UNITED STATES SKI AND SNOWBOARD ASSOCIATION

ALPINE OFFICIALS' MANUAL

CHAPTER IX

TIMING and CALCULATIONS

2011-2012

NOTE: Current edition of FIS TIMING BOOKLET 2.45 includes timing installation requirements and is available on the FIS website; Booklet is not duplicated in this Chapter.

OVERVIEW

In the earliest days of Alpine ski racing all of the competitors made a mass ("geschmozzle") start in the "straight race" and the first competitor to reach the village was the winner!

Timing was introduced when "records" were established. It became a necessity years later when competitors started individually. From the beginning, however, timing officials were expected to provide accurate times and post them quickly. The objective is still prompt posting of accurate times. Due to the use of more sophisticated equipment, even Replacement Times (Equivalent Electronic Times – EET) are more accurate.

USSA-scored and FIS race requirements include two electronic timing systems (primary and secondary) with printed strips (timing tapes). Competitions that are not scored to points lists require an electronically based primary timekeeping system, preferably measuring time-of-day. Manual/hand timekeeping, separate and independent of electronic timing, *is required for all* USSA and FIS events.

It is essential that competitors' times be recorded accurately and posted promptly regardless of personnel, machinery or procedures utilized. Verification of official times is paramount to a fair, accurate race, and an accurate and fair race for all competitors is the primary goal of Alpine Officials.

As equipment has become more sophisticated, so have our timing officials. Timekeepers need to know more today than they did before and are required to be true professionals in their approach to their duties. This "professional" approach keeps standards high and timekeeping accurate.

Modern equipment has made our lives much easier, but it has also caused bigger and more complex problems. Competitors may pass each other, times can be "lost", equipment can malfunction or a power outage can occur. It is the timing officials' duty to be able to handle these problems in a "professional" manner. Timing clinics that address the basics of timekeeping for alpine events are held each year to refresh the memories of the veteran timekeepers and to introduce the novices to the basic requirements. Timing workshops that address installation and operation of timekeeping equipment and computer software are a new and welcome addition to the education process.

GLOSSARY

BOB RULE - Proposed by Bob Arnott (AUS) and Bob Beattie (USA) for calculating a race penalty. It was adopted by the FIS in 1967 and is currently used as modified. ***(See "RACE PENALTY".)***

REPLACEMENT TIME (EQUIVALENT ELECTRONIC TIME - EET) - Time used when an electronic time is missed. This time is calculated by comparing the manual/hand times with the respective electronic times of the 10 competitors' times closest to the missed time and dividing the sum ***of the differences*** by 10 to give a***n average difference or*** correction, which is then applied to the manual/hand time of the competitor without an electronic time. This same system is used when primary electronic timing fails and it becomes necessary to calculate a replacement/equivalent time by comparing secondary electronic times to primary electronic times.

MANUAL/HAND TIME (HT) - The calculated elapsed time of a competitor determined *from* hand-held watches or hand-held battery-operated timekeeping devices operating in time-of-day mode.

LOWRY FORMULA - Proposed by Warren Lowry (USA) for calculating race points. It was adopted by the FIS in 1984. It is better known internationally as the New Alpine Formula or linear formula. ***(See "RACE POINTS".)***

POINTS - A determination used when establishing an individual's ranking in a particular event. Usually this is the average of a competitor's best two results in each event. (There are provisions for using a single result with a penalization and using the first list or basic points as one result.)

POINTS LIST - A competitors' listing documenting their earned points in each event. We use only two points lists - the current USSA Points List for USSA races and the current FIS Points List for FIS races. Each list is valid as published until publication of the next list. The publication dates for these lists can be found in the current USSA Alpine Competition Guide or on the USSA website. All USSA and FIS Points Lists are only available electronically at the appropriate websites. *A FIS list that has been formatted for downloading into race result software is available only on the USSA website.*

RACE PENALTY - This is a calculation (again defined by the BOB RULE) that is used to equalize races held on different hills. It also allows for weighing the race results according to the caliber of the top five competitors who start the race and the caliber of the top five competitors (relative to their Seed Points) who are among the top ten finishers in the race. (Two additional steps are included in the calculation of a FIS Penalty. Refer to Penalty Point Example 4: FIS Penalty.)

RACE POINTS - the LOWRY FORMULA in which the competitor's time is compared to the winning time determines these points. The winner of a race always gets 0.00 points. Race Points are used in the calculation of the Race Penalty.

RESULT - A competitor "gets a result" from each race they finish. The "result" is the sum of their earned Race Points and the calculated Race Penalty. When a competitor earns a result lower than the Seed Points with which they entered the race, the competitor is showing improvement. This gives competitors, coaches and parents an idea as to how an individual is progressing. (FIS results for USA competitors are included in the USSA Points Lists.)

USSA TIMING RULES IN THE ACR

- Electronic timing equipment, start gates and finish photocells approved by USSA (see list of FIS Homologated Equipment on the FIS website), must be used for all national championship races including regional junior championships. Races using devices other than those on the approved list will not be considered for scoring to the USSA Points List.
- For other competitions scored to the USSA Points List, there shall be a primary timekeeping system which generates a permanent printed record of time of day at the start and at the finish.
- Primary timekeeping device shall be shown to meet requirements of a homologated timing device. A secondary electronic timing system, preferably reporting time of day, is also required.
- For competitions that are not scored to any points lists, there shall be a primary timekeeping system that is electronically based, preferably measuring time of day.
- Rules allow for the use of wireless timing. Please contact your regional Timing Working Group.
- All timing equipment and technical installations must be demonstrably functional to the requirements of the rules when disconnected from external devices, e.g. scoring and results computers.

- All time of day times must be immediately and automatically sequentially recorded on printed strips to at least the 1/1000th (0.001) precision. *Effective 2012-2013, 1/10000 (0.0001) precision will be required.*
- Both systems must allow for calculation of net times by mathematical comparison of each racer's start time to finish time. Final result for each racer is expressed to 1/100th (0.01) precision by truncating calculated net time on course.
- All times used for the final result must be from System A. If there is a failure of System A, a calculated net time from System B must be used following the same procedure as established for a Replacement Time (Equivalent Electronic Time - EET). It is not permitted to substitute time of day times from System B for use with System A for the purpose of net time calculations.
- Timing equipment is to be turned on (powered) at least 30 minutes prior to synchronization.
- Timing equipment is to be synchronized within 60 minutes prior to the start. This is required for each run in two- run events. *In certain circumstances, e.g. 2-gender events with small fields, where the first run of the second gender event starts less than one-hour after the original synchronization, re-synchronization is not required. Re-synchronization is required for the start of the second run of any two-run event.*
- A Timing & Data Technical Report (TDTR) form must be completed for each run and each gender of scored competition and submitted with the result packet to USSA. A Timing & Data Technical Report (TDTR) is also required for non-scored Championship events (e.g. J4 Junior Championships). The form is a FIS form but it is also used for all USSA-scored events.
- Manual/hand timekeeping is required for all USSA events. Manual/hand timekeeping may not be a part of the secondary or any other electronic timekeeping system. Manual/hand timekeeping is totally separate and independent of the electronic timekeeping system and is done with handheld stopwatches or hand-held battery operated devices ***operated in time of day mode.***

FIS TIMING RULES IN THE ICR

The most direct comments in the FIS ICR concerning Timing, Calculations and Communications required for ski racing include the following:

- Electronic timing equipment, start gates and finish photocells must be on the list of homologated/approved devices. Races using devices other than those approved will not be scored. (Refer to current list of Homologated Timing Equipment posted on FIS website.)
- Should be multiple modes of communication (telephone or radios, etc.) between start and finish.
- It is permitted to use radio transmission systems (wireless timing systems) *only* for Level 3 FIS races and below and some USSA races.
- Two synchronized electronically isolated timing systems operating in time of day must be used….time of day times must be immediately and automatically sequentially recorded on printed strips to at least the 1/1000 (0.001) precision. *Effective 2012-2013, 1/10000 (0.0001) precision will be required.*
- Both systems must allow for the calculation of net times by the mathematical comparison of each racer's start time of day to finish time of day. The final result for each skier's run is then expressed to 1/100th (0.01) precision by truncating the calculated net time on course.
- All times used for the final result must be from System A or the appropriate correction (EET) must be made.
- If there is a failure of System A, a calculated net time from System B must be used following the same procedure as for an Equivalent Electronic Time. If both systems fail, manual/hand times will be used for all competitors.
- It is not permitted to substitute time of day times from System B for use with System A for the

purpose of net time calculations. e.g.: Subtracting System A time of day start from System B time of day finish.

- Software that calculates net times must use precision of ToD as used in the timing device.
- The Start Gate must have separate electronically isolated switch contacts for triggering the start inputs of both System A & System B.
- If a Start Gate requires replacement during a run, it must be replaced with an identical start gate in the same position and with the same rotation.
- Photocells are placed at such a height that a competitor finishing normally cuts the beam with the lower half of his legs. The vertical separation must not exceed 20 cm and if, possible, should be less than that.
- The manual/hand timekeeping must record the 1/100ths (0.01) of a second. It must be completely separate and independent of the electronic timekeeping. Times must be recorded/printed and immediately available at the start and finish. Manual/hand timing devices should be resynchronized prior to the start of each run, and if possible, they should be synchronized with the electronic timing. The use of ToD manual/hand timekeeping equipment is highly desirable.
- Manual/hand times are used in the Official Results after a correction resulting in a time equivalent to the average difference between the 10 closest times recorded by electronic timing and those recorded manually/by hand has been calculated. (Replacement Time/EET)
- Any manual intervention of the timing must be marked on the timing tape.
- All timing equipment and installations must be demonstrably functional to the requirements of the rules when disconnected from external devices, e.g. scoring and results computers. All equipment must also be fully functional in the case of a power failure; this is when old-fashioned battery power is a necessity.
- Use of additional finish timing system, photo-finish timing, is currently being used at FIS World Cup events and is not addressed in this Chapter. It is addressed in the Precisions to the FIS ICR, on the FIS website and in the applicable rule books.

Other rules related to timing specify the titles and duties of various timing officials, proper start gate specifications, start procedures for all events and determination of a legal start (early and late start rules), and finish line specifications and determination of a legal finish. Additional information is contained in the current USSA/FIS rules and guidelines.

"Points" receive only a brief mention in the formula for calculating points. Additional information is contained in the current Rules of the FIS Points.

Chapter VI - Working Papers of this Manual lists forms that facilitate record keeping and also contain information to refresh one's memory. This Manual does not supersede any information contained in more current USSA/FIS publications; it is to be used in conjunction with all current rules and bulletins issued by USSA/FIS. The “Master Packet of Forms” located on the USSA website contains all forms listed in Chapter VI.

NOTE: Refer to current edition of FIS Timing Booklet 2.45 posted on the FIS website.

CRITICAL SITUATIONS

Errors can and do occur when setting up the equipment, database, etc., for a race and also when doing the necessary calculations and paperwork. This is one of the reasons we check and double-check our work. The most common problem areas are:

- Inadequate maintenance of a "permanent" communication system.
- Incorrect connection of wire/switch at the start gate.
- Breakage of the start "wand" with no "exact" spare available.
- Incorrect alignment of the finish "beam".
- Absence of manual/hand timekeeping (Assistant Timekeeper) crews.
- Inadequate or lack of supervision of manual/hand timekeeping (Assistant Timekeeper) crews.
- Inadequate staffing of additional timekeeping crew officials at start and/or finish.
- Faulty determination of elapsed time from time of day (ToD) recordings.
- Rounding or averaging of times. *For ski racing rounding or averaging of times is prohibited*.
- Failure to use **updated** computer software and/or verify the data contained in computer-generated documents. Computers are being used exclusively for managing ski race data and producing race results. However, if the race result software has not been updated for the current season, or if the software and/or hardware introduce errors, incorrect data will be generated. Don't assume that because the information came from the computer it's correct.
- ***Failure to proactively keep up with precisions and rule adjustments.***
- Failure to use **appropriate** points list: USSA for non-FIS USSA events; FIS for USSA FIS events).
- Failure to use points list valid for race date.
- Failure to use the proper competitors' Seed Points for the event of the race.
- Errors in copying and/or failure to verify Seed Points against website versions of the appropriate points lists: (Verification must be done even if lists are downloaded from the USSA website directly into the race result software.)
- Failure to post or announce all unofficial times promptly.
- Failure to verify times against timing tapes.
- Failure to use proper "F Value" (factor) for the event when calculating Penalty.
- Failure to check for a 10th place tie for time in the Results which might affect the Penalty.
- Failure to use correct Seed Points in the Penalty calculation.
- Failure to assign "maximum" values.
- Failure to check for a 5th place tie for best (lowest) Seed Points.
- Faulty "rounding" in the Penalty calculation.
- Failure to use current race level Adders and/or Correction Values (Z) for the event level/gender/event. (FIS RACES ONLY.)
- Failure to accurately apply Z Value, e.g. when Z Value is positive it is subtracted; when Z Value is negative it is added. (FIS RACES ONLY.)
- Failure to observe "maximum/minimum penalties", when required.
- Failure to prepare Second Run Start List in a timely manner; not being familiar with rules for "bibbo" when a tie occurs at the 30th or 15th position; not being familiar with Second Run seeding requirements for adaptive competitors in USSA races ("Golden Rule", USSA Alpine Competition Guide), not being familiar with Second Run seeding for Age Class events.
- Failure to run "quality checks" on all race data.
- Failure to accurately complete required Timing & Data Technical Report forms, 1 per event per gender for all FIS and scored USSA events.

- Failure to allow ***sufficient*** warm-up time for the timing devices before synchronization and the start of the race.
- Failure to properly synchronize System A and System B.
- Failure to consider the effects of cold weather and extreme weather conditions on equipment and especially volunteers.

GENERAL TIMING COMMENTS

The essential elements in timing a ski race are:

1. The race should start on time! There should be no delays caused by insufficient preparation of the timing. ANTICIPATE and be prepared to react to problems quickly. Check all your equipment/computers at least 24 hours prior to EVERY race. Don't assume because it worked last month, it will work today.
2. Times should be recorded accurately. Make quality control a component of the system.
3. The times should be announced promptly and correctly. However, the announcer should be isolated from the timing area as much as possible.
4. The system should be sufficiently redundant and protected to eliminate possibility of "missed time" and the subsequent need for rerun. Replacement times (EET) must be obtained with minimal delay. If multiple problems accumulate, "hold" the race until the problem(s) can be corrected and controlled – don't allow problems to multiply!
5. Situations that occur in the Timing Building should stay in the Timing Building. Casual or announced comments about problems, etc., can bring the integrity of the timekeeping for the whole event into question.

The records that are needed are:

1. Accurately recorded competitors' times.
2. Sequenced list of competitors -
   a. Corrected Start List
   b. Competitors' times (ToD and/or Elapsed)
   c. Final Status of all competitors (Finishers, DNS's, DNF's, DSQ's)

The required outputs are*:*

1. First Run Start List
2. Second Run Start List
3. Unofficial "top 10" finishers or "Results by Class" for Awards Ceremony
4. Documentation of any Replacement Times (Equivalent Electronic Times - EET)
5. Report by the Referee - each run, if two runs
6. Official Results with Race Points and Penalty Points, when applicable
7. Penalty Calculation(s) for scored events
8. Timing & Data Technical Report forms, 1 per event per gender
9. Documentation of "quality control" - cross check procedures. This may include Results from each run.

EQUIPMENT AND SUPPLIES

The following is a list of suggested supplies for a Timing Building that should be supplied by the Organizer.

- Manual timing devices, batteries if needed
- Communication means - headsets or intercom
- Cables/Connectors, as needed
- Power source - battery or hard wire copiers
- Extra timing printer tape
- Surge protection
- Trash container(s)/liners
- Calculator(s)
- Clip Boards
- Plastic lock-top bags, small & large
- Large manila envelopes
- Backpack for carrying supplies
- Adequate supply of required forms
- Pencils
- Pencil sharpener
- Felt marking pens
- Paper/ink supply for printers,
- Rubber bands
- Tool set/electrical repairs
- Tape: Electrical, Scotch and Duct tape
- Stapler(s)
- Staples
- Staple remover
- Scissors

TIMING PROCEDURES AND THE TIMEKEEPING CREW

The degree of accuracy provided by electronic timing is an essential requirement for separating competitors in this highly competitive sport. In order to time a ski competition, we must determine exactly when a competitor starts, when a competitor finishes and the elapsed time between the two events. Electronic timing, which allows measurement of times to at least $1/1000^{th}$ (0.001) of a second, and backed up by manual/hand timing which measures times to $1/100^{th}$ (0.01) of a second, is required. FIS and scored USSA events require two timers with printers, and it is the Technical Delegate's responsibility to assist with and verify synchronization of the timing. A Timing & Data Technical Report (TDTR) form that documents these procedures is completed and signed for each event and each gender.

For races where two electronic timing systems are used, if the primary system fails, the secondary system is to be used but only after being adjusted. The adjustment is to be made with the same procedure used to calculate Replacement Times using manual/hand times when both electronic systems fail. Tracking the differential between primary and secondary electronic systems throughout the race will assist in quick posting of accurate, adjusted secondary electronic times. *For information regarding proper synchronization of two electronic timing devices, refer to FIS Timing Booklet 2.45and the Timing & Data Technical Report Form.*

When both the primary and the secondary electronic timing systems fail, a Replacement Time (Equivalent Electronic Time - EET) is calculated from the manual/hand times. According to the rules, if the electronic timing, both primary and secondary, breaks down completely during the race, the times taken manually/by hand shall be valid for all competitors. It may also be necessary to use manual/hand times for all competitors if the timing equipment malfunctions repeatedly during a race and the number of required Replacement Times becomes excessive. *(This is a Jury decision.)*

When the official printing timer allows manual input or correction of a time, some type of indication (asterisk) concerning any effected change must be printed on all timing documentation. If the printer does not identify DNF's, etc., these should also be marked. This will help eliminate any confusion when proofing the competitors' times against the timing tapes. Many timing devices do

not calculate net times and many clubs choose to allow computer software to calculate net times. This is entirely acceptable. However, all TOD start and finish times must be recorded and properly marked if manual intervention occurs.

Synchronized digital stopwatches or hand-held battery operated timing devices operating in time-of-day mode are needed for modern manual/hand timing. Good manual/hand timekeeping involves human reaction, which differ from person to person. Varying degrees of fatigue, endurance to cold, span of attention and competence make accurate manual/hand timekeeping over a long period of time difficult. The Chief of Timing and Calculations should make every effort to assure the well being of the timekeeping crew and the consistency of their performance.

Although the personnel and equipment used, the communications available and the procedures followed will vary from organization to organization, general descriptions of electronic and manual/hand timekeeping procedures and requirements are useful.

The following is the minimum number of timing officials required to start a race. Their responsibilities are outlined in the ACR and/or the ICR:

Chief of Timing and Calculation/Chief Timekeeper
At Start:
- Start Referee
- Starter
- Assistant Starter
- Assistant Timekeepers (Start Manual/Hand Timekeeper/Recorder)

At Finish:
- Electronic Timer Operator(s)
- Electronic Time Recorder
- Assistant Timekeepers (Finish Manual/Hand Timekeeper/Recorder)
- Posting Person(s) for Scoreboard
- Finish Referee and/or Spotter

Additional personnel, such as additional Assistant Timekeepers (Manual/Hand Timekeepers), an Announcer and runners should be added as needed.

NOTE: **Chief of Timing and Calculations** is responsible for supervising, documenting and enforcing the quality control of actual timing and results. With the exception of lower-level non-scored events, *(e.g. YSL), where staffing issues may require it*, the Chief of Timing and Calculations should not also be the individual operating the electronic timing equipment or the timing/race result software.

USSA's Schedule Agreement requires that Chief of Timing and Calculations as well as other key officials, be appropriately certified. Certification is a benefit of membership so these officials must also be USSA members. The Chief of Timing and Calculations for National Championships, Continental Cup (NAC) and World Cup events should be USSA-certified as TC 3 or higher.

TIMING METHODS AND EQUIPMENT

START/STOP TIMING or elapsed timing: This method involves starting a timing device when the competitor leaves the Start and then stopping the same device when they cross the Finish Line. Time accrues from 0.00 (START) to time when the clock is stopped 0.56 (FINISH). This system is used in sports such as track and swimming but is not permitted in ski racing.

TIME OF DAY TIMING or continuous timing: This method involves taking readings of start and finish times on a continuously running, synchronized hand-held manual timekeeping devices. The timing never stops although the running time on the screen stops to display and record the time; this is called a "split" time. The competitor's start "split" readout is subtracted from the competitor's finish "split" readout in order to determine the competitor's "elapsed" time (the time taken to ski from start to finish).

This last method involves the additional step of calculating the elapsed time. However, this drawback is more than compensated for as it results in greater reliability. Even if the time of day device is inadvertently stopped (by an animal, spectator or official crossing the finish, for example) the clock continues to run, and accurate times will be provided for the competitors on course.

ELECTRONIC TIMERS

An electronic timer receives an impulse when a competitor starts and another impulse when a competitor finishes. The intervening time is obtained by subtracting the times of the impulses or by a direct readout of the elapsed time when the timing device calculates the difference.

Electronic timers are delicate machines that operate best above freezing temperatures and require careful handling to avoid damage. Any required batteries - for the timer and the photocell light source (or electronic eye at the finish as well as some start gates), must be fully charged before the race. Use new batteries frequently! Batteries don't last long in below freezing temperatures! A spare set as well as fuses and essential tools required for repairs should be available. If possible, batteries should be protected from the cold.

Timers are connected at start and finish by a telephone-type circuit (twisted-pair wires), by which the impulses from the starting gate and the finish eye are transmitted to the timing machine.

A few timers receive start and finish impulses when a circuit is opened or interrupted. Most timers widely available in the United States receive impulses when a circuit is closed or completed. The wiring must assure that inadvertent induced or variable impulses are impossible.

Recent advances in timing equipment have replaced the visible light beam at the finish with infrared beams. When used properly, these may be less vulnerable to problems common to the visible light beam. The use of infrared light beams at the start is being studied.

Digital Printout Timer: Has one or more digital timers, each capable of printing elapsed time on separate tapes. In this case the operator will key in the competitor's number on a timer channel and both bib number and elapsed time will be displayed on the tape.

The disadvantage of both of these timers is that should the photo beam be inadvertently interrupted while a competitor is on the racecourse, no time will be recorded at the finish for that competitor. These timers are also "start/stop" (impulse) timers.

Continuous Printout Timer: Prints on one continuous tape the time of departure and the time of arrival. They can be set at zero at the start of the race or set to the actual time of day. In this case, the operator must mark the bib number of the competitor on the tape opposite the start and finish

times. To obtain the elapsed time of each competitor the start time must be subtracted from the finish time. These timers are "continuous timers". Some timers/printers combine the features of continuous printout with elapsed time printout, but a vast majority of the equipment used in the USA only records ToD and requires a computer to do the math. Homologated timing devices are continuous.

Centigraphs, Etc.: Modern continuous printout timers may be equipped with a number of sophisticated and "computerized" functions. They may be programmed to print the competitor's bib number automatically on the tape as cued by the operator). They may calculate and print elapsed time on the tape, and they may also "drive" electronic scoreboards and video monitors. The most complex systems provide coded input into data processing systems, which will produce, printed results in the approved formats. Times are **NEVER** rounded!

Many changes have been introduced regarding equipment capabilities and wiring requirements. Check current specifications regarding timing equipment for all levels of USSA/FIS competition. Current editions of the FIS Timing Booklet (2.45) as well as lists of Homologated Timing Equipment are available on the FIS website.

MANUAL/HAND TIMEKEEPING

Manual/hand timekeeping is required as a backup to electronic timing for all FIS and USSA events. The manual/hand timekeeping system is completely independent of any communications between start and finish and is conducted with hand-held watches or hand-held battery operated devices.

The Start Assistant Timekeeper must clearly understand that a "start" is the exact time the competitor's lower leg crosses the start line.

The Finish Assistant Timekeeper must clearly understand that a "finish" is the exact time when any part of the competitor's body crosses the finish line.

It is extremely important that both the Start and Finish Assistant Timekeepers trigger their devices consistently so that the time is measured at the same location for each competitor.

Prior to the Start Assistant Timekeeper's leaving for the start, all available manual timekeeping devices should be reset to the same time of day as System A & B and started in synchronization. If Time of day synchronization is not possible, it is permissible to synchronize manual timekeeping devices from 00:00.00. This task is the responsibility of the Chief of Timekeeping or Chief of Manual/Hand Timing.

The quartz watches we use today are quite accurate and variation is negligible. Elapsed electronic times can be compared with elapsed manual/hand times throughout the race and necessary corrections made. It is a good idea to change the batteries before the first race of each season, at regular intervals during the season and whenever large deviations occur.

When possible, two manual timekeeping devices should be available at the start and two manual timekeeping devices available at finish. The manual timekeeping device not being used should be kept close to the timer's body so that the display and batteries stay warm. The weight of the manual timekeeping device should be supported with both hands, and the control button should be operated with the index finger. It is important that Assistant Timekeepers have an opportunity to practice

with the manual timekeeping devices prior to the start of the race and they should be instructed to also record forerunners' times.

If at all possible, the reset button on the manual timekeeping devices should be blocked so that it is impossible to accidentally reset the clock. The suggested procedure to follow IF one of the manual timekeeping devices is accidentally stopped is to switch to a backup device and MAKE A NOTATION on the record form, OR continue with the first device after restarting it and MAKING A NOTATION on the record form - the differential can be figured later. *Each device should be marked with a permanent number to assist with record keeping.* Resynchronization of manual timekeeping devices by radio is possible but is not recommended.

NOTE: The practice of drilling the reset button and inserting a blocking device may affect the waterproof capability; the vibrations of the drill may damage the circuitry. Drilling the reset button voids the manufacturer's warranty!

It is strongly recommended that the Chief of Timing and Calculations verify synchronization of manual timekeeping devices when all Assistant Timekeepers are in position at the Start and the Finish. This can be done by radio. Count a simple command (3--2--1--GO). At "GO", Assistant Timekeepers activate a split on their continuously running manual timekeeping devices and the Chief of Timing and Calculations can compare start manual timekeeping device display to finish manual timekeeping device display to verify synchronization. Verifying synchronization can eliminate missed manual/hand times caused by "mode" reset. (This procedure should be followed when using new/inexperienced manual/hand timing crews and should be fully explained in race day timing crew instructions.)

Forms, manual timekeeping devices, pencils and clipboards should be given to the Start Assistant Timekeeper(s) early enough that they could reach the Start well before the first Forerunner leaves the start gate. The Start Assistant Timekeeper(s) should be close to the start gate and opposite the hinge on the wand so they are able to observe the opening of the start wand and see the lower leg cross the start line.

Finish Assistant Timekeeper(s) require a clear view across the finish line to determine when the first part of the competitor's body crosses the finish line. They should be positioned as clear of the "fall zone" as possible and outside of the protection pads and fences. The Finish Referee is responsible for the horizontal marking of the finish line with a coloring substance, and the Chief of Timing and Calculations should verify that it has been done.

When a competitor starts, Start Assistant Timekeepers activate continuously running manual timekeeping devices that have been synchronized with those at the finish. Finish Assistant Timekeepers activate their manual timekeeping devices when the same competitor finishes. The activation freezes the display although the time is still running internally. Once the displayed time is documented, the devices may need to be reactivated in order for the display to start running and be ready for the next competitor's start and finish. Newer devices just require that the button be pushed again in order to display the next time. Knowing how the manual timekeeping devices actually operate is another good reason to "practice"!

A perfect situation would be two Manual/Hand Timekeepers with a Manual/Hand Time Recorder at the start and an identical team at the finish. Personnel are not always available for this "perfect"

situation so it is suggested that the Primary Manual/Hand Timekeepers at the start and at the finish each operate *ONLY ONE* manual timekeeping devices. The Secondary Start and Secondary Finish Manual/Hand Timekeepers can then operate another manual timekeeping device and also fulfill the duties of a Manual/Hand Time Recorder. This will encourage accuracy and teamwork and will provide an educational atmosphere.

If two racers are approaching the finish in close proximity and there is not enough time for both Manual/Hand Timekeepers to time the first racer, read off/record elapsed times and reset for the second racer, it is strongly suggested that the Primary Finish Manual/Hand Timekeeper records a time for the first racer to cross the line and the Secondary Finish Manual/Hand Timekeeper/Recorder records a time for the second racer to cross the line.* An indication must then be made as to whether the recorded times are a "P" (primary) time or an "S" (secondary) time.

**This is not a perfect solution, but the alternative is "no time"; it is important that manual/hand timekeeping be available for every competitor.*

The manual timekeeping device display is recorded exactly as it is displayed; times are NEVER rounded. If two manual timekeeping devices are available and both times are being recorded, the recorded times are NEVER averaged.

In order to determine the elapsed time of a competitor, the manual/hand start time is subtracted from the manual/hand finish time. In the case of a missed electronic time the time start manual/hand time can be obtained, subtracted from the finish manual/hand time for the same competitor, and a Manual/Hand Time (HT) can be posted on the scoreboard. Times posted on the scoreboard are **unofficial**, so the Replacement Time (EET) can be calculated later and the corrected time furnished to the Data Management person.

Manual/hand-held watches or battery-operated, hand-held timekeeping devices operating in time-of-day mode and that can be synchronized to the electronic timing system are available. Manufacturers' specifications should be followed for proper performance.

AT THE FINISH

A designated official - Finish Referee, Finish Controller, Finish Gate Judge or Spotter - announces the bib number of the approaching competitor. The times (electronic and manual/hand) are recorded on the respective recording form for each competitor.

Two different persons should record electronic times in at least two places. The Chief of Timing and Calculations will develop the preferred method. As noted earlier, manual intervention of the times must be marked on the timing tapes.

It is primarily the Chief of Timing and Calculations' responsibility to verify official times against the timing tapes; they are the only official timing record for the race. These tapes are given to the Technical Delegate for review and are kept by the Race Organizer until the race is officially approved. *In cases of force majeure, the Technical Delegate may choose to retain the timing tapes; the decision of the Technical Delegate must be respected.*

The Chief of Timing and Calculations must account for all competitors at the end of each run. Start List - Total DNS's - Total DNF's - Total DSQ's = Finishers. (Verify DNS's, DNF's, and DSQ's

against the Report(s) by the Referee.) The number calculated should be the same as the number of finishers on the results (1st Run, 2nd Run or Official Results).

Although the Technical Delegate is the official responsible for verifying the competitors' Race Points and the Official Penalty for races that are scored for points, if time allows it, the Chief of Timing and Calculations should calculate/verify the Race Points and the Official Penalty. Manual verification of Race Points and Official Penalty is a required duty even if a computer has already calculated them. (See "Penalty Calculation" in this Chapter.)

The Chief of Timing and Calculations must also verify and complete the Timing & Data Technical Report Form (TDTR). For information on how to properly complete this form and to insure that timing is carried out according to the rules, please refer to current editions of the FIS Timing Booklet and current timing rules. *Timing & Data Technical Report (TDTR) is required for all USSA-scored events, all USSA non-scored Championship events, (e.g. J4 Junior Championships), and all FIS events.*

REPLACEMENT (EQUIVALENT ELECTRONIC) TIME – (EET)

If an electronic time is missed a replacement (equivalent electronic) time is calculated, as follows, in accordance with the provisions of the ICR using the Replacement Time - EET worksheet:

1. For a MISSING electronic time, 10 competitors'* times should be used (5 before and 5 after the missing electronic time or, if necessary, the 10 closest to the missed time).
2. Record the bib number(s) of the missing time(s) in the appropriate area on the worksheet. (Chapter VI - Working Papers)
3. Record the 10 bib numbers being used for the calculations in the appropriate boxes.
4. Transfer the manual/hand times as recorded on the Start/Finish Timekeeper Recording Forms (Chapter VI - Working Papers) to the worksheet with Finish time placed above the Start time in each box.
5. Subtract the start time from the finish time for each bib number to determine the competitors' elapsed manual/hand times.
6. Transfer this time to the right side of the worksheet along with the appropriate bib number.
7. For each respective bib number record the electronic time in the proper column.
8. Find the difference between the manual/hand time and electronic time for each competitor and record it in the proper column depending on whether the manual/hand time is longer (slower) or shorter (faster) than the electronic time.
9. Subtract the sum of "Hand Time Longer (-)" column from the sum of "Hand Time Shorter (+)" column.
10. Divide this difference by 10.
11. Add or subtract this to/from the elapsed manual/hand time for the missing electronic time. This is the Replacement Time (Equivalent Electronic Time - EET).

There are a number of different software applications that are available so that data required for the calculation of a Replacement Time can be entered into a computer. The software will calculate and print the completed Replacement Time. It is strongly suggested that all calculations be verified.

Rule refers to "competitors"; forerunners are NOT competitors.

READING A TIMING TAPE - WITH INTERVAL TIMES

D1	017	A1	022 1:39.6942	Prior to the start of the race, it is
	11.54:00.0769		12.00:39.3009	important that you know how to
I2	016 1:08.760	D1	024	read the tapes generated by the
	11.54:08.3838		12.00:59.9723	timing equipment you will be using
I1	017 0:39.114	I2	023 1:08.775	
	11.54:39.1912		12.01:07.2039	
A1	016 1:40.0506	I1	024 0:38.846	There are many different formats
	11.54:40.5860		12.01:38.8188	
D1	018	A1	023 1:40.9974	
	11.54:58.7774		12.01:39.4260	
I2	017 1:08.0573	D1	025	
	11.55:09.0402		12.01:59.0303	
I1	018 0:38.740	I2	024 1:08.304	<u>Reading A Tape</u>
	11.55:37.5179		12.02:08.2772	
A1	017 1:41.0517	I1	025 0:38.8988	Determine the
	11.55:41.1286		12.02:37.9292	Start Time,
D1	019	A1	024 1:40.9590	Finish Time and
	11.55:59.8453		12.02:40.9313	Elapsed or Run Time
I2	018 1:08.258	D1	026	for the following competitors:
	11.56:07.0361		12.02:59.2753	
I1	019 0:37.600	I2	025 1:09.713	
	11.56:37.4454		12.03:08.7427	20:
A1	018 1:39.9694	I1	026 0:40.025	
	11.56:38.7468		12.03:39.3011	
D1	020	A1	025 1:42.8298	
	11.56:59.7584		12.03:41.8601	
I2	019 1:07.574	D1	027	
	11.5707.4202		12.03:59.0525	
I1	020 0:37.695	I2	026 1:10.885	
	11.57:37.4540		12.04:10.1686	24:
A1	019 1:39.5346	I1	027 0:40.935	
	11.57:39.3799		12.04:39.9880	
D1	021	A1	026 1:43.2812	
	11.58:00.2846		12.04:42.5565	
I2	020 1:07.464	I2	027 1:12.659	
	11.58:07.2227		12.05:11.7115	
A1	020 1:39.6390	D1	028	
	11.58:39.3974		12.05:06.8828	28:
I1	021 0:39.519	A1	027 1:46.6823	
	11.58:39.8042		12.05:45.7348	
D1	022	I1	028 1:17.322	
	11.58:59.6067		12.06:24.1787	
I2	021 1:09.875	A1	028 1:35.5999	
	11.59:10.1602		12.06:42.4827***assigned to 28(?)	
I1	022 0:38.171	*I2*	*<u>028</u> 1:57.263*	
	11.59:37.7777		*12.07:04.1197*	
A1	021 1:42.5023	*A1*	*<u>028</u> 2:39.0066*	
	11.59:42.7869		*12.07:45.8894*	
D1	023			
	11.59:58.4286			
I2	022 1:07.652			
	12.00:07.2590			"A"=Arrive=Finish
I1	023 0:38.938			"D"=Depart=Start
	12.00:37.3673			"I1 & I2"=Intermediate times

Case Study: A Timing Tape

Determine the Start Time, Finish Time and Elapsed or Run Time for competitors #20, #24 and #28:

#20:	A1:		11.58.39.3974 (Arrive, Finish)
	D1:		11.56:59.7584 (Depart, Start)
			1:39.6390
	Time:	1:39.63	(TRUNCATE 100th of a second)

#24:	A1:		12.02:40.9313
	D1:		12.00:59.9723
			1:40.9590
	Time:	1:40.95	(TRUNCATE 100th of a second)

THIS WAS AN ACTUAL CALCULATION--LOOK FOR THE PROBLEMS.

#28:	A1:	12.06:42.4827
	D1:	12.05:06.8828
		1:35:5999

Assigned Time: 1:35.60*

*Questionable, as fastest time is 1:37.52. Probably caused by "keying" error by operator at position A1 (Finish) and possibly caused by confusion when competitor hiked.

*1:35:5999 SHOULD NOT HAVE BEEN ROUNDED TO 1:35.60; rounding and assignment of 1:35.60 was probably caused by manual calculation.

CALCULATION SHOULD HAVE BEEN AS FOLLOWS FOR LISTING ON THE UNOFFICIAL TIMES:

#28:	A1:		12.07:45.8894 – Actual Finish
	D1:		12.05:06.8828
			2:39.0066
	Time:	2:39.00	(TRUNCATE 100th of a second)

The usual thoughts at the end of a race are: "okay, last competitor has finished, let's pick up and go home". Quality Control by cross checking and proofing assigned times against the tape from the primary timing equipment caught the questionable time just as the Start Referee was delivering his report of "Late start on #28". *Any time that is an anomaly – much faster or slower than the rest of the field's – must be verified!*

Note that all other competitors left the Start Gate within the legal five seconds before or after the minute interval. It is documented that Competitor #28 started 06.8528 seconds after the start command at 12:05.0000, so with proper documentation, Competitor #28 will be disqualified.

THE IMPORTANCE OF POINTS

Ski racing has a unique position in the world of sports as it pits the competitor against the clock and also against other competitors. There is no set court, field or track and no absolute length of a racecourse. A number of variables such as terrain, snow conditions, weather, racecourse configuration, speed and turns are also factors. In order to compensate for these variations in terrain and racecourses, FIS and USSA have set guidelines such as minimum vertical drop, minimum and maximum number of gates, and gate dimensions for the setting of the racecourses. In addition, there is a formula for assigning points by relating a competitor's time to the winner's time (Race Points).

Two factors led the development of a numerical system of scoring competitors in ski events:

1. The problem of combining the results from more than one event, such as Downhill and Slalom, to obtain the results for the Downhill/Slalom "Combined" race. This problem surfaced after the adoption of the Slalom by the FIS in 1928.
2. The problem of seeding competitors by a method other than the Jury's recognition of their performance records.

Competitors are:

1. Scored by points for each competition in which they finish without disqualification.
2. Ranked nationally and/or internationally according to their earned points.
3. Seeded in subsequent competitions according to their points (as listed in the current USSA/FIS Points Lists), which were earned in previous events.
   NOTE: Effective 2011-2012, the validity period of a FIS result is the current season. A Base List (BL) will be published prior to calculation and publication of the first FIS List for each season. (Rules of FIS Points)

As you can see, everything in ski racing is "done by the numbers", in this case, the “Points”. The calculations required to obtain the Race Points and the Penalty are not difficult. Use the proper forms and formulas for either USSA or FIS Penalties and report the calculations correctly rounded to two decimal places (the 1/100ths position).

Race Points

The linear or Lowry formula (New Alpine Formula) was approved by the FIS Congress at Sydney, Australia and has been valid since the 1984-85 season. Both FIS and USSA points are based on this formula. Factors, (F-Values), are announced each fall in the USSA Alpine Competition Guide, the "Commentaries" for the FIS and USSA Point Lists, and the Precisions to the ICR. These factors are based upon statistical analyses for races from previous seasons.

Symbols in the formula:

To = Winner's Time, in seconds: SSS.ss
Tx = Competitor's Time, in seconds: SSS.ss
P = Race Points
F = 60 -:- (Cm - 1)
Cm = Average time for all competitors finishing without disqualification,
Divided by the Winning Time.

NORMALLY, an official does not need to be concerned with Cm. The values for F are published and are subject to revision at the FIS Congress in even numbered years.

The formula is expressed in two algebraically equivalent ways:

P = F x (Tx -:- To) – 1 OR P = [Tx x (F -:- To)] - F

This 2nd formula avoids the repeated division of Tx by To for each competitor as the fraction (F -:- To) can be stored in a calculator's memory as a "constant". This leaves only a multiplication and a subtraction for each competitor. This version is recommended for use with non-programmable calculators that have a single "memory".

For consistency, this version is also recommended for programmable calculators and for digital computers. Programs for programmable calculators and for digital computers should display and print the competitor's points rounded and truncated to two decimal digits - the nearest hundredth.

The principle formula we use for these points is as follows:

$$\frac{\text{(Tx) Racer's Time in seconds}}{\text{Winner's Time in seconds (To)}} - 1 \times \text{Factor for} \begin{cases} \text{/ DH} & \text{- USE} \\ \text{/ SG} & \text{- CURRENT} \\ \text{\ GS} & \text{- F} \\ \text{\ SL} & \text{- VALUES} \end{cases}$$

NOTE: Your calculator may not require "=" after keying "To" or "CLR" before keying "Tx". Some calculators require the use of an " = " after the division process. Do not round off during the calculation - wait until the end.

RACE POINT CALCULATIONS FOR CALCULATORS WITH ONE MEMORY:

Store in Memory: F -:- To

Then, For Each Competitor: Tx X Memory Recall - F = Race Points

USSA RACE PENALTY CALCULATION PROCEDURES

The purpose of a Race Penalty becomes apparent when considering this scenario: Two races of the same event are run on the same day at adjacent ski areas with different levels of competitors. In each race, the winner receives 0.00 Race Points.

Because of this type circumstance, a "handicapping" system, known as the BOB Rule is used to calculate additional points to be added to each competitor's Race Points to compensate for the difference in the level of competition in the specific event.

These handicap points, or Penalty Points, are calculated by a formula that uses the Seed Points of the 5 competitors with the LOWEST (best) SEED POINTS entered in the race who actually **START** the first run, regardless of result or status (DNF, DSQ), and the Seed Points and Race Points of the 5 competitors with LOWEST (best) SEED POINTS from among the top 10 competitors who finish without being disqualified.

The procedure for a USSA Penalty calculation is as follows:

1. List the **5 competitors** with the **lowest** (best) **Seed Points** who actually start the first run. Total their Seed Points.
2. List the **top 10 finishers** and their respective **Seed Points. CHECK FOR MAXIMUM SEED POINT VALUES AND CHECK FOR TIE AT 10TH.** (If either situation occurs, verify **current** rules.)
3. Working across on the same line for each competitor, choose the 5 competitors from among the top ten finishers who entered with the **lowest (best) Seed Points. CHECK FOR TIE AT 5TH.** (If this occurs, verify **current** rules.) Total their Seed Points.
4. List the race points for these **5 best Seed Point finishers**. Total their Race Points.
5. Add total Seed Points of best 5 competitors that started to total Seed Points of best 5 competitors who finished among top 10 without disqualification.
6. Subtract total Race Points in step 4 from sum of step 5.
7. Divide difference by 10; round off to 100ths (.01) if necessary. Result is the Penalty.

There is a form to use for this calculation, which is self-explanatory. Refer to Chapter VI - Working Papers, USSA Penalty.

MINIMUM PENALTIES FOR USSA-SCORED EVENTS: When a USSA event is submitted for scoring:

1. The minimum penalty for a non-FIS USSA race that meets published standards is 15.00. If the calculated penalty is lower than 15.00, the applied penalty shall be 15.00.
2. If the minim vertical drop requirement is met, then the minimum time requirement does not apply.
3. If the minimum vertical drop requirement is not met, then the greater of the calculated penalty or the minimum penalty of 30.00 shall be applied.
4. If the minimum vertical drop requirement is not met, but the minimum time requirement is, the greater of the calculated penalty or the minimum penalty of 30.00 shall be applied.
5. If the minimum vertical drop requirement and the minimum time requirement are not met, then the greater of the calculated penalty plus the additional penalty as published in the current Alpine Competition Guide, or the minimum penalty of 30.00 shall be applied.

FIS RACE PENALTY CALCULATION PROCEDURES

FIS Technical Delegates must be aware of the minimum/maximum penalties that apply to the race being scored. The minimum is the lowest penalty at which the event will be entered into the Points List. If the calculated penalty is lower than the minimum, the minimum figure must be applied. If the calculated penalty is greater than the minimum, the calculated figure is used. Minimum penalties are printed on the cover page of the appropriate FIS Points List. There may also be maximum penalties mandated for some events. This information can be found in current copies of the International Competition Ski Racing Rules and/or its Precisions, the Rules of the FIS Points, and the cover page of the appropriate FIS Points List.

At the 1996 FIS Congress in Christchurch, New Zealand, the Congress approved the introduction of the Integrated FIS List. This change, as amended, achieves the following: The top 30 competitors of the WCSL and the FIS Points List will be the same; the three-level structure: World Cup, Continental Cup, and FIS races will be clearly defined through the use of race level Adders, and the FIS points will become less compressed, without affecting the rankings.

The details of the Integrated FIS Points List, as amended, are:

Allocation of FIS Points for the Top 30 WCSL. The top 30 competitors on the WCSL are allocated FIS Points between 0 and 5.99. The difference between the allocated FIS Points of the top 30 WCSL will be proportionate to the difference between their WCSL Points.

Correction Value (Z): Zero (X) and 'Ten' (Y) Positioning (X+Y=Z). Before the above allocation of points for the top 30 takes place on each List, a correction (Z) will be made to all FIS Points which comprises both the zeroing (X) and the 'tenning' (Y) - the difference between the Points of the 31st competitor and 10 points.

Correction of Penalties. The above correction value (Z) will be taken into account in the penalty calculation for each race. This ensures that all results can be compared to each other from list to list.

Race Level Adder and Minimum Penalty: The relevant race level adder is added to the calculated penalty. If the calculated penalty is less than the minimum, then the minimum penalty is applied. *(The following is an example.)*

CATEGORY	LEVEL	MIN	MAX
OWG, WSC, WC;		0	0
COM		0	4
WJC, EC, FEC, NAC, SAC, ANC, UVS, ECOM	1	6	999
NC	2	8	999
FIS, JUN, NJR, NJC, UNI, CIT, CORP, CISM	3	9	999
ENL	4	40	999

Separate race level adders will be established *in each event and gender for each of the four lower levels* (1, 2, 3, and 4). The race level *adders may be updated with each points list* and will be published on the front page of the FIS List which is available on USSA and FIS websites.

"Z" for each event and gender *will be updated with each points list* and will be published on the front page of the FIS List.

ENL (Entry League FIS). ENL events have separate vertical drop/gate count requirements.

Validity of Points: The length of validity of each result is the current season.

The calculation of a FIS Penalty follows Steps 1 - 7 of the USSA Penalty. Following any necessary rounding, however, the following steps are added:

8. Apply correct correction value, (Z Value). This may be a plus or minus figure.

NOTE: IF THE Z VALUE IS A **POSITIVE** NUMBER, IT MUST BE **SUBTRACTED**. IF THE Z VALUE IS A **NEGATIVE** NUMBER, IT MUST BE **ADDED**. *The Z should be entered into the computer exactly as it is displayed on the cover page of the FIS Points List. The software has been designed to complete the function correctly.*

9. Apply correct race level Adder.

The result of these additional calculations is the FIS Penalty.

There is a form to use for this calculation, which is self-explanatory. Refer to Chapter VI - Working Papers, FIS Penalty.

PENALTY CALCULATION

Name of Competition		
Date	**Event**	**Name of the TD**

The best 10 at finish

Result	Number	Name	Nat	USSA-Points	Best 5	Race points
1.		A		4.00	4.00	0.00
2.		B		2.00	2.00	2.00
3.		C		14.00		
4.		D		8.00	8.00	8.00
5.		E		12.00		
6.		F		10.00	10.00	9.00
7.		G		20.00		
8.		H		16.00		
9.		I		6.00	6.00	10.00
10.		J		18.00		
				(STEP 2)	**(STEP 3)**	**(STEP 4)**

The best 5 at start (STEP 1)

DNF 1				1.00
2				2.00
DSQ 1				3.00
1				4.00
DNS 2				5.00

TOTALS

(B) **USSA Points of best 5 at start** 15.00

(A) **USSA Points of best 5 to finish in top 10** 30.00

(C) **Race Points of corresponding competitors** 29.00

Calculated penalty (STEPS 5 & 6) **(STEP 7)**

A 30.00 + B 15.00 - **C** 29.00 = 16.00 : 10 = 1.60

Penalty applied 15.00

Signature TD	Nr

Penalty Point Example 2 - Tie for 10th Place

Calculation of Penalty requires the following information - Competitors with lowest (best) SEED points who started first run:

BEST 5-START	NAME	RESULT	SEED POINTS
1	D	4	0.00
2	M	DNF	.85
3	L	DSQ	1.04
4	A	1	2.00
5	B	2	3.00

When two or more competitors are ranked 10th in the race, all shall be taken into consideration for the penalty calculation, if they are part of those five competitors with the best Seed Points.

Place	Competitor		Seed Points	Best-5	Race Points
1	A		2.00	2.00	0.00
2	B		3.00	3.00	2.64
3	C		6.21		
4	D		0.00	0.00	7.16
5	E		6.15		
6	F		8.57		
7	G		5.00		
8	H		7.54		
9	I		7.62		
10T	J		4.28	**4.28**	18.61
10T	K	3.06	**3.06**	18.61	
				12.34	47.02

Both of the competitors tied for 10th have Seed Points lower than those of competitor number 7 and must be taken into consideration for the penalty calculation. (FOR FIS PENALTY, STEPS 8 & 9 WOULD BE INCLUDED, MINIMUM PENALTY WOULD BE CHECKED AND IF LARGER THAN CALCULATED PENALTY, MINIMUM PENALTY WOULD APPLY.)

Penalty Point Example 3 - Tie for 5th Best Seed Points

One could also find a tie in for 5th best Seed Points among the top 10.

Place	Competitor	Seed Points	Best-5	Race Points
1	A	2.00	2.00	0.00
2	B	3.00	3.00	2.64
3	C	6.21		
4	D	0.00	0.00	7.16
5	E	6.15		
6	F	8.57		
7	G	5.00		
8	H	4.00	4.00	12.00
9	I	**4.28**		
10	J	**4.28**	4.28	18.61

Which competitor is the 5th of our "best 5"? Is it competitor F or I? Rules require that we choose the competitor whose race points will result in the calculation of a lower (better) Penalty.

PENALTY CALCULATION
CALCUL DE LA PENALITE
PUNKTEZUSCHLAGSBERECHNUNG

Name of event *Nom de l'événement* Name der Veranstaltung COC EVENT		
Date *Date* Datum	**Event** *Événement* Veranstaltung	**Name of the TD** *Nom du DT* Name des TDs

The best 10 at finish / *10 meilleurs à l'arrivée!* / Die besten 10 im Ziel

Result *Résultat* Resultat	**Number** *Dossard* Nummer	**Name** *Nom* Name	**Nat** *Nat* Nat	**FIS-Points** *Points FIS* FIS-Punkte	**Best 5** *5 meilleurs* 5 besten	**Race points** *Pts de course* Rennpunkte
1.		A		4.00	4.00	0.00
2.		B		2.00	2.00	2.00
3.		C		14.00		
4.		D		8.00	8.00	8.00
5.		E		12.00		
6.		F		10.00	10.00	9.00
7.		G		20.00		
8.		H		16.00		
9.		I		6.00	6.00	10.00
10.		J		18.00		

(STEP 2) (STEP 3) (STEP 4)

The best 5 at start / *5 meilleurs points FIS au départ* / Die 5 besten FIS-Punkte am Start

DNF 1		K		1.00	
2		B		2.00	
DSQ 1		L		3.00	**(STEP 1)**
1		A		4.00	
DNS 2		M		5.00	

TOTALS / *TOTALS* / SUMMEN

(B)	**FIS Points of best 5 at start** Points FIS des 5 meilleurs au départ Die 5 besten FIS-Punkte am Start	15.00		
(A)	**FIS Points of best 5 to finish in top 10** *Points FIS des 5 meilleurs dans les premiers 10* Die 5 besten FIS-Punkte aus den ersten 10		30.00	
(C)	**Race Points of corresponding competitors** Points compétition de ces concurrents *Rennpunkte der entsprechenden Wettkämpfer*			29.00

Calculated penalty / *Pénalité calculée* / Berechneter Zuschlag **(STEPS 5, 6 AND 7)**

A 30.00 + B 15.00 - **C** 29.00 = 16.00 : 10 = 1.60

Correction value / *Valeur de correction* / Korrekturwert (-z →+z Art. 4.4.6) **(Z= (-)1.00; IF Z IS POSITIVE, SUBTRACT; IF NEGATIVE, ADD) (STEP 8)**	+1.00*
Category Adder / *Additif de catégorie* / Kategorie-Adder **(STEP 9)**	+6.00*
Penalty applied / *Pénalité appliquée* / Angewandter Punktezuschlag **(SUBJECT TO MINIMUM PENALTY)**	+8.60
Signature TD / *Signature du DT* / Unterschrift des TDs	**Nr**/*No*/Nr

***NOTE: CORRECTION VALUE (ADDER) AND "Z" ARE EXAMPLES ONLY. THEY MAY CHANGE WITH EACH FIS LIST.**