assistant Starter

The Assistant Starter(s) is responsible for assisting the Starter at the start line and controlling the area adjacent to the start line.

Duties:

summon skiers to the start line

check order of skiers with start list

pass the correct skier at the correct time to the starter

records all DNS and late starts (may be done by Start Time Recorder)

manage late start skiers. (may be done by a second Assistant Starter)

Procedure for Interval Start:

exercise control over the skiers as they line up to start

inform inexperienced skiers of the starting procedures (i.e., to move up slowly and lift poles over the start gate without hitting it)

check off each skier against the official start list

present the correct competitors to the starter at the correct times

inform the Starter and Start Time Recorder of missing or late skiers and record on start list. Take position in track so that the next skier cannot accidentally enter the gate at the wrong time

periodically deliver start list with DNS, false starts, etc. record to the Chief of Results or the Chief of Manual Timing

direct all skiers arriving late to the recall/late start track. A late start can be defined as being more than three seconds (electronic timing) or “0” seconds (manual timing) after the start time listed on the official start list

start all late starters. Skiers must come to a full stop but do not require a countdown. The only comments required are “come to a stop” and “GO”.

Ensure that the Start Time Recorder takes and records the actual departure time.

Do not let these skiers interfere with other competitors. The skier must not leave when a countdown is in progress in the start gate or for at least three seconds after the official start is completed. If more than two late starters arrive at the start line at the same time the skiers should be started according to the order of their bib number

Procedure for Mass/Relay Start:

assist the Starter in lining up skiers, usually in multiple rows, according to the start list or Lane Assignment sheets.

observe, from a position beside a row of skiers, the position of the skiers in their start positions. The correct starting position requires that the toes are behind the start mark for their position. However, poles may be in front. If a skier or group of skiers has moved over their start mark before the start signal, then a false start must be called. Assistant Starter(s) is responsible for indicating to the Starter that a false start has occurred. The method of signaling the Starter and the degree of flexibility allowed should be established ahead of time!

one method of signaling the Starter that their lane is ready is for each Assistant Starter to hold up a green flag when ready.

after each start is completed, deliver start list with DNS, false starts, etc. record to the Chief of Results or the Chief of Manual Timing

Equipment:

Lane Assignment sheets, green flag(s) on 60 cm long (minimum) stick, clip board

Procedure for Pursuit Start:

check off each skier according to Lane Assignments. One Assistant Starter will be required for each lane (up to five) to assist each Starter

keep the waiting skier one ski length from the start line

present the correct skiers to the Starter at the correct time. If a skier is missing, ensure that the next skier on the start list does not advance to the start line until the scheduled start time of the missing skier has passed. Attention to this situation is critical, as the Starter will usually be too busy to note missing skiers

bring late starters forward to the start line and release them as soon as possible, providing there is no interference with other competitors. Be sure the skiers actual start time is recorded.

Procedure for Sprint Heats:

check off each skier according to the Heat Start List for their heat

summon the skiers to the pre-start line

allow skiers one at a time, to select lanes according to the rules (see ICR 360.3.3).

instruct skiers as to the start procedure i.e. the Starter will call “take your positions”, when in position the call “SET” requires they be motionless. The race immediately when all skiers are motionless on the start line.

pass control of the skiers to the Starter when the Starter is ready.

Equipment:

clipboard with Heat Start Lists

Chief of Start

Assistant Starter - headset

The Assistant Starter - Headset Operator reports to the Timing Unit Team, via headset/radio, anomalies (late and DNS) regarding the departure of competitors.

Duties:

Interval Start:

report bib numbers of departing skiers from a position in the start area

report information on special status skiers (i.e., DNS, false start) to the Timing Unit Team

report/explain to the Timing Unit Team any unexpected signals from the start gate

start all late starters. Skiers must come to a full stop but do not require a countdown. The only comments required are “come to a stop” and “GO”.

Do not let these skiers interfere with other competitors. The skier must not leave when a countdown is in progress in the start gate or for at least three seconds after the official start is completed. If more than two late starters arrive at the start line at the same time the skiers should be started according to the order of their bib number

Relays/Mass Starts:

report start information to the Timing Unit Team.

Activate start of timing system, with a plunger button, from a position near the start line

Equipment:

headset/radio, radio, Start List

Chief of Start

False Start Controller

The False Start Controller is responsible for turning back skiers who have false started.

Duties:

Mass Start/Relay:

alert competitors that a false start has been committed by proceeding to the middle of the starting lanes to block any skiers from unknowingly skiing on. Establish ahead of time which signals from the Starter will indicate a false start. The controllers (two to four are required) are positioned seventy meters past the starting line

Equipment:

identically coloured bright clothes or vests, large red flag for each controller

Pursuit Start:

False Start Controller is not required for this event

Chief of Start

Start Controller

The Start Controller is responsible for assembling skiers for the start.

Duties:

Interval Start:

Summon skiers to the start area

Mass Start/Relay or Pursuit:

direct competitors to their correct lane according to Lane Assignment sheet.

Sprint Elimination Heats:

Assemble skiers for each heat in the pre-start area

Equipment:

clipboard

Mass/Pursuits/Relay Lane Assignment sheet.

Sprints – Heat Start Lists

Chief of Start

Chart Stewards

The Chart Steward is responsible for assisting the Starter in Pursuit Start competitions.

Duties:

manage the start order chart by marking off starters and turning pages

Procedure:

the Chart Steward is positioned one meter in front of the start line on the same side of the skier as the Starter. One Steward is required for each start lane (up to five)

the skier's pre-determined start time as presented on the start order chart is pointed out to the starting skier

the display clock is then used to determine the skier's actual departure time

when a start time has arrived (determined by the time on the display clock in front of the start line), cross it off with a wax pencil whether a skier departs or not (if a skier does NOT start mark the chart with a DNS)

start order chart pages (one chart per steward) are flipped as required. Be prepared for windy conditions

provide manual timing back-up with watches that can provide a printout of actual start times. Recording bib numbers with the start times is not required

Equipment:

start order, chart stands and pages (may use a flip chart), wax pencils, watches with printout capabilities

Chief of Electronic Timing

Intermediate Timing Teams

Intermediate Timing Teams are responsible for recording times at specific points on the course between the start and finish of a competition. The teams consist of 3 members, a Bib Caller, a Recorder and a Timer. Mass start races will cause 'trains' to form. A useful tool in that event is a hand held recorder so that a bib order can be recorded and replayed when it is too close for a bib recorder to write.

Positions and responsibilities for an Intermediate Timing Team are the same as that of a Finish Timing Team. Data can be recorded electronically or manually, depending on the location. Lap times are handled as intermediate times.

For a 10 km course one intermediate time must be taken; for 15 km, one to two intermediate times; for 30 km, two to three times; and for 50 km at least three intermediate times must be taken.

This team may choose to work in partnership with a Splits Calculator or an Announcer Assistants communicating competitor positions back to the announcer station.

Equipment:

Stadium: plunger, headset/radio, clipboard, pencils, hand held voice recorder

On course: micro computer, appropriate software, start list, pad of paper, pencils, radio

Chief of Electronic Timing

Finish Referee

-Finish Bib Recorder
-Video Camera Operator

The Finish Referee is stationed at the finish line to determine and record the order of finish of all competitors. A Finish Referee is a "must have" official for any race decided by order of finish. Some races, e.g., sprint heats, may have up to four finish referees.

Duties:

call the order of finish as skiers cross the finish line

record order of finish, dictate order to a Finish Bib Recorder or report (via headset) finish line information to Electronic or Manual Timing.

deliver order of finish sheets to Chief of Results via a runner

supervise video camera operations

supervise Finish Bib Recorder

Procedure:

The Finish Referee is positioned on the end of the finish line and must have a clear unobstructed view of the line and the "vertical plane" above it

The Finish Referee has the authority to determine the order of finish and verify the accuracy of the "order of finish" report with his/her signature. This report is submitted to the Chief of Results for inclusion in the competition files.

details regarding the order of skiers crossing the finish line are reported to the Timing Unit Team via headset/radio. In the case of close finishes, the order of finish is determined by the first foot to the finish line.

If high traffic is expected the Finish Referee would benefit from a hand held recording device into which the finish order could be dictated and then replayed when the traffic calms down

Equipment:

clipboard, skier Bib Order forms, pencil, plastic cover for wet weather, headset/radio, hand held recorder

Finish Referee

Finish Bib Recorder

The Finish Bib Recorder has the responsibility to record, by bib number, the order of the competitors as they cross the finish line. There must be the same number of Finish Bib Recorders as Finish Referees.

Duties:

write down the order of finish as dictated by the Finish Referee on the appropriate form

Procedure:

the Bib Recorder works adjacent to the Finish Referee

when a close group of skiers is finishing, the bib recorder will record the order of finish dictated by the Finish Referee. This information may be needed immediately by the Manual Timing Recorder.

Equipment:

clipboard, pencil, plastic cover for wet weather

Manual Timing with printing timers – Time Record forms

Manual Timing with non-printing watches – Bib Record forms

Electronic Timing – Bob Record forms

Sprint Elimination Heats – Sprint Finish Order Record

Finish Referee

Bib Caller - Headset

The Bib Caller with Headset at the Finish Line reports to the Timing Unit team via headset/radio the details regarding the arrival of competitors. An experienced Finish Referee may be able to handle this responsibility.

Duties:

report to the Timing Unit Team information on arriving skiers, ie, bib number in order of finish from a position at the finish line

report/explain to the Timing Unit Team any unofficial signals from the electronic beam.

may also be responsible for plunger button when other systems fail (or are not used)

Equipment:

headset/radio

Finish Referee

Finish Lane Recorder

The Finish Lane Recorder is only used in Sprint Heats and has the responsibility to record the bib numbers which finish in the lane to which they are assigned

Duties:

Write down the bib number of skiers who finish in their assigned lane

Procedure:

the Finish Lane Recorder works at the end of the finish pen

record the bibs finishing in each lane.

Equipment:

clipboard, pencil, finish lane record forms, plastic cover for wet weather

Finish Referee

Video Camera Operator(s)

The Video Camera Operators are responsible for setting up and operating video cameras to record the order of finish at

the finish line. In order to do this it may be necessary to establish which skier was in which lane. This requires two cameras at the finish area. These officials are required for any type of race decided by order of finish i.e. mass starts, pursuits, relays and sprint eliminations. The setup is the same for other competitions.

Duties:

Camera 1 is placed just past the finish line at an angle of approximately 5° to the Finish Line to establish which skier (boot) arrived at the finish line first. The camera is not exactly perpendicular to the finish line so that a foot or leg of a skier nearer the camera cannot block the view of a foot further away.

Camera 2 is placed 20 metres before the finish looking at the backs of finishing skiers to establish which skier finished in which lane (the finish line camera only shows feet).

Alternatively Camera 2 may be place 20 metres past the finish line, focusing on on-coming skiers, to avoid recording into a bright sun or background.

Equipment:

video camera(s) and tripod(s)

Chief of Electronic Timing

PhotoFinish Camera Operator(s)

The PhotoFinish Camera Operators are responsible for setting up and operating photofinish cameras to record the order of finish at the finish line and provide a backup timing source. This requires two cameras at the finish area. These officials and the equipment should be present for any type of race decided by order of finish i.e. mass starts, pursuits, relays, and sprint heats. For OWG, WSC, JWSC, and WC competitions, this is a required position.

Duties

Coordinate with the Chief of Stadium to ensure there is sufficient space in the stadium layout for the cameras.

Place the two cameras at opposite ends of the finish line, ensuring that they are aligned to the front edge of the finish line (Rule 353.1.5). They must be exactly in line with the finish line.

Ensure that the area between the cameras and the finish line is cordoned off and other officials are made aware of this “no-go” zone. That includes finish-line referees!

Consider placing lane markers (small signs, stake chasers or stake whiskers) at the finish line and on each side of each finish lane to help distinguish the lanes. Where finishers are close together, this makes figuring out the lanes of each finishing skier, and therefore the identity of each finishing skier, much easier.

During the race, this individual is responsible for finding the finishing group of skiers in question and displaying the image to either the Chief of Electronic Timing, Chief of Timing, or Technical Delegate for a ruling.

Following the race, this individual must make backup copies of the recorded data for display at a later time, should there be a formal dispute.

Procedure

This individual must be an experienced computer and network technician familiar with timing systems. He/she should be recruited well in advance of the actual event. This person must have received training specific to the photofinish system in place.

Equipment

photofinish equipment
tripods
network cable
extension cords
ladder
laptop computer

Chief of Electronic Timing

Electronic Timing Operator

-Electronic Timing Assistant
-Assistant Starter - Headset Operator
-Computer Operator

The Time Unit Operator is responsible for operating the timing unit.

Duties:

check for sufficient paper for printout purposes
start the electric timing unit (usually the starting point for the entire timekeeping system)
verify the mode of operation and timing precision
determine which finish signal belongs to which skier by closely observing the finish line
receive reports from Headset Operators at start, finish and intermediate timing stations. This responsibility may be shared with or delegated to the Assistant Operator
key in (or write on printout) all necessary data, including DNS, false starts, and on some units, the bib numbers. Remember that the late start and recall start times are recorded by the manual start timing recording team and are not used for calculations unless on the request of the Jury
cross off irrelevant information such as extra breaks in the finish beam, accidental tripping of the start gate, etc.
if there is a direct connection between the timing unit and computer is in use, annotate bib numbers on the timer tape anyway in case of discrepancies and keep the tapes as an organized backup in case the direct link fails.
When direct connection is not used provide printout of tapes with bib numbers for computer operator.
produce a post race printout (data dump) from the timing unit equipment

---

The most important task is to ensure that key information (the skier bib number and time) is correctly matched.

Electronic Timing Operator

Electronic Timing Assistant

The Operator Assistant provides support to the Timing Unit Operator and Computer Operator as needed.

Responsibilities are adjusted according to the configuration of the timing and race management system. If a timing beam is used for the finish signal the Timer Operator has the finish line as their primary focus. Therefore the Assistant should monitor the start signal. Under the rules for electronic timing a skier may leave up to 3 seconds prior to their “Start Time”. This means that any time more than 3 seconds before the start interval must be called as a false start. For example if the next start time is 0:04:30 and the timer prints 0:04:26.82 for the channel being used for the start gate, the skier left more than 3 seconds early. In order to see the next time immediately, it is necessary for the printer cover to be removed from most electronic timers. In the event of a false start, the Assistant Starter must be notified by headset/radio immediately.

Duties:

receive reports from Headset Operators at the start, finish and intermediate timing stations
organize information to be processed
visually monitor the ‘start channel’ for early starts
visually monitor skier traffic and timer signals to identify signal failure
relay timing unit printout information to the Computer Operator.

Equipment:

Headset/radio, pad of paper, pencils, official start list, order of finish forms

Computer Operator

The Computer Operator is responsible for all duties relating to the recording of times and bib numbers in the computer and the production of results. Times are not entered when a direct connection is used but the computer must be monitored in case the link fails.

Duties:

assemble the hardware and software, with help from the Chief of Electronic Timing

check set-up (program operation, printer set-up, etc.)

operate the computer and assist the Competition Secretary to produce a start list at the draw

enter data on competitors and race definition

set up and test interface between the timing unit and the computer

operate computer during the competition

key in data on all special status skiers

arrange for the elapsed time of interval skiers to be displayed on the computer screen and/or printed in the order they cross the finish line. The latter procedure may require a second printer.

provide printout of intermediate, unofficial and official results.

make back-up of files and results.

Equipment:

Personal computer, printers (dot matrix, laser), printer paper, printer ribbon, toner, software, pencils, diskettes, extra batteries, power bar

Chief of Electronic Timing

Electronic Technician

The Electronic Technician is responsible for the preparation, setup, maintenance and repair of the electronic timekeeping equipment and the communication equipment.

Duties:

assist The Chief of Electronic Timing in the selection/procurement of compatible timing /computer systems and equipment

assist with the selection of a suitable communication system and equipment

obtain or build suitable connector boxes for timing and the communications systems. (See section 12).

install wiring and connector systems for timing, communications and public address systems

setup and test, with the chief responsible, the timing, communications and public address systems

trouble shoot and maintain all electronic systems prior to and during the event

assist with the dismantling and storing of all electronic systems after the event

Procedure:

This volunteer must be a trained electronic technician familiar with timing, radio and public address equipment and operating systems. This person should be recruited well in advance of the actual event to assist in the selection of equipment and any preliminary installations required. New installations may need suitable underground wiring or connector boxes may need to be designed and built. Immediately prior to the event, the electronic technician assists with installing the various systems and tests them to ensure they all work. When the equipment is functional, he/she remains on call to correct any operational problems which may occur. (Cold, wet or snow and wind are known to give electronic systems problems).

Equipment:

tool kit, circuit tester, spare connectors, tape

Chief of Timekeeping & Data Processing

Chief of Manual Timing

-Manual Timers
-Manual Timing Recorders
-Chief of Manual Timing Calculations
-Bib Callers
-Bib Recorders
-Start Time Recorder
-Runners-Electronic and Manual Timing

The Chief of Manual Timing is responsible for supervising the officials working in Manual Timing for the recording and calculating of skiers' times and for the information flow from time recorders to the Chief of Manual Calculations and/or to the Chief of Results.

Duties:

organize manual timing teams, a minimum of two teams
synchronize the starting of all manual stopwatches for timing and starters and with electronic timing if applicable
check synchronization of watches before and during race
check bib number and time recording procedures and legibility
supervise manual timing calculations
when manual timing is the primary system, double check the results before they go to the Competition Secretary
calculate the average deviation between the manual timing teams

Equipment:

clipboards, pencils, pencil sharpener, stopwatches, batteries, timer printer paper, time recording forms and manual calculation forms.

Procedure:

As head of the manual timing operations the Chief of Manual Timing will confer with the Chief of Timekeeping and The Chief of Results on matters pertaining to the positioning of timing personnel. In less sophisticated setups this official will have to do considerably more coordination of the timing teams, especially in instances where a group of skiers arrive simultaneously.
The Chief of Manual Timing should remind the manual timing crews that their jobs are extremely important. Often when electronic systems are in place, the manual timing takes a back seat. History has proven over and over again that the manual timing results often become the official results due to power failures and hardware malfunctions of the electronic systems.

Manual timers should consider themselves the secondary timing unit of primary importance.

Chief of Manual Timing

Start Time Recorder

Start time recorders are responsible for checking the bib number against the official start list and for recording the start time of each competitor.

NOTE: Where manual timing is the primary timing system, skiers receive their assigned start time on the start list. Should a skier start late by one or two seconds, these changes are ignored. If the skier starts significantly late, or there is any concern regarding the skier's start, record the actual start time. Changes in start times are not used in calculations unless one is instructed to do so by the Jury. When electronic timing is used, the actual start time taken when the skier's shin/leg moves the start gate. It is recorded by the Start Time Recorder for each skier, is recorded, and the time is used for manual timing calculations.

Duties:

complete required information on top of "start time record form", and number each page
record the actual start time of each skier
note false starts as requested by Starter/Assistant Starter(s)
deliver start time record forms to manual timing calculations

Equipment:

official start list, start time record forms, clipboard, pencil, (2) stopwatches, start time recorder sheet

Procedure:

The Start Time Recorder is positioned so that they have a clear view of when the racer's first foot crosses the start line. The start time recorder 'splits' a stopwatch and notes to the nearest 1/10th second the start time of each racer as well as the bib number of each racer. The Start Time Recorder forms are passed to calculations so that the exact start times can

be recorded on each competitor's timing sheet where required. The start time recorder should be familiar with synchronization procedure for stop watches.

Chief of Manual Timing
Manual Timer

The Manual Timer is responsible for capturing the time as each skier crosses the finish line and for passing the time to the Manual Timing Recorder.

Times recorded are in hours, minutes, seconds, tenths, hundredths, and thousandth of seconds

Duties:

Regular type stopwatches:

start two stop watches under the direction of the Chief of Manual Timing
set the watch to secure its' operation so that it can not be accidentally stopped (ie, set pin)
call out times by reading the watch as skiers approach the line

Printing timer:

start timer printer
start timer under the direction of the Chief of Manual Timing
capture a time by pressing the "lap time button" (or "split" button) as the racers first foot crosses the finish line
pass off timing strips to the Timing Bib Recorder on a regular basis.

Equipment:

stop watches - two per timer or printing timers - one per timer plus one spare

Procedure:

The Manual Timer is positioned so as to have an unobstructed view of the finish line. Two stop watches are started simultaneously with the starting signal (i.e., dropping of hand to side) and then secured so that the stop button cannot be pressed accidentally. One watch remains held in the hand and the other is stored in a warm safe location (usually inside one's jacket).

Manual Timers should not try to emulate electronic timers

Using printing timers

Manual Timers using a printing timer do not have to relay the captured time since the timer unit prints the time, with a sequence number, on a tape. The Finish Time Recorder official is not required. Once several times have been captured (8 to 12) the tape should be rapidly advanced, torn off, and passed to the Finish Bib Recorder for attachment to the Finish Record form. (Apendix 5-2). A corresponding numeral should be written on each of the tape and Finish Record Form.
Caution: With some products the timer printer unit must be started before the timer or stopwatch is started.
This procedure is quite simple and straight-forward for much of the race. Inevitably a race presents several instances where two, three or more skiers approach the finish line side by side. In such instances the Chief of Manual Timing will detail which timing crew times which approaching skier. The identity of the skier is best designated using bib numbers, or clothing if it is impossible to obtain the bib number. Do not assign skiers based on which track they are in or by who is leading, since the skiers may change positions as they approach the finish and a racer can be missed. These types of circumstances should be well rehearsed so that everyone knows their job and remains relatively relaxed. Whenever possible each timing team should record the time of every skier crossing the finish line.

After a group of skiers has finished (and there is a sufficient gap in the timing activity), the Chief of Manual Timing will ensure that Timing Team #1 receives the times from the other timing teams for skiers which they did not time. This action of "borrowing times" must be done carefully. The recorder must note beside the "borrowed time" which team it was recorded from so that the Calculators can double check for any errors or omissions. If the rate of activity is too intense at the finish line or the weather is too cold, then the

calculators will be able to perform this "borrowing" process at a later time. Therefore, do not risk missing incoming skiers for the sake of getting a borrowed time at the finish line.

Chief of Manual Timing

Finish Time Recorder

The Finish Time Recorder records the bib number and time to the nearest 1/10th of a second (1/100th for Sprint Qualification) on timing record forms, then forwards the forms to the calculator.

Duties:

Regular Stopwatch operation

write name, team number and page number on each page of the "Time Record Form"

record the bib number of the skier being timed on their "Form"

write the matching time for the bib number recorded

Team #1 passes off "Forms" to calculations runner on a regular basis. DO NOT hold on to pages.

Equipment:

pencils, Time Record forms, clipboard

Procedure:

Confirm that the information is being recorded in the correct order including hours, minutes, seconds and tenths of a second (and one hundredths for sprint qualification).

Times are ALWAYS TRUNCATED to the last tenth (or one hundredth) of a second. Times are never rounded.

Be certain that the correct bib number is on the sheet as designated by the Timing Bib Recorder.

Team #1 Time Record forms are used as the master set from which the official manual timing results will be produced.

Chief of Manual Timing

Bib Caller

The Bib Caller calls skier bib numbers in the order of arrival of competitors.

Duties:

report bib number in order of finish from a position at the finish line

Equipment:

audio recorder in case the Bib Recorder cannot keep up

Chief of Manual Timing

Bib Recorder

The Bib Recorder is responsible for recording the order of bib numbers given by the Bib Caller as skiers cross the finish line and passing the order on to the Manual Timing Recorders.

Equipment:

clipboard, pencil(s), Time record forms, stapler and staples.

Procedure:

The Bib Recorder works up course from the timing team. The Bib Recorder will often verify the order of finish with the Finish Referee after a close group of skiers have finished. In these instances, the information about the order of finish will be needed immediately by both the Manual Timing Recorder(s) and the Bib Recorder with Headset for electronic timing. Order of finish is determined by the skier's first toe to reach the finish line.

Chief of Manual Timing

Chief of Manual Timing Calculations

-Calculators
-Computer Operator (s) Calculations

The Chief of Manual Timing Calculations is responsible for coordinating and supervising the calculations required to produce the final official or backup results. The 'paper and pencil' approach is now rarely used. While it has the advantage that no setup needs to be done with a PC, the preferred method that produces more accurate results is to use a PC with Race Management software to makes these calculations. A valuable function in this area is to do manual calculations of elapsed times for say, the top 10 in each category when a direct connection between timing unit and PC is **not** used. This will ensure that data entry errors did not occur.

Duties:

supervise manual timing calculations
check results before forwarding to the Competition Secretary or Results Checker

Equipment:

pencil, start list, calculation forms

Chief of Manual Timing

Calculators

Calculators are responsible for calculating elapsed times.

Duties:

calculate times of each skier as the information is supplied from the timers
double check times and data entry to eliminate errors before posting or forwarding

Equipment:

Same as Chief of Manual Calculations

Procedure for manual calculations:

For Interval Start Races where a start wand is used, take the Start Time Recorders record.
Select the skiers who are going to be checked and transcribe their recorded start times.
If a start wand was not in use the Start List represents their start times.
Find their finish times on the Time Record forms from the Finish Time Recorder.
Transcribe the finish times and calculate the elapsed times.
Pass the calculated results to the Results Checker.

Reminder: When tenths are borrowed from seconds, the value of 10-tenths is used; when seconds are borrowed from minutes, the value of 60 seconds is used.

Chief of Manual Timing

Computer Operator - Calculations

The computer operator is responsible for entering times from Manual Timing. The best start point is a copy of the race file form the Electronic Timing Team. This obviates the need to re-enter skier and start data as well as removing one more source of errors.

Duties:

If necessary, enter skiers into program including; names, class, team, CCC racer number
enter start times (if start wand used) and bib numbers for all skiers
as race progresses, enter times for each skier
calculate racer times and sort order of finish
produce unofficial results for cross- checking with electronic timing or for posting as required

Equipment:

Personal Computer with Race Management software, a Printer, printer paper, warm location in which to work

Procedure:

During, or after the draw meeting the Race Management database is backed up and then copied onto the 'Manual Calculations' computer. During the race the operator enters the time data for each skier as it becomes available and prints out race results as times are available and all the required data has been entered. NOTE: in cases where electronic timing is used, care must be taken to ensure that manual results are only provided to the Chiefs of Timing and are not generally made public.

Intermediate Manual Timing

In the event that a competition is located in a stadium where the skier by-passes the finish line on a "thru" lane and where intermediate times are to be recorded by an additional timing team, times are recorded using the same technique as used by a finish line manual timing team. A runner is required to transport the lap time recording forms to Calculations for including in the results calculations. The intermediate time recording forms must be marked on each page "intermediate times" to avoid any chance of confusion.

Chief of Timekeeping & Data Processing

Chief of Results

Results Checker
Results Board Poster
Scoreboard Operator (Electronic)
Announcing Coordinator

The Chief of Results is responsible for overseeing all aspects of checking calculations and for the displaying of stadium results.

Duties:

careful planning - keep the number of steps to a minimum
coordinate, with the Results Board Poster, the acquisition and setting up of results board(s) and an Official Notice Board.
coordinate, with the Announcing Coordinator, the acquisition, installation and testing of a Public Address system
acquire and coordinate the use of display terminals, printers and fax machines suitable for system
coordinates the flow of calculations information inside the timing centre
coordinate, with the Chief of Electronic Timing, a plan for prompt interim and unofficial result information to be channeled via the Results Operator to appropriate points in the stadium (results board, and announcers station)
supervise the process for preparing a printout of unofficial and official results for The Chief of Timekeeping for delivery to the Competition Secretary and the Announcer
ensure the provision of prompt and accurate result information for awards presentations
collect, co-ordinate and check documentation from the Assistant Starter(s), Finish Referee, and Chief of Controllers for information affecting results preparation
co-ordinate support documentation on results, for the Jury as required

Stadium results requirements must not interfere with basic timing operations

Equipment:

pencil, clipboard, pad of paper, start list

Chief of Results

Results Checker

The Results Checker is responsible for the accuracy of the calculated results. A knowledge of the athletes is helpful.

Duties:

Manual timing system:

- double check calculated times for exceptional times, good or bad, against the original data
- investigate any competitor/coach concerns regarding results
- pull together calculation information from manual timing and electronic timing
- cross check manual and electronic calculations looking for major differences
- trouble shoot inconsistencies and missing information
- investigate competitor/coach concerns of results

Equipment:

pad of paper, time calculator, pencils, clipboard, start list

Chief of Results

Results Board Poster

The Result Board Poster(s) is responsible for posting interim and unofficial results on the results board. In Sprint Elimination heats the Results Board Poster must write the results of heats which will show which skiers are advancing to the next round.

Duties:

- Take interim and unofficial results and place on the Results Board
- In Sprint Elimination write results of each heat on a pre-prepared chart showing progression from Quarter finals though semifinals to Finals.
- Monitor and record comments and queries about unofficial results
- Have the runners take concerns to the Results Checker
- remove result board after the competition

Equipment:

radio/headsets, marking pens, results board, clipboard and stapler

Chief of Results
Scoreboard Operator (Electronic)

The Scoreboard Operator is responsible for operating an electronic scoreboard from the timing centre.

Equipment:

electronic scoreboard, scoreboard operating computer and software

Chief of Manual Timing
Runners – Manual and Electronic Timing

Runners are used to transport information among the Calculators and Start Time Recorder, Manual Timer Recorders, Chief of Results, Results Checker, Result Board Personnel, Announcing Coordinator and the Competition Secretary.

Procedure:

The runners must circulate carefully, as directed, between the various locations. They require a knowledge of how the time and results information must flow for any given competition, and must be aware of potential dangers such as stepping across the electronic beam or interfering with skiers.

Chief of Results
Announcing Coordinator
-Announcer
-Colour Commentator
-Splits Calculator

The Announcing Coordinator is responsible for coordinating the activities of the announcing team and gathering and distributing announcing information.

Duties:

gather event and competitor statistics, sponsor and thank you lists for the Announcer

prepare, with the Announcer, an agenda of activities, weather reports, music, etc.

supervise the setup of the Public Address System and, with the announcer, test the system prior to the start of the days activities

gather weather and snow condition reports prior to the event and co-ordinate arrangements for updates during the event

arrange for and facilitate the supply of relevant unofficial and official results to the Announcer

arrange interviews with winners

arrange, with the Chief of Results, for awards presentation information

coordinate, with the awards presenters and the Announcer, how and when the awards will take place

Equipment:

clipboard, start lists, tape recorder, tapes of suitable music, national anthem(s) tape, competitor background information (PA system if not on site)

Announcing Coordinator
Announcer

The Announcer is responsible for providing a continuous supply of information to the public, coaches, and skiers at the race site by means of a public address system. Announcers should be encouraged to describe the action, but in any close finish, let the results come from the officials. The Announcer is often the MC for the banquet or reception.

Duties:

duties will vary considerably with respect to the level of the competition as will the hardware used. For local/club events a strong “one man show” and a good megaphone may be sufficient. For major events, the role of the Announcer almost becomes that of a performer, and with his talents he must capture the drama and excitement of the competition through continuous commentary. The Announcer should be able to speak more than one language for international events and is expected to be bilingual for national level events.

the Announcer’s booth or platform is set up in the stadium area to provide a commanding view of all start and finish activities

Pre-Competition Information:

It is extremely important for the announcing crew to synchronize with 'Race Time'.

weather conditions, temperature, wind, etc.

countdown to start; 15 minutes; 10 minutes; and 5 minute warnings

maintain silence for at least one minute before races are scheduled to start (avoids interfering with communication between timekeeping officials)

bulletins to skiers to go to ski marking area, etc.

Between the above announcements, the Announcer develops spectator interest via general information on the following:

competitor profiles

sponsor acknowledgements

visiting dignitaries

location of services and facilities

Music is an excellent means of creating an exciting atmosphere. The Announcer should co-ordinate music selection and presentation. Some events will require the national anthem.

During Competition:
The Announcer is striving to maintain spectator interest by continually supplying the crowd with stimulating commentary of a play-by-play nature.

introduction of each skier entering the start gate. Name pronunciation should be correct, and information should include basic facts such as age, home town, club/division affiliation, past performances of note. Adapt skier introductions to suit different start methods (pursuit, relay and mass starts). Mass starts require complete silence at the time of the actual start.

intermediate times of skiers passing through the stadium or out on course and predictions of their unofficial ranking

report on special status of any skiers or start times or injuries

report of skiers who did not finish

warning announcements following events and start times

sponsor acknowledgements

announce unofficial results - remind audience that times are “unofficial”

announce time and location of awards presentations

Concentrate on building excitement around the suspected leaders in the competition. How close are the competitors to each other? Is this a qualifying event for the Provincial Team, National Championships, the Olympics? Where possible the announcing team should be given a view of the Race Management system while the race is in progress. By viewing the results monitor they can call unofficial results as seen by the Timekeeping team. A remote monitor on the Results Computer is one approach, or a separate computer networked to the Results system represents the other. However, the announcer should be wary of announcing winners of gold, silver and bronze, but rather should announce finish order since some racers may not be eligible for medals.

Post Competition:

congratulate winners and all competitors, officials, coaches, sponsors, organizers

announce medal winners at on- site awards presentations

Equipment:

public address system, radio, wire connected mike or wireless mike (a mike stand will free hands), clipboards, pencils, start list, racer profiles if available

Announcing Coordinator

Colour Commentator

The Colour Commentator is responsible for gathering, preparing and feeding racer and sport specific information to the Announcer. He/she makes “trade-off” commentary with the Announcer regarding racers and their progress to maintain continuity.

Duties:

sport “expert” providing information on athlete performances, waxing, skiing technique, race format etc.)
receive reports from the intermediate timing and any other prearranged timing stations set up on the course
receive reports from the stadium and timing centre. Handle incoming and outgoing messages
spot incoming skier bib numbers
supply unofficial finish results using the a PC networked to the Race Management PC.

Equipment:

binoculars, pencil, pad of paper, radio, headset to pre-caller

Announcing Coordinator

Splits Calculator

The Splits Calculator is responsible for supplying the Announcer's station with the current rankings of competitors during the competition. It is definitely preferable to use a PC networked into Race Management for short interval start races (e.g. 5 and 10k) because the 6 second time window in which a start can occur will make a big difference with ranking.

Duties:

calculate and record rankings of competitors from stations on the course or in the stadium
report times and skier rankings to the announcing team either directly of by radio
may work with the Intermediate or a Splits Timing team on course.

Equipment:

PC either standalone or networked to the Race Management system, radio, binoculars, start list, clipboard

Chief of Results

Awards Results Compiler

The Awards Results Compiler is responsible for gathering and distributing official results information on competitors receiving awards.

Should one official not be given this job it must be assigned to some other official in the results or announcing group of officials to ensure that the required information is prepared as the competition progresses and is ready as soon as the last race ends.

Duties:

gather information on which awards will be presented
obtain a ‘Top 5’ results report from the Race Management system – Competition Secretary
Forward it to the Announcing Coordinator or Announcer and the awards presenters
Co-ordinate with the Presenters and the Announcing Coordinator the presentation activities as required.

Blank

Competition Security

Security Organization & Practice

Competition Security is responsible for controlling the access of all personnel to the stadium area and on course. In large events, this may be extended to include the entire race site. The access control ensures that the integrity of the field of play is maintained and that a free flow of spectators and athletes around the stadium and course occurs. The enjoyment of the race is thereby enhanced for athletes, officials and spectators alike. In low level regional and club events, security may be a minor problem and is managed by the Chief of Course and the Chief of Stadium. In larger, high level events where international racers are competing, spectator and media interests are high which makes security a concern. Such an event requires a large number of volunteers (marshals) to maintain control. This creates a need for a Chief of Competition Security and a specific structured committee to provide the security required.

Chief of Competition Security

—Chief of Course Marshals
—Chief of Stadium Marshals
—Manager of Team Rooms
—Manager of On Course Transportation

The Chief of Competition Security is responsible for providing the necessary controls to allow the spectators and media to circulate freely without interfering with race officials, skiers and coaches.

Equipment:

armbands or uniforms, radio, course and stadium maps, cellular telephone

General Procedure

The Chief of Competition Security is normally required only at large, high level competitions. For such events, a system of "accreditation" is devised by the Event Organizing Committee so that any person on the race site, except the general public, is given an identification tag which indicates by code where they are permitted access. The Chief of Competition Security is responsible for providing Stadium and Course Marshals at the various control gates and viewing areas. Close liaison with the Chief of Competition, the Chiefs of Course and Stadium, the Event Chairperson and Venue Management is necessary. The Chief of Competition Security may also have to liaise with the local police force to arrange for some assistance, especially with the general public who do not wish to abide by the security provided by the Competition Committee, or to provide security for high-profile guests.

At all levels of competition some degree of control must be organized to protect the movement of people in the following areas:

stadium
start and finish
race course and warm-up
waxing facilities
race officials building
parking area

Security in these areas should control not only access but also provide continued surveillance with a concern for theft and vandalism where it is appropriate. While maintaining effective controls, it is important to promote a pleasant and friendly atmosphere.

Chief of Competition Security (in major events)
Chief of Course (for lower level events)

Chief of Course Marshals

— Course Marshals

The Chief of Course Marshals is responsible for supervising the access of spectators, officials and non-competing skiers on the course. They can also direct traffic with respect to coaches, wax testers, etc., to course closures, to skiing in the correct direction on the course, etc.

Marshals maintain the integrity of the field of play!

Equipment:

radio, course maps, light touring or racing ski equipment

General procedure

The Chief of Course Marshals plans and assigns Course Marshal locations in order to supervise course crossings, competitor access to trails, monitor non-competitors skiing on course, etc. It is important to move around the course, keeping in radio contact with course marshals to locate any areas requiring additional control. This official should have a friendly but firm disposition.

Chief of Course Marshals in major events
Chief of Course in minor events

Course Marshals

Course Marshals are responsible for supervising controlled access areas and surveillance as directed by the Chief of Course Marshals.

Equipment:

armbands or identifiable clothing, radio (key areas), course map, warm footwear

General procedure

Course Marshals are required to check appropriate forms of identification, such as arm bands, racing (training) bibs, and accreditation tags, to determine if an individual is authorized to be on course. Course marshals supervise all course crossings to control racer/pedestrian traffic and to ensure that the track quality is maintained.

People skills are important!

A marshal's function is one of control. They should not be threatening or aggressive in dealing with the public and skiers. They should be knowledgeable of race regulations and familiar with the course in order that the restrictions can be explained and assistance given in a professional and diplomatic manner. Every effort should be made to maintain an enjoyable atmosphere on the course.

Chief of Competition Security in major events
Chief of Stadium for lower level events

Chief of Stadium Marshals

—Stadium Marshals

The Chief of Stadium Marshals is responsible for supervising all access points for spectators, media, volunteers and athletes into the stadium area.

Equipment:

- radio, stadium map, start list.

General procedure

This official plans and assigns Stadium Marshal locations in order to supervise stadium access, press corral access, traffic and parking control, ski waxing and team room areas access and surveillance against theft and vandalism. In addition Stadium Marshals may be assigned to direct spectators to viewing areas. The Chief of Stadium Marshals moves around the stadium area monitoring stadium security during the competition. This official should have a friendly but firm disposition.

Chief of Stadium Marshals in major events
Chief of Stadium in minor events

Stadium Marshals

Stadium Marshals are responsible for providing controlled access and surveillance as directed by the Chief of Stadium Marshals.

Equipment:

armbands or identifiable clothing , stadium map

General procedure

Stadium Marshals duties fall into three basic categories: spectator, officials, and skier access control; general surveillance; and parking or traffic control. All are related in that they seek to ensure a controlled environment to maintain security and protect the field of play.

Stadium Marshals are required to check appropriate forms of identification to determine whether an individual has the authority to enter any restricted areas. This may involve asking to see accreditation tags, racing (training) bibs or armbands depending on what is being used.

Marshals should not have to be threatening or aggressive in their manner of dealing with the public and racers. They should be capable of explaining why the restrictions are necessary so that those confronted can accept them.

Every effort should be made to maintain an enjoyable atmosphere in the stadium area.

Chief of Competition Security

Manager of On-course Transportation —Drivers

The Manager of On- Course Transportation schedules and manages on-course transportation of officials, VIPs, media, and equipment transport using snowmobiles and/or all terrain vehicles. This official ensures that all vehicles are regularly serviced and operational, and that all drivers are familiar with the vehicles and course access rules.

Duties:

consult with the Chief of Course and the Chief of Stadium regarding transportation needs and corridors for training days and the competition day.

train and/or check drivers to ensure they have suitable driving skills

familiarize drivers with on course etiquette

check all drivers to ensure they meet any area safety and licencing requirements for snowmobiles and ATVS'

on race day, dispatch drivers and suitable vehicles to transport officials, press, supplies, etc as required.

ensure that vehicles are maintained and ready for operation as required.

Equipment:

long track snowmobile(s), 4 wheel drive ATVs, snowmobile sled(s), radio, dispatch centre, course and stadium maps.

Manager of On-Course Transportation

Drivers

Drivers transport people and/or equipment via snowmobiles and/or ATVs to required locations on course.

Equipment:

snowmobile suit or extra warm clothing, felt lined boots, radio, course map

General procedure

Drivers provide on-course transportation by driving suitable snow vehicles as requested. Attention to safety and awareness of approved routes are of the utmost importance. All driving routes must be cleared with the Chief of Course.

Chief of Competition Security

Manager of Team Rooms (waxing area)

The Manager of Team Rooms is responsible for the organization and maintenance of team rooms.

Duties:

assign, in consultation with the Chief of Competition, waxing rooms or area to each team and make a list of assignments and give a copy to the competition office

distribute room keys to the team manager or coach and have keys signed for at the Competition Office

check rooms and toilets that all utilities are working

be on site during scheduled training hours, and two hours before to one hour after a competition

monitor flow of people in area.

watch for vandalism and theft especially during training and competition times

ensure that security surveillance is provided day and night

Equipment and supplies:

team room supplies available, e.g. soft drinks, water, chocolate bars, etc., team room keys and master set, broom(s) and dust pan(s), flash light, team leader name list, fire extinguisher for each room, signs and flags

General procedure

The Manager of Team Rooms maintains a list of racing teams, the team leaders and their assigned team rooms. He/she distributes keys or is available to open team rooms as required. The team rooms are checked regularly to ensure cleanliness and security. If teams are to be given supplies these are distributed equitably to each team room on a regular basis.

Waxing facility details: See “Ski Preparation Waxing and Warmup Areas” Chapter 8.

Competition Safety, Medical Services, & Doping Control

The responsibility for first aid and medical services vary with the level of the competition. In club, local area, divisional cup, and local championship competitions, these activities are supervised by the Chief of Course. In Regional and National Championships, Provincial and Canada Winter Games, World Cups and major loppets, these activities are supervised by the Chairperson of Venue Planning and Services. This Chairperson from the Competition Organizing Committee must work closely with the Chief of Course. Competition safety and medical services are important considerations in cross country ski racing because:

air temperature and weather conditions have a potential for causing frost bite, hypothermia, etc.
remote areas on the course can make treatment and evacuation difficult.
speed of the skiers is increasing the potential for injury in the event of an accident
insurance coverage and organizer liability are of concern.

Competition Safety

Competition safety is best achieved by good planning, preparation and operation.

Planning

evaluate courses in advance and remove/avoid hazards.
design cut-offs for long races as in Loppets, so that injured competitors can be accessed and treated quickly. It also allows competitors to be removed quickly from the course and taken to a treatment area or hospital.

Preparation

have well ventilated waxing areas (See Section 11-9).
have safety fences and pads around potential hazards.
have well marked race courses.
have a warm, well equipped and staffed first aid centre in the stadium area.

Operation

have first aid attendants on course and at the finish area during the race.
have well-located refreshment or feeding stations with warm drinks, food and support services where appropriate.

Each type of competition will have specific safety requirements; check the rule book and technical package for the competition for details.

Chief of Competition

Chief of Medical Services

—Clinic Staff
—First Aid Coordinator

The Chief of Medical Services is responsible for coordinating all first aid and medical treatment required by the competitors, volunteers and general public attending the competition and managing the stadium First Aid Centre.

Equipment

first aid room, snowmobile with rescue toboggan, blankets, mobile first aid kits, radios, ambulance and perhaps even a helicopter.

General procedures

The person performing this duty should ideally be a doctor with a sport medical knowledge of cold weather sports. The manager will be required to supervise and perhaps give training to first aid personnel. With assistance from the Chief of Course, the location and deployment of first aid attendants on the course will be decided. Close work with the Chief of Competition and Chief of Course is required.

In some areas, doctors may not want to be, or able to be, in this position. Some jurisdictions maintain that a doctor who occupies such a position may have to be able to provide emergency services on site, not just first aid. Because there has been some planning, then a doctor cannot act just in a good Samaritan capacity. So it may be necessary to have a person trained in first aid to be the Chief of Medical Services. Many doctors will also maintain that good first aid properly applied is the best that anyone can do anyway until the injured person is transported to a hospital with all the services.

If a doctor cannot or will not assume the position of Chief of Medical Services, it may be possible to ask him/her in confidence to at least be on site, and to watch the treatment of any injured persons, and perhaps be able to act in the capacity of a good Samaritan.

All on-course movement and positioning of First Aid Volunteers is under the direction of the Chief of Course

---

Chief of Medical Services

Clinic Staff

These trained nursing staff or First Aid Attendants are required to supply first aid care as directed by the Chief of Medical Services

Equipment

Warm first aid room with bed (preferably), first aid supplies, stretchers, blankets, radio

General Procedures

The clinic staff should be qualified to give emergency first aid and preferably have experience in treating hypothermia, exhaustion, frostbite, dehydration and injured morale.

This group will normally be under the direct supervision of the Chief of Medical Services. The stadium area represents the location where their services will be most frequently required.

The Chief of Medical Services or Chief of Course

First Aid Coordinator

— First Aid Attendants

The First Aid Coordinator supervises the First Aid attendants who supply first aid care to injured skiers or officials.

Duties

provide training and ensure that all attendants and patrollers are trained in cold temperature treatment techniques and on snow evacuation techniques

deploy First Aid Attendants on course or in the stadium in consultation with the Chiefs of Course and Stadium

General procedure

The First Aid Coordinator is usually located in the stadium area and is in touch with the on-course attendants by radio before and throughout the race. In low-level competitions, the coordinator usually provides stadium first aid service as well as supervising the remaining attendants. They establish and maintain communication links with the local emergency services i.e., police, ambulance services, in the event an emergency evacuation is required. Coordinators are also responsible for having and maintaining all the emergency equipment for the competition being run. Should an accident happen during the competition, an accident report form must be filled in and reviewed with the TD/TA who may require copies for the sanctioning authority. If in doubt, report it! In large or high level competitions, some of these duties may be performed by the Chief of Medical Services.

First Aid Coordinator or Chief of Course

First Aid Attendants

First Aid Attendants and the first aid staff are required to supply first aid care to competitors and officials and to evacuate skiers to the medical centre if required. First aid applied quickly and professionally can minimize personal injury, and reduce any potential liability that might arise.

Equipment

Each on-course attendant carries a backpack supplied with a first aid kit, blankets, warm drinks, triangular bandages, small splint set, radio, course maps and accident report forms. In addition, a rescue toboggan equipped with extra blankets and long splints is located at a convenient intersection on course.

General procedure

First Aid Attendants are normally posted on the race course at potentially hazardous locations or at a convenient intersection on the course which will allow quick access to several areas of the course, and at the finish and lap areas in the stadium. They should be familiar with the entire trail network, and have a course map, so they can reach an injured skier as quickly as possible. On very cold or windy days, they must be prepared to deal with frost bite and hypothermic cases as well.

Doping Control

Doping Control is a procedure for checking athletes for drug use and is sometimes required at regional and national championships and international competitions. The tests are managed and done by The Canadian Centre for Drug-Free Sport (CCDS). The CCDS assigns a Certified Doping Control Officer (CDCO) to the competition site. The Competition and/or The Competition Committee assist in the procedure by providing a Chief of Doping Control, Stewards, Registrar and two assistants. Reference the Canadian Centre for Drug Free Sport handbooks on “Doping Control” and “Drug Classification” and contact Cross Country Canada for the latest sport specific information.

The Doping Control Station should be located in close proximity (within walking distance) to the competition site. The Doping Control Station should be set aside from the general traffic flow to assist security and be clearly marked with signs. It should be in a heated building with three rooms: the waiting room with seating capacity of at least 20 and with a table, a working room large enough for three people, storage equipment, a lockable fridge, table and chairs; and a lavatory equipped with a toilet and sink and large enough for the athlete and a witness.

The CDCO brings all of the required sampling equipment to the competition site, and the Competition Committee should supply: drinks individually sealed (and unbroken), non-alcoholic, and non-caffeinated; cups; snacks in sealed containers; paper towels; toilet paper; name tags/arm bands for volunteers; clipboards; pens and pencils.

Chief of Medical Services

Chief of Doping Control

Liaise with Chief of Competition / Technical Delegate

The Chief of Doping Control is responsible for liaising between the Competition and Competition Committee, CCC and the Certified Doping Control Officer.

Duties

- liaise with CCC Office, The Technical Delegate and CDCO
- work with the CCDS and the CDCO to organize and set up the drug testing station
- recruit, assign and train volunteers as stewards (6), registrar (1), testing station assistants (2)
- explain doping control procedures at the Coaches Meeting prior to the race
- select and identify, with the TD, the athletes to be sampled and assign the steward to the athlete. Normally the first four skiers plus two random skiers are selected
- notify selected skiers upon finishing the race by accompanying the assigned steward. Each skier has an escort (male for men and female for women)
- ensure that skiers are escorted to the testing station when ready or when scheduled
- assist with security control at the testing station after all racers are notified.

Chief of Doping Control and CDCO

Stewards

Stewards are responsible to notify skiers of selection for doping control immediately after the racer crosses the finish line.

Duties

- notify the skier of his selection immediately after he crosses the finish line and present the skier with an official notification form
- escort the skier during warmdown and to the Doping Control Station and to award presentations, if necessary. Warn the skier that he/she must not leave the sight of the Steward, or the skier may be deemed guilty of a doping infraction, with subsequent penalties
- ensure that the skier does not drink or ingest anything other than the beverages provided from the doping control area (since they are sealed at the time of being given to the skier).
- assist the CDCO with administration of the samples if required

Equipment Required

clipboard, pen/pencil, appropriate notification forms

Procedure for escorting skiers to doping control

Stewards are called “Marshals” by the CCDS. Each steward is assigned to one selected skier. When the selected skier crosses the finish line, the steward presents him with an official “Canadian Centre for Drug-free Sport” notification form and witnesses the skier signing the form. He/she must then initial the signature and record the time of notification on the form. The skier has 1/2 hour to report to the Control Station. The Steward must remain with the athlete from the time he/she crosses the finish line until he/she is signed into the Doping Control Station. During this time, the athlete is not permitted to eat, drink (except a beverage in a sealed bottle given to the skier by the Steward of Doping Control staff), or use the washroom. It is preferred that Stewards be competent skiers and of the same sex as the skier he/she is escorting.

Chief of Doping Control and CDCO

Registrar

The Registrar is responsible for signing people in and out of the Doping Control station.

Duties

crosscheck the identities of skiers

control access to the doping control station to doping control officials, selected athletes, and one team official only.

assist the CDCO with administration of the samples if required

Equipment Required

clipboards, pens, appropriate forms

General Procedures

When the athlete arrives at the doping control station, the registrar verifies the identity of the skier by crosschecking his notification form and his bib number. As the competition progresses, security may become a problem and an unassigned steward or the Chief of Doping Control should assist in managing the situation.

Assistants

Assistants in Doping Control witness the passing of the samples and ensure that there are no irregularities with the passing of the sample. Male observers are paired with male athletes and female with female. Stewards may assist with this job.

Appendix 1 - List of Equipment

The following List of Equipment is provided as a guide. The number and type of items needed will vary significantly with the size and level of the event.

Course Equipment	Source	Quantity	Acquired
Course Length Signs			
Course Distance Signs			
Course Direction Signs			
Spectator Signs			
Stop Watches			
Portable Radios			
Clip Boards, Paper & Pencils			
Pocket Knife			
Standing footpads			
Permanent Fencing			
Snow Fencing			
Pop Fencing			
4 Inch Wide Ribbon			
Course Marking Colored Flags			
Post Padding			
Track Setter			
Snowmobile - 2 Track or Long Track			
Grooming Equipment - Compactor or Roller			
- Powder Maker			
- Scarifier or Renovator			
- Compactor Drag			
Sled			
Transportation Tobaggan			
Snow Cat Vehicle - “U” blade			
Renovator			
Power Tiller			
Compactor Bar			
Rakes 1 meter wide			
Garden Rakes			
Snow Scoops			
Snow Shovels			
Square Shovels			
Rope 5/16-3/8 in diameter			
Axes			
Bow Saw			
Racing or light touring skis			
Forerunner and Course Closer Bibs			
Folding Tables			
Bottles for Refreshments			
20 liter thermos Jugs			
Propane Stove			
20 Liter Pot with Lid			
Garbage Bags			
Officials List			
Rechargeable Electric Drill with batteries & snow twist drill bit			
Backpacks			
Blankets			
Thermometers for temperature stations			

Stadium Equipment	Source	Quantity	Acquired
Tents for Waxing and volunteer shelters			
Timing Shelter			
Generator			
Heaters-Space/Industrial			
Fire Extinguisher			
Course Direction Signs			
Information signs			
Start & Finish Banners and Posts			
Relay/Mass Start lane numbers & flags			
Movable, stand alone fencing			
Pop Fencing			
Snow Fencing			
'V" Boards			
Course Flagging (Colors)			
Flags - City, District, National. International			
Snow marking food dye (Koolaid)			
Paper towels or facial tissue			
Ski Marking Kit			
Rags for cleaning skis			
Solvent for ski wax removal			
First Aid Centre & equipment - bed/stretcher			
First Aid Kits - portable for on course			
Storage Rail /Storage Shelves for racers clothing			
Barometer			
Thermometer (in degrees Celsius)			
Wind meter For Speed & Direction)			
Portable Radios			
Clipboards, Pencils & Paper			
Stop Watch			
Official Notice Board			
Results Board			
Manual Score Board			
Weather Board			
Armbands			
Pocket Knife			
Standing Pads			
square, chisels, 10 meter measuring tape			
Mechanic Tools-open end/box end set, socket sets			
screwdriver sets - straight, square & Phillips			
Rechargeable Drill & Batteries			
Post Snow Drill			
Measuring Tape-100 meter			
Rakes 1 meter wide			
Garden Rakes			
Snow Shovels			
Square Shovels			
Rope 5/16-3/8 in diameter			
Sledge hammer			
Podium-3 Level Awards Type			
Garbage Bags			
Folding Tables			
Blankets			
Carpet for Pursuit Exchange Boxes			

Timekeeping Equipment	Source	Quantity	Acquired
Stop Watches			
Printing timers			
Portable Radios			
Clipboards, Pencils & Paper			
Voice recorder (s)			
Stapler			
Standing Footpads			
Officials List			
Electronic Timing Units			
Multi-lane attachment			
Start Gate			
Finish Beam			
Gripswitches			
Cables			
Receptacles			
Patch cord box			
Start gun/horn			
PCs for Electronic Timing			
PC for Manual Timing			
PC for Announcers			
Laser Printer(s)			
Inkjet Printer(s)			
Public Address System			
Cordless microphone			
Speakers and stands			
CD/tape player for anthems etc.			
Starting Clock(s)			
Loudhailer(Precaller)			
Binoculars			
False Start Control Flags (Red)			
Flags for Relay Assistant Starters (Green)			
Headsets			
Plastic Covers for Information Boards, display clocks etc.			
Garbage Bags			
Folding Tables			
Video camera(s)			
Photo Finish equipment			

Security & Medical	Source	Quantity	Acquired
Telephones			
Cellular Telephones			
Portable Radios			
Clipboards, Pencils & Paper			
Pocket Knife			
Rope 5/16-3/8 in diameter			
Folding Tables			
Armbands			
Officials List			
Backpacks complete with First Aid Equipment			
Blankets			
First Aid Equipment			
Stretcher			
Evacuation Toboggan			

Competition Office	Source	Quantity	Acquired
Telephones			
Cellullar Telephone			
Portable Radios			
Clipboards, Paper & Pencils			
Garbage Bags			
Folding Tables			
Officials List			
Photocopier			
Paper for Photocopier (colored for various forms)			
Toner for Photocopier			
Fax Machine			
Paper for Fax Machine			
Toner for Fax Machine			
PC			
Computer Printer			
Paper for Printer			
Post-It-Notes			
Pencils "H" or "F"			
Pencil Sharpener			
Eraser			
Ballpoint Pens			
Permanent markers (various colors)			
Highlighter Pens			
Scotch Tape			
Masking Tape			
Three Hole Punch			
Overhead transparencies			
Transparency Pens/Markers			
Overhead Projector (or PC projector)			
Projector Screen			
Flip Chart			
Filing Container			
Mail Box or Message Pick-up System			
Thumb Tacks			
Paper Clips			
Glue Stick			
Three Ring Binder			
File Folders			
Small note pads or message pads			
Ruler			
Stapler			
Staples			
Heavy duty staple gun			
Staples for staple gun			
Scissors			
Elastic Bands			
Envelopes			
Letter size			
large brown			
Phone/email/Fax number list for race personnel, press contacts,			

Blank

Appendix 2 - Officials Organization List

Name of Competition _____ Competition Dates _____

	Name of Official	Phone/email
Chiefs Committee		
Chief of Competition		
Chief of Course		
Chief of Stadium		
Chief of Timekeeping		
Competition Secretary		
Technical Delegate		

Course Officials

Chief of Course
Chief of Mech. Grooming
Machine operators

Chief of Man. Grooming
Man Grooming/Marking Crew

Chief of Controllers
Controllers

* Chief of Course Marshalls
* Marshalls

Chief of Forerunners
Forerunners

Course Closers

Chief of Temperature Stations
Temp. Recorders

First Aid Coordinator
First Aid Attendants

Asst. Chief of Refresh.
Pourers and Servers

* May report to Chief of Competition Security

Competition Secretary Officials

Competition Secretary		
Recording Secretary		
Comp. Office Manager		
Bib Pullers/Draw Assistants		

Stadium Officials	Name of Official	Phone/email
Chief of Stadium		
Chief of Stadium Prep		
Chief .of Comp. Equipment		
Set Up Crew		
Chief of Refreshment Stns		
Servers		
Drink Pourers		
Chief of Finish Line		
Finish Line Stewards		
Clothing Stewards		
Chief of Ski Marking		
Chief of Clothing & Equipment		
Clothing & Equipment Checkers		
Ski Markers		
Ski Marking Controller		
Chief of Relay Exchange		
Exchange Controller(s)		
Exchange Referee(s)		
Failed Exchange Controller		
Pre-caller		

Timekeeping Officials	Name of Official	Phone/email
Chief of Timekeeping & Data Processing		
Ch. of Electronic Timing		
Chief of Start		
Starter		
Assistant Starter(s)		
Start Controller(s)		
False Start Controller		
Chart Stewards		
Intermediate Time Team		
Finish Referee		
Finish Bib Recorder		
Bib Caller – Headset		
Finish Lane Recorder		
Video Operator		
Electronic Timing Operator		
Electronic Timing Assistant		
Computer Operator		
Electronic Technician		
Photo Finish Operator		

	Name of Official	Phone/email
Chief of Manual Timing		
Start Time Recorder		
Manual Timer(s)		
Finish Time Recorders		
Bib Caller (Manual)		
Bib Recorder (Manual)		
Runner(s)		
Chief of Manual Calculations		
Calculators		
Computer Op. – Manual Timing		
Chief of Results		
Results Checker		
Results Board Poster		
Electronic Scoreboard Op.		
Announcing Coordinator		
Announcer		
Colour Commentator		
Splits Calculator		
Awards Results Compiler		

Officials Committee	Name of Official	Phone/email
Officials Coordinator		
Officials Committee		
Extra Officials		

Blank

Appendix 3 – Planning & Checklists

Chief of Competition - Race Day

EVENT		DAY & DATE
PRIMARY DISTANCES Men & Women		START TIME
TECHNIQUE	METHOD OF START	START INTERVAL

Courses to be used	Special Tracksetting or Signage Requirements
1	
2	
3	
4	
5	

PLANNED ORDER OF START					START TIME		FINISH TIME		TIME TO SKI	
Class	Est. Field	Distance	Course	Laps	First Skier	Last Skier	Lap	Finish	Est. from	To
Forerunners										
Course Closers										
Jury Meeting										

Awards Location, Logistics etc.

Chief of Course – Official Training Day

EVENT		DAY & DATE
TRAINING FOR DISTANCE & TECHNIQUE		COURSE OPEN from To
Courses to be used	Grooming and Tracksetting Requirements	
1		
2		
3		
4		
5		
6	Feeding station grooming	

Course marking and control

Course	Task	Responsible
	Signage and marking placement	
	Signage and marking removal	
	Equipment Transportation	

NOTES

Chief of Course – Race Day

EVENT	DAY & DATE
DISTANCES	START TIME
TECHNIQUE	METHOD OF START & INTERVAL

Courses to be used	Grooming and Tracksetting Requirements
1	
2	
3	
4	
5	
6	

Course marking and control

Course	Task	Responsible
	Signage and distance marking placement	
	Signage and marking relocation and removal	
	Equipment Transportation	
	Checking of signage and security	
	Assignment and coordination of marshals (Chief of Marshals)	
	Assignment and positioning of controllers	

Feeding Station Tasks

Time	Task	Responsible
	Grooming and track preparation	
	Equipment transportation and setup	
	Officials deployment	

NOTES

Chief of Controllers – Race Day

EVENT		DAY & DATE
CFFICIAL & STATION ASSISTANT	NAME	PHONE NO./email

TASKS	RESPONSIBLE Grooming and track		ITEMS REQUIRED	QUANTITY	
Select controller stations with Chief of Course	Chief of Controllers		Course maps		
Organize forms and clipboards			Stations marked		
Organize and assign/collect radios			Infraction report forms		
Collect forms during/after competition			Bib sequence forms		
Check forms for infractions			Clipboards & pencils		
Report infractions to Competition Secretary	Chief of Controllers		Note paper		
Notify controllers required for Jury meeting			Radios		

NOTES

Chief of Stadium Official Training Day

Planning & Check List

EVENT		DAY & DATE	
DISTANCE , TECHNIQUE and START METHOD		COURSE OPEN from	To
Courses to be used	Special Tracksetting or Signage Requirements		
1			
2			
3			
4			
5			
6			

Stadium Area Tasks		
Time	Task	Responsible
	Open wax huts and daylodge	
	Maintain or re-arrange fencing and 'V' boards	
	Check signage in place	

NOTES

Chief of Stadium Race Day Planning & Check List

EVENT	DAY & DATE
DISTANCES	START TIME
TECHNIQUE	START METHOD & INTERVAL

Stadium Area Tasks

Time	Task	Responsible
	Open wax huts and daylodge	
	Setup temperature record and forms	
	Set up course, start, finish and warm up area fencing/'V' boards	
	Set up ski marking	
	Set up clothing storage	
	Place stadium signage	
	Place sponsors banners	
	Setup start are (lines & grids)	
	Setup finish lanes	
	Set up start and finish timing equipment	
	Place results board	
	Setup finish area refreshments	

Major Officials in Stadium

POSITION	NAME	Phone/email
Chief of Start & Finish		
Chief of Stadium Preparation		
Chief of Timekeeping & Data Processing		
Starter		
Chief of Ski Marking		

EQUIPMENT

Chief of Timekeeping Race Day Planning & Check List

EVENT		DAY & DATE	
DISTANCES		START TIME	
TECHNIQUE		START METHOD & INTERVAL	
Major Officials inTimekeeping			
Position	Name	Phone	email
Chief of Electronic Timing			
Chief of Manual Timing			
Chief of Manual Calculations			
Chief of Results			
Announcing Coordinator			
	Setup start are (lines & grids)		
	Setup finish lanes		
	Set up start and finish timing equipment		
	Place results board		
	Setup finish area refreshments		

Major Officials in Stadium		
POSITION	NAME	Phone/email
Chief of Start & Finish		
Chief of Stadium Preparation		
Chief of Timekeeping & Data Processing		
Starter		
Chief of Ski Marking		

EQUIPMENT

Blank

Appendix 4 – Competition Secretary's Forms

Race Invitation Contents

Competition Name	
Host Community	
Dates	
Hosted by	(Name of Host Club)
Sanctioned by	(CCC and *lor* Division)
Location	Site name and directions to get to the site.
Competition Schedule	Include categories, distances, techniques,start times, types of starts and training schedules. (May be on attached page for large number of races and multiple day schedule).
Eligibility	Who may enter the Competition. Restrictions if any.
Fees	Fee charged for each category. Means of payment (on-line), Credit Card(s), Cheque(s) payable to.
Registration	Registration deadline -date. time and restrictions. Entry (registration) forms -see attached for individual and club type forms. Send entries to: Name address and postal code Telephone and Fax numbers Email address and web site
Facilities and Course	Course maps and profiles. Waxing and change facilities. All pertinent information.
Team Captains Meetings	Date, time. & location including address and directions. Time of Draw if included.
Awards	What. Where. When information.
Accommodation	Name. addresses, phone numbers and prices of lodging facilities and any special arrangements. For more information -a contact person. (usually supplied on attached sheets)
Transportation	Road maps, travel arrangements to site if provided. local van and car rental agencies. (on attached sheet)
Banquet Information	Date. time. location. price and ticket information.
Attachment check list	Name and phone numbers of two key contact people. Schedule of events Course map(s) Entry forms: Individual and club types Accommodation information Transportation information

NOTE: Organizers should try to put all key information on one page as this page is often the only copy passed on.

Sample Agenda – Team Captains Meeting

Competition Name _____

Date _____

AGENDA
TEAM CAPTAINS AND DRAW MEETING

1 Welcome
2 Role call of Team Captains (by Division, Team or Club)
3 Introductions: (First Meeting)
Competition Committee
Technical Delegate
4 Review of matters arising from minutes of previous meeting
5 Congratulations to previous days winners.
6 Establish the Jury, accepting nominations (or make its pre-determined composition clear)
(chaired by Technical Delegate)
7 Remarks by Technical Delegate
8 Weather report
9 Course information: Chief of Course
10 Stadium Information: Chief of Stadium
11 Clarification questions : e.g. Start order of categories
12 Draw: conducted by Competition Secretary
13 General Information: i.e. accommodation, transportation, banquet, awards
14 Date, time and location of next meeting
15 Distribution of Start Lists
16 Distribution of Bibs (or notification of time and location for pickup)

NOTE: With the consent of those attending the meeting, items 11 and 12 may be moved up to follow the weather report. This allows the team captains to agree start order and give the Secretary more time to prepare Start Lists and sort bibs.

Competitor Registration Form

Competition Name

Name:		**Club:**		**Division**	
Address:		**Phone:**			**(Home)**
					(Work)
					(Fax)
Province		**Postal Code:**		**email:**	
Birth Date (YY/MM/DD)		**Sex (M or F)**		**CCC Racing License #**	
				FIS Racing License #	

Races

Please mark an "X" in each category and each race you will be registering for.

CCC Racing License required - Entry deadline DATE ??? and TIME ???

Category				
	Juvenile (born 19??)		Junior man/woman (born 19??)	
	Junior boy/girl (born 19??)		Senior (born 19??)	

Day 1	Sr Men/Jr Men 10 km		Sr Women/Jr Women 5 km		Free Technique - Interval Start
	Junior Boys 10 km		Junior Girls 5 km		Free Technique - Interval Start
	Juvenile Boys 5 km		Juvenile Girls 5 km		Free Technique - Interval Start
	Sit-ski Male 5km		Sit-ski female 2.5km		Free Technique - Interval Start
Day 2	Sr Men/Jr Men 30 km		Sr Women/Jr Women 10 km		Classic Technique - Mass Start
	Junior Boys 15 km		Junior Girls 10 km		Classic Technique - Mass Start
	Juvenile Boys 10 km		Juvenile Girls 7.5 km		Classic Technique - Mass Start

Type of Fee	# of Races		Amount	
Individual Races @ $30 each		x$30	$	
	TOTAL		$	

RELEASE and WAIVER

In consideration of Cross Country Canada (hereinafter called CCC) and the XXX Division (hereinafter called the Division) and the YYY Ski Club, hereinafter called the **Host Club**) accepting my entry into the above named activity, I hereby for myself, my heirs, executors, administrators and assigns, forever release, and forever discharge, **CCC,** the **Host Division** and the **Host Club**, their executive directors, servants, agents, sponsors, supporters, employees or volunteers from any and all claims, demands, damages, costs (including solicitor and client costs on a full indemnity basis), actions or causes of actions, proceedings arising out of or in consequence of any loss, injury or damage which may arise by reason of negligence of **CCC,** the **Host Division** and the **Host Club**, their servants, agents, sponsors, supporters, employees or volunteers.

Without limiting the generality of the foregoing, I further release any and all recourses which I may now or hereinafter have resulting from any decisions of **CCC,** the **Host Division** and the **Host Club**.

In addition to the foregoing, I further waive any claims I might have in connection with any cancellation or rescheduling of the event for whatever reason.

I declare that my physical condition, to the best of my knowledge, is adequate to participate safely in the sport of cross country skiing, and that no physician or other qualified individual has advised me against participating in the sport. I further acknowledge and agree that it is my choice as whether I will obtain a physical examination prior to participating in the event, and I hereby acknowledge and agree to assume all risks associated with not obtaining such examination, or if I do obtain an examination and is instructed not to participate in the event, I hereby assume all risks associated with my participation.

I authorize and consent to the publication by **CCC,** the **Host Division** and the **Host Club** of any materials containing my name or picture, and I release to **CCC,** the **Host Division** and the **Host Club** and all persons acting under authority from them, any claims I might have due to the initial or subsequent publication of such material.

By completing this **Waiver of Liability** with my signature below, I hereby agree to abide by the Rules and Regulations as set forth by **CCC,** the **Host Division** and the **Host Club**, and to follow the instructions of the officials during the event.

Adult Participant - Release and Waiver.

As a participant in the above event, I have read and understood the above.

Date:		Signature:	

Minor Participant - Release and Indemnification

As the parent or guardian of a participant under the legal age of 18, I have read the above and accept its terms and conditions on the entrant's behalf.

Date:		Signature of Parent or Guardian	
		Name of Participant	

Team Entry Form

Competition Name____________________________________

Competition Date(s)__________________________________

Team Name:			Mailing Address		
Coach:					
Phone:		email:			

Please enter all skier details and Mark fees payable for the days in which they are participating.

Skier's Name	**M/F**	**Year of Birth**	**Category**	**CCC License #**	**FIS License #**
Race Date – Fees	Day 1 - $30	Day 2 - $30	Day 3 - $30	Day 4 - $30	
Fees payable					
Skier's Name	**M/F**	**Year of Birth**	**Category**	**CCC License #**	**FIS License #**
Race Date – Fees	Day 1 - $30	Day 2 - $30	Day 3 - $30	Day 4 - $30	
Fees payable					
Skier's Name	**M/F**	**Year of Birth**	**Category**	**CCC License #**	**FIS License #**
Race Date – Fees	Day 1 - $30	Day 2 - $30	Day 3 - $30	Day 4 - $30	
Fees payable					
Skier's Name	**M/F**	**Year of Birth**	**Category**	**CCC License #**	**FIS License #**
Race Date – Fees	Day 1 - $30	Day 2 - $30	Day 3 - $30	Day 4 - $30	
Fees payable					
Skier's Name	**M/F**	**Year of Birth**	**Category**	**CCC License #**	**FIS License #**
Race Date – Fees	Day 1 - $30	Day 2 - $30	Day 3 - $30	Day 4 - $30	
Fees payable					

Summary

Day 1	# of skiers		@ $30 each =	
Day 2	# of skiers		@ $30 each =	
Day 3	# of Skiers		@ $30 each =	
Day 4	# of Skiers		@ $30 each =	
			Total	

Please make cheques payable to ____

Entrant and CPL List

Canadian Nationals 2004

Category Grouping: Open Men					
Province	Surname	FirstName	CCCLic	CCCPoints	Club
NS	Algar	Chris	5827	76.99	North Highlands Nordic
NT	Argue *U	Mike	6070	88.96	Yellowknife
NB	Arseneau	Fernand	14086		Snow Bear
NB	Aube	Gabriel	1381	55.41	Snow Bear
AB	Babikov	Ivan	13710	95.34	FNSC/X-C.COM
QC	Beaulieu-Savard	Jean-Philippe	13132	73.39	Skibec
ON	Bewick *U	Rob	6524	85.03	Laurentian Nordic/NTDC
QC	Blais	Jonathan	12382	88.78	Mouski
AB	Boelman *U	Menno	5931	84.57	Camrose Ski Club/AUC
ON	Brandt *U	Cornelius	13761	75.75	Carleton University
ON	Brown *U	Philip	5466	76.97	Big Thunder
ON	Cameron *U	Jeffrey	12621	85.15	Big Thunder/NTDC
NS	Campbell	Mark	14106		Arctic Fox
AB	Carleton	Erik	5398	89.14	Rocky Mtn Racers/X-C.COM
NB	Caron	Alain	4040		Les Aventuriers
NS	Caterini	Lorenzo	14107		NONE
NL	Churchill	Lee	6053		Blow Me Down
AB	Cook	Jack	2241	81.85	Edmtn Nordic/ENSC/xc.c
ON	Crooks	Sean	12620	88.42	Big Thunder/NST
BC	Cummings	Matthew	6477	87.89	Sovereign Lake Nordic
NS	Curtis *U	Charles	5939	82.99	North Highlands Nordic
ON	DeAbreu	Robert	520	80.16	Silver Fox Nordic
NB	DeGroot	Bill	4201		Les Montagnards
NS	Doyon	Kristopher	5577	77.93	North Highlands Nordic
QC	Duchesne	Jérémie	13043	83.55	Skiélite
ON	Dustin	Wayne	1104	83.07	XC Ottawa
BC	Egan *U	Gregory	12573	79.45	UBC Nordic
ON	Ellis	Jeff	6225	85.34	Mono Nordic
ON	Faulkner *U	Justin	6635	85.15	University of Waterloo
NL	Fitzgerald *U	William	6061	87.9	Aurora Nordic/NTDC
QC	Gélinas	Charles	6332	85.57	Skiélite
NS	Germani	Tyler	13000	43.97	Baddeck Area Ski Club
AB	Goldsack	Drew	5835	93.51	Rocky Mtn Racers/NST
BC	Grey	George	5911	94.92	Black Jack/NST
NB	Hamilton	Clark	3741		Wostawea
ON	Hart *U	Stephen	12471	87.27	Trent University
BC	Heckrodt *U	Luke	12576	80.7	UBC Nordic
ON	Henninger *U	Conrad	6522		Carleton University
ON	Hughson *U	Bryon	12658	81.09	Team Hardwood

Results By: ZONE4 **www.zone4.ca**

Seeding Request – Team Captain's Choice

Race Management by RaceMan Version 95

2004-01-30

JGC Junior Girls Classic Groups *3* Start Order *1* *2* *3*

Please enter Group for each Competitor

Competitor ID	Group	DIV	Name	Team
12889		ALTA	Ammar, Amanda	Edmonton Nordic
13763		ALTA	Griffith, Heather	Canmore Nordic Ski Club
12974		ALTA	Jaques, Cathy	Banff Ski Runners
13275		BC	Dow, Nellie	Bulkley Valley Ski Club
13419		BC	Garmulewicz, Alysia	Hills Nordic
13335		BC	Kuppers, Haley	Snow Valley Nordic
13446		BC	Thomas, Kelsey	Wells Gray
13247		NFLD	Corbett, Jessica	Menihek Nordic
13141		NWT	Lennie, Holly	Yellowknife Ski Club
13269		ONT	Brennan, Kate	Nakkertok
13061		ONT	Deyne, Mallory	Porcupine Ski Runners
13086		ONT	Dool, Berit	Lappe Nordic
12706		ONT	Farrell, Katie	Laurentian Nordic
13324		ONT	Geiger Whitlock, Anna	Team Hardwood
13231		ONT	Koskenoja, Viktoria	Soo Finnish
13538		ONT	Lougheed, Roz	Team Hardwood
13316		ONT	Mahy, Bibiane	Porcupine Ski Runners
13282		ONT	McVicar, Lisa	Kanata Racers
13378		ONT	Patterson, Nicole	Team Hardwood
13357		ONT	Rudachyk, Ava	North Bay Nordic
13284		ONT	Van Dorp, Carrie	Georgian Bay Nordic
13130		QUE	Bedard, Karine	SKINOUK
13360		QUE	Bouffard Nesbitt, Audrey	Fondeurs Laurentides
13278		QUE	Boyer, Sophie	SKIELITE
13362		QUE	Cloutier, Kim	Fondeurs Laurentides
13134		QUE	Godbout, Claude	SKIBEC
14056		QUE	Marchand, Gabrielle	Club Nordique Mont Ste-Anne
13127		QUE	Morin, Gabrielle	SKINOUK
13409		QUE	Parent, Anny	SKIELITE
13108		YUK	Enders, Heather	Whitehorse
13221		YUK	Greer, Brittany	Whitehorse

Relay Declaration Form Example
2003 CANADIAN SKI NATIONALS

Please note deadline dates and times for Team Declaration and Final Team Order

Relay Event	Race Date	Initial Declaration		Final Team Order	
CCUNC	Friday 2003-03-07	Due 2003-03-06 4pm	☐	Due 2003-03-07 8am	☐
Coaches	Friday 2003-03-07	Due 2003-03-06 8:30pm	☐	Due 2003-03-06 8:30pm	☐
Junior Challenge	Sunday 2003-03-09	Due 2003-03-08 4pm	☐	Due 2003-03-09 8am	☐
Junior Open	Sunday 2003-03-09	Due 2003-03-08 4pm	☐	Due 2003-03-09 8am	☐

Team Name _____ Male ☐ Female ☐

Leg	License #	Name
1		
2		
3		
1st Alternate		
2nd Alternate		

Team Captain's Name Signature

Received by Race Secretary Date : _____

Initials: _____ Time : _____

Notification of Withdrawal (Scratch)
2003 CANADIAN SKI NATIONALS

Event	Date	
Free Technique Race	Tuesday 2003-03-04	☐
Classic Mid-distance	Thursday 2003-03-06	☐
Sprints	Saturday 2003-03-08	☐
Classic Long Distance	Sunday 2003-03-09	☐

License #	Name

Team Name _____ Male ☐ Female ☐

Team Captain's Name Signature

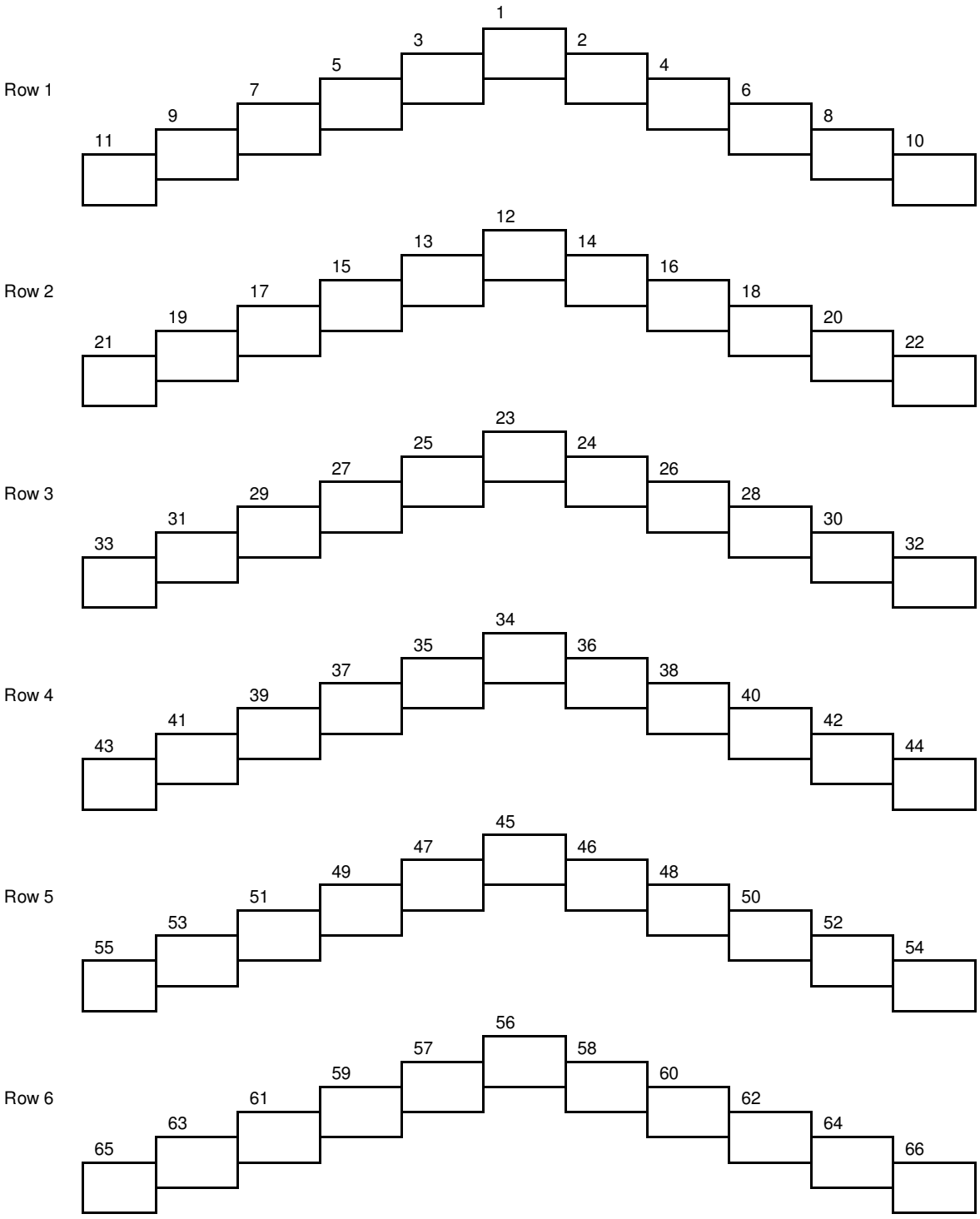
_____

Received by Race Secretary Date : _____

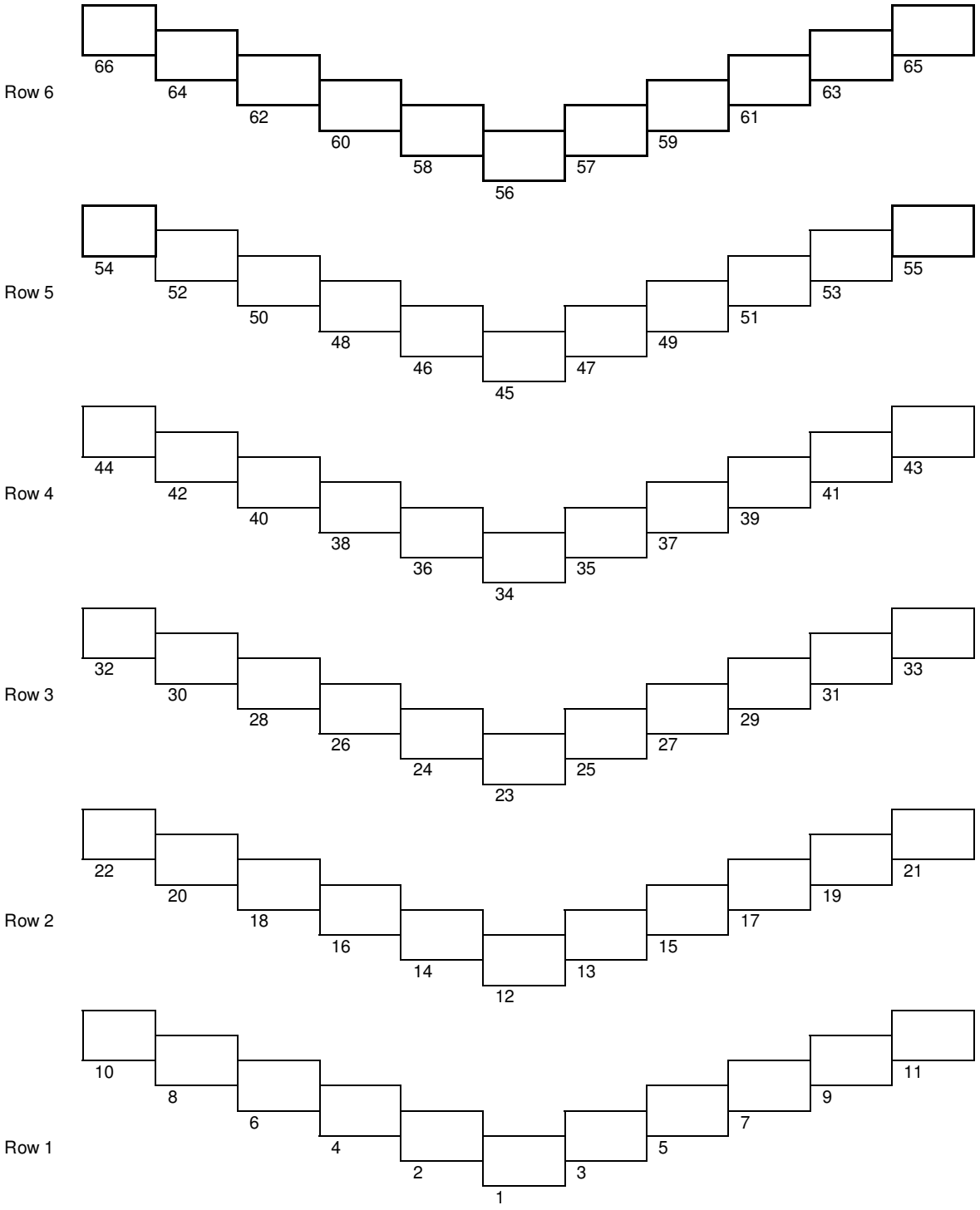
Initials: _____ Time : _____

Lane Assignments – Mass Start – Chevron – Racers View

*****START LINE*****



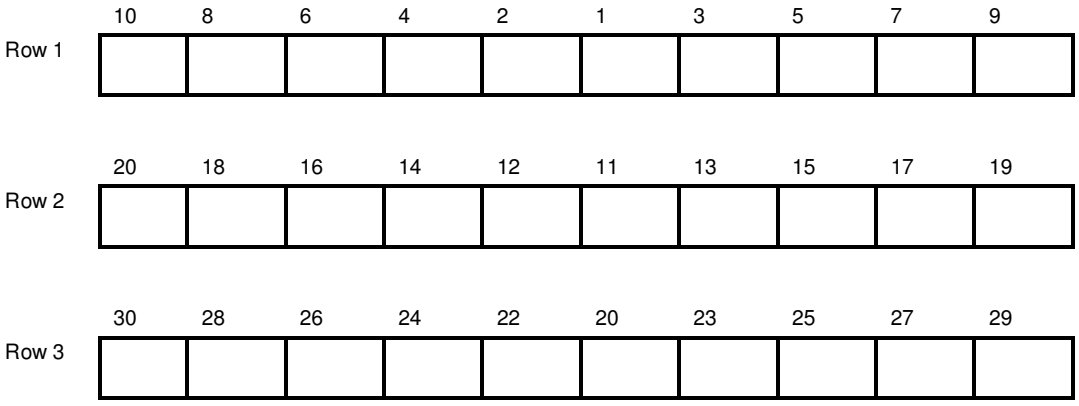
Lane Assignments – Mass Start – Chevron – Starters View



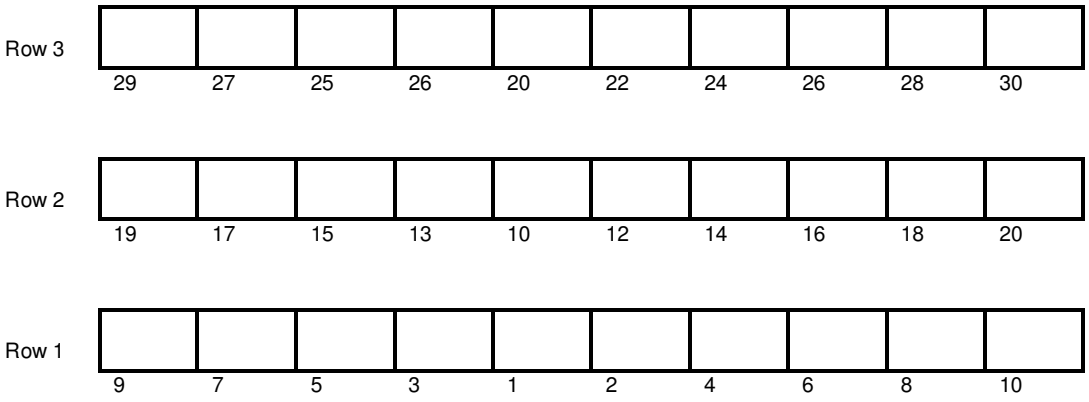
*****START LINE*****

Lane Assignments – Relay Start – Racers View
****Superseded. Use Chevron Start. See Appendix 4-9

*****START LINE*****



Lane Assignments – Relay Start - Starters View
*** Superseded. Use Chevron Start. See Appendix 4-10



*****START LINE*****

Protest Form

Competition				Date				
Name of Protesting Skier								
Division/Club						Bib No.		
Category		Distance		Technique:		Free		Classic
Names and Bib numbers of skiers/witnesses involved:								
1		Bib		2		Bib		
3		Bib		4		Bib		

State concisely the circumstances which give grounds for this protest:				

Use reverse side if necessary.						
Signed by Coach					Telephone	
Address					Email:	
Received by Competition Secretary:					Date:	
	Fee paid:				Time:	
Jury Decision:	Accepted		Rejected			
	Date:				Time	
Signature of Technical Delegate:						

See CCC Rules regarding protests. In the event of an unsatisfactory settlement of this dispute, the decision rendered may be appealed to CCC. See rules on appeals.

Accident Report Form

Competition _____ Date _____

Name of Accident Victim _____ Competitor ? Y/N ____

Division/Club _____ Bib No. _____

Category _____ Distance ____ Technique: Free ____ Classic ____

Address _____

_____

Postal Code _____ Telephone: _____ Email _____

Name of Host Club _____

Address _____

_____

Date of Accident: Time: _____

Nature of injury _____

_____

Cause of Injury _____

_____

Treatment _____

Hospital _____ Telephone: _____

Name of Doctor/First Aid Attendant _____

Address _____

_____ Telephone: _____

Report of Doctor/First Aid Attendant _____

_____

_____

Report of Chief of Competition/Course

_____

_____

Name of Witness _____

Address _____

_____ Telephone: _____

Report of Witness _____

_____

_____

Name of Technical delegate _____

Address _____

_____ Telephone: _____

Report of TD _____

_____

In case of serious injury the TD must notify the sanctioning office immediately and send this report to the office within 48 hours. Copy for TO, Doctor and Chief of Competition.

Pre-competition Medication/Drug Use form

Competiton		Date	
Name		License No.	
Club		Division	

This form is to be filled out by the athlete on medication/drugs.
Hand to the Competition Secretary prior to the competition.

Medication/Drug (Total dose per day)

a. Long Term (e.g. vitamins, mineral supplements, herbal preparations)

b. Short term

Blood transfusion(s) in the past year ? Yes		No		

Additional Comments	
Signature of Athlete:	
Date:	
Time:	

Appendix 5 – Stadium Forms

Start Time Record

CCC Championship Pursuit Day 1 Classic

Date: March 16, 2004 Start Time Record

Location Charlo N B
Club Les Aventuriers

Bib	Name	CCCLic	Prov	Start Time	Recorded Start Time
1	Brown, Philip	5466	ON	0:00:15.0	
2	Hamilton, Gavin	13748	ON	0:00:30.0	
3	McIntyre, Glen	12556	ON	0:00:45.0	
4	Waddell, Brendan	12899	AB	0:01:00.0	
5	Henninger, Conrad	6522	ON	0:01:15.0	
6	Leduc, Bruno	13121	QC	0:01:30.0	
7	Churchill, Lee	6053	NL	0:01:45.0	
8	Steudler, Carl	13211	AB	0:02:00.0	
9	Moloney, Oliver	13627	ON	0:02:15.0	
10	Critchley, Will	12789	AB	0:02:30.0	
11	Lammens, Paul	13581	NB	0:02:45.0	
12	Apramian, Tavis	13206	AB	0:03:00.0	
13	Heacock, Gerry	13279	AB	0:03:15.0	
14	Hamilton, Clark	3741	NB	0:03:30.0	
15	Schwar, Werner	307	ON	0:03:45.0	
16	McMillan, Roger	6482	BC	0:04:00.0	
17	Metsaranta, Riku	5736	ON	0:04:15.0	
18	Doyon, Kristopher	5577	NS	0:04:30.0	
19	Murray, Daniel	5336	NS	0:04:45.0	
20	Caron, Alain	4040	NB	0:05:00.0	
21	Egan, Gregory	12573	BC	0:05:15.0	
22	Brandt, Cornelius	13761	ON	0:05:30.0	
23	Lea, Jeremy	13496	ON	0:05:45.0	
24	Toope, Tristan	12755	NL	0:06:00.0	
25	Levesque, Jean-Philippe	12677	NB	0:06:15.0	
26	Dorego, Pierre-Olivier	12804	QC	0:06:30.0	
27	Kangarloo, Justin	13218	AB	0:06:45.0	
28	Doble, Mark	12955	ON	0:07:00.0	
29	Spiller, Rob	6476	BC	0:07:15.0	
30	Whitten, Alan	12917	AB	0:07:30.0	

Results By: 

me

Time Record

Initials: Sheet #

Bib #	HH MM SS T
	: : .
	: : .
	: : .
	: : .
	: : .
	: : .
	: : .
	: : .
	: : .
	: : .
	: : .

Time Record

Initials: Sheet #

Bib #	HH MM SS T
	: : .
	: : .
	: : .
	: : .
	: : .
	: : .
	: : .
	: : .
	: : .
	: : .
	: : .

Sprints - Finish Lane Record

Initials: Sheet #:

Heat	Lane 1	Lane 2	Lane 3	Lane 4

Instructions: For each heat, record the bib # in the appropriate lane box, in which each racer crosses finish line.

Sprints - Finish Order Record

Initials: Sheet #:

Heat	1st	2nd	3rd	4th	5th	6th

Instructions: For each heat, record the bib # in the appropriate position.
Pass to Race Control at the end of the round (e.g.semi-finals).

Blank

Appendix 6 – Course Forms/Maps etc.

Bib Order

Position: Initials : Sheet #

	1	11	21	31
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Fill in down and then across

Lap Count Form

Competition: _____

Position: _____ Initials : _____ Sheet # _____

Put a check mark in the square that matches the bib number of the skier each time they pass.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	00

Infraction Report

Competition: _____

Name of Controller: _____

Position on course: _____

Racer #	Time	Next Racer #	Description of infraction

Sketch:

Temperature Record

Competition: _____ Date: _____

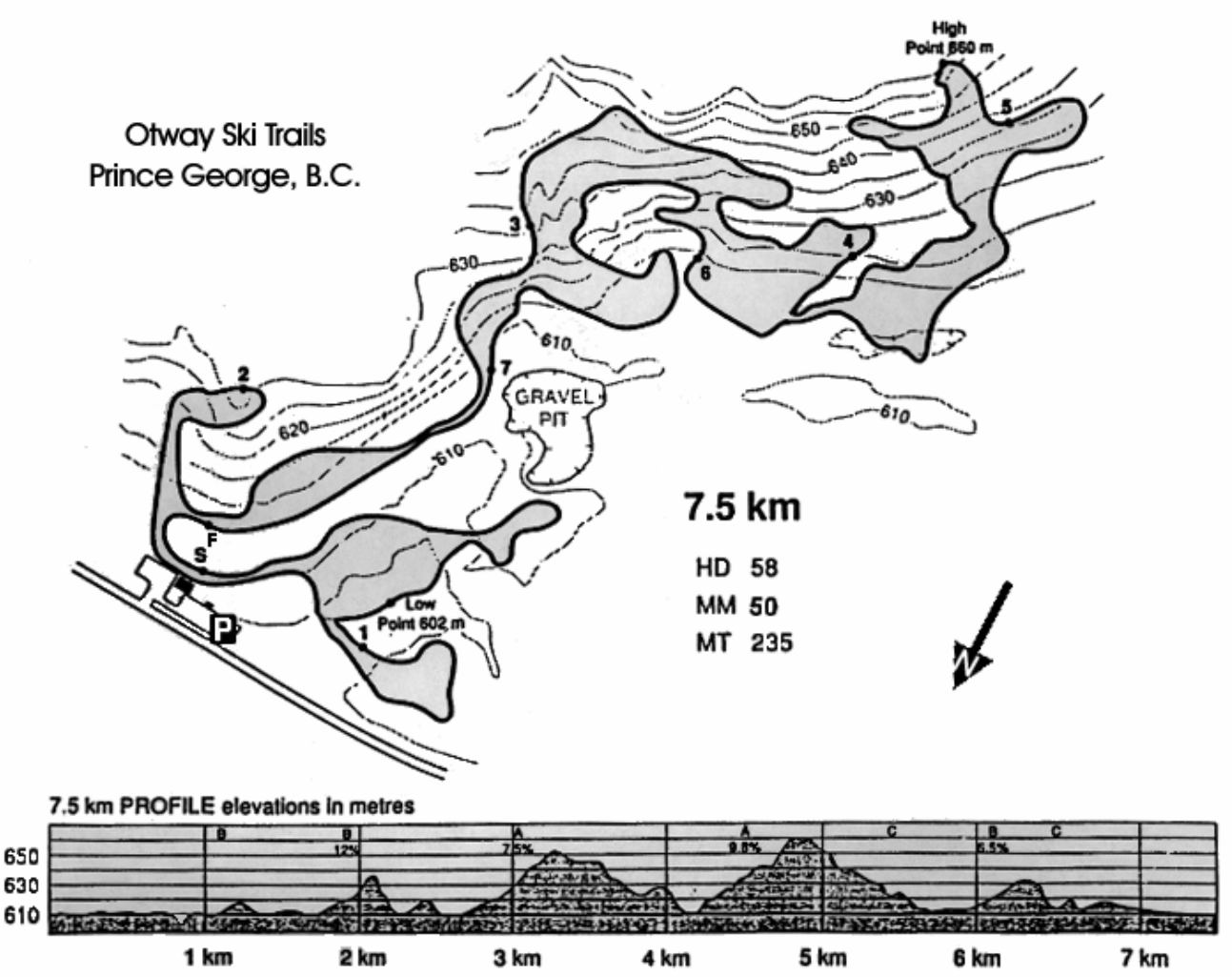
Name: _____

Turn this record in to Competition Secretary after the last entry.

Time	Air Temp			Snow Temp			Humidity	Wind Vel/Direction	
	Stadium	High	Low	Stadium	High	Low			

Note: Maintain record from 2 hours prior to the competition until completion.

Course Map and Profile



Blank

Appendix 7 – Start Lists and Results

Start List – Interval Start Race

CCC Championship Pursuit Day 1 Classic

Date: March 16, 2004

StartList

Location Charlo N B
Club Les Aventuriers

Jury

TD	Al Maddox
Assistant TD	Al White
Chief of Race	Rheal Laviolette
Coach	Mary Waddell
Coach	Mike Cavalier

Bib	Name	SubCategory	CCCLic	Club	Prov	Start Time
1	Brown, Philip	Open Men	5466	Big Thunder	ON	0:00:15.0
2	Hamilton, Gavin	Junior Men	13748	Carleton University	ON	0:00:30.0
3	McIntyre, Glen	Open Men	12556	Kanata Racers	ON	0:00:45.0
4	Waddell, Brendan	Junior Men	12899	Rocky Mountain Racers	AB	0:01:00.0
5	Henninger, Conrad	Open Men	6522	Carleton University	ON	0:01:15.0
6	Leduc, Bruno	Junior Men	13121	Nakkertok/NADC	QC	0:01:30.0
7	Churchill, Lee	Open Men	6053	Blow Me Down	NL	0:01:45.0
8	Steudler, Carl	Junior Men	13211	Rocky Mtn. J. Ski Club	AB	0:02:00.0
9	Moloney, Oliver	Junior Men	13627	Georgian Nordic	ON	0:02:15.0
10	Critchley, Will	Junior Men	12789	Edmonton Nordic	AB	0:02:30.0
11	Lammens, Paul	Open Men	13581	Chignecto	NB	0:02:45.0
12	Apramian, Tavis	Junior Men	13206	Rocky Mountain Racers	AB	0:03:00.0
13	Heacock, Gerry	Junior Men	13279	Edmonton Nordic	AB	0:03:15.0
14	Hamilton, Clark	Open Men	3741	Wostawea	NB	0:03:30.0
15	Schwar, Werner	Open Men	307	Lappe Nordic	ON	0:03:45.0
16	McMillan, Roger	Open Men	6482	UBC Nordic	BC	0:04:00.0
17	Metsaranta, Riku	Open Men	5736	Lappe Nordic	ON	0:04:15.0
18	Doyon, Kristopher	Open Men	5577	North Highlands Nordic	NS	0:04:30.0
19	Murray, Daniel	Open Men	5336	North Highlands Nordic	NS	0:04:45.0
20	Caron, Alain	Open Men	4040	Les Aventuriers	NB	0:05:00.0
21	Egan, Gregory	Open Men	12573	UBC Nordic	BC	0:05:15.0
22	Brandt, Cornelius	Open Men	13761	Carleton University	ON	0:05:30.0
23	Lea, Jeremy	Junior Men	13496	Georgian Nordic	ON	0:05:45.0
24	Toope, Tristan	Junior Men	12755	Mount St. Margaret	NL	0:06:00.0
25	Levesque, Jean-Philippe	Junior Men	12677	Les Aventuriers	NB	0:06:15.0
26	Dorego, Pierre-Olivier	Junior Men	12804	Skinouk	QC	0:06:30.0
27	Kangarloo, Justin	Junior Men	13218	Banff Ski Runners	AB	0:06:45.0
28	Doble, Mark	Junior Men	12955	Team Hardwood	ON	0:07:00.0
29	Spiller, Rob	Open Men	6476	Sovereign Lake	BC	0:07:15.0
30	Whitten, Alan	Junior Men	12917	Edmonton Nordic	AB	0:07:30.0

Results By: ZONE4

Official Results – Interval Start Race

ON Cups 1 & 2 & Canada Winter Games Team Trials **2002-12-28**

Chief of Competition		Greg Deyne	Race Secretary		Bonnie Foster
Technical Delegate		Alan White – SOD	**Jury Member:**		Heinz Neiderhauser - NCD
Wind Direction	SW	Wind Velocity	4km/h	Weather	Cloudy, flurries
Air Temperature	-1.6	Snow Temperature	-1.1		Snow Condition:

Official Results

Place		BIB	License #	Name	Club	Division	Time
CWG Team Trial Men		**7.5km**	**Classic**	**1** **Lap**			
1	18	12586		Zylberberg, David	XC Ottawa	NCD	**0:20:40.9**
2	25	12620		Crooks, Sean	Big Thunder	LSSD	**0:20:44.8**
3	19	12630		Seguin, Jeff	North Bay	NOD	**0:20:56.5**
4	20	12477		Nighbor, David	North Bay	NOD	**0:21:18.5**
5	26	6540		McCarthy, Tom	XC Ottawa	NCD	**0:21:26.1**
6	23	12470		Martin, Chris	PSR	NOD	**0:21:28.8**
7	22	6050		Puiras, Timo	Lappe	LSSD	**0:21:29.7**
8	16	5736		Metsaranta, Riku	Lappe	LSSD	**0:21:49.5**
9	27	6524		Bewick, Rob	Laurentian	NOD	**0:22:03.9**
10	24	12621		Cameron, Jeff	Big Thunder	LSSD	**0:22:09.9**
11	17	12829		Morel, Skeets	Georgian Nordic	SOD	**0:22:24.3**
12	12	12758		McCarthy, Edward	Nakkertok	NCD	**0:22:31.4**
13	8	12955		Doble, Mark	Hardwood Hills	SOD	**0:22:34.5**
14	14	6635		Faulkner, Justin	Univ Waterloo	SOD	**0:22:47.0**
15	11	12921		Martin, Robb	PSR	NOD	**0:22:54.4**
16	15	13327		Klassen, Dana	Kanata	NCD	**0:22:56.8**
17	5	12476		Copps, Matt	PSR	NOD	**0:23:06.3**
18	1	12956		Mamen, Chris	Nakkertok	NCD	**0:23:15.5**
19	9	12570		Van Dorp, Jack	Georgian Bay Nordic	SOD	**0:23:22.5**
20	13	12924		Myles, Ian	Hardwood Hills	SOD	**0:23:28.1**
21	7	13139		Suke, Brian	Georgian Bay Nordic	SOD	**0:23:54.4**
22	10	12967		Campbell, Luc	Nakkertok	NCD	**0:24:29.2**
23	2	13396		Tuttle, Stephen	Nakkertok	NCD	**0:24:48.1**
24	3	12622		Fabius, Alistair	Big Thunder	LSSD	**0:25:08.0**
25	6	13206		Apramian, Tavis	North Bay	NOD	**0:25:43.7**
26	4	P172		Wood, Phillip	Mono Nordic	SOD	**0:26:33.3**
27	21	12658		Hughson, Bryon	Big Thunder	LSSD	**DNS**
Junior Men		**7.5km Free**	**1**	**Lap**			
1	32	12708		Mason, Andrew	Georgian Bay Nordic	SOD	**0:25:51.0**
2	40	13529		Weber, Jordan	Hardwood Hills	SOD	**0:26:01.6**
3	49	12619		Mettam, Robert	Big Thunder	LSSD	**0:26:14.1**
4	48	12618		Crowley, Sean	Big Thunder	LSSD	**0:26:28.4**
5	36	13595		Buob, Misha	Peel	SOD	**0:27:23.9**
6	31	DL182		Edgar, Greg	Georgian Nordic	SOD	**0:28:02.5**

Start List – Second Race - Pursuit with a Break

ON Cups 1 & 2 & Canada Winter Games Team Trials 2002-12-28
Chief of Competition Greg Deyne **Jury Member** Heinz Niederhauser
Technical Delegate Alan White Race Secretary Bonnie Foster
Race Management by RaceMan Version 80 2002-10-30

Start List Race Start Time: 13:00

Start Time	BIB	License	Cat	Name	Club/Team
	1	**CWG Team Trial Pursuit - Men**		**7.5km**	**1 Lap**
0:00:00	101	12586	U23m	Zylberberg, David	XC Ottawa
0:00:04	102	12620	JM	Crooks, Sean	Big Thunder Nordic
0:00:16	103	12630	U23m	Seguin, Jeff	North Bay Nordic
0:00:38	104	12477	JM	Nighbor, David	North Bay Nordic
0:00:46	105	6540	U23m	McCarthy, Thomas	XC Ottawa
0:00:48	106	12470	JM	Martin, Christopher	Porcupine Ski Runners
0:00:49	107	6050	U23m	Puiras, Timothy	Lappe Nordic
0:01:09	108	5736	U23m	Metsaranta, Riku	Lappe Nordic
0:01:23	109	6524	U23m	Bewick, Robert	Laurentian Nordic
0:01:29	110	12621	U23m	Cameron, Jeffrey	Big Thunder
0:01:44	111	12829	JM	Morel, Skeets	Goergian Nordic
0:01:51	112	12758	JM	McCarthy, Edward	Nakkertok
0:01:54	113	12955	JB	Doble, Mark	Team Hardwood
0:02:07	114	6635	U23m	Faulkner, Justin	University of Waterloo
0:02:14	115	12921	JB	Martin, Robert	Porcupine Ski Runners
0:02:16	116	13327	JM	Klassen, Dana	Kanata
0:02:26	117	12476	U23m	Copps, Matt	Porcupine Ski Runners
0:02:35	118	12956	JB	Mamen, Christen	Nakkertok
0:02:42	119	12570	JM	Van Dorp, Jack	Georgian Bay Nordic
0:02:48	120	12924	JM	Myles, Ian	Hardwood Hills
0:03:14	121	13139	U23m	Suke, Brian	Georgian Bay Nordic
0:03:49	122	12967	JM	Campbell, Luc	Nakkertok
0:04:08	123	13396	JM	Tuttle, Stephen	Nakkertok
0:04:28	124	12622	JM	Fabius, Alistair	Big Thunder
0:05:03	125	13206	JB	Apramian, Tavis	North Bay Nordic
0:05:53	126	13614	JB	Wood, Phillip	Mono Nordic
0:06:00	127	12658	U23m	Hughson, Bryon	Big Thunder

Printed 2002-12-28 16:37:02 Page1 of 1

Pursuit with a Break – Second Leg – Lane Assignments & Start Times

CWG Team Trial Pursuit - Men

101 0:00:00 Zylberberg, David	102 0:00:04 Crooks, Sean	103 0:00:16 Seguin, Jeff	104 0:00:38 Nighbor, David
105 0:00:46 McCarthy, Thomas	106 0:00:48 Martin, Christopher	107 0:00:49 Puiras, Timothy	108 0:01:09 Metsaranta, Riku
109 0:01:23 Bewick, Robert	110 0:01:29 Cameron, Jeffrey	111 0:01:44 Morel, Skeets	112 0:01:51 McCarthy, Edward
113 0:01:54 Doble, Mark	114 0:02:07 Faulkner, Justin	115 0:02:14 Martin, Robert	116 0:02:16 Klassen, Dana
117 0:02:26 Copps, Matt	118 0:02:35 Mamen, Christen	119 0:02:42 Van Dorp, Jack	120 0:02:48 Myles, Ian
121 0:03:14 Suke, Brian	122 0:03:49 Campbell, Luc	123 0:04:08 Tuttle, Stephen	124 0:04:28 Fabius, Alistair
125 0:05:03 Apramian, Tavis	126 0:05:53 Wood, Phillip	127 0:06:00 Hughson, Bryon	

Pursuit with a Break - Combined Official Results

ON Cups 1 & 2 & Canada Winter Games Team Trials 2002-12-28

Chief of Competition Greg Deyne Race Secretary Bonnie Foster
Technical Delegate Alan White - SOD Jury Member**:** Heinz Neiderhauser - NCD
Wind Direction SW Wind Velocity 4km/h Weather Cloudy, flurries
Air Temperature -1.6 Snow Temperature -1.1 Snow Condition:
RaceMan Version 80 2002-10-30

Official Results - Combined Pursuit

Place	BIB	License #	Name	Club	Leg 1	Leg 2	Combined
CWG Team Trial Men							
1	103	12630	Seguin, Jeff	North Bay	0:20:56	0:19:21.3	0:40:17.3
2	101	12586	Zylberberg, David	XC Ottawa	0:20:40	0:19:37.7	0:40:17.7
3	102	12620	Crooks, Sean	Big Thunder	0:20:44	0:19:36.9	0:40:20.9
4	107	6050	Puiras, Timo	Lappe	0:21:29	0:19:36.5	0:41:05.5
5	108	5736	Metsaranta, Riku	Lappe	0:21:49	0:19:20.1	0:41:09.1
6	104	12477	Nighbor, David	North Bay	0:21:18	0:20:27.5	0:41:45.5
7	105	6540	McCarthy, Tom	XC Ottawa	0:21:26	0:20:38.3	0:42:04.3
8	109	3100001	Bewick, Rob	Laurentian	0:22:03	0:20:02.8	0:42:05.8
9	110	12621	Cameron, Jeff	Big Thunder	0:22:09	0:19:59.0	0:42:08.0
10	106	12470	Martin, Chris	PSR	0:21:28	0:20:55.4	0:42:23.4
11	117	12476	Copps, Matt	PSR	0:23:06	0:19:37.2	0:42:43.2
12	113	12955	Doble, Mark	Hardwood Hills	0:22:34	0:20:13.0	0:42:47.0
13	114	6635	Faulkner, Justin	Univ Waterloo	0:22:47	0:20:11.4	0:42:58.4
14	111	12829	Morel, Skeets	Georgian Nordic	0:22:24	0:20:41.3	0:43:05.3
15	112	12758	McCarthy, Edward	Nakkertok	0:22:31	0:20:36.7	0:43:07.7
16	116	13327	Klassen, Dana	Kanata	0:22:56	0:20:30.6	0:43:26.6
17	118	12956	Mamen, Chris	Nakkertok	0:23:15	0:20:50.3	0:44:05.3
18	115	12921	Martin, Robb	PSR	0:22:54	0:21:29.5	0:44:23.5
19	119	12570	Van Dorp, Jack	Georgian Bay Nordic	0:23:22	0:21:12.3	0:44:34.3
20	121	13139	Suke, Brian	Georgian Bay Nordic	0:23:54	0:21:34.3	0:45:28.3
21	120	12924	Myles, Ian	Hardwood Hills	0:23:28	0:22:00.6	0:45:28.6
22	123	13396	Tuttle, Stephen	Nakkertok	0:24:48	0:21:52.0	0:46:40.0
23	122	12967	Campbell, Luc	Nakkertok	0:24:29	0:22:17.7	0:46:46.7
24	125	13206	Apramian, Tavis	North Bay	0:25:43	0:22:26.3	0:48:09.3
25	124	12622	Fabius, Alistair	Big Thunder	0:25:08	0:23:13.3	0:48:21.3
26	126	P172	Wood, Phillip	Mono Nordic	0:26:33	0:23:10.5	0:49:43.5

Printed 2002-12-28 16:25:34 Page1 of 1

Official Results - Relay Race

New Nouveau Brunswick

CCC Championship Relay
Official Results

Date: March 14, 2004

Location Charlo, NB
Club Les Aventuriers

Jury			
TD	Al Maddox	Asst. TD	Al White
Chief of Race	Rheal Laviolette		
Coach	Jack Sasseville	Coach	Mike Cavalier

Temp -10
Sunny Wind moderate

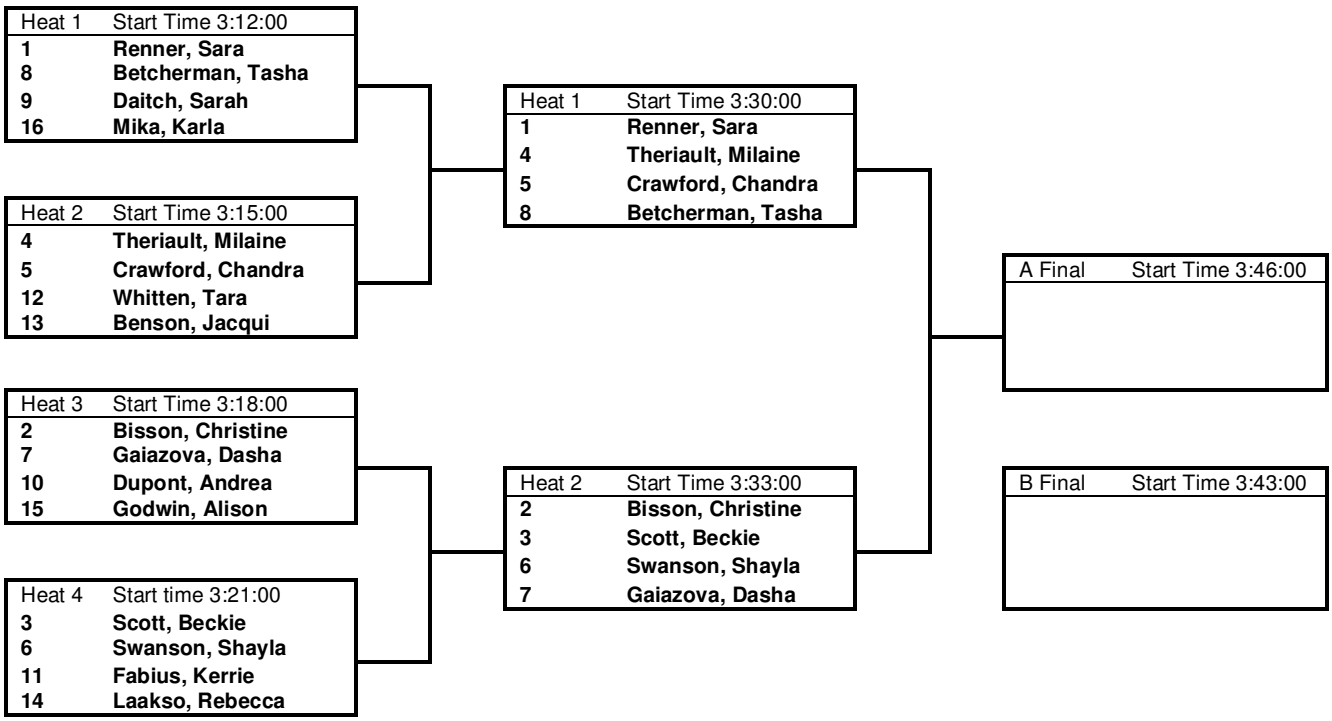
Challenge Boys 3 x 5 km. Free Relay Course Info: MC: 35m HD: 62m TC: 158m

1	1	Big Thunder Nordic		Greg Field Luke Viljakainen Chris Butler	0:13:12.3 0:13:54.0 0:12:54.6	(4) (3) (1)	0:40:00.9	+0.0
2	14	Banff Ski Runners #1		Evan Bruce Jess Cochney Haakon Lenes	0:13:03.8 0:13:45.8 0:13:15.4	(1) (2) (2)	0:40:05.0	+4.1
3	2	FNSC		Adam Snow Brent McMurtry Georg Jalkotzy	0:13:11.9 0:13:19.9 0:14:39.8	(3) (1) (8)	0:41:11.6	+1:10.7
4	3	Team Hardwood #1		Harry Seaton Cam Moore Kevin Throop	0:13:31.9 0:14:24.5 0:13:47.5	(7) (5) (4)	0:41:43.9	+1:43.0
5	11	Lappe Nordic Ski Clu		Michael Somppi Christopher Hamilton Travis Comeau	0:13:39.7 0:14:09.4 0:13:57.1	(8) (4) (6)	0:41:46.2	+1:45.3
6	9	Skibec		Antoine Plouffe Mathieu Angers Christian Ruel	0:13:55.9 0:14:42.5 0:14:08.6	(10) (7) (7)	0:42:47.0	+2:46.1

Results By: Zone4 www.zone4.ca

Sprint Heat Start List

Open Women



Blank

Appendix 8 – Para-Nordic Competitions

(draft pending approval of Para-Nordic Coordinator)

Classification by Disability

After the 2002 Paralympic Games in Salt Lake City, the categorization of the different classes of athletes was changed to consist of three (3) medal categories: Visually Impaired, Sit-ski and Standing.

Paralympic versus Olympic Nordic Sports

The Para-Nordic Cross-Country in most cases follows the same rules, regulations and event procedures as the International Ski Federation (FIS). However, in certain areas, the differences are notable and explained below:

- Competition formats
- Course design and track setting
- Athlete classification
- Percentage system
- Timing & results
- Wheelchair accessibility and facilities
- Special IPC competition rules

COMPETITION FORMAT	**Standing**	**Sit-ski**
Cross-Country Sprint*	800 – 1000 m*	750 - 800 m*
Cross-Country Short Distance	5 km	2.5 km Women
		5 km Men
Cross-Country Middle Distance	10 km	5 km Women
		10 km Men
Cross-County Long Distance	15 km Women	10 km Women
	20 km Men	15 km Men
Cross-Country Relay	3 x 2.5 km Women	
	1 x 3.75 km (sit-ski) + 2 x 5 km (standing)	

Course design and track setting for Para-Nordic Competitions

In general, the Standing and Visually Impaired categories can ski on courses that are very close to regular FIS courses. However, design considerations in the following areas should be considered:

- Fast downhills with curves and corners that can be difficult and unsafe for Visually Impaired skiers
- Use of shorter loops such that Visually Impaired skier more easily can become familiar with the course
- Reduction of the longest climbs which should replaced by medium length climbs
- The range for the total climb should in general be in the low range of the FIS standards

Courses for the sit-ski category can not use normal FIS courses due to the fact that sit-skiers have no use of their lower body, and pull themselves forward with poles from a sitting position (on their sledge).

The following points should therefore be considered when designing courses for the sit-ski category:

- Uphills should in general not be steeper than 10 - 12 % gradient, and not longer than 200 m in length
- Downhills should have straight run-outs preferably with a slight uphill to break the speed. The hills should not be steeper than 12 – 14 % gradient
- Corners and turns should be placed where the speed is slow. Corners on flat part of the course should optimally not be less than a 90 % angle (larger angle required for downhill corners). This applies in the stadium as well, for example for lapping.

Classification of Athletes

For the competitions, all standing locomotor disabled classes are combined into one standing category, all sitting locomotor disabled classes are combined into one sitting category, and all visually impaired classes are combined into one category with the appropriate utilization of the percentage system for Nordic Skiing. The following table describes in general terms the current classification system:

Category	Class	Region of disabilities	Main sport equipment
Visually Impaired	B1	No light perception in either eye up to light perception, but inability to recognize the shape of a hand at any distance or in any direction.	Must ski with a guide and wear special black goggles
	B2	From ability to recognize the shape of a hand up to a visual acuity of 2/60 and/or visual field of less than 5 degrees.	Must ski with a guide
	B3	From visual acuity above 2/60 up to visual acuity of 6/60 and/or visual field of more than 5 degrees and less than 20 degrees.	May ski with a guide
Standing	LW 2	Single above knee amputation with a prosthesis or comparable.	Skiing with 2 skis and 2 poles
	LW 3	Double below knee amputations or comparable.	Skiing with 2 skis and 2 poles
	LW 4	Single below knee amputation minimum through the ankle joint or comparable.	Skiing with 2 skis and 2 poles
	LW 5/7	Double upper limbs amputations or comparable.	Skiing with 2 skis and no poles
	LW 6	Single upper limb amputation above the elbow or comparable.	Skiing with 2 skis and 1 pole
	LW 8	Single upper limb amputation below the elbow or comparable.	Skiing with 2 skis and 1 poles
	LW 9	Severe disability in upper and lower limbs i.e. amputation or comparable (one side, diagonal or a combination of more limbs).	Equipment of their choice, but with 2 skiis
Sitting	LW 10	Disabilities in the lower limb(s) and no functional sitting balance.	Using sit-ski
	LW 10.5	Disabilities in the lower limb(s) and with minimal to marginally adequate functional sitting balance.	Using sit-ski
	LW 11	Disabilities in the lower limb(s) and with adequate functional sitting balance.	Using sit-ski
	LW11.5	Disabilities in the lower limb(s) and with better than adequate functional sitting balance and loss of sensation in buttock(s) and back of thigh(s).	Using sit-ski
	LW 12	Disabilities in the lower limb(s) and with good functional sitting balance.	Using sit-ski

Percentage system

The percentage-system is an adjusted time formula, which is used to determine overall level of disability of each athlete relative to all other disabled athletes. This formula assigns a percentage to each competitor based on each individual`s particular class. In the

competition, the athlete's real time is multiplied by this percentage to determine his/her adjusted time. Each disability class has different percentage for the two techniques, classic and free technique. The percentages will be evaluated by the IPNSC after every season and changes will be done if necessary.

Percentages used for the season 2005-2006:

Class	Classic technique	Free technique
B1	87%	85%
B2	98%	98%
B3	100%	100%
LW 2	91-93%	86 – 91%**
LW 3	87%	80 – 91%**
LW 4	94 - 96%*	96%
LW 5/7	79%	87%
LW 6	91%	96%
LW 8	92%	97%
LW 9	85 – 95%**	82 – 95%**

Class	Classic
LW 10	86%
LW 10,5	91%
LW 11	94%
LW 11,5	98%
LW 12	100%

* **94%** those athletes who have problems in both legs, but too little to be classified in LW 3

96% "a real" LW 4 athlete with amputation below knee or comparable disabilities

if no remarks are done – the LW 4 athletes have this percentage

** Athletes in this group will have individual percentages - for "individual" percentages – see IPC web site.

Timing & Results

The classification/percentage system creates a need for a unique results system. The real race time for each competitor is multiplied by the competitors' class or individual percentage before the final times and ranking is calculated. Both the real time and the calculated times, as well as the athletes' percentages are shown on the final results.

In IPC Cross-Country competitions, any time adjustments due to neutralization or early/late starts are added to the athlete's real time.

Any intermediate times shown in the result lists, must be shown as *calculated* times. Any time information shown on the venue's scoreboard or announced by the public announcer must be the athletes' *calculated* time.

The unofficial and official start and result lists shall include the last name and first initial of the race guide of each blind racer.

Wheelchair accessibility and facilities

The competition venue needs to accommodate wheelchair access to all team preparation areas, as well as to the start, finish and awards areas. It is important that the Sit-ski athletes are easily able to move from the parking lot to the athlete preparation area (wax cabins), and from there to the stadium or start of the groomed trails or snow surface.

Similarly, it is required to provide an accessible surface for the Sit-ski athlete to the flower- or awards podium if this is set up inside the stadium (the athletes are often in their wheel-chairs at this time)

The most practical surface for wheelchair access is simple sheets of plywood that is laid down on the ground or the snow, and perhaps covered with a carpet to provide a non-slip surface.

Specific technical IPC rules

Most of the rules in the IPC rulebook are taken from the FIS rulebook, however, there are several areas that require new rules or require changes to existing FIS rules:

Goggles: B1 class athletes must wear special goggles which covers the eyes such that no light signals can be detected when wearing them.

Assistance: Event volunteers are allowed to help a sit-skier that have crashed, and assist them in getting back onto the track if needed

Guides: The athletes in the B1 and B2 classes must use a guide during the whole competition. For the B3 athletes a guide is also allowed, but not required

It is allowed to change guides during the competition. Guides are allowed to use amplifiers, radios etc. for communicating with their skiers.

The guides are considered athletes, and must receive the same recognition and awards as the person they are guiding (listed on the start and result lists, medals, prizes etc…)

Holding zones: For reasons of safety, the guide is allowed to hold a B1 competitor (one arm or one pole) on certain sections of the track which shall be marked. These parts (holding zones) of the track shall be clearly marked. The Jury decides the location and length of the holding zones.

At the start the Guide will be placed ahead of the start wand in the track or off to the side of the track depending on the preference of the blind racer.

For all B classes the start and finish times will be taken as the competitor and not the guide crosses the line. The guide must not pass through the starting gate neither cross the finishing line.

An LW 10-12 competitor is not allowed to use a foot for steering.

Competition courses

The following tables list the recommended lengths for the competition courses and their loops:

Standing courses:

Event	Standing Course Loop
20 km CC	10 or (7.5 km and 5 km) or 5 km
15 km CC	5 or 7.5 km
10 km Cc	5 km, 3.33 or 2.5 km
CC sprint	800 – 1000 m
5 km CC	5 km or 2.5 km
2.5 km CC	2.5 km
CC Relay	2.5 km

Sit-ski courses:

Event	Sit-ski Course Loop
15 km CC	7.5 km, 5 km or 3.75 km
10 km CC	5 km, 3.33 or 2. 5 km
CC sprint	750 – 800 m
5 km CC	5 km or 2.5 km
2.5 km CC	2.5 km
CC Relay	2.5 km and 3.75 km

NOTE: The course distances should be within 5% of numbers listed above

The width of the courses is increasingly important due faster speeds and new race formats.

The following table lists recommendations for width of competition courses:

Competition Format	Course width
Interval start, classical technique	Minimum 3 m (1 track)
Relay, classical technique	Minimum 4 m (2 tracks)
Interval start, free technique	Minimum 6 m
Relay, free technique	Minimum 6 m
Sprint (hunting) start	Minimum 8 m

Where sit-ski courses and standing courses are together, it is important to provide enough width to accommodate both, and to avoid that the sit-ski (classical) tracks are being destroyed by other skiers skating across them. The minimum width between the two sit-ski tracks is 1.5 m (total of 3 - 4 m), and with a skating surface of 5 - 6 m (in case of a biathlon race, for example), implies that the total width of the common course should be about 9m.

Relay exchange area

Finish **Exchange** **Start**

Lane 1 **Lane 2**

The Para-Nordic relay exchange area is set up very differently than for a FIS competition. Due to the visually impaired category, the skiers are not tagging each other as normal. Two corridors are prepared, each marked with a line in the snow. The incoming skier must cross the line in corridor 1 before the next skier can start from the line in corridor 2.

The organizer must provide officials (volunteers) to make sure that each team's exchange is correct, and that the second skier does not start early.

Special procedures for track setting at IPC Nordic Skiing events

Skating race: No track for first few meters

Classic race: Double track from start gate

Sitski courses

Double track the whole course, set as deep track as possible

In intersections:

- Remove the track when “exiting” the main track (for example in a “cutoff” situation from the main outer loop). Remove the track early enough.

Track is removed prior to intersections, such that sit-skiers can move over to inside corner.

Track is not removed where cutoff track enters the main course. Sit-skiers are able to enter the tracks, and the continuous track on the main course is preferred by the B-class skiers.

- Do not remove the track when entering into the “main” track again

In sharp corners

- either remove all tracks or leave one track on the outside (depending on speed and radius)
- Bank or Super-elevate difficult corners

Standing courses

- Even in Free technique, leave one track the entire course (for those who can not skate)
- Use best/ideal line for the track in all downhills where the skiers can use it
- Leave one track in all Downhill corners for B1 skiers, unless corner is too sharp
- Start the downhill track on top of the hill (before the start of the downhill), such that the B1 skiers can get into the track before the speed is too high
- Start the holding zones 2 – 3 meters before the downhill starts, end the holding zone where the transition to a new technique starts (double pole or diagonal for classic, skate stride for skating).

START ORDER

The starting order: shall be determined by the Race Committee in such a way as to avoid overtaking as much as possible. On principal men start before women. The competitors are divided into sub-groups by seeding. The number of sub-groups and the size of sub-groups depend on the total number of competitors.

6-10 competitors should start in each sub-group. Within the sub-group the starting order is decided by draw. The coach of each team selects his competitors in the different sub-groups.

The recommended start order of the different classes if the same track is being used for all is as follows:

Men	LW10,11, 12
Women	LW10,11, 12
Men	B CLASSES
Women	B CLASSES
Men	LW2-9
Women	LW2-9

START NUMBERS

The guides will wear a bib numbered with 3 digits, the last two of which will be the same as the number of the competitor. E.g.: blind no. 15- Guide no. 115, or a bib printed with a "G" meaning the word "guide".

EQUIPMENT - Special Rules for Sit-Skiers

940.1 The nordic sit-ski shall consist of a sitting device mounted on a pair of cross-country skis.

940.2 The material and shape of the nordic sit-ski is not subject to any regulation.

940.3 The maximum allowable height difference between the seat and the top of the skis is 30cm. Mounted steering devices are not allowed.

940.4 Competitors may use straps to fasten 'their bodies to the sit-ski for stabilization. Additional upholstery and weather protection is recommended.

HOMOLOGATION OF COURSES FOR PARA-NORDIC SKIING

In general, the philosophy for FIS homologation, and the requirements and recommendations for stadium and course design applies to Para-Nordic skiing as well. However, since certain classes and categories have clear physical limitations, the courses must in general be made easier, with special attention to fast downhill sections, sharp curves, and steep or long uphills. The following sections will describe areas within homologation work that is specifically should be considered when designing courses for Para-Nordic athletes.

Terms

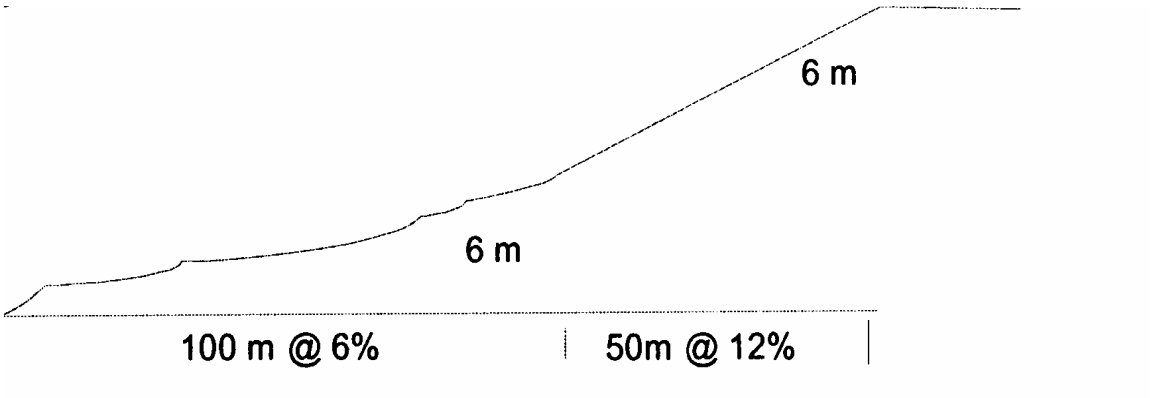
The following terms are consistent with what is used in the FIS Homologation Manual:

A-climbs definitions:

A= Major uphills = PHD ≥ 30 m, gradient 9 - 18 %, normally broken with some short undulating sections less than 200 meters in length or a down hill that does not exceed 10 m PHD. The average gradient including the undulating sections should be > 6%. Normally the maximum PHD should not exceed 80 m.

B-climb definitions:

B = Short uphills 10 m ≤ PHD ≤ 29 m, gradient 9 - 18 %
B-climbs can also permit sections with gradients of less than 9% providing that the B-climb includes some sections with a gradient ≥ 9% and that the average gradient is > 6%. The following will qualify as a B-climb.



C-climb definitions:

C = Steep uphills 4m < PHD < 10m gradient > 18%. Climbs with < 4 m PHD will be included as undulating terrain or as part of an A- or B-climb.

Maximum Climb (MC)

MC is the climb with the highest PTC, in other terms, the biggest uphill.

Total Climb (TC)

TC is the sum of all climbs on the course.

Height Difference (HD)

HD is the vertical distance from the highest to the lowest point on a cross-country course.

Partial Height Difference (PHD)

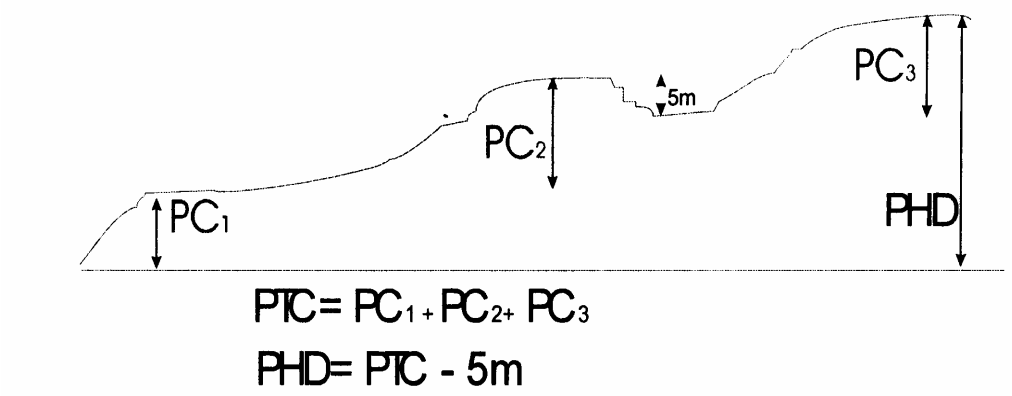
See figure below.

Partial Total Climb (PTC)

PTC (Partial Total Climb) = PC1 + PC2 + PC3, for any A or B climb that has some varied gradients in sections. If the A or B uphill has no downhill parts then the PTC = PHD. PHD is used to calculate the average gradient of the climb.

Partial Climb (PC)

See figure below.



PTC is only used to calculate the overall percentages of the TC that are located in all of the A-climbs and all of the B-climbs

The following table shows recommended standards for Total Climb, Max Climb and Height Difference. Although it is not recommended to include many A-hills, it is still important to design hills with varying slopes, gradient and length, where a few hills are close to the standard for A-hills (over 20-25 m in PHD).

Course	TC	MC	HD	Hills
10 km	250 - 350	40	75	0-1 A hill, 8-12 B hills, 0-2 C hills
7.5 km	200 - 250	40	75	0-1 A hill, 6-10 B hills, 0-2 C hills
5 km	140 - 180	40	75	0-1 A hill, 4-6 B hills, 0-2 C-hills
3.3 km	90 - 130	30	50	3-5 B hills, 0-1 C hill
2.5 km	75 - 90	30	50	2-3 B hills, 0-1 C hill
Sprint	0 - 30	30	30	

Sit-ski classes

Event	Sit-ski Course Loop
15 km	7.5 km, 5 km or 3.75 km
10 km	5 km or 3.33 km
12 km biathlon	2 km
7.5 km biathlon	2.5 km
5 km	5 km or 2.5 km
2.5 km	2.5 km
2.0 km	2.0 km
Sprint	750 – 800 m
Relay	2.5 km and 3.75 km

Courses for the sit-ski category can not follow FIS homologation rules due to the fact that sit-skiers have no use of their lower body, and pull themselves forward with poles from a sitting position (on their sledge).

The categories for A, B and C hills are therefore proposed to be changed to:

A-hills 10 – 20 m PHD and gradient between 4 – 12 %

B-hills 4 – 9 m PHD and gradient between 4 – 12 %

C-hills distance < 30 m and gradient 12 – 18 %

The following points should also be considered when designing courses for the sit-ski category:

• uphills should in general not be steeper than 10 - 12 % gradient
• A-hills should not be too long (not over 250 m in length)
• downhills should have straight run-outs preferably with a slight uphill to break the speed, the hills should not be steeper than 12 – 14 % gradient
• corners and turns should be placed where the speed is slow corners on flat part of the course should optimally not be less than 90 % angle (larger angle required for downhill corners). This applies in the stadium as well, for example for lapping or into the shooting range. (NOTE: If you as a standing skier are poling without using the legs, the skis should easily follow the track both in curves/bends in flat parts and also in downhills – if we have to "work" with the legs, a sledge will have problems)

Sit-ski Course	TC	MC	HD	Hills
7.5 km	100 - 150	20	75	4 – 6 A hills, 4 – 6 B hills
5 km	70 - 120	20	75	2 – 4 A hills, 2 – 5 B hills
3.75	60 - 90	20	50	1 – 2 A hills, 1 – 3 B hills
3.33 km	50 - 80	20	50	1 – 2 A hills, 1 – 2 B hills
2.5 km	40 - 70	20	50	1 – 2 A hills, 1 – 2 B hills
2.0 km	30 – 60	20	50	1 – 2 A hills, 1 – 2 B hills
Sprint	0 – 20	20	20	

Stadium layout

In contrast to the newest development of stadiums and course layouts for FIS competitions, it is less important to ski through the stadium often in Para-Nordic competitions, since most competitions are interval start races. Since Para-Nordic Skiing events are divided into 6 categories (3 for men and 3 for women), it is difficult for announcers and spectators to follow the event if several categories are starting, passing through the stadium or finishing at the same time. For competitions with small fields, this situation can however be solved by letting each category finish the race before the next one starts.

A special consideration should be given to the transition and staging area for the sit-ski category. This should be provided with an easy, flat access to start & finish areas, with nearby covered and heated area for transition from wheelchair to sit-ski.

THE SENIOR NATIONAL COMPETITION PROGRAM (see next table)

Senior and above	**LOCOMOTION STANDING & BLIND**	**SITSKI**
WOMEN'S EVENTS	LW 2 - 9/ B 1-3 Short distance = 5 km Middle distance = 5 km (FT) Long distance = 15 km Relay = 3 x 2,5 km (including sit ski)	LW 10 LW 12 Short distance = 2,5 km Middle distance = 5 km Long distance = 10 km
MEN'S EVENTS	LW 2 - 9/ B 1-3 Short distance = 5 km Middle distance = 10 km (FT) Long distance = 20 km Relay = 4 x 5 km	LW 10 LW 12 Short distance = 5 km Middle distance = 10 km Long distance = 15 km Relay = 3 x 2,5 km

933.2 Protests against the admission of a competitor must be delivered in writing to the Competition Secretary before the competition begins.

933.5 Protests concerning erroneous and clerical errors, or contraventions of the IPC Rules only established after the competition, will be considered if sent by registered post through the competitor's National Association to the IPC Nordic SAEC (through its Chairperson) within one month of the competition. These protests must be clear with within a month.

958 PARTICULAR RULES OF RELAY FOR DISABLED

958.1 Composition of the team

958.1.1 STANDING/SITTING

Women 3 X 2,5 km.

Relays will use the sit-ski track, consist of 2 classical and 1 free technique legs. At least one skier from each team must be from Group 1. B1 skiers and their guides may hold in order to avoid danger with a sit-skier.

Women's Relay Groupings	
Group I	Group II
B I LW3 LW5/7 LW 10-12	B 2 B3 LW2 LW4 LW 6/8 LW9
Relays will use the Sit-ski track. B1 Skiers and their Guides may hold in order to avoid danger. Relay will consist of 2 Classical Legs and 1 Free Technique Leg. At least one Skier from Group I must be on Relay Team.	

958.1.2 **STANDING**

Men 4 X 5 km.

Relays will use the men's 5 km track and consist of 2 classical and 1 free technique legs. At least one skier from each team must be from Group I, with a total maximum percentage total per team not to exceed 370%.

Men's Relay Groupings - 4 x 5 km	
Group I	Group II
B I LW3 LW5/7	B 2 B3 LW2 LW4 LW 6/8 LW9
Maximum Total of 370% allowed for Relay Team. Percentages based on specific technique per disability class. Relay will consist of 2 Classical Legs and 1 Free Technique Leg. At least one Skier from Group I must be on Relay Team.	

958.1.3 **SIT-SKI**

Men 3X2,5 km: - One LW 10

- Two of choice (LW 10 or/and LW 11

958.1.4 All standing relays will use a combination of classical technique and free technique.

Men (standing)	2 Classical - 2 Free Technique
Women (standing/sitting)	2 Classical - 1 Free Technique