
# COURSE SETTING
## HANDBOOK

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*Compiled by Ron Kipp, Jon Nolting, U.S. Ski Team's Alpine Coaching Staff and USSA Clinician Staff*

*Photos by Getty Images*

# INTRODUCTION

## What is Course Setting?

Course setting is an essential tool for the ski coach. Sometimes thought of as an art or even a philosophical statement, course setting is the decisive evaluation to the goal of ski racing. Essentially who can get from start house to finish line in the shortest amount of time.

Course setting consists of two categories; course set for races, and course set for training. Race courses are under the auspices of two governing bodies; the International Ski Federation (Fédération Internationale de Ski or FIS) and in the United States, the United States Ski and Snowboard Association (USSA). The FIS governs international race courses, while USSA is in charge of domestic race courses in the United States. Each organization has set guidelines for the length of the course, number of gates, and distances between gates. While the hills or slopes are subject to homologation by the respective governing body.

*FIS or Fédération Internationale de Ski is the International Ski Federation. It is the governing body of international ski racing.*

**Introduction:**

Course setting for a race course is a privilege, an honor, and an obligation. The sport requires that coaches set courses, but how a coach accomplishes that task becomes part art, part science, and part a reflection of the setters past experiences and current understanding of and appreciation for the trends of the sport. Each course has its own unique rhythm and speed, its own terrain interpretation and snow adaptation, along with its own response to the weather. A portion of the professional reputation of a coach is based upon the courses he or she sets. In the end, a course is a reflection of the setter's skiing and competition philosophy.

## Current Environment:

How does a coach set a course? First, let's establish the current environment for setting. The evolution of ski design and construction has led to an interdependent relationship between ski equipment, the racer, and course setting. Even though the basic rules and regulations for course setting have changed little over time, the courses set today have changed dramatically. Setting a course that follows the rules and minimizes the risks is one thing, setting one that is challenging, fair, age and skill appropriate, and that also successfully "accommodates" the design of modern ski equipment is a much greater task.

In addition to the dramatic changes in ski technology, the second leading factor effecting course setting is the quality, consistency and durability of the snow surface. Technological advances in snowmaking, grooming and preparation have improved the field of play to the point where, racers farther down the start order are less impacted by negative conditions. All racers are able to ski more aggressively in almost all conditions and disciplines. Because of these dramatic changes in ski equipment and the accompanying improvements in the training/competition environment, coaches have greater flexibility in course setting, program planning, and have enhanced opportunities to teach ski skills with wider creativity.

Today, course setters have had to “adjust” the setting of their courses to accommodate these changes. Simply stated, courses have become ” rounder” (more off-set or out of the fall-line) in order to not only control the speeds, but also to adequately challenge the technical and tactical skills and experience of the athletes and their equipment.

## Poles

Poles, aka flex poles or slalom poles, (erroneously called "gates”), are used in alpine ski racing and training to define the line of travel for the ski racer. The FIS has specifications for flex pole dimensions used in international competition (FIS, 2012), while individual countries, like the U.S.A. determine domestic standards (USSA Alpine Competition Guide, 2016).

*Gate*: Consists of two poles in slalom and four in GS, SuperG, and downhill. There is a turning pole(s) and an outside pole(s). The ski racer’s ski tips and boots must pass through the “gate” breaking the imaginary line between turning and outside pole.

The FIS has two categories of poles: Type A; which is authorized to use in any FIS race. These poles have shaft diameters that range from 29 to 32 mm. Type B poles are authorized for use in any FIS race except World Cup races. Shaft diameters for Type B poles range from 25 to 28.9 mm.

Poles vary by their height above the snow surface when placed vertically. All FIS and USSA U16 races must employ poles that stand a minimum of 1800mm above the snow surface. In the U.S. there are also 60 inch (152cm) poles. These are used for U14 and younger events with FIS type B 25 to 28.9 mm shaft diameter. The shorter 54 inch (137cm) poles have been phased out for use in competition. Shorter stubbies or Heroes (pliable, rubber-like shaft, 35mm in diameter and 70cm length) are allowed for U14 and younger non-scored events.

In giant slalom, Super-G, and downhill, poles should be full height (1800mm) for all age groups and genders. U14’s and younger should use FIS type B poles. For all events the outside pole(s) must be of the same type as the turning pole(s).

Poles can have a flexing hinge at snow level or for speed events be of rigid construction (static gates). The flexing hinge must conform to FIS specifications. The rigid pole must be round, uniform poles with a diameter between a minimum of 20 mm and a maximum of 32 mm without joints. They must be of such a length that when set, they project 1.80 m out of the snow and they must be made of a nonsplintering material (plastic, plasticized bamboo or material with similar properties). Flex poles must be used for all alpine competition except downhill. The use of flex poles may be requested by the jury for downhill.

Poles are also used for the training of ski racers. The type and style is only mandated by the ski coach. Additionally there are popular ancillary training props that include; Whiskers (aka brushes) and Heroes (aka stubbies).

The base of the gate, the section that holds the poles in the snow has two popular styles; the screwing “snow grip” and “BrushGrip™”. The screw type is like a large wood screw.


The screw is turned clockwise (like a normal screw) with a wrench (gate tool) till the top of the screw base is flush with the skiing surface. This will permit the hinge of the gate to flex. Deeper and the hinge will not be allowed to flex, shallower and the gate base will not flex as intended and could act as a solid obstacle if contacted by a ski. Screw in gates are removed by turning counter clockwise with the wrench. BrushGrip™ poles can be pulled straight out of the snow. If stuck, you can use the drill to make additional holes very close to the pole shaft (the brush bristles will move out of the way and are very robust to the drilling).

## Gate panels

For Giant Slalom Super-G and Downhill Gate panels which conform to the FIS Specifications must be used for all Giant Slalom, Super-G and Downhill competitions published in the FIS Calendar. A list of homologated panels is published on the FIS Website. ICR arts. 701.3.2, 901.2.2 and 1001.3.2 remain valid.

## Drills and bits

There are many type of drills. They should be powerful with a long battery life. A spare (fully charged) battery in your backpack is recommended. Drill bits are long (50 cm) and large diameter. Screw bases usually take a 32 mm diameter bit and BrushGrip™ bases a 35 mm diameter bit.

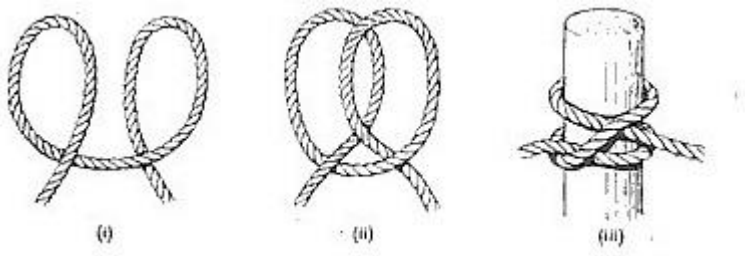
## Carrying poles on the chair

If more than a couple poles, bungee the top and bottom of the bundle. Only carry as many as you feel comfortable with. Don’t be shy to bow out of this job if you feel uncomfortable. It is a dangerous job. Loading the chair: Check to see what side of the towers you will be traveling on. With hinges down either place the gates on your lap, with shaft pointing away from the tower, or place the shafts out the back end of the chair, again with shafts biased away from the towers.

### Race arena fencing

The race arena must be shut out from the public. This is usually accomplished with signs, rope, banner guard, barricade tape, barrier webbing, fabric fence, mesh fence, or marking net.

While not full proof, closing off the area to the public does allow a greater prospect of safety. To set up fencing, drill a hole in the snow every 5-10 meters. Place a pole in the hole. If using rope construct a clove hitch (see below) and slide it over the top of the bamboo. Tighten the clove hitch to secure the rope fence. For other barriers, see the manufacturers recommendations. Always check with the snowsport area to see what their rules are governing closing off an area.



**Assisting the course-setter.** Several jobs can assist the course-setter: Carrying poles. Usually two buggies are on the poles. Removing the bungee from base leaving the top tied (for a while) will make the carrying job easier. Poles are set red, blue, red, blue, etc. Be prepared to hand or toss the course-setter the next color pole. If there is a lot of help a third person may assist in placing the gate. If tossing the pole, make a momentary eye contact then with the base down and the shaft vertical give the pole a toss to the out-stretched hand of the course-setter. Be aware of where you are during the course-set. Leaving a line of sight up-hill and downhill for the course-setter will allow them to be able to see the course while setting.

### Goals and responsibility of the Course Setter

The ability to set appropriate courses that achieve the desired training result is an important attribute for the successful coach. It requires experience, planning, and practice. Course setting is acknowledged as an art, not a science. It cannot be easily taught or explained, it must be practiced. The more coaches that are competent course setters in a program, the better. There is no one perfect course set. To maximize the learning environment for our skiers, a variety of different courses and sets should be introduced. Each coach will acquire a certain course setting style, or tendency. For training, especially for developing racers, it is important that they are exposed to many different styles of courses to help them become adaptable skiers with a broad base. To this end, we encourage you to step up and actively participate in the course setting with your club and share this responsibility with your fellow coaches.

### Course setting with a purpose

Before setting any course, you should start with an objective in mind. Most technical skill development is best achieved outside of gates during freeskiing or practicing drills. Once acquired, the skiers should try to apply those skills in the course. The coach can then set a course that will progressively challenge the athlete, and with practice, make the newly learned skill habitual. There are many possible training objectives that the coach may factor into their course set.

**Course setting with safety in mind** Safety should be the first and foremost consideration on the coach's mind. This doesn't preclude the coach from setting a course that is fast, or uses challenging terrain, or that has risk/reward tactical elements. It does mean that the coach factors in the environment. How wide is the trail? How steep is the trail? How much protection or safety fencing is set up? What are the snow conditions? What is the skill level of the skiers who will run the course? The course setter must consider these things and set accordingly.
Safety installations, such as B-netting, should be set for training just as it would if it is a sanctioned event.

### Know the rules

You have an obligation to know and abide by the rules of course setting as published in the USSA Alpine Competition Regulations (ACR), found in the USSA Alpine Competition Guide. The ACR specifies the number of gates that can be set, the distance between gates, the allowable vertical drop, the number of special gate combinations, and other guidelines. There are age-specific guidelines and rules for U16 and younger racers that are designed to maximize their development and enjoyment.


## COURSE SETTING PHILOSOPHY

The USSA Alpine Officials Manual provides a good overview for course setting. It reads:

> *"Racecourses should be set appropriate to the level of competition and are required to be set within USSA and FIS specifications regarding the number of gates, the width between the poles of each gate, the distance between successive gates, and the restrictions applied to vertical combinations (flushes and hairpins). In general, racecourses should have some rhythm and the preferred line should be obvious. The challenge should not be in memorizing the racecourse but in selecting the best line in the racecourse set. Course Setters should not rely merely on complex combinations of poles, as a selection of a general line that will test a variety of normal racing skills is the first objective. Racecourses should be technically challenging and the gates should require competitors to make complete turns. A racecourse should have a variety of turns, with varying radii in and out of the fall line and skillful use of the terrain, especially for GS. The final gates of a racecourse should lead the competitor through the center of the finish gate, and Course Setters should anticipate setting into the finish several gates before the end of the racecourse. The Course Setter should check to see that poles are set in firmly to the proper height."*

The recommendations below have been compiled from a broad spectrum of U.S. Ski Team coaches, as well as top domestic junior development coaches, gleaned from their decades of setting assignments.

### Minimizing risk to the athletes

Skiing and ski racing are inherently dangerous sports. Being aware at all times of the environmental factors that could affect the safety of the athletes is paramount. Setting to avoid obstacles, to successfully negotiate difficult terrain elements, and to provide for adequate spill zones is a priority for all setters.

### Creating the right mix of speed and control

Allowing the racers to seek speed while being appropriately controlled and challenged is a delicate balance the course setter needs to strive for.

### Evaluate the ability levels

A setter needs to accurately gauge the skill levels of the competitors within the context of the event objective. For example, the course set for a U16 qualifier in early January will likely be significantly different than the one set for the U18 National Championships in March.

### Set what you know not what you think

The environmental factors often determine the course to be set, i.e. set within the terrain, snow conditions, weather, trail configuration, and event objectives. Set what you have the most experience setting, and set with confidence.

### Challenge the skill and experience levels of the competitors

For younger or less experienced athletes set more consistent rhythm. As the athletes gain in competitive experience and technical/tactical skiing skills, courses should change correspondingly, resulting in greater difficulty, frequent speed and rhythm variations, and the creative use of terrain.

### Set by feel (experience) as much as by science

Experience is the great teacher. The more one sets, the more one develops a feel for what is the appropriate speed and offset, how to gauge the integrity of the snow surface and how to manage the skier's speed through the course set. To understand how a particular piece of terrain will affect the athlete and what rhythm or gate combinations would work best to accommodate that terrain takes practice and patience.

### Adopt a mentor

Seek the advice and feedback from a more experienced setter. The mentor should be part of the setting team offering constructive comments and advice.

### Enlist a helpers

When setting on an unfamiliar site, ski the hill first, enlist a “helper” coach who can follow you down and watch for poor combinations, inappropriate speeds, and for possible terrain judgment errors. Look for difficult sections and trouble spots ahead and decide where to set required gate combinations. In possible low snow areas a helper with a drill could be several gates down the hill checking snow depth. Ask a helper to count the number of gates and turns for competition. If setting outside gates this may be performed by a helper. Although you are responsible to let them know if the gate is oblique or needs to be placed at the minimum or maximum distance. A helper may also be used to install panels if not already in place.

### Review the course

Unless time does not permit, review your course, count gates, make sure red and blue alternate, and make adjustments as needed prior to athlete inspection.

**Course setters at USSA events must have a current coaches membership and must have a current referee certification.**

**Duties of the Course Setter (from the USSA ACR, rule 603.7)**

603.7.1 In order to set the course appropriately, respecting the terrain, the snow cover and the ability of the participating competitors, the course setter conducts a preinspection of the race terrain in the presence of the TD, the Referee, the Chief of Race, and the Chief of Course.

603.7.2 The course setter sets the race course respecting existing course protection measures and course preparation. The course setter must take speed control into consideration.

603.7.3 For all events, the course setter has to set gates according to the respective rules.

603.7.4 The courses must be set and ready in time so that the competitors are not disturbed during course inspection.

603.7.5 The course setters should take care that the difference between the winning times of each run of SL and GS will not be too great.

603.7.6 The course setting is the task of the course setter alone. He is responsible for adhering to the rules of the USSA ACR and may be advised by members of the Jury…

603.7.7 The course setter must participate in all team captains meetings at which a report is to be made about their course.

## GETTING STARTED


It's time to get started. As you set out on your first course sets, remember that it takes practice to get good at anything, so get someone to help you and don't worry if your course doesn't quite come out how you wanted it to. These tips should help you as you begin to gain

### Get help

Have other coaches or helpers carry the gates so that you can focus solely on where you will set the gates. Enlist a coach who helps you line up your distances and offset from above.

### Bring course setting rules with you

Review the course setting rules before you set and bring a copy with you. You'll want to decide what distances between gates you'll generally be setting ahead of time.

**Course Setting Specifications for Scored Events**

| | | Sr, U21 & U19 | U16 |
|---|---|---|---|
| DH | Women - VD | 400 m - 700 m | 500 m max |
| Downhill | DC | as required | as required |
| (700) | Men - VD | 400 m - 700 m | 500 m max |
| SL | Women - VD | 100 m - 200 m | 160 m max |
| Slalom | DC | 30% - 35% (+-3) | see next page |
| (800) | Men - VD | 100 m - 220 m | 160 m max |
| GS | Women - VD | 250 m - 400 m | 350 m max |
| Giant Slalom | DC | 11% - 15% | see next page |
| (900) | Men - VD | 250 m - 450 m | 350 m max |
| SG | Women - VD | 300 m - 600 m | 450 m max |
| Super G | DC | 7% min | see next page |
| (1000) | Men - VD | 300 m - 650 m | 450 m max |

VD = Vertical Drop DC = Direction Changes

**2015-16 Course Setting Specifications for U16 and Younger (Scored and Non-Scored)**

| | | U10 and younger | U12 | U14 | U16 |
|---|---|---|---|---|---|
| Train to Race Ratio (strongly recommended minimum) | | 6:1 (days) | | 5:1 (days) | |
| GS/SL Race Days [3] (recommended) | | Max. 10 Division/State organized, all events | Max. 12 Division/State organized, all events | Max. 14 Division/State organized, all events | Max. 18 Division/State organized, all events |
| Downhill (DH) 700 and U125 | Distance between gates [1] | X | X | 50 m max. | As required |
| | Vertical drop | | | 350 m max. | 500 m max. |
| | Direction changes | | | 8% of vertical drop | As required |
| Slalom (SL) 800 and U125 | Distance between gates [1] | Combination 4-6 m; Open 6-10 m; Delay max. 15 m | | | Combination 4-6 m; Open 6-12 m; Delay max. 18 m |
| | Vertical drop | Max. 100 m | Max. 120 m | Max. 140 m | Max. 160 m |
| | Additional requirements | Max. 3 hairpins; Max. 1 vertical combination; Max. 1 delay gate | | | Min. 3 hairpins; 1-3 vertical combinations; 1-3 delay gates |
| Giant Slalom (GS) 900 and U125 | Distance between gates [1] | Open 15-22 m; Delay max. 30 m | | Open 15-25 m; Delay max. 35 m | Open 15-27 m; Delay max. 35 m |
| | Vertical drop | Max. 200 m | Max. 250 m | Max. 300 m | Max. 350 m |
| | Additional requirements | Min. of 1 delay; Variety of terrain suggested | | | |
| Super G (SG) 1000 and U125 | Distance between gates [1] | X | 22-35 m | Open 25-40 m; Delay min. 15 m | Open 25-45 m; Delay min. 15 m |
| | Vertical drop | | Max. 300 m | Max. 350 m | Max. 450 m |
| | Direction changes | | 8-12% of vertical drop [2] | 8-12% of vertical drop [2] | 8-12% of vertical drop |
| | Additional requirements | | Training run required (U1256.4) | Min. of 1 jump recommended<br>Training run required (U1256.4)<br>Variety of terrain suggested | Min. of 1 jump recommended<br>Training run recommended (U1003.2.1) |
| Parallel | Distance between gates [1] | 10-15 m | 15-20 m | | |
| | Maximum vertical drop | 60 m | 100 m | | |
| Kombi - SL/GS U125 | Distance between gates [1] | SL 6-10 m, GS 12-20 m | SL 6-10 m, GS 12-20 m | | |
| | Maximum vertical drop | 150 m | 180 m | 200 m | |
| Kombi - GS/SG U125 | Distance between gates [1] | X | GS 12-20 m, SG 18-28 m | | |
| | Maximum vertical drop | | 250 m | | |
| Other Events | | All of above plus SkillsQuest events | All of above plus SkillsQuest events | | All of the above plus combined and SkillsQuest events |
| Ski Recommendation - Maximum (strongly recommended) | | 1 pair - Multi-event<br>Length - skill/size appropriate | 2 pair - SL, GS<br>Length - skill/size appropriate | 3 pair - SL, GS, SG<br>Length - skill/size appropriate | SL, GS, SG, DH |

[1] Gate distances correspond to distance between turning gates, with the exception of SL combination distance, which refers to gate width.

[2] Per USSA ACR U1256.3, based upon hill topography and field ability, the Jury may increase the gates to a maximum of 14% of vertical drop (counting only those requiring change of direction).

[3] Does not include Regional or National Championships.

** Crossover between age categories for SL, GS, SG, Kombi and SkillsQuest is encouraged. Where multiple age classes are competing, course setting guidelines will be based on the guidelines for one class older than the youngest class (for example, if a race has U10, U12 and U14 racers, it should use the U12 guidelines) except in DH where course setting guidelines will be based on the youngest class participating.

## Begin with measuring

For slalom, a course setter's tape is helpful to measure distances. These clip onto the gate above, then simply slide down in the direction you plan to set the next gate and go to the distance you are targeting. Look back up and down the hill to check your offset. A helper can help you to hook up and remove the tape from the gate, working down the hill with you. If you are solo, you can attach the tape to the gate and a sharp pull will remove it. For GS, a range finder may help you with distance. You can also measure distance by marking off ski lengths in the snow (see the last page for a table showing the conversions of various ski lengths into distances). However you do it, measuring ensures the distances are consistent

allowing the racer to create a rhythm. At first, measuring may feel too deliberate, too rigid, but it will help to establish a sense of distance and consistency. The majority of USST coaches still measure sections or combinations and all use a range finder for GS and Super G.

For the off-set (distance across the fall-line), it is possible to measure the distance from the fall-line traveling down the center of the course, or from turning pole to turning pole, but it can be difficult (often a question of judgment), less accurate and doesn't necessarily take into consideration the changing terrain. Therefore, often the offset is set by feel and "approximate" measuring, or by lining up with a previously set gate of the same color. When first starting out, you should try to line up your first few gates with the offset you want, then as you continue setting in a rhythm section try to keep the gates in a straight line, creating a corridor

### Measuring Distance Without a Tape or Range Finder

A common way to measure the distance between gates is to use the ski as a measurement tool. Position your uphill ski facing along the line between the gate just set and where you want the next gate to be. Slide down marking distance in ski lengths by either setting the edge of the downhill speed or tapping the drill bit in the snow to make a mark at each ski length. You can use the table below to approximate distance from different ski lengths.

## Course Setter's Measuring Guide

| NUMBER OF SKI LENGTHS | LENGTH OF COACH'S SKI | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 |
| 3 | 4.5 | 4.7 | 4.8 | 5.0 | 5.1 | 5.3 | 5.4 | 5.6 | 5.7 | 5.9 | 6.0 |
| 4 | 6.0 | 6.2 | 6.4 | 6.6 | 6.8 | 7.0 | 7.2 | 7.4 | 7.6 | 7.8 | 8.0 |
| 5 | 7.5 | 7.8 | 8.0 | 8.3 | 8.5 | 8.8 | 9.0 | 9.3 | 9.5 | 9.8 | 10.0 |
| 6 | 9.0 | 9.3 | 9.6 | 9.9 | 10.2 | 10.5 | 10.8 | 11.1 | 11.4 | 11.7 | 12.0 |
| 7 | 10.5 | 10.9 | 11.2 | 11.6 | 11.9 | 12.3 | 12.6 | 13.0 | 13.3 | 13.7 | 14.0 |
| 8 | 12.0 | 12.4 | 12.8 | 13.2 | 13.6 | 14.0 | 14.4 | 14.8 | 15.2 | 15.6 | 16.0 |
| 9 | 13.5 | 14.0 | 14.4 | 14.9 | 15.3 | 15.8 | 16.2 | 16.7 | 17.1 | 17.6 | 18.0 |
| 10 | 15.0 | 15.5 | 16.0 | 16.5 | 17.0 | 17.5 | 18.0 | 18.5 | 19.0 | 19.5 | 20.0 |
| 11 | 16.5 | 17.1 | 17.6 | 18.2 | 18.7 | 19.3 | 19.8 | 20.4 | 20.9 | 21.5 | 22.0 |
| 12 | 18.0 | 18.6 | 19.2 | 19.8 | 20.4 | 21.0 | 21.6 | 22.2 | 22.8 | 23.4 | 24.0 |
| 13 | 19.5 | 20.2 | 20.8 | 21.5 | 22.1 | 22.8 | 23.4 | 24.1 | 24.7 | 25.4 | 26.0 |
| 14 | 21.0 | 21.7 | 22.4 | 23.1 | 23.8 | 24.5 | 25.2 | 25.9 | 26.6 | 27.3 | 28.0 |
| 15 | 22.5 | 23.3 | 24.0 | 24.8 | 25.5 | 26.3 | 27.0 | 27.8 | 28.5 | 29.3 | 30.0 |
| 16 | 24.0 | 24.8 | 25.6 | 26.4 | 27.2 | 28.0 | 28.8 | 29.6 | 30.4 | 31.2 | 32.0 |
| 17 | 25.5 | 26.4 | 27.2 | 28.1 | 28.9 | 29.8 | 30.6 | 31.5 | 32.3 | 33.2 | 34.0 |

Distances in meters

### Start with simple rhythm

For your first sets, keep it simple. Try to set a consistent rhythm by setting the same distances between turns with the same amount of offset. These are called rhythm sections. Gate combinations can be used to move the course, or to change to a new rhythm section. Try to do your first set on a hill with consistent terrain.

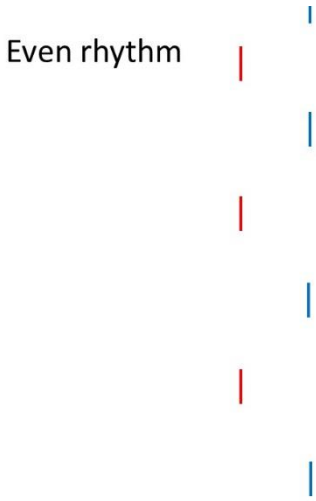
### Look up and down as you go

Look up the hill to see the rhythm and imagine the speed of the course. Look down the hill to anticipate any changes in terrain, turns in the trail, fall zones or obstacles such as lift towers or tree islands that you'll need to avoid. The inexperienced course setter often forgets to look down the hill as they go, and can start heading in the wrong direction. Looking down the hill will permit you time to start moving the course well above these elements.

### Where to place the poles

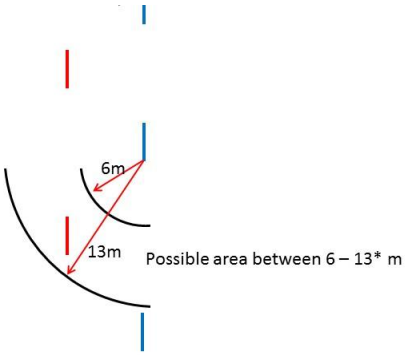
The current ICR and ACR gives rules governing course setting specifications (see above). While this will give turning pole to turning pole distances it does not give the entire picture. While this is a start there are two other dimensions that need to be considered; the actual vertical distance down the hill and the distance across the hill sometimes called “swing”.

Setting even rhythm, the poles are set with the same vertical and horizontal distance. We are assuming an even agled slope with no sidehill.



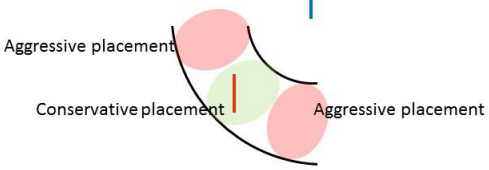

With the same vertical and horizontal distance between gates the course setter can look up the hill and the pole will be lined up.

There are other pole placement possibilities. The vertical and horizontal distances can be altered while staying within the rules.

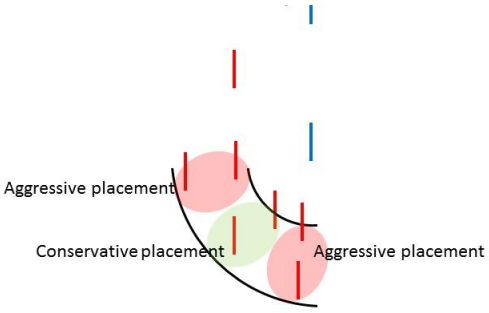



*these dimensions will be different for other age groups

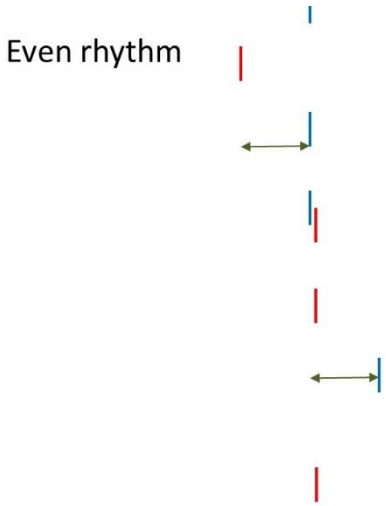
There can be the “conservative” or (even rhythm) placement. If the field of competitors is older, and/or more skilled a more challenging “aggressive placement” may be considered.



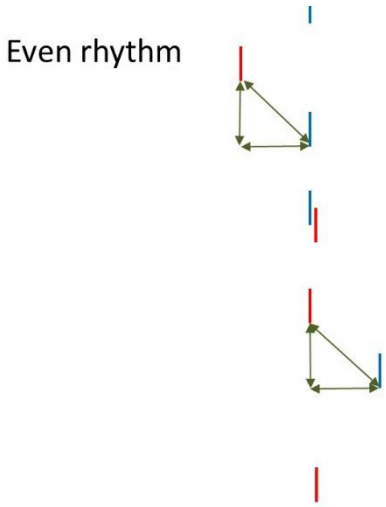

This results in more possible placement options.



For even rhythm flushes and hairpins the entrance and exit horizontal distance can be equal to the initial column width that was first described for even rhythm. In this case the green horizontal lines are equal in length. The course has been adjusted to the skiers left by one column width.




The same criteria can be used for vertical distance or the pole to pole distance. Changing these distances increases the challenge of the course.



### Review before running

After setting, review the course prior to anyone running it and make adjustments as needed. The very nature of alpine skiing and its ever-changing “field of play” means that it is very hard to set a “perfect” course the first time. It is fine to make adjustments if time allows.

As you get more practice setting, try to add more variety while maintaining rhythm and flow. Also work on setting more quickly. Ultimately, the less time you spend setting up the course, the more time you have to work with your skiers, and the more time they have to train!

As you get more practice setting, try to add more variety while maintaining rhythm and flow. Also work on setting more quickly. Ultimately, the less time you spend setting up the course, the more time you have to work with your skiers, and the more time they have to train!

## SETTING RULES OF THUMB

These course setting rules of thumb apply in most situations and for most disciplines. Use them as you get started to increase your chance of setting a course with good rhythm and flow. Time is a premium. The ability to set quickly depends upon your preparation and course setting skill.

### Check your poles

Poles need to be of uniform height and diameter for the type of race. Consult the ICR and ACR for current standards. Make sure you will have enough poles for the intended course.

### Hole size

Drill bit diameter and the depth of the hole need to match the type of pole base being used. Holes that are too wide will continue to enlarge with every gate contact. Holes that are too narrow will not accept the gate without undue damage to the snow. Gates need to be place so they are firm with the hinge at snow surface level.

### Come straight out of the start

Set the first gate such that the athlete contacts the start wand perpendicular to their upcoming direction of travel. Avoid making the racer come out of the start gate in a sharp angle. This will assure that the timing wand is tripped where small legs may slip out the sides with little wand movement.


### Get the athlete up to race speed quickly

Set the first couple of gates so that the athlete is finished pushing and skating by the first gate. This may mean that the first few gates are set straighter and more in the fall-line than the next section of gates. The first three to five gates should almost always be set with rhythm. This allow the skier time to adjust to the snow and allows their skiing form to materialize. Teenagers may worry about peers that will be watching from the start area. Easy rhythm will allow them to feel masterful in these situations and ultimately want to continue ski racing.

### Control speed before an abrupt terrain change

If there is an abrupt transition from flat to steep or a sharp terrain change, adjust the set to control the skier's speed a few gates before the transition as opposed to right at the terrain change.

### Control speed on steep sections

You can control the skiers' speed on a steep pitch by increasing the distance across the hill or by decreasing the vertical distance between gates. Remember to make these adjustments before the start of the steep pitch, rather than on it.


### Let speed run onto flatter sections

You can allow the skiers to carry speed onto the flats by decreasing the distance across the hill or increasing the vertical distance between gates as they come into these sections.

### Strategies to modify speed

To increase the speed of a racer, the course setter can increase the vertical distance between gates, decrease the amount of offset across the hill, set more rhythmically, and keep the overall direction of the course more in the fall-line. These approaches are often used leading up to a long flat section or across very flat parts of the course.

To decrease the speed of a racer, the course setter can increase the offset across the hill, work the course across the hill more, decrease the amount of vertical distance between gates, or add arrhythmic sections.

### Strategies to vary rhythm while maintaining speed

To maintain speed but change rhythm, the setter can increase or decrease both the offset and the vertical distance at the same time. Vertical combinations in slalom also often have the same effect since they are more in the fall-line but quicker. Changing rhythm with consistent speed can make for a fun course with good flow.

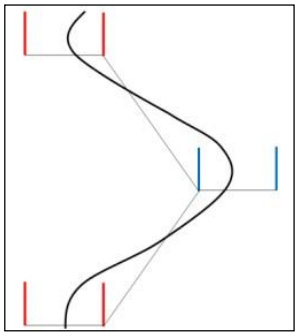
### Set rhythm into the center of the finish

The last several gates should have even rhythm and should lead the skier toward the center of the finish line. The final few gates is not the place for tricky gate combinations. Sending the racer through the finish near the sides instead of the center brings the timing equipment into the fall zone and should be avoided. This is especially essential with young children. You want them to feel confident and in control when they cross the finish line. Teenagers should be left with the feeling that they were gaining speed -- especially in front of peers who may be at the bottom of the course.

SETTING BY DISCIPLINE

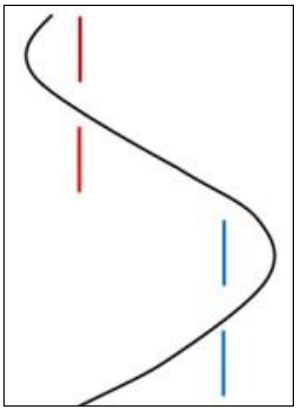
## Slalom


Slalom has the least time between gates of the alpine racing disciplines, with the fastest skiers making each turn in less than one second. A single flex pole is used to turn around. Competition courses may be set with or without outside gates, though single pole slalom rules do require outside gates on the first and last turns and in gate combinations. Different gate combinations are hairpins, flushes and delays. They can be used to change the course rhythm and move the course location on the hill. Following are the possible gate configurations for slalom racing.



### Open gates

These consist of a turning pole and an outside pole set horizontally across the hill four to six meters from the turning pole, or in the case of single-pole slalom, just a turning pole. Open gates make up the majority of the turns on a slalom course. Open gates are generally spaced between 6 and 12 meters apart, depending on the age, developmental phase and ability level of the skiers.



### Closed gates

These are when the outside pole is set vertically below the turning pole. These are typically only used in vertical combinations (hairpins and flushes) or as a delay gate, but may be occasionally used within an open gate section where the trail is narrow or has thin snow wide of the turning pole, or at the course setter's discretion.

## Hairpins

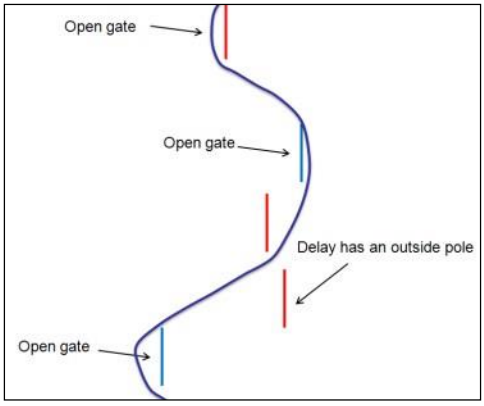
Hairpins consist of a vertical combination of two closed gates, separated by a distance of ¾ to 1 meter. The skier typically enters the hairpin over the top of the upper gate. Since the distance between poles in a closed gate must be between 4 and 6 meters, hairpins present a rhythm change for the skier. In a typical hairpin that is entered over the top, the skier exits the hairpin on the opposite side from which they entered. This makes hairpins useful to course setters for moving the course across the hill.

## Flushes

Flushes consist of a vertical combination of three or four closed gates, separated by a distance of ¾ to 1 meter. The skier typically enters the flush over the top of the upper gate. Since the distance between poles in a closed gate must be between four and six meters, flushes present a rhythm change for the skier. Since flushes have three or four turns in a straight line, skiers usually gain speed through a flush. In a typical flush that is entered over the top, the skier exits a three-gate flush on the same side that they entered, and in a four-gate flush they would exit on the opposite side from which they entered. Flushes can be used to move the course across the hill if needed.

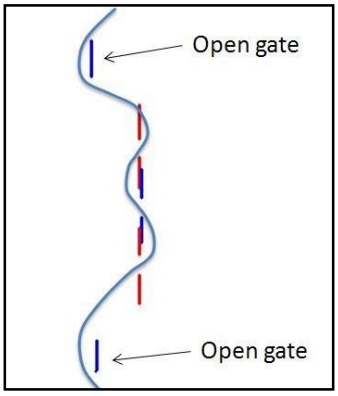
## Delays

Delays or delayed gates (aka banana) consist of a closed gate placed in between two open gates where the distance between the two open gates can be extended. Delays are normally used to bring the skier across the hill and to change up the rhythm. The top pole of the closed gate must be at least six meters from the open gate above it (four meters for U10's). The closed gate, called the delay gate, is typically set right along the line of the skier.




## Gate combination placement

One of the first things the slalom course setter must consider is where they will place the gate combinations. Flushes are usually set on flatter sections of the course. Delays are often set where the trail turns, or to work across a sidehill section, or sometimes near the bottom of a steeper pitch as it transitions into a flatter section. Hairpins may be set at just about any part of the course. However, these gate combinations are not usually set right over abrupt transitions, within the first three to five turns on the course, or within the last three turns on the course.

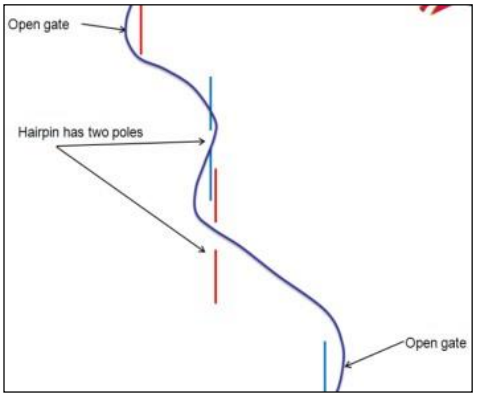



Hairpins and flushes are usually set down the fall-line. As athletes mature, these combinations may be angled somewhat across the hill, as long as all of the gates that comprise the combination are set along a straight line. Be careful though, since vertical combinations have a shorter distance between turns, setting them too much across the fall-line can be very difficult for the racer. It

should be noted that the last gate of a flush or hairpin must always be set right in line with the gates above, it should not be oblique, or offset.

### Single pole slalom

A single pole slalom has no outside pole except the first and last gate, a delayed gate and combinations (hairpin, vertical). Where there is no turning pole on the same side, following the normal race line of the slalom crossing the imaginary line from turning pole to turning pole. If a competitor loses a ski, without committing a fault, e.g. not by straddling a pole, then the tip of the remaining ski and both feet must meet both requirements. If the racer has not correctly crossed the imaginary line from turning pole to turning pole and does not follow the normal race line, then he has to climb back up and pass around the missed turning pole. Where there is an outside pole (first and last gate, delayed gate, and combinations (hairpin, vertical) the competitor's ski tips and both feet have crossed the gate line.




### Athlete age and experience

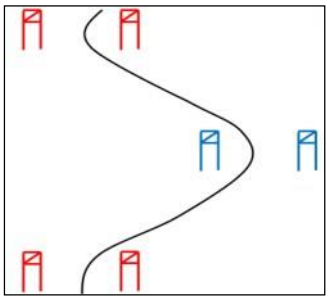
The Alpine Training System (ATS) points out that younger, less experienced athletes need to have learning situations presented in simple to difficult progressions. Open, rhythmical gates are the simplest form of gate to negotiate. When combinations are interspersed with four to six open gates, the novice athlete has a chance to regain composure and realign themselves mentally for the next combination. Meanwhile, mature athletes with many years of racing experience can negotiate combinations in unison, such as hairpin to hairpin, delay into flush, etc.

Slalom course setting rules have requirements for the number of hairpins, flushes and delays set. Check the USSA ACR for these rules and the allowable distances between gates and required number of turns.

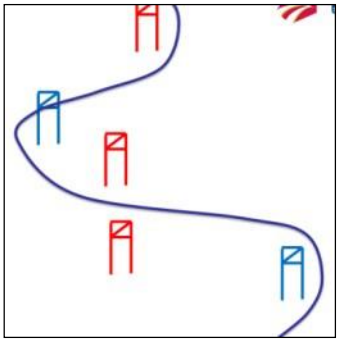
Strive to set a course that uses the terrain effectively, that integrates the banks, side-hills and drop-offs into a fluid and natural rhythm, as opposed to fighting the terrain with a poorly placed combination. Varying the vertical and offset distances is used to control speed, change rhythms, and to adjust for terrain and course direction changes. The design of the modern slalom ski allows the athlete to finish their turn more across the fall-line. This necessitates a slalom course that is set more across the hill to challenge the modern ski racer. Even flatter sections will have more swing across the hill than in the past.

## Giant Slalom

Giant slalom is considered by most to be the most demanding event technically. It requires quick turns at high speeds with constant changes in terrain, turn size and turn shape. Good GS course setting is characterized by flow, rhythm, speed and technical challenge. A well-set GS uses the terrain and challenges the skier through demanding arcs and a variety of tactical choices.



Giant slalom consists mainly of open gates. Each gate consists of two poles connected by a 75x50 cm rectangular flag capable of tearing or breaking away. In a single gate GS, only the turning gate is set. An outside gate is required for the first and last turn and on any delay gates. except for the first and last turn. The distance between open gates is between 15 and 27 meters for U16. Shorter maximum distances are required for younger age groups (see the ACR). When outside gates are used, they are between six to eight meters from the turning gate.



Delay gates may be set in GS similar to those in a slalom course. The distance between the open gate above the closed gate of the delay (delay gate) must be at least ten meters. Generally, the delay gate will be set roughly 1/3 of the way between the open gate above and the open gate below, and along the racer's line. Like in slalom, a delay can be used to change rhythm, or to move the course across the hill. A delay gate is required for competition sets in USSA races for all ages.

Since hairpins and flushes are not set in GS, the course setter usually varies the rhythm more in open gate sections to move the course around the hill, or uses delays.

The higher speeds of GS make course setting adjustments based on terrain particularly important. Here are some good tips.

***Flat to steep:*** Control the racer's speed coming into the steep section. You'll want to adjust the offset before the transition, rather than right at it, for best flow. If there is an abrupt knoll, it is generally easier for the skier if the breakover is between gates, rather than right at the gate. As the skill and experience level increases, gates can be set at the transition to test the competitors' abilities, inspection skills and tactical knowledge.

***Steep terrain:*** To adjust for steep terrain, use both greater offset distances and/or tighter vertical distances while maintaining even consistent rhythm. Open gates are primarily used because the difficulty of the course is the steepness, and therefore difficult rhythm changes should be avoided.

***Steep to flat:*** Gradually reduce the offset, thereby increasing the speed for the flat. Consider setting a delay onto the flat for possible racer recovery, to increase speeds for the flat, and to challenge the tactical plan. Gates start to be more open vertically.

***Flat and medium terrain:*** Set rhythm, direction and speed variations to test the athlete's skill and tactical experience, while also breaking the monotony of flat and uninteresting groomed terrain.

## Kombi

Kombi is a fun event for children and is excellent for skill development. There are two versions of Kombi. One blends slalom and GS sections together into one course, and the other blends GS and super G sections together in one course. The USSA ACR describes Kombi as follows:

> *"The children's Kombi consists of a mixture of standard turns and gates. The event meets developmental needs for children, creating a tactical awareness by blending sections of different gates in a flowing, rhythmical, constantly changing pattern…The course should test the skier's ability to react and adapt to an ever changing rhythm and radius, but allow the competitors smooth transition between the various sections of gates."*

Kombi courses should include a minimum of one jump that can either be man-made, or can simply be jumping over a gate placed on the ground. Gates may consist of one or two poles. GS and super G sections should be set with paneled gates, while slalom sections may either be set with slalom gates or stubbies. The course should include three to five sections moving back and forth between slalom and GS turns.

Kombi courses can be difficult to set at first, but they become quite fun with experience. A good strategy for setting the transition from GS to slalom turns is to have the initial slalom turns work across the fall-line to help control the skier's speed, or to transition into slalom on flatter terrain. A Kombi course should use the entire slope and available natural terrain, working across the fall-line often.

The slalom sections in Kombi should be set with 6-10 meters between gates. The GS sections should be set with 12-20 meters between gates and the super G sections should have 18-28 meters between gates.

Kombi racing is recommended especially for U12 and U14 racers, but can be used for U10 and U16 as well.

## Super G and Downhill

Because of the safety considerations involved with high speed and terrain in SG and DH, experience is critical for the competition course setter. New course setters must practice speed sets first under the guidance of an experienced course setter.

The environmental factors of terrain, snow conditions and overall trail configuration clearly determine the final course set. The challenge of setting speed events is to effectively utilize the existing terrain to create a course that is both challenging technically and tactically and minimizes the risks to the athletes. Setting a fast and demanding track is also one of the joys of course setting. Setting speed events is not to be avoided, but it should also not be entered into without proper preparation and training either.

Beginning setters should start by setting fast open giant slaloms or speed element drills, while gradually working into setting super G sections. Working closely with an experienced downhill and super G setter is strongly suggested. Setting for speed events should never be a matter of ego. The consequences of a poorly set speed event can be serious. All coaches should take the time to learn how to set speed events, as speed is the essence of the sport and a great skill teacher.

Just as beginning coaches must learn how to judge the appropriate speed for slalom and giant slalom by setting over and over, setting for super G and downhill takes the same patience and time. Future speed event course setters need to coach speed events (with a mentor coach) to develop a feel and understanding of the forces involved and how to manage them through setting.

## ENVIRONMENTAL CONDITIONS

There are extremes in weather and snow conditions that can dramatically influence how a course will run and therefore must always be taken into consideration when setting.

### New snow

When there is substantial new snow or soft snow, the course setter can contribute greatly to the success of the race by setting open gates with even rhythm that the racer can ski with a round turn as opposed to a turn that gets smaller in radius. The goal is to produce “ruts” or “grooves” that are shaped for easy entrance and exit and that wear with consistency (if possible). A course setter should try to avoid setting too straight a line that would result in sharper, shorter ruts. Speed, rhythm, and turn shape are the critical factors to control.

### Freeze/thaw and salted snow

Often when races are run in light rain and/or soft and melting snow, salt or other chemicals may be applied to harden the surface. This is often effective at hardening the surface, but there is risk that the top layer could break through to a softer layer. Again, the course setter should set a course that will feature even rhythm to produce consistent turn shapes as the snow surface breaks down. Speed control is also important, as fast and more direct gate combinations will result in sharper ruts and holes as the racer attempts to apply pressure in a shorter more direct arc. Speed, rhythm and turn shape are the critical factors to control.

### Ice

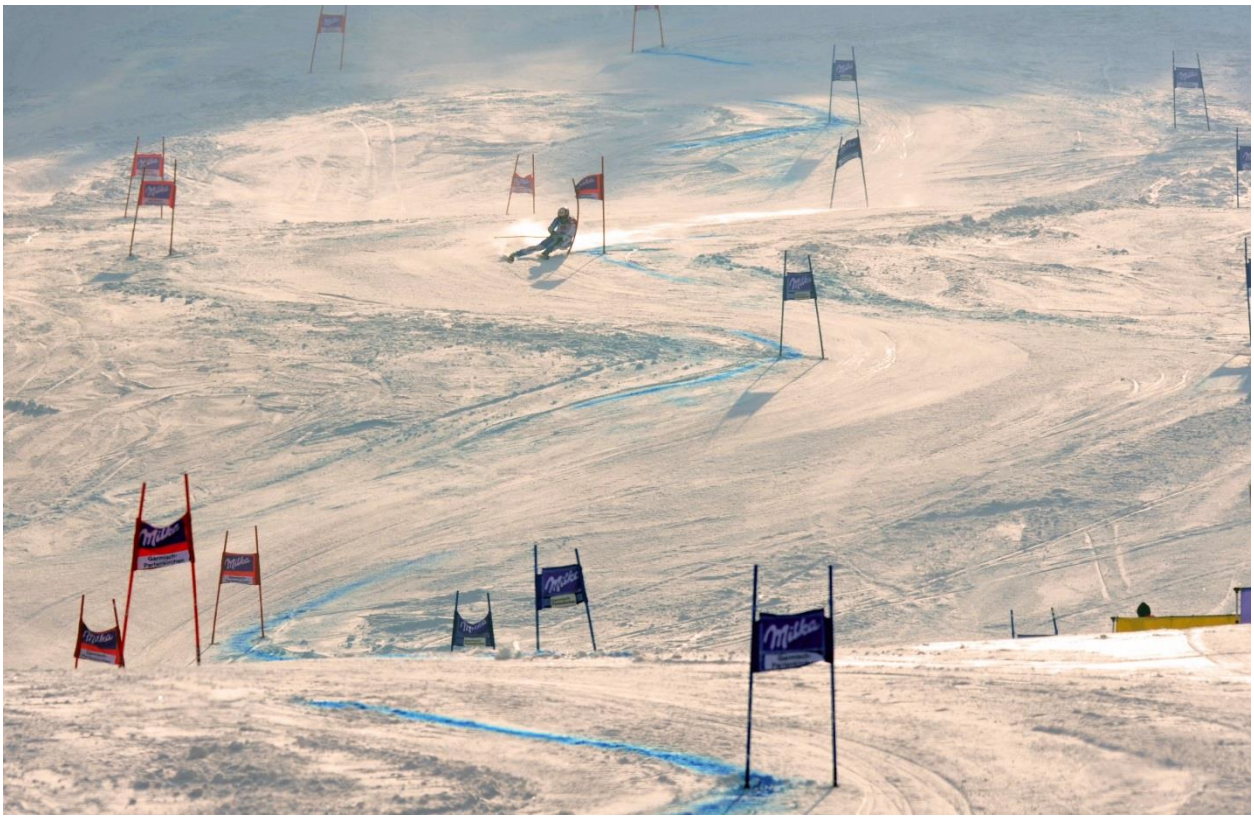
Snow can be very hard, even icy or almost “polished” from slipping during preparation. Again, the course setter’s role is to adjust the set accordingly. Race speeds are the fastest on ice. Ice holds up the best from the first to last competitor, but is difficult for less skilled skiers to hold their edges and ski cleanly. Depending on the quality of the field, speed should be on the medium to slower side, as many competitors will have trouble executing their turns. Secondly, less-skilled racers will find steeps and fall-aways difficult and challenging. Set so that speed can be controlled and turn shape maintained. As the quality of the field improves, ice or very hard conditions eventually becomes the surface of choice as it represents the fairest conditions for all competitors. Therefore, coaches need to help their racers to develop the technical and tactical skills to successfully negotiate these demanding conditions.

### Flat Light, Fog or Poor Visibility

It could be a combination of snow, cloud cover, or moisture resulting in limited or impaired visibility. If the race jury says go, the course setter needs to focus on controlling the speed, setting an easy rhythm to inspect/learn, and an having an awareness for the effect of unusual terrain features (bumps, fall-a ways, sharp transitions, etc.)

The common adjustable course setting factors between all the above examples are course speed, vertical distance and offset, turn shape, and the impact of terrain. Speed and turn

shape may be the key factors, because often the extreme conditions will take a toll on the athletes competing regardless. How the course is set can have a substantial impact on the number of successful runs.



## TRENDS IN SETTING

The evolution of ski design and construction has led to an interdependent relationship between ski equipment, the racer and course setting. Even though the basic rules and regulations for course setting have changed little over time, the courses set today have changed dramatically. Setting a course that follows the rules and minimizes the risks is one thing, setting one that is challenging, fair, age and skill appropriate, and that also successfully accommodates the design of modern ski equipment is a much greater task.


In addition to the changes in ski equipment regulations (i.e., lengths, side-cuts, binding and boot height), a second leading factor affecting course setting is the quality, consistency and durability of the snow surface. Technological advances in snowmaking, grooming and preparation have improved the field of play to the point where racers farther down the start order are less impacted by negative conditions. All racers are able to ski more aggressively in almost all conditions and disciplines. Because of these changes in ski equipment and the accompanying improvements in the training/competition environment, coaches have greater flexibility in course setting, program planning, and have enhanced opportunities to teach ski skills with wider creativity.

## Current FIS/USSA Trends:

A. **Sport Time Lag**: As with any dynamic on-going sport evolution, there is always a delay in passing down changes from the top to the bottom, or, in this case, from the World Cup to the domestic circuit. Even at the regional FIS level, one still sees courses that are too straight, too fast, and simply too easy. Only through proper course and drill setting will the U.S. develop athletes with superior technical and tactical adaptability.

B. **Training and Drill Courses** – **emphasize variety:** Training courses should expose the skiers to a wide variety of rhythms, vertical gate distances and offsets. Prepare athletes to be successful over a broad range of course sets.

C. **Slalom:** Current distances between turning poles is generally 9-11m on the World Cup. Off-set distances vary, but tend to average around 34m. Courses are typically more arhythmical, with multiple combinations (delay into hairpin, hairpin into hairpin, etc.)

Combinations are frequently set with less than 6m distance between poles. Regardless of the current trends, the course setter has to accommodate for the configuration of the trail (slope), the requirements of the FIS/USSA regulations and homologations, and the objective of the event.

D. **Giant Slalom:** Current vertical distances between turning poles on the World Cup can range from 24-28m depending on the venue, with an average around 26m. The offset distances vary but 10-12 meters seems average, depending on terrain, speeds, width and length of trail, and vertical drop requirements. Distances vary greatly between venues because of gate count requirements based on vertical drop. Distances should be shorter for younger skiers. Again, the current trends notwithstanding, the course set has to accommodate the configuration of the trail, the requirements of the FIS/USSA regulations and homologations, and the objective of the event.

E. **Super G**: While speeds are higher at the Europa Cup and World Cup levels, than at the domestic FIS level, general overall speeds still vary dramatically by age, ability, and geographic regions. A U.S. Ski Team coach described World Cup Super Gs this way: “A few courses are as fast as downhills and others like a super fast GS, it all depends on the available environmental factors [the trail and conditions]. The best advice, set for the natural terrain, taking into account the snow conditions, the potential speed of the course, and most importantly, the skill level of the competitors.” These factors should determine the overall line, degree of difficulty, speed, and airtime on the course.

F. **Downhill**: In general terms, on the World Cup and Europa Cup circuits, the downhill sets are emphasizing more high speed turns with less gliding sections (if terrain permits), and are set over demanding terrain including big air jumps. However, there are a number of “classic” European tracks (Lauberhorn in Wengen, Switzerland for example) that are set the same way every year.

**G. <u>Overall evaluation of American courses</u>:** In broad general terms, the trails homologated for races in North America are easier, typically more in the fall-line with less terrain (the result of summer earth moving and grading) than European tracks, and therefore the courses set are often easier and less demanding. If the abilities of the athletes permits, a general recommendation from USSA would be for junior development programs to use or develop more environmentally demanding training and competition slopes, resulting in more technically and tactically demanding courses throughout all age groups and abilities. The ideal would be to have the widest variety of teaching terrain, supporting all the technical and tactical progressions required to develop great skiers first then great racers. If varied terrain is not available, course sets should contain more variability in rhythm and distances to increase the adaptability of athletes.

# Alpine Course Setting Recommendations Based on USSA Training System Phases of Development

The following are recommendations for coaches for course setting to maximize the development for athletes at different phases in training and in competition. Note that the recommendations within are not a revision of the rules, but rather suggestions for coaches taking into consideration recent evolutions in equipment, course setting, and corresponding technique. Following the recommendations by phases, we discuss setting for competitions by age class, where in many cases athletes are in multiple developmental phases. We encourage coaches to expose their racers to a variety of different courses and drills, to limit standing around, and to spend as much time as possible on the hill actually skiing. Current course setting rules can be found in chapter 8 of the USSA Competition Guide and in the FIS ICR.

## Alpine Training System Developmental Phases:

| Foundation Stage | | Pre & Post Puberty | | | World Class Performance Full Maturation |
|---|---|---|---|---|---|
| PHASE 1 | PHASE 2 | PHASE 3 | PHASE 4 | PHASE 5 | PHASE 6 |
| **Biological Age**<br>Pre Puberty<br>**Age**<br>2–6 years old<br>**Play Age**<br>1–4 years in sport<br>**Participation**<br>Ski around 1 day a week<br>20 days a year<br>At least 95% free skiing<br>Play many other sports - gymnastics or balance-based sports | **Biological Age**<br>Pre Puberty<br>**Age**<br>6–10 years old<br>**Training Age**<br>1–4 years in sport<br>**Participation**<br>Ski 2–3 days a week<br>50 days a year<br>At least 90% free skiing<br>Fun races<br>Play many other sports | **Biological Age**<br>Pre Puberty<br>(Before Growth Spurt)<br>**Age**<br>Girls: 10–13: J4 (J5–J3)<br>Boys: 11–14: J4 (J4–J3)<br>**Training Age**<br>4–8 years in sport<br>**Participation**<br>Ski 3–4 days a week<br>70 days/year<br>At least 60% free skiing<br>Competition Period: (Jan.–April)<br>Number of race starts: 10–15<br>Ratio 1:6 (race:training)<br>Play complementary sports | **Biological Age**<br>Puberty<br>(Growth Spurt)<br>**Age**<br>Girls: 11–14: J3 (J4–J3)<br>Boys: 12–15: J3 (J4–J2)<br>**Training Age**<br>5–9 years in sport<br>**Participation**<br>Ski 4–5 days a week<br>100 days/year<br>At least 30-50% free-skiing<br>Competition Period: (Dec.–April)<br>Number of race starts: 15–30<br>Ratio 1:5 (race:training)<br>Play complementary sports | **Biological Age**<br>Post Puberty<br>(After Growth Spurt)<br>**Age**<br>Girls: 12–16: J3 (J4–J2)<br>Boys: 14–17: J2 (J3–J1)<br>**Training Age**<br>6–11 years in sport<br>**Participation**<br>Ski 4–5 days a week<br>120-140 days/year<br>At least 15% free skiing<br>Competition Period: (Nov.–April)<br>Number of race starts: 25–max 45<br>Ratio 1:4 (race:training)<br>Play complementary sport | **Biological Age**<br>Full Maturation<br>**Age**<br>Female: 16+ J2–J1<br>Male: 17+ J1<br>**Training Age**<br>Minimum 10+ years in sport<br>**Participation**<br>Ski 4–5 days a week<br>130–150* days/year<br>At least 10% free-skiing<br>Competition Period: (Nov.–April)<br>Number of race starts: 55*<br>Ratio 1:3 (race:training)<br>*based on the number of disciplines |

### PHASE 1

Skiers start following a designated line by skiing around cones, playing follow-the-leader, and exploring the mountain. Racing introduction via NASTAR and/or obstacle courses.

PHASE 2

***Background:***

Skiers in this phase are moving into the optimal window for them to acquire and hone fundamental skiing skills. They are also in an optimal window to develop agility and quickness, and very short duration speed (5 seconds or less). They also have relatively short attention spans and do not have a well-developed anaerobic energy system for sustained high-intensity skiing over a long course. Skiers in this phase are encouraged to use one pair of skis for all events. Recommended disciplines include giant slalom, slalom, Kombi, dual courses, obstacle courses, and skills competition.

**SLALOM:**

***Training***

- Progress from brushes to stubbies. Use of junior flex poles (shorter shaft, 25-27mm diameter, light-weight hinge) once skiers are ready to practice clearing. Gate clearing is an important skill for athletes to work on, particularly in the second half of this phase. Angling the junior flex poles slightly to the outside of the turn can help alleviate issues with athletes reaching across with their hands to clear. Set a stubbie or brush course alongside the junior gate course so that coaches can move skiers back and forth depending on their ability to maintain proper body position.
- Frequently set very quick short drill courses to develop quickness, distances from 2-6m
- Typical characteristics – minimal combinations, recommended distance between gates in combinations 4-5m, recommended distance between open gates 6-9m
    - Always set outside gate of hairpin/flush and delay gate in training
- Rather than setting one 30-40 gate training course, split the hill in 2 or 3 shorter courses (10-15 gates) and emphasize focus for each section on a specific technical task
    - Set a start and finish gate for each section so athletes always practice a strong start and skiing through the finish

***Competition***

- Maximum distance between turning gates: 9m
- Normal distance between turning gates: 7-9m
- Normal distance between poles in combinations: 4-5m
- Changes in rhythm requiring different turn shapes, but not tactically challenging
- Recommend 20-30 changes
- Dual format is encouraged to get more runs (independent timing on each course)

**GIANT SLALOM:**

***Training***

- Use brushes, stubbies, and paneled gates.
- Recommend distances of 15-22m between gates.
- Always set outside gate of delay gate in training
- Rather than setting one 20-30 gate training course, split the hill in 2 or 3 shorter courses (around 10 gates) and emphasize focus for each section on a specific technical task

- Set a start and finish gate for each section so athletes always practice a strong start and skiing through the finish

***Competition***

- Maximum distance between turning gates: 22m
- Normal distance between turning gates: 17-20m
- Changes in rhythm requiring different turn shapes, but not tactically challenging
- Recommend 15-20 direction changes
- Dual format is encouraged to get more runs (independent timing on each course)

**KOMBI:**

***Training***

- Use brushes, stubbies, and paneled gates
- Recommended distances between gates for SL sections: 6-10m, for GS sections: 12-20m
- Combinations for SL may be set, but should be with single pole, 4-6m distance
- Course should use the entire slope, working across the fall line as often as possible
- Course should be set such that a smooth transition between GS and SL sections is possible
- Course should include at least one jump

***Competition***

- Same as for training
- Recommend around 5 different sections and around 30 turns

PHASE 3

***Background:***

Skiers are in the optimal window for them to hone their fundamental skiing skills. This may be the most important developmental phase of a ski racer. To take maximum advantage of this opportunity, course setting should progressively challenge the skier's technique. Variety is essential. For motor learning to take place, skiers must first demonstrate they can perform the skill, then continue to execute it as the task gets more difficult. Training course progressions can go from rhythmic to a-rhythmic, flat to steep, or open to tight or vice versa. Kombi is a good event for this phase because it requires versatility and a variety of turn shapes. The skiers still do not have a well-developed anaerobic energy system for sustained high-intensity skiing over a long course. Recommended disciplines include giant slalom, slalom, Kombi, dual courses, obstacle courses, skills competition, and an introduction to speed and terrain elements.

## SLALOM:

***Training***

- Progress from brushes to stubbies. Use of junior flex poles (shorter shaft, 25-27mm diameter, light-weight hinge). Gate clearing habits learned here will stay with these skiers for some time. Coaches must demand proper clearing and using age-appropriate gates can help phase 3 skiers clear correctly (think of the smaller ball for youth soccer or lower hoop for youth basketball). Set a stubbie or brush course alongside the junior gate course so that coaches can move skiers back and forth depending on their ability to maintain proper body position.
- Typical characteristics –recommended distance between gates in combinations 4-5.5m, recommended distance between open gates 6-10m
    - Always set outside gate of hairpin/flush and delay gate in training
- Rather than setting one 30-40 gate training course, split the hill in 2 or 3 shorter courses (10-15 gates) and emphasize focus for each section on a specific technical task
    - Set a start and finish gate for each section so athletes always practice a strong start and skiing through the finish

***Competition***

- Maximum distance between turning gates: 10m
- Normal distance between turning gates: 7-9m
- Normal distance between poles in combinations: 4-5.5m
- Changes in rhythm requiring different turn shapes, but not tactically challenging
- Recommend 25-35 direction changes
- Dual format is encouraged for race efficiency (independent timing systems)

## GIANT SLALOM:

***Training***

- Use brushes, stubbies, and paneled gates
- Recommend distances of 17-24m between gates
- Always set outside gate of delay gate in training
- Maximize variety, in a progressive manner (start easy and increase challenge using slope, offset, vertical distances, rhythm variability)
- Rather than setting one 20-30 gate training course, split the hill in 2 or 3 shorter courses (around 10 gates) and emphasize focus for each section on a specific technical task
    - Set a start and finish gate for each section so athletes always practice a strong start and skiing through the finish

***Competition***

- Maximum distance between turning gates: 24m
- Normal distance between turning gates: 18-22m
- Changes in rhythm requiring different turn shapes, but not tactically challenging
- Recommend 15-25 direction changes
- Dual format is encouraged for race efficiency (independent timing systems)

**KOMBI:**

***Training***

- Use brushes, stubbies, and paneled gates
- Use both GS/SL Kombi and GS/SG Kombi
- For GS/SL Kombi, recommended distances between gates for SL sections: 6-10m, for GS sections: 12-20m
- For GS/SG Kombi, recommended distances between gates for GS sections: 12-20m, for SG sections: 18-28m
- Course should use the entire slope, working across the fall line as often as possible
- Course should be set such that a smooth transition between sections is possible
- Course should include at least one jump

***Competition***

- Same as for training
- GS/SL Kombi contains 5-6 different sections with around 30-35 turns
- GS/SG Kombi contains 3-5 different sections with around 20 turns

**SUPER G:**

***Training***

- Emphasis is on elements training – jumping and gliding skills
- Course setting should be appropriate for skiers on GS skis
- Recommended distances between turns range from 22-32m

***Competition***

- Set on moderate terrain
- Distance between turns from 22-32m, use full spectrum, but make sure course maintains rhythm and flow
- Sets are generally basic and control the skier's speed, no abrupt turns or terrain

PHASE 4

***Background:***

Skiers in this phase are into their growth spurt. For many skiers, the challenge will be to maintain their technical skills through this phase. Gate training becomes a greater percentage of training time. Course setting should begin to challenge the skiers' tactics to a greater degree through more substantial rhythm changes. Variety is still very important. While skiers in this phase can make great gains in stamina, they still do not have a well-developed anaerobic energy system, so a mix of short and long courses can be used. Recommended disciplines include giant slalom, slalom, super G, duals, and terrain and jumping elements. Skills competitions help skiers in this phase stay focused on maintaining their fundamentals from the earlier phases.

**SLALOM:**

***Training***

- 27mm diameter, full-length gates are appropriate, though brushes and stubbies are still used frequently.
- Typical characteristics –recommended distance between gates in combinations 4-6m, recommended distance between open gates 7-11m
    - Set the full spectrum of these distances
    - Always set outside gate of hairpin/flush and delay gate in training
- Rather than setting one 30-40 gate training course, split the hill into shorter courses frequently and emphasize focus for each section on a specific technical task
    - Set a start and finish gate for each section so athletes always practice a strong start and skiing through the finish

***Competition***

- Maximum distance between turning gates: 10m
- Normal distance between turning gates: 7.5-10m
- Normal distance between poles in combinations: 4.5-5.5m
- Changes in rhythm requiring different turn shapes
- Recommend 30-40 direction changes

**GIANT SLALOM:**

***Training***

- Recommend distances of 18-27m between gates
    - Set the full spectrum of these distances
- Always set outside gate of delay gate in training
- Maximize variety, in a progressive manner (start easy and increase challenge - slope, offset, vertical distances, rhythm variability)
- Rather than setting one 20-30 gate training course, split the hill in shorter courses and emphasize focus for each section on a specific technical task
    - Set a start and finish gate for each section so athletes always practice a strong start and skiing through the finish

### *Competition*

- Maximum distance between turning gates: 27m
- Normal distance between turning gates: 21-25m
- Changes in rhythm requiring different turn shapes
- Recommend 20-30 direction changes

## SUPER G:

### *Training*

- Emphasis is on elements training – jumping and gliding skills
- Recommended distances between turns range from 25-40m

### *Competition*

- Set on moderate terrain
- Distance between turns from 25-40m, use full spectrum, but make sure course maintains rhythm and flow
- Sets are generally basic and control the skier's speed, no abrupt turns or terrain

PHASE 5

***Background:***
Skiers in this phase are starting to grow into their new bodies after the growth spurt, with the benefit of increased stamina. Strength gains can be quite rapid in this phase, and skiers can be expected to generate more power through their turns throughout the course. The anaerobic system starts to become developed, allowing skiers to ski with greater intensity from start to finish. As a result, course setting in this phase should start to mirror that at the elite levels, as skiers begin to manage higher speeds and more difficult terrain.

**SLALOM:**

***Training***

- 27-31mm diameter, full-length gates are appropriate, though brushes and stubbies may still be used.
- Typical characteristics –recommended distance between gates in combinations 4-6m, recommended distance between open gates 7-12m
    - Set the full spectrum of these distances
- Pairing of combinations is practiced, with hairpins into flush, delay into hairpins, etc.
- More challenging tactical situations

***Competition***

- Maximum distance between turning gates: 12m
- Normal distance between turning gates: 8.5-10.5m
- Normal distance between poles in combinations: 4.5-6m
- More challenging tactical situations
- Recommend 40-60 direction changes

**GIANT SLALOM:**

***Training***

- Recommend distances of 20-30m between gates
    - Set the full spectrum of these distances
- Maximize variety
- Incorporate terrain

***Competition***

- Maximum distance between turning gates: 30m
- Normal distance between turning gates: 24-27m
- Changes in rhythm requiring different turn shapes
- Recommend 30-40 direction changes

## SUPER G:

### *Training*

- Sections and full-length courses
- Emphasis on gliding and terrain elements, use of timing
- Inspection skills rehearsed in training
- Set full spectrum, some sets more downhill oriented, some more GS oriented
- Courses incorporate more terrain, though sets are kept basic through difficult terrain
- Course setting with existing or available safety installations in mind, appropriate fencing is in place before training begins

### *Competition*

- Setting within rules of FIS or USSA, encourage full spectrum
- Courses incorporate terrain, but sets are kept basic through difficult terrain
- Course setting with existing or available safety installations in mind, course setter assists with fencing installations when needed

## DOWNHILL:

### *Training*

- Sections and shorter full-length courses
- Emphasis on gliding and terrain elements, use of timing
- Inspection skills rehearsed in training
- Jumping progressions – course set should control speed above the jump, athlete has time to be in balanced position for jump takeoff
- Overly difficult tactical/technical elements and large jumps are avoided, particularly on the lower part of the course
- Course setting with existing or available safety installations in mind, appropriate fencing is in place before training begins
- Setting done by or with the assistance of an experienced speed event course setter

### *Competition*

- Overly difficult tactical/technical elements and large jumps are avoided, particularly on the lower part of the course
- Course setting with existing or available safety installations in mind, setter assists with fencing setup as needed
- Setting done by or with the assistance of an experienced speed event course setter

# PHASE 6

***Background:***
Skiers in this phase are moving into mastery of all aspects of the sport. Some will begin to specialize toward certain disciplines, though a well-rounded training approach is still encouraged. Course setting should test and challenge all the skills the skiers possess. Course setting will mirror that on the NorAm, Europa Cup, and World Cup levels.

## SLALOM:

***Training***

- 27-31mm diameter, full-length gates are appropriate, though brushes and stubbies may still be used
- Typical characteristics –recommended distance between gates in combinations 4-6m, recommended distance between open gates 7-12m
    - Set the full spectrum of these distances
- Pairing of combinations is practiced, with hairpins into flush, delay into hairpins, etc.
- Challenging tactically

***Competition***

- Maximum distance between turning gates: 12m
- Normal distance between turning gates: 8.5-11m
- Normal distance between poles in combinations: 4.5-6m
- Corridors of equal spacing and offset are not used, rhythm changes regularly, but course setter varies distance and offset to maintain flow
- Set within FIS or USSA rules as applicable

## GIANT SLALOM:

***Training***

- Recommend distances of 20-30m between gates
    - Set the full spectrum of these distances
- Maximize variety, challenging tactically
- Use all available terrain, setting over abrupt terrain such that sometimes the knoll will be in the turn transition, and sometimes in the middle of the turn

***Competition***

- Maximum distance between turning gates: 30m
- Normal distance between turning gates: 24-27m
- Changes in rhythm requiring different turn shapes including chicanes
- Use all available terrain
- Set within FIS or USSA rules as applicable

## SUPER G:

### *Training*

- Sections and full-length courses
- Set full spectrum, some sets more downhill oriented, some more GS oriented
- Courses incorporate lots of terrain
- Course setting with existing or available safety installations in mind, appropriate fencing is in place before training begins

### *Competition*

- Setting within rules of FIS or USSA, encourage full spectrum
- Courses incorporate terrain
- Course setting with existing or available safety installations in mind, course setter assists with fencing installations when needed
- Courses set by experienced speed event course setters familiar with the hill

## DOWNHILL:

### *Training*

- Sections and full-length courses
- Jumps may be present at any part of the course
- Course setting with existing or available safety installations in mind, appropriate fencing is in place before training begins
- Setting done by or with the assistance of an experienced speed event course setter

### *Competition*

- Course setting with existing or available safety installations in mind, setter assists with fencing setup as needed
- Setting done by or with the assistance of an experienced speed event course setter.

## APPENDIX

## Outline of the steps for setting a course

**Before you start:**

1. Know the event FIS/USSA rules and regulations
2. Know the site/event homologation specifications
   - vertical drop
   - # of gates
   - special circumstances
   - start & finish setup
3. Evaluate the event objective (for example, a qualifier vs. a championship)
4. Evaluate the participants' age, skill and experience levels
5. Evaluate the field size, gender (single sex or both running the same course or on the same slope) **Steps:**

**1.** Determine Goal: Either a competition course or what the training objective is (one of four)
   a. Skill Acquisition
   b. Skill Adaptation
   c. Equipment Testing or Comparative Timing
   d. Competitive Preparation

**2.** Inspect Site and Review Environmental Factors:
   a. Site
   b. Discipline
   c. Course Type / Length
   d. Snow Type
   e. Terrain
   f. Safety / Obstacles / Materials
   g. Deterioration
   h. Visibility
   i. Weather
   j. Elevation
   k. Start / Finish
   l. Race Crew / Available Help
   m. Coach Stations
   n. Warm-up Area

**3.** Set the Course or Drill
   a. Mentor

**4.** Review & Evaluate
   a. Athletes
   b. Mentor / Coaches
   c. Organizing Committee
   d. Personal / Video

## Frequently Asked Questions

### What should the desirable finish rate be?

The general trends of the sport have been to set courses that ensure a higher finish rate at all competition levels. For younger and more inexperienced racers, set a rhythmically consistent course to achieve a higher finish rate and a more positive overall experience, but as they gain experience challenge them more technically. Tricky tactical sections are generally not appropriate for children's racing, but should be introduced in training.

### Should one set for the middle of the field, top 15, or the bottom of the field?

The more inexperienced and less skillful the competitors, set for the middle of the field resulting in a higher finish rate and fairer competition. At the highest levels, the FIS recommends setting for the top 30 racers. In a survey of U.S. Ski Team coaches, they set according to the objective of the race and the quality of the field. The better the field of competitors and the more important the race, the more demanding the course should be. The U.S. Ski Team coaches set for the top 15 to 30.

### How should one set for very inexperienced or unskilled racers?

Start with less offset, consistent rhythm, and fairly open distances. On this type of course, they'll have a chance at success, and will feel the increased speed as they figure out their line. This will give them increased enjoyment and confidence. Once they are comfortable, start adding more challenge.