



PRACTICE CLIMBING IN COMPETITION



UIAA

International Climbing and Mountaineering Federation
UNION INTERNATIONALE DES ASSOCIATIONS D'ALPINISME

PRACTICE CLIMBING IN COMPETITION

International Climbing and Mountaineering Federation
UNION INTERNATIONALE DES ASSOCIATIONS D'ALPINISME

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Frits Vrijlandt

*President of the UIAA -
International Climbing and
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PREFACE FROM FRITS VRIJLANDT, PRESIDENT OF THE UIAA

A new guide for the future of ice climbing

During the past decade, I have met many ice climbers through the UIAA Ice Climbing World Tour. Today, I feel that competitive ice climbing has never been stronger with a huge and lively community from all over the world.

This positive moment provides the perfect opportunity to step up the development of ice climbing. Fun and dynamic, this sport is also becoming more and more professional.

To ensure a sustainable future, we need to be pro-active in sharing our know-how and in promoting ice climbing to youth athletes, thus offering a legacy for future generations.

This manual, written by UIAA experts, is

a key document gathering a wide range of information on several topics: including speed climbing, lead-difficulty, national teams and event management. It is dedicated to national bodies, event organizers and also ice climbing lovers who want to improve their skills and knowledge.

The UIAA is striving for ice climbing to be part of the official Winter Olympic competition program in 2022. We achieved a first step with our presence at the 2014 Sochi Winter Olympic Games. I'm sure this guide is an essential element in involving even more stakeholders in the adventure. The passing of knowledge will also help increase the quantity and quality of the events. Together with

the entire ice climbing community from the athlete to the national federation, we will be able to reach this common ambition.

To all of you who use the guide, I wish you enjoyable reading and a fruitful implementation.

Frits Vrijlandt

President of the UIAA - International Climbing and Mountaineering Federation



PREFACE FROM URS STÖCKER

Over the last few years I have witnessed the motivation and willingness of different people to develop competition ice climbing in their country. At the same time, I realized that real information was lacking on how to achieve this and consequently everybody had to invent their own way. This is a normal characteristic during the pioneer phase of a sport. But aiming for the Winter Olympic Games in 2022 we need to enter the next stage: the development phase. This means sharing information and knowledge so that everybody can profit from it, preventing the same mistakes being repeated. By doing so, ice climbers can add their own experiences and know-how so that the sport can develop.

This manual is a product of a strategic milestone of the Ice Climbing commission and a big step in bringing ice

climbing forward as a professional competition sport. The aim of this project is to explain the philosophy and nature of competition ice climbing, support the officials of national federations in building national teams and national competitions as well as assisting personal trainers and athletes in planning and executing their training so they can compete with the best.

But why does ice climbing need to be a competition sport? In nature it is, and remains, a tough adventure. It is fun and sometimes a battle against yourself and the conditions. But it also lies in the nature of the human being to develop and compare each other's performances. So if you want to know if you are the best ice climber the only way to find out is to compete against the best. But this does not mean that in a competition there must be rough rivalry. The true winner's

fight is to conquer the challenges posed and not to concentrate on defeating the other competitors. The competition ice climbers are a friendly and supportive family. This is also reflected in this guide – everybody is engaged in the sport because they are truly passionate about it and happy to share knowledge and experiences. This is true for me as an active coach and trainer of the Swiss National Ice Climbing Team. Over the last ten years we have achieved numerous victories and won countless medals and are probably one of the most successful countries in ice climbing together with Russia and Korea. We went through many stages of building the national structures up to a big investment in youth climbers over the last five years, which now pays off with some leading Swiss athletes in the Elite category. Many of these experiences are captured in this manual to offer other federations a faster approach to success so that we can be present in the Winter Olympic

Games 2022 in Beijing with many strong athletes from around the globe.

So I hope this guide can provide essential information for all the stakeholders in competition ice climbing and can create a clear path to Beijing 2022!



Urs Stöcker

President of the UIAA Ice Climbing commission



CAUTION!

The following information is dedicated to competitive ice climbing and closely related field of activities. The practice of competitive ice climbing, alpine activities and the use of technical equipment are inherently dangerous, and may result in severe injury or death. Specific training by a qualified instructor on the use of technical equipment is essential. You are responsible for your own actions and decisions.

This information is intended for ice climbers who wish to expand the practice of their favorite activity by acquiring additional skills and knowledge. It has been developed specifically as a reference for managers and ice climbers in clubs and mountain organizations that are members of the UIAA - International Climbing and Mountaineering Federation.

To name managers, athletes, volunteers or trainees, the pronouns "he" or "she" will be used alternately throughout the manual, randomly without gender stereotype.

The authors do not necessarily provide

the only acceptable, nor the best, techniques for an individual or group. Techniques other than those recommended here may be equally valid or required. Individual practitioners, physical skills, and coordination, also have their limits, and potentially require more complete risk analyses in certain cases. The purpose of this information is to present tried-and-true techniques that have been standardized among the authors as well as many participating UIAA federations and ice climbing competition organizers. Despite the care with which this handbook has been compiled, it may contain errors or inaccuracies, making a critical eye and professional mentoring indispensable.

The information provided is non-exhaustive. Consult each manufacturer's product manual for any recommended piece of equipment.

Everyone is responsible for his or her actions and decisions. Before heading into the ice climbing theater, or anytime ice climbing equipment is to be used in any forum, each participant must:

- Read and understand all instructions pertaining to proper use of all equipment;
- Receive proper training on how to use the equipment
- Familiarize himself or herself with the UIAA Safety standards equipment; know its performance capabilities and limitations; and,
- Understand and accept all risks associated with the use of this equipment

Ignoring any above warnings may result in severe or fatal injuries.



1. INTRODUCTION

1.1 L'UNION INTERNATIONALE DES ASSOCIATIONS D'ALPINISME (UIAA) – INTERNATIONAL CLIMBING AND MOUNTAINEERING FEDERATION

United by a unique passion

The love of climbing and mountaineering unites millions around the world. The UIAA – International Climbing and Mountaineering Federation, founded in 1932 in Chamonix, France, is the voice that speaks for climbers and mountaineers through over 80 member national federations across five continents. Today, the UIAA is at the forefront of

programmes that seek to enhance personal and equipment safety. It promotes access, sustainable mountain protection practices and leads the quest to have ice climbing declared a Winter Olympics sport. The UIAA is recognized by the International Olympic Committee (IOC), and has been member of the Olympic family since 1995.



Figure 1: Logo of the UIAA in 2015





1.2 THE UIAA MISSION STATEMENT

The mission of the UIAA is:

- To govern climbing and mountaineering throughout the world,
- To lead the climbing and mountaineering movement,
- To gather all countries that have a competent national federation for climbing and mountaineering committed to complying with UIAA statutes and regulations.

The UIAA is a worldwide organization working in favour of the practice of climbing and mountaineering in the spirit of its traditions, the requirement of the Olympic Charter and the current tendencies in the world sports development.

The UIAA fulfils its Mission Statement mainly through the work of its commissions, which make recommendations, set policies, and advocates on behalf of the mountaineering community at large.

1.3 THE UIAA VALUES AND BELIEFS

Driven by respect, trust and love.

Our values are infused with a sense of freedom, respect, risk awareness, decision-making and willpower. A climber should have the freedom to choose the place to climb, but along with that comes the need for responsible access, trust in a teammate and a knowledgeable assessment of risk. We come from all corner of the globe, but our love of the mountains unites us with a common respect for the challenges we undertake and the mountains we climb. Whether it's a big wall rock climbing, bouldering, ski mountaineering or climbing high mountains, UIAA members are driven to push their physical, mental and spiritual limits in the practice and pursuit of their sport.

1.4 ICE CLIMBING IN COMPETITION

The history of the UIAA Ice Climbing World Cup dates back to 2002, when the first competitions under UIAA rules took place in Val Daone (Italy), Pitztal (Austria), Kirov (Russia), Quebec (Canada) and Saas-Fee (Switzerland).

Figure 2: Structure full of ice in one of the earliest ice climbing competition, Kirov (Russia) in 2003





The International World Cup (IWC) was preceded by a European competition schedule that included events in Courchevel (France), Cortina (Italy), Pitztal (Austria) and Kirov (Russia). The first common rules to govern competitive ice climbing appeared in 1998. The first International World Cup (IWC) took place in 2000, organized by a private German company, which remained responsible for the event until 2002. From this date on, the International Ice Climbing Commission of the UIAA took over the organization of the International World Cup competitions.

The history of the sport, however, dates back to 1912 when the first known ice climbing competition was organized on the Brenva glacier in Courmayeur, Italy.

Figure 3: The ice climbing community pose proudly with the Olympic rings in the Sochi Olympic park.

1.5 CURRENT STATUS OF ICE CLIMBING IN COMPETITION

Today, ice climbing in competition is a well-developed sport with multiple world cup competitions organized each year. The annual circuit is named the “UIAA Ice Climbing Tour”. There are three official disciplines:

- Lead-difficulty
- Speed
- Lead-bouldering

However, throughout the rest of the booklet, the stress is put on the two most popular disciplines: lead-difficulty and speed.

In the year 2015, six world cup stages took place around the globe and included events in the United States of America, South Korea, Switzerland, Italy, France and Russia. More than 250 athletes from 25 nations competed in these events. Moreover, every two years, the world championships are organized. Athletes compete to win the title of World Champion in lead-difficulty and/or in speed.

In 2015, the third UIAA World Youth Championships were organized in Saas-Fee, Switzerland. The event welcomed more than 60 young climbers from Russia, France, Switzerland, the United Kingdom, and many other countries.

1.6 THE OLYMPIC AMBITION: THE DREAM IS COMING REALITY

As for many other competitive sports, one of the ultimate goals of the UIAA is to bring ice climbing into winter Olympic Games.

In 2014, in Sochi, Russia, ice climbing was presented to the audience and Olympic community at the Olympic Park during the winter Olympic Games. The best ice climbers from all over the

world demonstrated the huge potential of this sport on a magnificent ice tower especially built for the event.

This challenging ambition strongly depends on the evolution of this fascinating sport on all five continents. Achieving this goal requires considerable effort from all members of the ice climbing community. The UIAA and its partners are on good track.

The UIAA invites all the national body members to develop ice climbing competitions in their country. A worldwide collaboration is the best solution to achieve the goal to be part of the Olympic Games.



2. LEAD-DIFFICULTY: THE ART OF ICE CLIMBING IN LEAD

Ice climbing lead-difficulty discipline takes its roots from alpinism. In the 1990s, competitive ice climbers were alpinists who decided to challenge each other on a specially-prepared ice structure. Participants in competition used the same equipment as they were using for mountaineering. Over the years, competitive ice climbing branched out from mountaineering into a separate discipline of its own. Nowadays, ice climbers are professional athletes who train especially for ice climbing competitions, and the competition events take place around the world. Equipment manufacturers produce equipment specifically designed for the use of ice climbing competition. As the International Climbing and Mountaineering Federation, the UIAA is in charge of competitive ice climbing and maintains the responsibility to enforce the sport rules.

Lead-difficulty competitions organized by the UIAA generally take place on artificial ice climbing structure. The purpose

for this is to standardize the competition routes among all athletes. Usually, there are three rounds in a competition: qualifications, semi-finals, and finals. In each round, the competitor who is belayed from below must climb in lead-format, a route where quick draws are clipped sequentially. For security, one or two of the first quick draws are pre-clipped by the route setters for each athlete. Each participant is allowed a single attempt to climb the route in all rounds except the qualification round. In qualification rounds, the athlete is allowed to start a second attempt if in the first attempt she couldn't clip first quick draw after the pre-clipped one(s). In addition, each climber has a predetermined time to climb the lead-difficulty route in every round. Time starts when an athlete leaves the starting position, and stops when an athlete falls or finishes her performance on a route. Athletes must terminate their attempt on the route when the allotted time is expired.

Figure 4: An elite athlete is performing a typical lead-difficulty movement called "figure 4"





The result of each athlete is mainly based on the height achieved by the climber. Time is also considered by the referee when an athlete finishes an attempt before the route time is over.

According to the UIAA Rules and Regulations (downloadable from the UIAA website www.theuiaa.org) all athletes in each round are allotted a fixed time, determined by the President of Jury and the Chief Route Setter, to observe the route before round begins.

After this observation period athletes are guided into an isolation zone, where each climber has the possibility to warm up and prepare for his attempt. Isolation zones should be located in a place where athletes have no possibility to observe the competition route in any fashion. This rule is essential in ensuring fair play and that all athletes are treated equally.

After each round only a defined number of athletes can progress to the next round of competition, until the final round where the strongest climber in lead-difficulty is determined based upon the final round results.



Figure 5



2.1 INDIVIDUAL EQUIPMENT

Individual equipment is a key element for the competitor. First of all, the equipment used by any climber has to be compliant with the UIAA safety standards, and be acceptable by the UIAA rules and regulations. Second, it should be comfortable to wear, light and robust, as to maximize the climber's performance.

Before each event, the equipment is checked by the judges. If an element doesn't meet the UIAA guidelines, the climber has to change the discrepancy, or he could be disqualified.

2.1.1 Ice axe

There are many different types of ice axes, but not all of them are useful for competition. Ice axes used by athletes in competition ice climbing differ from those used for waterfall ice climbing or mountaineering. The ice axe shaft's shape is curved aggressively, and their ice picks have an aggressive inclination angle as shown in the Figure 5 on page 28 and Figure 6 on page 29. These specifics allow the athletes to climb very overhanging routes, which is often the case in ice climbing competitions. The weight of an ice axe is minimized by removing all unnecessary aspects of a standard manufactured ice axe, such as a hammer or an adze. For safety and freedom of moves, leashes are not allowed on the ice axes.

Figure 6



Figure 7: Climber with all the personal equipment needed for competing in lead difficulty competitions. It includes ice axes, helmet, long-sleeve t-shirt, glove and harness. The ice climbing boots are also part of the equipment



Regarding the ice axe size, according to the UIAA Rules and Regulations, the ice axes used in competitions should fit in a UIAA box in order to be accepted. The box (Figure 8 on page 31) is standardized for all athletes. The dimensions are 30 x 55 cm.

Most ice axes (manufactured by various brands) are much shorter than the maximum box length. Many ice climbers extend the shaft or the handle of a standard ice axe to maximize the length still keeping it within the dimensions of

the box (Figure 9 on page 32). This extended length ice axe may help on a long distance moves, as well as make it is easier to change the hands on a single ice axe. However, taking this kind of approach is not for all athletes. Some movements are harder or impossible to execute due to the route setting style if using a modified longer ice axe.

In summary, the athlete is free to use the ice axe he wants with the only condition that it fits on the UIAA box.

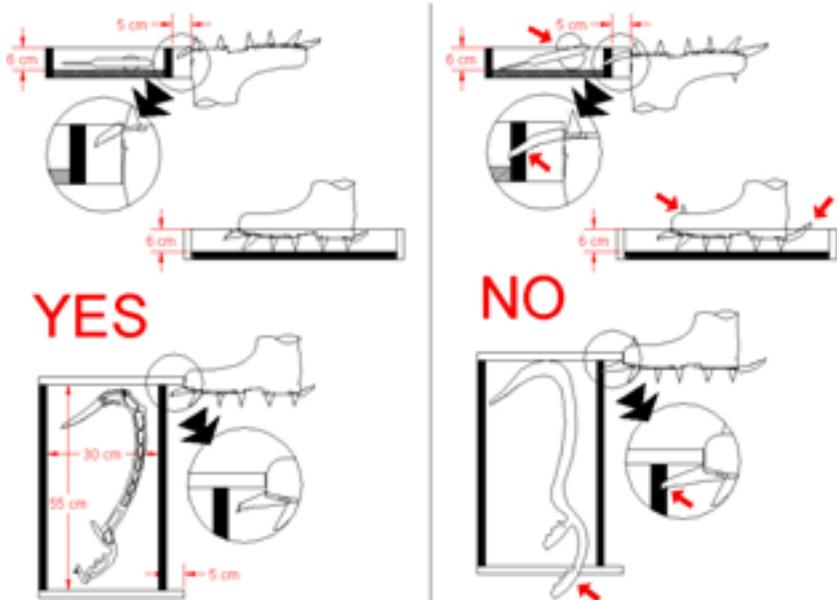


Figure 8: The UIAA box regulating the ice axe dimensions and fruit boots features

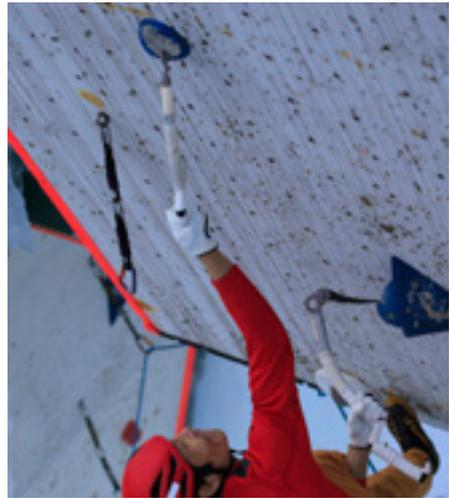


Figure 9 **Figure 10:** example of two optimized ice axes which fits the UIAA box

Many athletes attach soft material on the shaft of the ice axe for two main reasons. Firstly for a better grip to prevent slipping and falling. The second reason is to be able to hold an ice axe in the mouth in order to change hands or to clip the quickdraws easily.

2.1.2 Pick

Another key element is the pick. Each manufacturer produces spare parts for its own models of ice axes. A used or broken pick can be replaced with an original brand new pick from the manufacturer, or by an after-market model. Many of the athletes use a modified pick. These competition oriented picks have a slightly more aggressive angle of inclination, are generally thicker, have no taper of the steel, and use

reinforced steel. Using harder steel is advantageous as competition holds frequently have an imbedded metal plate where the ice axe has contact with a hold. Reinforced steel might last longer on these kinds of holds, and the tip of the pick may stay sharper during the climb, which is sometime very critical. Picks provided from manufacturers are generally not strong enough for heavier climbers as the picks generally break or fold when used in competition where severe leveraging is common.

2.1.3 Ice climbing shoes

In several sports, equipment used by the athletes plays a big part in their performance. That is why sport equipment manufacturers try to increase the robustness and decrease the weight of

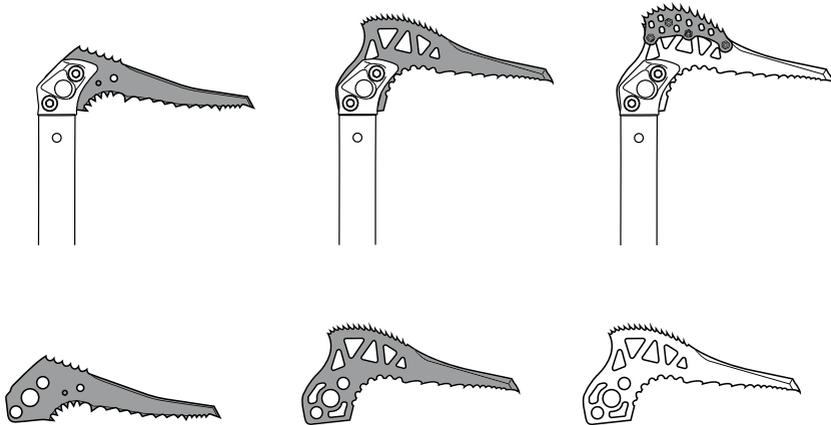


Figure 11: Example of an ice climbing picks used in lead difficulty competition. No matter the material: on ice, on plastic holds, or on metal plate holds with original brand picks or modified picks, the tips have to be sharpened. A well-sharpened pick permits accuracy of the ice axes position which is essential in competition.

the material used by a sportsman. In ice climbing, special shoes have been designed offering, lightness, comfort and solid performance. The ice climbing shoes or “fruit boots” were created for competition sport, and have gone through iterations of creativity.

Although the front part of the classical crampons and separate mountain boots are allowed by the UIAA, none of the athletes generally use this combination. The reason is easily understandable; mountain boots and crampons are quite bulky and heavy.

Currently, athletes use fruit boots with

crampons bolted to the sole of the boot. This reduces the weight of ice climbing boots drastically, while still allowing an athlete to kick on the ice wall with the front points.

Ice climbing crampons are also made to reduce the weight and increase precision of a front point.

As for the ice axes, manufacturers sell their crampons with their own front points. Usually, they are often re-sharpened by athletes to be more efficient on ice structures and especially on wood panels.

Third party companies also propose

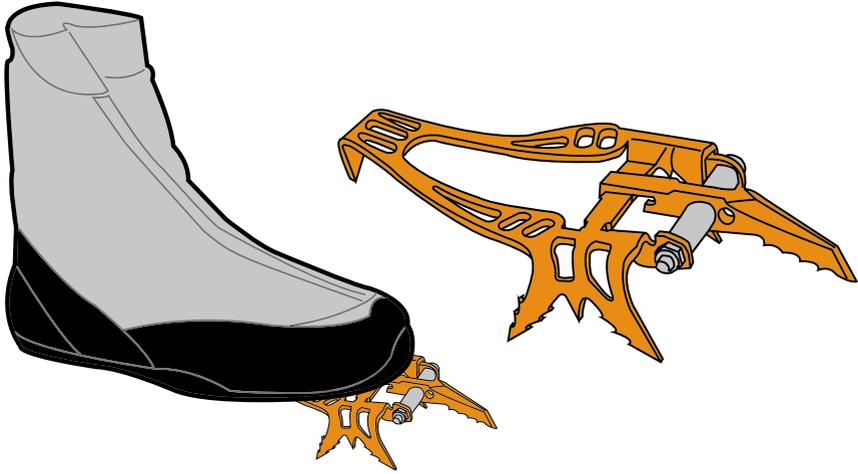


Figure 12: Ice climbing boots are very efficient for the top level competitions. Front points are strongly sharpened to easily kick on the ice or on the wooden panels.

products specifically for ice climbing competition.

Climbers are free to choose their personal crampons and front points. However, all components of an ice climbing boot must also comply with UIAA regulations, and must fit into the UIAA box accordingly.

2.1.4 Helmet

Any mountaineering or climbing helmet can be used at the competition if it has the UIAA Safety Label certification. As in the case of ice axes, athletes at the ice climbing competitions prefer to climb with the lightest possible helmet.

2.1.5 Gloves

Ice climbing competitions are frequently organized in cold temperatures. Despite this and to ensure accuracy in performance, competitors use very thin gloves which also maximize the grip with the ice axe. The choice of many athletes falls between golf or mountain bike gloves. They have a very thin layer of natural leather combining maximum freedom of movement, best grip with the ice axe, and maximum sensitivity when working with rope.



Figure 13: The helmet must be certified UIAA and the jugular fastened.

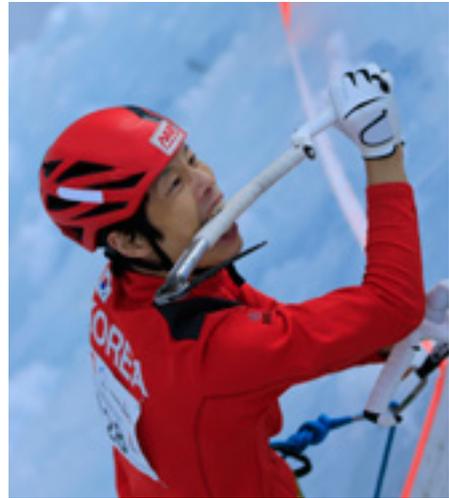


Figure 14: Athlete climbing with golf gloves

2.2 COMMON EQUIPMENT

Three main elements composed the common equipment:

- [The ice climbing structure](#)
- [The ice climbing holds](#)
- [The time keeping device](#)

Regarding the two first, they are indivisible. Concerning the time keeping device, this equipment is relevant for high-level training and competition.

In any case, these tools could be extremely expensive for an individual. In

the vast majority of cases, they are purchased by a national body, municipality, or ice climbing club.

2.2.1 Ice climbing structure

The UIAA ice climbing competitions are organized on artificial ice climbing 3-dimensional structures. These kinds of walls are similar to the walls used for sport climbing but include a crucial difference. Generally, they contain large ice panels and the routes would be impossible to climb all the way without ice axes. The structures combine wood panels and ice. These specificities make it a specialized form of climbing and

create the identity of the sport. The ice climbing walls may have various reliefs with some vertical ice sections, ice barrels, and some greatly overhanging features in combination, forming a complete ceiling. On one hand, the ice itself forms the core of the discipline. The ice features are demanding for the athletes because climbing on ice demands focus, technique, and concentration. Since breaking ice is not a technical incident, climbers have to “read” the ice in order to find the more reliable and easiest route. Ice creates an interesting aspect, as there is always a chance it could break, unexpectedly, so the athletes must have a lot of experience and a very good instinct. Climbing on ice is not just a physical exercise but is also mentally engaging. The UIAA encourages ice climbing structure owners and local organizers to ensure ice is on the wall to help preserve the identity of the sport and develop its interest for the athletes and the public. Wood panels are an interesting alternative when conditions don’t permit the use of ice. This option allows the climber to place his feet on the wall almost in any position by kicking into the wood using the front point of the crampons. The wood panels also enable setting a large range of route difficulty and variations thereof. Climbing routes are

created by placing specially made holds directly onto the panels; this is accomplished by using bolts or screws. Since there are several variations of manufactured holds, routes can be easily created or changed by replacing the hold type, rotation of the hold, or changing the distances between the holds.



Figure 15: The ice climbing structure in Rabenstein, Italy was built and updated to organize the UIAA Ice Climbing World Championships in 2015.

Figure 16: One of the first but still performant structures in the UIAA Ice Climbing World Tour is in Kirov, Russia





Figure 17: The ice climbing structure of Cheongsong, South Korea during route-setting

A variety of textures, reliefs, and holds composed by ice, plastic, or wood offer endless possibilities to create different types of routes for all different levels of climbing ability. Figure 15 on page 36, Figure 16 on page 37 and Figure 17 on page 38 present some of the structures used for the UIAA Ice Climbing World Tour 2015.

2.2.2 Hold

Ice climbing holds used for route-setting are made with solid and rigid material

such as resin and sand compound, metallic alloy, stone, or a combination. Figures 22, 23, 24, 25 show various holds used in ice climbing competitions at the 2015 UIAA Ice Climbing World Tour. Sport climbing holds could be considered in order to diversify the range of possibilities on route-setting. However, it's essential to understand that these kinds of holds are more fragile than holds specially produced for ice climbing. Due to the ice axe lever arm, sport climbing holds may break easily with the



Figure 18: Stone shaped and included in a resin base

higher forces produced with an ice axe. Several companies produce holds especially designed for ice climbing. They are easily available via the internet.



Figure 19



Figure 20



Figure 21

2.2.3 Timing system

Both in lead-difficulty and speed, time management is one of the key elements. In lead-difficulty competition, the referees operate the time keeping device. For each athlete, the height result is kept, but the time is also recorded in case of success. Time is taken from the start of the climb and stopped at the end of the attempt.

The complete time keeping process is described in the UIAA Rules and Regulations.

2.3 TECHNICAL HIGHLIGHTS

Since the beginning of the ice climbing lead-difficulty competition, climbing technique has developed dramatically both due to evolution of the athlete's equipment and evolution of the

structures and routes. Routes are extremely demanding, requiring excellent physical condition. Lead routes at the UIAA Ice Climbing World Cups are made on a constantly overhanging structure with 40-60 moves where several difficult moves are extremely time consuming. Moreover, time to climb a lead route is limited by the referees. The time restriction requires a climber to progress on the route with greater speed than when climbing recreationally, which requires better physical preparation to perform more demanding moves at higher speed.



Figure 22: Professional display unit dedicated to Ice Climbing lead-difficulty competitions



Figure 23: Three athletes are climbing at same time during the qualification rounds

2.3.1 Figure 4

One of the most celebrated technical elements in lead-difficulty is called a "Figure 4". Very often on the route there are holds separated from each other with a relatively lengthy distance. The use of a "Figure 4" technical move allows climbers to reach further when moving from one hold to another. At the same time, this move reduces the possibility of an ice axe to slip from the hold. Figure 24 on page 43 (sketches 5 and 6) shows a sequence of moves in order to perform

"Figure 4" technical element. Figure 25 on page 43 shows an example of an athlete performing a "Figure 4" during the competition. A "Figure 4" can be used both on a vertical parts of the lead route and on very overhanging aspects. Closer inspections of the Figure 28 reveals that a "Figure 4" allows a climber to bring his center of gravity quite close to the wall, as well as high, to the fixed ice axe. This allows the climber.

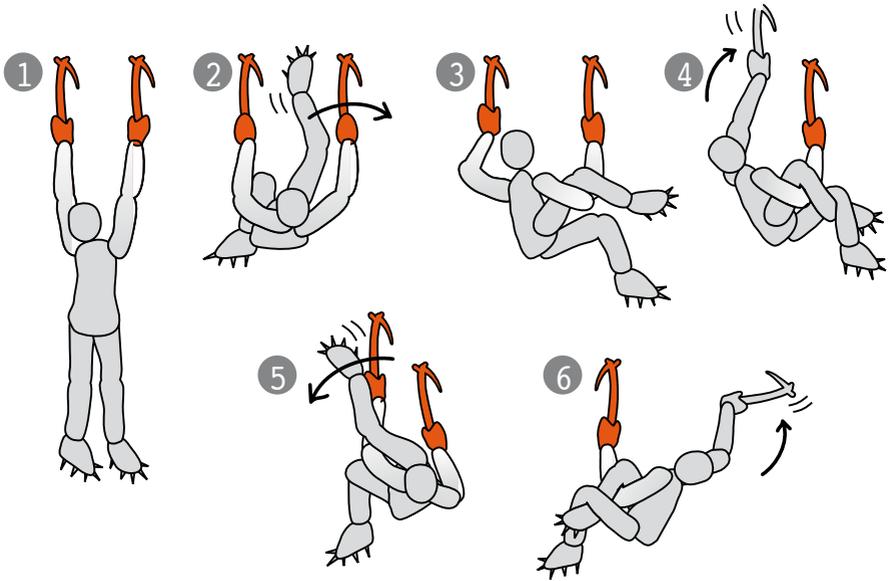


Figure 24: © Petzl



Figure 25: Climber performing a "Figure 4" during a UIAA Ice Climbing World Cup event

2.3.2 Figure 9

Another technical element widely used by athlete is called a "Figure 9". This element is used when an athlete wants to change hands on one ice axe and be in a "Figure 4" technical element for the next move. "Figure 9", is very similar to "Figure 4". The difference is that an athlete places his leg over the arm on the same side of the body as the leg.

At first glance this element does not seem like a comfortable position. To perform the move, it's essential to place the center of your gravity under the ice axe on a hold. Contrary to a "Figure 4", the "Figure 9" is mainly used on overhanging terrain. For example, Figure 24 on page 43 (sketches 2, 3 and 4) shows how a climber uses "Figure 9" element for a quick and smooth transition from vertical to the overhanging part of the route and permits her to perform a next move in "Figure 4". Both "Figure

9" and "Figure 4" moves allow a climber to keep his center of gravity close to an ice axe, which minimizes the swing of a climber and consequently the energy spent by a climber.

2.3.3 Undercling

Often on the lead ice climbing route, holds are turned upside-down with a "working" surface facing the ground. These holds are considered as underclings. They should be taken by a climber with an ice axe inverted as shown in Figure 28. Moving from a hold in the undercling position is quite demanding for an athlete since it requires a lot of muscular power not only by the climber's hand but also his back and legs. The longer the move demanded of the climber from an undercling hold, the higher the climber's feet should be placed and more demanding it becomes in terms of muscular power.

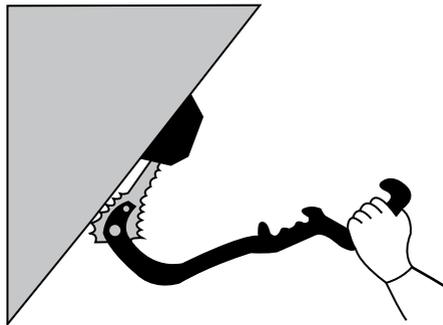


Figure 26: Typical undercling ice axe position



Figure 27: Athlete holds his ice axe in undercling position

Figure 27 on page 45 shows the essence of performing a move from the undercling hold. Notice that the climber's feet and the ice axe in the undercling form a triangular for better stability while reaching the next hold.

In lead-difficulty, an undercling position is often followed by a long move

(Figure 29 on page 47). In this case, the climber has to perform a technical body positioning, especially the knees, called "Egyptian". This move which is detailed in Figure 28 on page 46 enables an athlete to reach a far away hold without slipping.

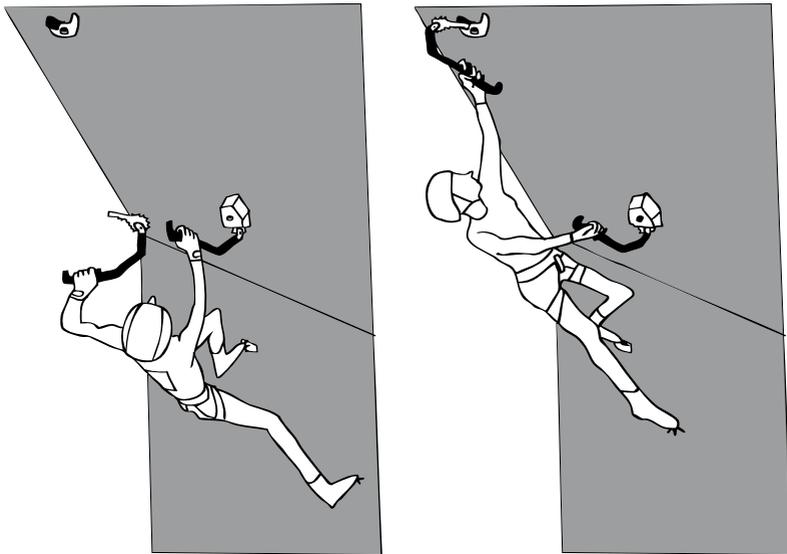


Figure 28: Representation of the "Egyptian" move in two sequences

2.3.4 Hand changing

Very often on the lead ice climbing route, athletes need to change their hand position on an ice axe in order to progress on the route, or simply take a break. Since an ice axe has lower and upper holds, it is quite understandable how the hand position can be changed on one ice axe. On the other hand, there

are different ways where a second ice axe could be utilized while performing a hand position change. According to the rules and regulations, the climber is not allowed to attach an ice axe on his harness at any stage of a climb. This restricts the possibilities where ice axes could be placed in order to change hands on a second ice axe.



Figure 29: Nuances of the long move. The athlete here is demonstrating the undercling move with an “Egyptian”. She also plays on the different handles of the ice axe to remain close to the overhanging wall.

UIAA ICE CLIMBING
WORLD CUP



Nevertheless, there are many possibilities that exist in changing hand positions on an ice axe.

One example is to place the second ice axe on the shoulder during the transition (Figure 31 on page 49). The second hand is free and can easily hold the lower or upper handle of the ice axe. This technique is the oldest method used by ice climbers beginning circa 2000, when leash less tools became popular.

Strengths:

- Easy understanding and implementation

Weaknesses:

- Ice axe can fall down while climbing in overhanging terrain
- Takes time, especially in competition

The second method is to use the mouth in order to retain the free ice axe during the change of hands (Figure 30 on page 49).

Strengths:

- Very quick
- Easily understood
- Low risk of dropping an ice axe

Weaknesses:

- Can be dangerous for teeth and temporal mandibular nerves.

This method is the most used nowadays among top climbers. This position is also useful for clipping the rope into the quickdraws.

2.3.5 Foot Work

Obviously, arm, back, and abdominal muscles play a great role in an athletes' performance, but foot work is also very important, and probably plays as important a role as the aforementioned mentioned aspects. Crampons worn by an ice climber require different footwork on a route in comparison with the footwork of a rock climber in rock climbing shoes. One main difference is that it is very difficult for an ice climber to develop a pull force with his toes. This limits the functions of the feet in crampons in supporting, balancing, and stabilizing the position of an ice climber. While performing a move, a rock climber can develop a pulling force thanks to his abdominal muscles and high friction of a rock climbing shoe with the foothold, toehook, or ability to scum holds, not otherwise possible on icy terrain. When an ice climber performs a move, Figure 30, it is very difficult to develop the same pull force with the toe of the foot when only one front point is placed



Figure 30: The athlete “eats” his ice axe in order to clip more easily the quickdraw.

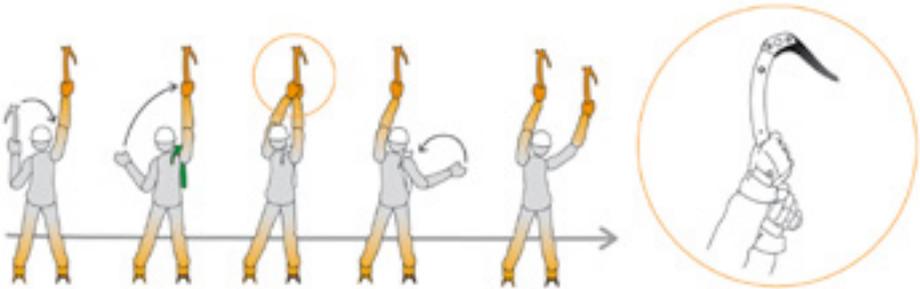


Figure 31: © Petzl

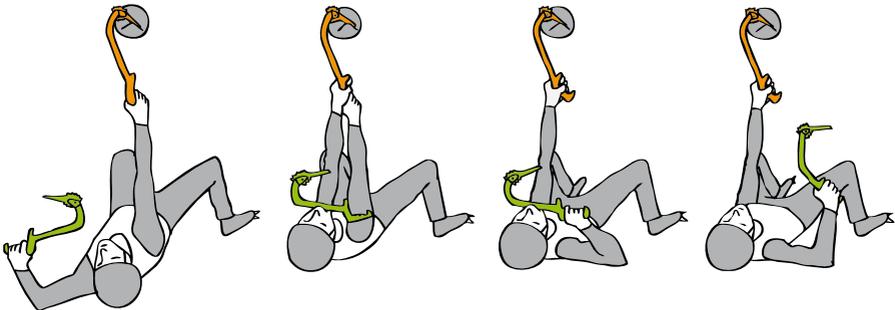


Figure 32

in the wooden panel. This means that an ice climber should compensate this reduced foot pull force with the force from his arms and back.

Another example is when an ice climber is on the ceiling, he can only use his feet for stabilizing his position and a small portion of pull force. Even pull force is reduced for an ice climber because the length of the ice axes makes it difficult to place their feet on a ceiling. All these limitations highlight the need to develop and use different climbing techniques such as "Figure 4" and

"Figure 9" as covered in the previous paragraphs.

Ice climbing requires much more force in the large muscle groups of the arms and upper body in order to perform moves on the severely overhanging terrain. Due to the fact that feet in many situations cannot unload the arms by taking some weight of a climber, the forearm muscles are loaded most of the time with full, or nearly-full, body weight. The best ice climbers in the world have very high anaerobic threshold in the forearm muscles.



Figure 33: Athlete plays with the ice curtain and the wooden panels to find the best foot position



Figure 34: A youth athlete pulls hard on his ice axes and tries keeping his feet on the ice ceiling



Figure 35: An experienced athlete uses both his feet to stick the wall



Figure 36: An athlete falls down and loses control of her ice axes

2.4 SPECIFIC SAFETY

Safety regulations are mandated both in training and in competitions. It is important that the ice climber, belayer, referee, or anyone standing under the route, wears a helmet at all times. Since both at the competitions and trainings athletes perform long, sometimes very dynamic moves with ice axes not attached to their hand, it is quite often that ice axes fall down as shown in Figure 33 on page 50.

2.5 RULES AND REGULATIONS

The UIAA Rules & Regulations should be the source of information that a local organizer, an athlete, a judge, or a route-setter adhere to when intending to hold an ice climbing competition. In this paragraph, the basic rules to keep in mind are presented.

2.5.1 Before the ascent

- The athlete has to be tied with an figure of eight knot + a stop knot
- The belayer has to be ready
- The judge in charge of the route has also to be ready
- The two ice axes have to be on the starting area; the starting area is marked with blue indicator on a hold or an area of ice

- The first quickdraw is pre-clipped

- The stopwatch is triggered when one of the two ice axes leaves the starting area

2.5.2 During the ascent

- The climbing period is defined by the President of Jury in collaboration with the Chief route-setter. The period is announced to all the athletes during the route preview



Figure 37: The starting position: the rope is tied with an eight knot plus a stop knot. The rope is pre-clipped in the first quickdraw: a locking carabiner is used to prevent accidental unclipping

Figure 38: Careful with the boundary lines



- The climber has the right to ask how much time remains on his ascent
- The start of the last minute is always announced by the judge in charge of the route
- Boundary markers are used (sometimes in red) and athletes are disqualified if the boundary line is touched

2.5.3 End of the ascent

- End of the official time dedicated to the route has expired
- When the climber falls
- If the climber goes over, or touches a boundary line
- If the climber misses clipping a quickdraw, or doesn't clip in sequence
- If the climber touches the ground after his start
- If the climber uses any type of aided climbing; the climber may only use their axes, hands, and feet. The climber may not use their elbow or knee to wrap around an ice axe. Ice axes may not be enchainé (one axe joined to another).
- In case of loss of a mandatory gear: helmet, gloves, ice axes...

LEAD







3. SPEED CLIMBING: A TRUE SPRINT ON ICE

While Italy and France were the first countries to organize lead difficulty competition in ice climbing, Russia (the former Soviet Union) was the motherland for speed competition. Probably the early pioneers of this sport were alpinists from Russia, negotiating fast ascents of various mountain routes. In the early 1960s in Russia, speed competition in rock climbing and alpinism were extremely popular among mountaineers and rock climbers. By the late 1980s speed ice climbing competitions were formalized and regularly organized in the country and come the late 1990s other speed ice climbing events started to emerge in North America and Europe. Today, speed competition is considering a technical discipline, practiced on an ice wall. Speed competitions are organized at every world cup stage. Modern speed competitions are held on a vertical ice wall from 12 to 15m high. The format could be either on a single route or in duel. To maximize competitor and audience interest, the UIAA recommends the duel format. In these cases, two walls are constructed, one next to another. Each competitor has

two attempts to climb each route for the purpose of familiarization of the route, also known as 'training'. Afterwards, for the qualification run, each athlete races up one route after the other and has only one attempt on each route. The fastest 18 athletes are determined by summing up the times of each competitor. These 18 participants qualify to the second qualification round. The same procedure is repeated to determine eight fastest climbers among the 18 athletes. The eight fastest climbers are arranged according to their overall time from fastest to slowest. For the quarter-final round they are split in pairs as the fastest (1st place in second qualification) with the slowest (8th place in second qualification), second fastest (2nd place in second qualification) with second slowest (7th place in second qualification), and so on. This way four pairs are created and each pair of athletes runs each of the routes in a "duel" or "play-off" head-to-head competition. The winner of the pair is determined by the fastest overall time on both routes. After the quarter-final round, four winners from each pair continue to the

semi-final round, while losers from the pairs are knocked-out from the competition and arranged from the 5th to 8th place according to their overall time. Again, according to the results in the quarter-final round, the athletes are arranged from fastest to slowest, and two pairs are created where 1st place athlete runs against 4th place athlete and 2nd place athlete against 3rd place athlete. The same process is repeated to determine the winners of the two semi-final pairs. The two winners qualify for the final, where they will compete for the gold medal and the two semi-final losers compete in the 'small final' (3rd vs 4th play-off), fighting for the bronze medal.

Another format of speed competition is possible and can be organized using only a single route. Sometimes this format is used on the UIAA Ice Climbing World Tour. For more details on this please refer to the UIAA Rules & Regulations.

Compared to lead-difficulty competition, the speed competition is less well known. However, this sport is worth the recognition of the ice climbing community. In recent years, speed climbing has been shown to catch the spectator's eye, and is more easily understood by the masses. Fast but serious, are good words to qualify this discipline.

3.1 INDIVIDUAL EQUIPMENT

Like in lead-difficulty wearing helmet, gloves, long-sleeves T-shirt and pant are also mandatory in speed climbing for safety precautions.

In addition, speed ice climbing needs specific and sometimes tailor-made tools. The following paragraphs detail them.

3.1.1 Fifi ice axe

Ice axes used by athletes to climb a 15m vertical ice wall at speed ice climbing differ dramatically from those used in lead-difficulty. Speed tools are called "Fifi". A "Fifi" is a very simplified ice axe which resembles a hook with a handle for the arm cut from a single sheet of metal. These tools probably appeared for the first time among Russian alpinists in the early 1980s. Mountaineers were using "Fifi" on long ice, rock or mixed mountain routes mostly as a hook for the gear or as a tool for aid climbing. Russian athletes preparing for speed competitions found that the "Fifi" was a very useful tool when climbing an ice wall which didn't require hammering the tool into the ice. Since then "Fifi" have spread dramatically among athletes competing in speed. Generally, it is the only tool used at the UIAA Ice Climbing World Cups.



Figure 39: Focus and determination can be capitalized on only with good technique and training. This gives his best to hit the timer to gain first position.

ranked by time achieved in semifinals

1

8		

4

5		

2

7		

3

6		

ranked by time achieved by winners of first heat

best time 1

4		

(of winners in first heat)

2nd time 2

3		

heat for 1st place

1

2		

heat for 3rd place

3

4		

Figure 40: Final round schematic



Figure 41: Young ice climber at the speed competition using "Fifis".

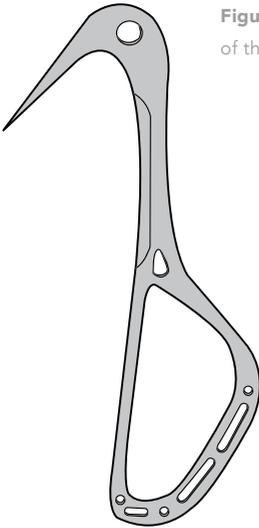
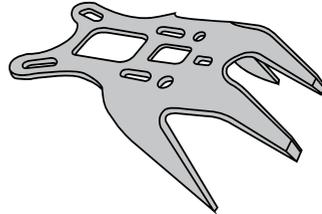


Figure 42: Overall shape of the “Fifis”

Figure 43: The two front points are the main specificities of these crampons.



3.1.2 Speed crampons

Another difference between equipment for lead-difficulty and speed is the type of crampons used. Two types of speed crampons are shown in Figures 42 and 43. Since the speed ice climbing route has only ice, it makes sense to use crampons which are specialized for ice.

Taking the lead from mountaineering, crampons made for ice have two front points, and if the ice is soft or is close to the snow, the front points need to have a triangular shape to increase the surface area on the ice. Two front points increase the stability of the ice

climber’s foot as well as preventing ice from breaking by increasing the surface when the weight of a climber is applied. Many athletes use the same boots for lead and speed competitions, while only changing detachable crampons for each discipline.

3.2 COMMON EQUIPMENT

The ice wall and the time keeping device are key elements in speed. They are used by the climbers during both training and competition. Their acquisition, operation and maintenance costs



Figure 44: Speed crampons were used by many climbers at the ice climbing demonstration during the Sochi Winter Olympic Games in 2014.



Figure 45: This photo demonstrates the stability of the left foot placement using the speed crampon while running up the ice.

may be high and need a special investment from the national body or the municipality of the club.

3.2.1 Speed ice wall

Ideally, the speed climbing wall should be 12 to 15m high and wide enough to accommodate two ice climbers ascending simultaneously next to each other. One of the best speed ice climbing walls can be found in Russia, shown in Figure 47 on page 66.

To create a speed ice climbing wall, a

metal frame with a net (chicken wire) attached on one of the surfaces is needed. Once it's cold enough, a water sprayer is attached on the top of the net. It takes several days to freeze a sufficiently thick layer of ice on the net. Periodically, it may be necessary to cut big icicles and ice columns to maintain the flat surface of the ice wall.

For places where the weather conditions do not facilitate the construction of a natural speed ice climbing wall, an alternative could be composed by using wooden planks as shown in Figure 46 on page 65.



Figure 46: Wooden panels with horizontal steps can be used in case of warm temperatures

Figure 47: The ice climbing wall in Kirov, Russia. World temple of the speed ice climbing.





3.2.2 Timing system

In any speed competition, time determines the winner. That's why timing is the most critical component for these competitions. The timing mechanism consists of a platform from where a climber should start, and a button at the top of the route which climber should tap with his ice axe. Time starts once an athlete leaves the platform and stops when an athlete touches the designated area on top of the route. The timing device should be able to operate on both routes simultaneously and needs to be extremely robust because climbers hit the bumper with their ice axes. The device has to be reliable in extreme weather conditions such as snowfall and temperature below -20°C.

3.3 TECHNICAL HIGHLIGHTS

Speed ice climbing is a sophisticated sport and requires knowledge of technical elements. This discipline is also physically demanding. The fastest speed ice climbers have developed arm and leg muscles that achieve high power output in order to climb a 15m ice wall in less than 10 seconds. In addition, speed ice climbing athletes possess high levels of endurance enabling them

to continually mount a 15m ice wall at nearly maximum speed.

3.3.1 Foot work

As covered in the section dedicated to the individual equipment used in speed ice climbing, crampons used by a speed athlete are quite different from those in lead competition. They do not require a large swing of the leg in order to penetrate the ice. Instead speed climbers use normal steps and just the weight of a climber is enough to place the front points of the crampons in the ice. An ice climber's foot performs only vertical steps. Contrary to rock climbing, ice climbers cannot rely on the full range of ankle motion. Vertical gain is achieved by expanding the knee joint with very low ankle joint mobility. Greatly flexing or extending the ankle creates a loss of power, which then requires the climber to reposition his foot. Ideally, the angle of the ankle joint should be 90 degrees to prevent the crampons from breaking the ice.



Figure 48: Located on the top of the route, the bumper has to be solid to resist to ice axe assaults.



Figure 49: In any position, the angle of the ankle remains at 90 degrees

3.3.2 Hand techniques

The ice axes “Fifi” used by a speed climber are normally made of very light steel. They are not designed to be hammered into the ice, instead simply hooked on the ice. And by applying the force directed downwards the top of the “Fifi” enters the ice. Because of this speed climbers simply hook one “Fifi” after another without applying any swing with their arms. When speed increases the climber doesn’t have so much time to find an optimal location to place

the “Fifi”. In this case, the “Fifi” might break the ice. Very often on the ice wall there are small ice columns which form rendering it very difficult for a climber to find any place on such a column to place the “Fifi”. Finding themselves in this situation, many speed ice climbers slightly turn the ice axes in order to use it as a side pull and put the “Fifi’s pick” around the column. This technique prevents ice breaks and falling.

Figure 50: An athlete pushes hard on his legs to gain velocity. He also decides to turn his right ice axe to use it as a side pull.

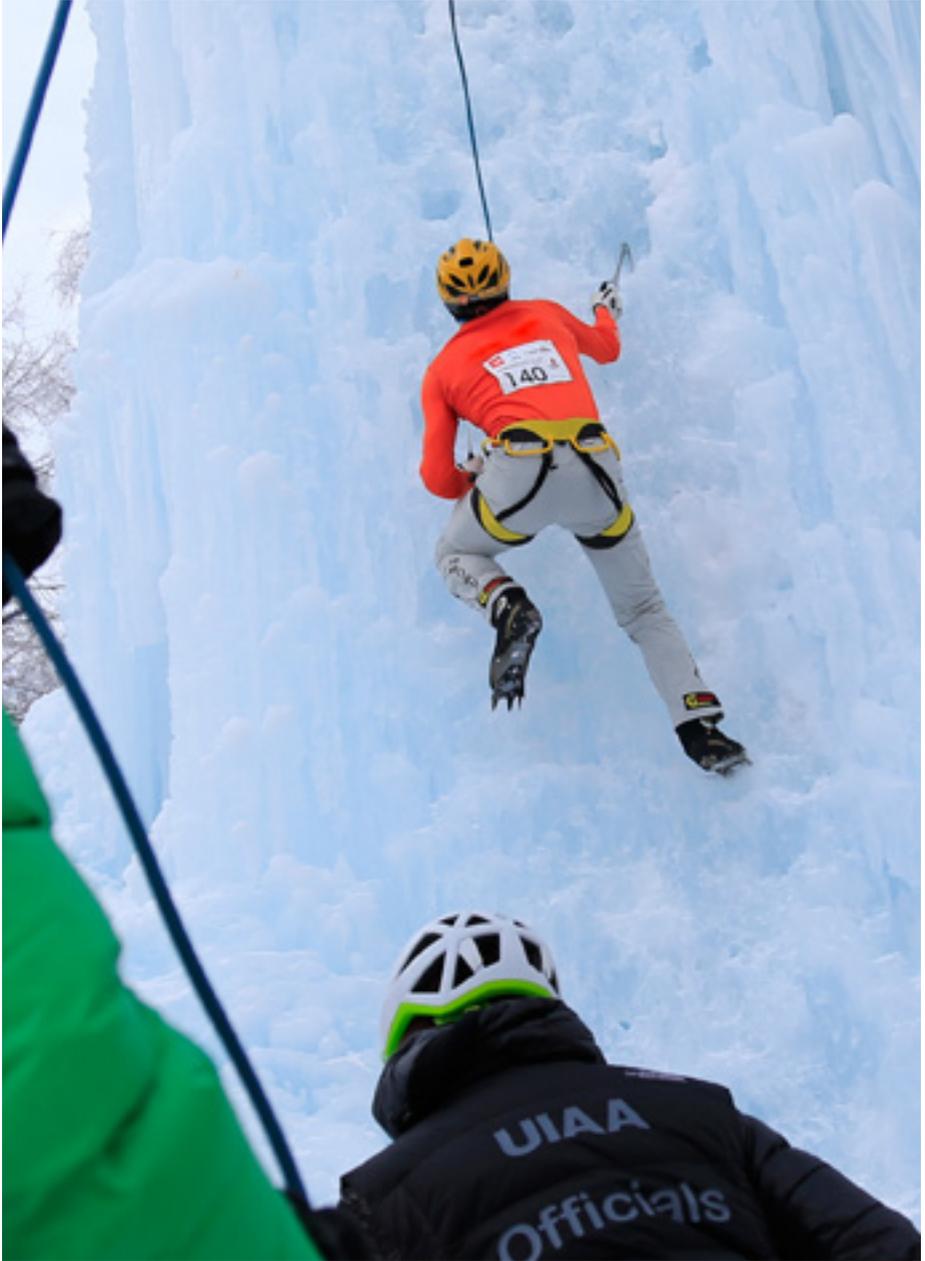
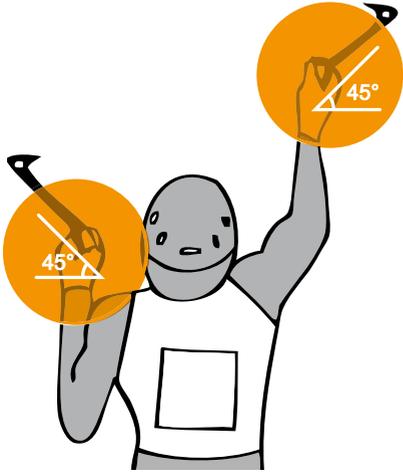


Figure 51: Zoom on the ice axes which are slightly turn on the sides



3.3.3 Rope position

For safety and speed efficiency, speed ice climbing is practiced and performed on the top rope. In this case, the rope comes down from the top of the wall to the athlete, otherwise the rope can disturb the climber. In essence, the rope goes from the athlete, up to an anchor or pulley that redirects the rope, then down to the belayers. Here are some tips to climb really fast without any encountering issues due to the rope position.

The first piece of advice is the training. Nothing is more important than good training sessions. After several training

sessions on an ice climbing speed wall, the climber finds the right balance and position of his body, his ice axes and rope, which is just in front of him. It's often a question of experience.

Some athletes prefer climbing with the rope behind their arm. This technique has to be tested during training in order to be effective in competition.

In speed competitions, belayers have true responsibilities. There are two belayers, one to wear the belay device (usually a Grigri or similar autoblocking device) and pull tension on the climber, and the second to pull the rope through the tail of the rope through the belay

Figure 52: Main speed climbing configuration.

The rope comes from the top and is located between the two arms of a climber.



device. The belayers tighten the rope according to the speed of the athletes. If they are not well coordinated, the rope could be slacked and could disturb the moves of the climbers during the ascent, as well as producing a fall. On the other hand, if the rope is too tight, the climber doesn't feel comfortable and his race can also be perturbed. Moreover, the referee could consider

that as cheating and the climber might be disqualified.

In summary, the rope position is essential in speed ice climbing. Whether climbers or belayers, both have to be very well trained and concentrated in managing the rope correctly.



Figure 53: An athlete using the special technique of placing the rope behind one arm.



Figure 54: Two skilled belayers are essential for a successful ascent.



3.4 SPECIFIC SAFETY

Because athletes climb very fast and the “Fifi” is very sharp, speed ice climbing requires specific safety precautions.

First of all, basic precautions have to be implemented: the rope must be in good condition, harnesses should be adjusted correctly, a helmet with an appropriately buckled chin strap on the head, etc. As noted in the “Caution!” section at the beginning of this manual, basic safety precautions will not be presented here. Only specific precautions due to the competitive nature of speed ice climbing are outlined.

Following this introduction, the most important element for speed ice climbers and their coaches is having always a first aid kit with them and knowing how to use it. The UIAA strongly encourages athletes, coaches and/or team managers to follow first aid recommendations in their respective countries.

Indeed, “Fifi” can slip and injure the climbers’ hands, arms or legs. Injuries are often minor and can be treated by a skilled person present of site. However, emergency situations can arise, and emergency transportation and care should be considered in the pre-planning stages of a competition, not after

an injury occurs.

During the competition athletes try to deliver their maximum performance. In speed competition this might result in a serious injury since when an athlete climbs a vertical ice wall at high speed, he can’t completely control where he places the fifi in the ice and quite often ice breaks unexpectedly. Sometimes this may result in puncturing of the climber’s arm, hand or leg. Due to the probability of an injury, ice climbers protect their arms and legs with protective equipment. This might include shin guards, knee protectors, thigh protectors, thicker gloves, and forearm protectors as shown in Figure 49. Ideal protective equipment should be light and not constrain the climber from making natural moves.

3.5 RULES & REGULATIONS

Speed ice climbing may seem easy to manage but, in fact, this activity is technically and physically demanding. In ensuring a fair competition, the UIAA speed climbing rules have to be perfectly understood by all parties involved: athletes, belayers, judges and event organizers.



Figure 55: 58 A young competitor ready to climb as fast as possible. She has all the mandatory equipment: helmet, gloves, long sleeve shirt, pants, a tight harness and special fruit boots. Her number is pinned on his back for clear identification for the judges (not seen).



Here are the main elements to take in account.

3.5.1 Format of the competition

- Speed climbing is practiced top rope
- Electronic time keeping devices are used to be more accurate. In case of need, judges use manual stopwatches.
- A warm-up period is possible before the competition: according to the will of the President of Jury and the local organizers
- In case of a climber falling: no contact with the ice for more than one second
- Exceeding the time limit
- Touching the ground after the start
- In case of external help
- Following two false starts

3.5.2 During the competition

- Start: at least one foot on the ground
- Official announcement: "Ready, Attention, GO!"
- Competitions can be organized on a single route or in duel.
- Details of each format are defined in the UIAA Rules & Regulations

3.5.3 End of attempt

- Touching the bumper on the top of the route





Figure 56: This speed ice climber uses shins guard and knee protectors to prevent injuries



Figure 57: An athlete slaps the “bumper” to stop the stopwatch. Notice he has no ice axe in hand, and is demonstrating letting go of a stuck axe in the ice at the last placement. This is a legal move.





4. TRAINING PLAN

There are different ways to improve your climbing. The most common is to go climbing as much as possible; however at some point this leads to small or no improvement. That's where a plan comes in handy. A plan consists firstly by a three-step preparation: goal setting, analysis of the current situation, measures to be taken to fulfill the goal.

4.1 PREPARATION

4.1.1 Goal

The set goal must be SMART, what means that it has to be:

- **Specific** – the goal should be a specific point that you want to improve.
- **Measurable** – the goal should be quantifiable or measurable.
- **Assignable** – the goal should specify who will do it.
- **Realistic** – the goal should be realistic, given available resources.
- **Time-related** – the goal should be terminable.

Search for goals in short term (some weeks to months), mid-term (months to years), and long term (several years) and write them down. Pay attention to write them down in a thoroughly positive formulation and write them in a personal formulation (I want..., I will...). Define some goals in every aspect of the sport as technique, tactics, power, mental, environment, resources and results.

4.1.2 Analysis

4.1.2.1 Actual State

The analysis should cover different points of your training and should be done by both the athlete and the trainer independently. For example write down your strengths and weaknesses for each of the following category: the technique, tactics, power, mental, environment, resources and results. Rate your overall performance in each of the former categories. This is you.

4.1.2.2 Target State

To analyze the target state you have to know where you want to go and what is needed on this level. For example if you

want to compete in world cup events you need to know the average climbing time, number of moves, level of the athletes etc. Furthermore knowledge about the technical (e.g. high foot placement, fast movement) and physical ability (e.g. number of one-arm-pull-ups, seconds in front-lever, flexibility) of the top athletes helps to define the target state. So in the course of time the target state can alter due to changing of the rules or route setting characteristics.

4.1.2.3 Prioritization

If you know your actual state and also the target state you also know the gap in each aspect. So now training comes into play. Fill your gaps, get rid of your weaknesses and extend your strength (to be even better than the others). But do not try to do everything together. Training is a process that needs a lot of patience and continuous will. Try to focus on three to five points to improve in short term that should also help to reach your mid- and long-term goals.

4.1.3 Planning

If you know where to work on you have to plan your training. It is best to have enough time to reach your goal. Your goal should not be too far away to keep the focus and motivation. In our experience a training cycle of 4 to 6 months

is useful to reach mid-term goals. In each training cycle you should set some short-term goals and evaluate their status (-/0/+) after each cycle. Depending on your strength-weakness-profile the following phases can be shorter or longer, meaning if you are by nature a powerful climber, extend the power endurance phase, if you are by nature an endurance type extend the power phase.

In every training phase you can add general core-training like pilates, easy jogging twice a week for 45 minutes and general shoulder strength. We recommend doing your shoulder exercises with a TheraBand as routine before each session. In addition don't forget to stretch your lower and upper body at least three times a week to keep the elasticity of your muscles. This can best be done after the training as a cool down.

The following phases and methods are written for adults and should be applied with care. You should already be on an intermediate overall athletic level and have an experienced coach to prevent injuries and overloading. For youth athletes these methods must be altered especially for the weight training. Please refer to the recommendations in the next chapter for this.



4.1.3.1 Basis training

Duration:	2-4 weeks
Frequency:	2-4 times a week
Complementary training:	normal route climbing, core-training, jogging, general shoulder strength training, stretching
Goals of this period:	stabilizing your specific techniques (hooking precision, gripping technique, dynamic movements, changing gripping position)

In the basis phase, the goal is to climb a large volume and thereby stabilize technique and to develop general endurance. In this phase, you can work on your technical weaknesses (e.g. (hooking precision, dynamic movements, gripping technique, changing gripping position, clipping, breathing etc.). Local muscular endurance training has an incredible effect of up to a 1000% increase in several weeks due to optimizing the energetic processes. Table 1 on page 83 gives an overview of some proposed endurance methods in the basis phase which can be all done in a special dry tooling boulder wall with ice tools and running shoes. Table 2 on page 83 gives an overview about the proposed methods in power training. 1RPM means one repetition maximum (the maximal weight that can be overcome within this exercise in one

repetition) and can be found with an initial specific power test at the start of the training cycle. For the dead hangs it means the weight you have to add/take away to hang on for maximum 1s. The dead hangs can also be performed with only two neighboring fingers on each ice tool. Change the finger pairs so that you can train each finger. Additionally you also roll a barbell up and down with your fingers and wrist.

No specific exercises are given for the power training as these are highly dependent on your training environment, training goals and weaknesses. If you know your specific weakness, exercises can be found on the internet or in many power training books. For a collection of must-have power exercises refer to chapter 4.1.3.2.



Figure 58: Barbell rolling up and down with your fingers and wrist.



Figure 59: Reverse butterfly as a balancing exercise

DURATION	REST	SETS	EXERCISE	TARGETS
25min 30min	5min 10min	3 3	boulderwall underarms lightly pumped	capillarization muscle aerobic capacity lactate compensation raising anaerobic threshold
25min	5min	3	boulderwall each 2min 20s speed	capillarization muscle aerobic capacity lactate compensation raising anaerobic threshold change aerobic-anaerobic
12min 8min	3min 2-3min	4 4-5	Traverse steep boulders Just long moves – no hand changes	capillarization muscle use of muscle glycogen anaerobic capacity raising anaerobic threshold

Table 1: Climbing exercises for the basis training in ice climbing [adapted from U. Stöcker 2014]

METHOD	REPS/ TIME	REST	SETS	EXERCISE	%1RM	EFFECTS
exercices with free weights or body weight	20-50	1-5 min	3-6	Slowly to intermediate	30-65%	resistance
Deadhangs on ice tools with extra weight or on a turning bar	30s+	1min	9	3 different gripping positions (short, long, undercling)	30-65%	small hy- pertrophy capillar- ization
Finger rolling on turning bar like 'turn- till-burn' or a barbell	30s+	1min	9	Roll fingers and wrist slowly up & down to full extension	30-65%	small hy- pertrophy capillar- ization

Table 2: Power methods in the basis training in ice climbing [adapted from U. Stöcker 2014]



4.1.3.2 Power-up training

Duration:	4-6 weeks
Frequency:	2-4 times a week
Complementary training:	medium-hard bouldering, core-training, easy jogging, general shoulder strength training, stretching
Goals of this period:	building up muscles for more power building specific short-term endurance enhancing your specific techniques in higher intensity

In the power-up phase, the goal is to slightly enlarge the cross-section of climbing specific muscles, thus laying a foundation for the following maximum motor phase. Many climbers are afraid to enlarge muscles that make them heavy. However, the maximum force of a muscle is directly proportional on the cross-section of the muscle and of the activation ability. Therefore a certain cross-section is needed for a certain amount of maximal power. Newer studies have shown, that the rest time in between sets are crucial for hypertrophy effects, saying that given the weight is still 80% of your one repetition maximum, the shorter the break the higher the break. This concludes that if we want to reduce the effect of hypertrophy we need to extend the breaks.

This is a good method for already bulky athletes. But we recommend even for muscular athletes to do a power phase of 2-3 weeks. Additionally your nutrition has a big effect on muscle growing as well, so if you are a slight athlete and want to increase muscle mass enhance your nutrition by adding more protein and carbohydrates after training and in the morning. Furthermore the power training phase does not only help gain muscle mass but also prepares the active (muscles, cardiovascular) and passive (tendons, ligaments) structures in your body for the following high intense maximum power phase.

During the power-up phase it is important do to a lot of climbing specific exercises on the wall that are technique related. The easiest thing is, to climb

middle long boulders (15-20 moves) with certain exercises (resting before the hold, shaking at each hold, changing gripping position at each hold, climbing with only one foot, climbing with only one axe). Table 3 on page 87 gives an overview about the most important climbing exercises.

Besides the climbing exercises that should be the main focus (> 75%) there is also need to build up general athletic fitness to withstand more powerful moves and to overcome specific weaknesses according to your prior analysis.

Typical must-have power exercises besides climbing are:

- Pull-ups or Muscle ups

- Deadhangs with extra weight
- Push-ups or Bench-press
- Biceps-curls and dips
- Front-lever and reverse front-lever
- Typewriter
- Butterfly and reverse butterfly

Each of these must-have exercises has many variations like doing it with one or two arms, with slings, cables or bars etc. There are many excellent books for those exercises like 'Gimme Kraft' from Matros and Korb or 'Training for Climbing' from Hörst. A recommendation of the repetitions, rest and series is given in the Table 4 on page 87.



Figure 60: front lever can be performed almost everywhere

DUR.	REST	SETS	EXERCISE	TARGETS
90s	3min	9-12	3-5 times 15 move boulders with same gripping position and one technical task: 3s resting in front the hold, 3s shaking at each hold, changing gripping position at each hold, climbing with only one foot, climbing with only one axe and one	Anaerobic capacity small hypertrophy
30s	30s	10	10 times 5-7 hard moves boulders with 30s rest	Anaerobic capacity small hypertrophy moving technique in competition intensity

Table 3: Climbing exercises for the power-up training in ice climbing [adapted from U. Stöcker 2014]

METHOD	REPS/ TIME	REST	SETS	EXERCISE	%1RM	EFFECTS
exercises with free weights or body weight	8-12	2-3 min	3-8	Slowly to intermediate	65-80%	Muscle quantity
Deadhangs on ice tools with extra weight or on a turning bar	30s+	1min	9	3 different gripping positions (short, long, undercling)	30-65%	small hypertrophy capillarization
Finger rolling on turning bar like 'turn-till-burn' or a barbell	10s	5s	8-10	Roll fingers and wrist slowly up & down to full extension	65-80%	hypertrophy

Table 4: Power methods in the power-up training in ice climbing [adapted from U. Stöcker 2014]



4.1.3.3 Maximum force phase

Duration:	3-5 weeks
Frequency:	3 times a week
Complementary training:	hard bouldering, core-training, jogging, general shoulder strength training, stretching
Goals of this period:	max your muscles out building maximal power and explosiveness building specific high intense short-term endurance applying your techniques to extremely hard moves extending your techniques with crazy moves

In the maximal force phase, the goal is to optimize the activation of your muscles inside the muscle itself as well as to coordinate the muscle among themselves. In this phase we mix two phases which are separated in other sports: maximal force and explosive strength. So in the first 2-3 weeks we need to focus on the maximal force whereas in the last 2-3 weeks we combine the maximal force and the explosive strength with in one exercise. This is known as the 'French contrast method' (Dietz and Peterson 2012).

3-4 sets:

- 1. Compound movement 80-90% load 2-3 reps** (eg. weighted pull-up)

- 2. Plyometric** (patterns #1 e.g. pull-up with clap) no load 3-5 reps
- 3. Weighted** (patterns #1, e.g. weighted pull-up) 30% load 3-5 reps
- 4. Assisted plyometric** (e.g. pull-up with band) no load 3-5 reps

Exercises 1-4 should be performed after each other with no rest in between. After 1 set take a sufficient rest of 4-5 minutes. Take additional caution with this method as you need a sound athletic basis to withstand it without causing injury.

In the first few weeks concentrate on the maximal force your muscles can exert. Here also negative dynamic movements

are helpful like in negative one arm pull-ups. The intensity should be maximum so try to work with additional weight or with high resistance. A training partner is really important in this phase as he can motivate you and actively help you to overcome the last repetition. A general advice for the power exercises this phase is given in Table 6 on page 91. For all the exercises in this phase take extreme care of movements and rest to prevent injuries. Don't do use extreme exercises like the contrast method or the negatives with youth!

But like in the other phases climbing specific exercises should be the main focus covering more than 75% of your training. Try to implement a lot of maximal moves and dynamic moves and take a sufficient rest in between tries so you can focus on every go! Table 5 on page 90.

DURATION	REST	SETS	EXERCISE	TARGETS
25min 30min	5min 10min	3 3	boulderwall underarms lightly pumped	capillarization muscle aerobic capacity lactate compensation raising anaerobic threshold
25min	5min	3	boulderwall each 2min 20s speed	capillarization muscle aerobic capacity lactate compensation raising anaerobic threshold change aerobic-anaerobic
12min 8min	3min 2-3min	4 4-5	Traverse steep boulders Just long moves – no hand changes	capillarization muscle use of muscle glycogen anaerobic capacity raising anaerobic threshold

Table 5: Climbing exercises for the maximum force training in ice climbing
[adapted from U. Stöcker 2014]



METHOD	REPS/ TIME	REST	SETS	EXERCISE	%1RM	EFFECTS
exercises with free weights or body weight	1-3	3-5 min	3-5	explosive	85-100%	Intra-muscular coordination
	5-10	-10min	3	Explosive, eccentric-concentric	100%	Reactive force
French contrast method	2-3	No in between exercises 5min	3-4	Compound Movement Plyometric Weighted Assisted Plyometric	80-90% No load 30% No load	Rate of force development reactiveness
	3-5					
	3-5					
	3-5					
One arm dead hangs on ice tools with added weight	2-4s	2-3min	9	3 times 3 different gripping positions (short, long, undercling)	85-100%	Intra-muscular coordination
Campus board	3-5	5s	8-10	Campus up & down, double dynos on special drytool board, accelerate as far as possible – play around!	100%	Explosive and reactive force

Table 6: Power methods in the maximum force training in ice climbing [adapted from U. Stöcker 2014]



4.1.3.4 Power endurance training

Duration:	4-5 weeks
Frequency:	2-3 times a week
Complementary training:	competition route climbing, core-training, jogging, general shoulder strength training, stretching
Goals of this period:	Building the competition specific mid-term endurance Putting all the trained factors together in your climbing Apply your specific techniques in competition intensity

In the power endurance phase, the goal is to build up the endurance needed in competition lead climbing. Therefore this phase must be altered by the speed climbers who instead apply all their trained strengths during 2-3 weeks on the speed wall. Here different training options can be performed with additional weights in the beginning of the phase and with weight reduction and frequency increase before the competition. Speed intervals can be introduced in the beginning of this phase by sprinting twice or three times in a row with only short rests in between.

In this phase for the lead climbers the training gets really hard and sometimes painful. So listen to your body and to

take enough rest in between each session. A hard session takes 36-72h recuperation time!

Use your additional maximum power to overcome cruxes in the routes and your basic endurance to recover in easier moves. Try to move quickly and efficiently. Breathe regularly and deeply. Use your feet intelligently so you need the minimum of energy. Read the moves carefully from the ground so you learn to anticipate the moves. In each session you should at least define three new long boulders to get as many variations as possible. Try to include specific weaknesses in these boulders.

In this phase try to perform some test competitions to get used to the format



Figure 61: Petra Klingler in the middle of a 40 move boulder

and the mental stress. Some national competitions would be a great tool for the preparation. For the target competition reduce the load of your endurance sessions so that you can recover faster. To regain the ideal explosiveness

for your target competition, include 1-2 maximum power climbing training per week during the last three weeks before the competition.



DURATION	REST	SETS	EXERCISE	TARGETS
6min	5min	4-6	2-3 times 40 moves boulders in exactly 6min. Variation: After 10 moves 5-10 fast pull-ups, for each fall additional 10 pull-ups at final hold	Anaerobic capacity Glycogen usage
10min	10min	3-4	2 times with no rest a predefined 30 move boulder. No shaking	Combination Aerobic-an-aerobic capacity Lactate tolerance
1min	1min	10	15 moves speed boulder, drop after 1min and retry after 1min.	Anaerobic capacity Fast moving
8-12min	15min	3	Climb a competition route	Combination Aerobic-an-aerobic capacity Lactate tolerance Local endurance

Table 7: Exercises for the power endurance training in ice climbing [adapted from U. Stöcker 2014]

4.1.4 Training during competitions

Training during the competitions is one of the hardest things and needs a lot of fine-tuning and intuition. Often the best method is to alter maximum force and endurance training in consecutive sessions. Don't mix them in one session. Do short and hard sessions and calculate enough rest (1.5-2 days) before the next competition. The best is sometimes to start training the day right after the competition so you don't lose time and can train at least twice in between weekly competitions. Here a coach's wisdom is critical.

4.1.5 Training load and recovery

If you want to improve you have to train more and harder. But be careful not to destroy yourself. If you train more than 14 hours a week, increase your training volume to no more than 2 hours per week. The most important thing if you want to improve over a long time is to monitor your training. The easiest thing is to write a training diary about each day. That should include the training you've done, how long and intense they were, how you felt, the amount of sleep and body weight. A good measure about the specific training load of a session is the multiplication of the training time (minutes) times the intensity from

1-10 like the Foster-scale (see Picture).

Define the training load for each week to assess if your week was a hard or an easy week.

If you train hard you have also to recover well! This means when training at a high intensity you must recover fast. For a good recovery you need firstly to sleep and eat well - This is 80-90% of your recovery and essential. Everything else like massages, cold-water-baths, electro stimulation... are simply nice to have. Sleep at least eight hours and eat within 60 minutes after your training - a mix of carbohydrates (60%) and protein (20%). Pay attention on invisible external stress like school, work, travel, family etc. When you are stressed your recovery time can double.

4.1.6 Periodization

If you want to perform at a certain point you must plan your phases and training focus ahead. Here comes the periodization of your training into play. The different training phases have a certain time-span to feel an effect of the training. The higher your level the longer the phases last. So you need to divide your total preparation time into these phases: basis training, power-up training, maximum force training and power endurance training. Within the

**FOSTER'S SCALE**

**"If you think back to your training/comp,
how hard was your training/comp today?"**

	RPE
Like in rest	0
Very easy	1
Easy	2
	3
Little hard	4
Hard	5
	6
Very hard	7
	8
Extremely hard	9
My hardest training ever	10

Table 8: Foster's Scale to rate the perceived exertion

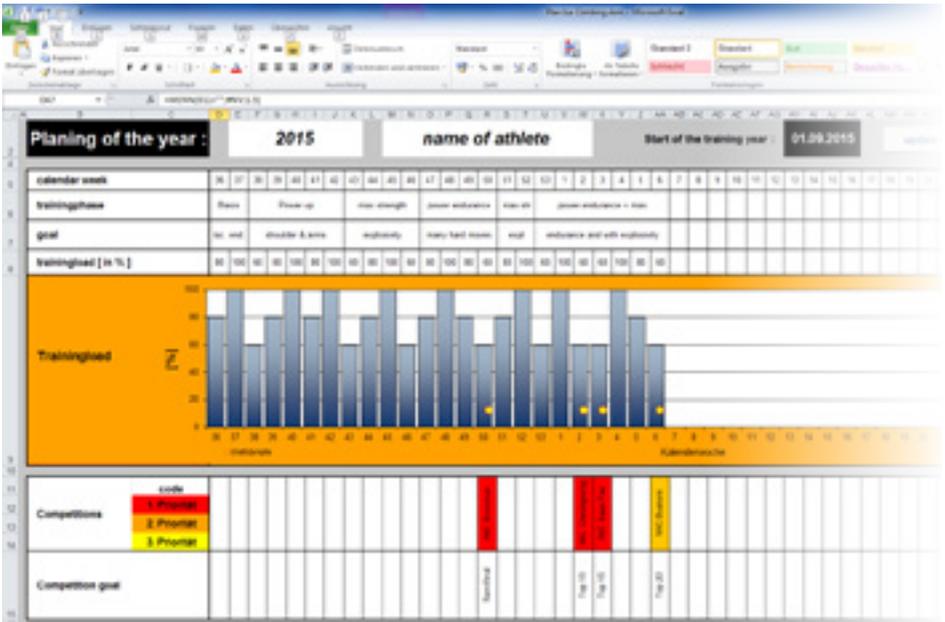


Figure 62: Example of a training plan for the IWC season 2015/2016

phases you need to vary the weekly load to not burn out. A load variation of 80%, 100%, 60% within three weeks has proven to be useful. If you calculate the training load like in the previous chapter (training time x intensity in Foster), you can target the weekly load while setting 100% as your hardest week. Hence 80% is therefore a reduced week in training time and/or training intensity. However you need to make compromises if you plan for competitions and shorten or extend the time-span of phases as well as to vary the week loads accordingly as can be seen in the

following picture.

4.2 YOUTH TRAINING

In youth training the main goal is to keep motivation levels high and to teach athletes as many moves as possible. This can be achieved in peer groups with qualified trainers. A strict training regime is not the key aspect moreover a lot of variations in boulders, routes and exercises. In adolescence you can already start with some power training while paying attention to the developing body. Problems that adolescences may encounter include open growth



plates in fingers and shoulders. Here you need to pay attention to reactive forces on these joints. Growing youths also gain weight fast so passive structures like tendons and ligaments need to adapt to the additional weight. Don't be afraid of intense training with youth groups but keep them short and infrequent. Encourage additional stretching, core-training and shoulder-strength extensively.

Training sessions are most fun if they are playful, such as a small individual or group competition where the rules are set cleverly so everybody can win.

Figure 63: Fun is the most important factor in youth training







5. ANTI-DOPING POLICY

The UIAA Anti-Doping Commission assists member associations to implement the Code and the Anti-Doping Policy and Procedure. The Anti-Doping Commission is responsible for managing the UIAA's responsibilities for the Code including:

- **Registered Testing Pool**
- **Doping Violation Procedure**

The UIAA adopts and implements the World Anti-Doping Association (WADA) Programme in its entirety and is responsible for ensuring that all its member associations and athletes respect and comply with the Code, all relevant International Standards and all the principles inherent to the Code.

Athletes participating in UIAA approved competitions, and other competitions run by UIAA member associations, are responsible for complying with the World Anti-Doping Code ("the Code") and all relevant International Standards. All athletes have a right to enjoy competitions that are properly organized under rules that aim to ensure fairness and prevent doping.

Member Associations are responsible

for complying with the Code and the UIAA Anti-Doping Policy and Procedure. Member Associations will make agreements in writing with athletes that confirms the athletes' support for the Anti-Doping Policy and Procedure and the other UIAA rules and regulations.



Figure 64: An athlete is preparing to pour the urine under the control of an UIAA Anti-Doping Officer





6. ICE CLIMBING NATIONAL TEAM

How to create an ice climbing national team?

This question is often asked to the UIAA. The reply is complex but extremely interesting for a federation that wants to structure its activity. Thanks to many years of experience, the UIAA proposes a guideline describing the different steps to follow.

6.1 FIND A TEAM MANAGER

One of the most essential and primary steps to build Ice Climbing National Team is finding a motivated and skilled leader.

The leader is a person who is interested in developing ice climbing and creating an ice climbing national team. Ideally, this person should be an experienced mountaineer who practices competitive ice climbing.

It is important to distinguish two different roles in a team:

- **The Team Manager who is able to manage all the aspects of a national team.**
- **The Athlete Leader who is more**

than just a climber and has a key function. He has the responsibility of motivating other team members to progress and to push athletes to their best possible ability. He is the “Team Captain” like in a soccer team

In this chapter we mainly describe functions and responsibilities of the team manager.

The team manager has several missions and functions. He is, at same time, the main link between the head of the federation, the coach(es), and the athletes. This structure can be represented by diagram in Figure 65 on page 104.

His missions are:

- Propose an “Ice Climbing” strategic plan to the head of the federation
- Adapt concretely the wishes of the head of the federation
- Hire the coach(es), to supervise them and to solve potential internal conflicts
- Manage the overall budget dedicated to the team by the federation

Figure 65

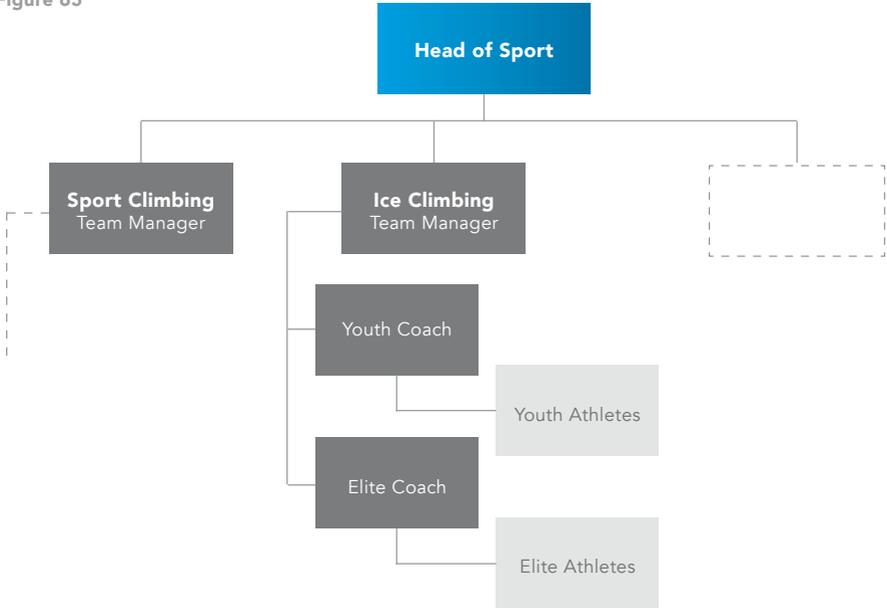


Figure 66: A coach is providing advice to the young climbers



- Organize the National Selection and to sign the list of selected athletes who will represent National Team for the coming season.
- Take the crucial decision in case of operational choices or conflicts
- Regularly report the results of his actions to the head of the federation

Sometime, in a framework of demanding business, the team manager takes also responsibilities of a marketing manager. In order to support expenses of the team, to promote athletes and to develop the prominence of his team, the team manager should also spend time to find sponsors. This function includes the writing of a sponsorship file, the presentation and negotiation with various companies and, at the end, to sign the sponsorship contract(s).

If we limit the discussion to the sport activities, the team manager has to organize a National Selection to form a National team.

6.2 ORGANIZE A NATIONAL SELECTION

Before organizing a National Selection competition, the Team Manager has to take into account many technical aspects.

Firstly the Team Manager should gather all useful documentation, information about potentially available structures, people willing to help, allocated budget, as well as all information available on the UIAA website: dates and places of the events (training camps, World Cups, World Championships), disciplines and categories, Rules and Regulations and Anti-Doping policy.

The Team Manager needs all of this data in order to implement a relevant National Selection.

More importantly, the Team Manager has to know what the allocated budget is and has to be extremely clear with the athletes of the national team on what will be taken in charges, reimbursements, and what they will have to pay by themselves. The amount that will be paid by athletes should be calculated as precisely as possible and should be communicated to them before the selection. Nevertheless, some modifications could be made during the season

but, in any case, these updates should be presented to the athletes well in advance. Detailed and frank communication within the team is essential for developing team spirit and confidence in each other.

6.2.1 Define criteria

A crucial mission for the team manager is to define the criteria to select the athletes.

We can distinguish two types of criteria: The first one is related to the Quota: number of athletes. Female, male, youth or the discipline lead of speed. These elements depend mainly of the budget allocated by the federation to the team and the UIAA quota. The more financial support the team has, the more athletes can be selected or the more training and competing opportunities could be provided while providing opportunities. In case of a tight budget, or by choice, the quota could also be defined thanks to a strategic plan. For example, if the federation wants to promote ice climbing towards youth, the team manager can select more young athletes compared to elite athletes. Or, in the event the federation receives special subsidies from the local government to develop female sport, females athletes will be given priority.

Each federation is unique and

implements their own strategic plan. In summary, the quota has to take in account the financial, political or organisational aspects existing in the national body.

The second kind of criteria is related to the sport, its values and the mid or long-term goals. A national selection can be organized purely and simply like a competition. With one or two routes, the best female, male and youth athletes can be selected. However, even if ice climbing is mainly an individual sport, a national team is composed of different members. These athletes will live, train and work together during, at least, the winter competition season. In this situation, good team spirit is essential. A team should not be the sum of individuals, but a group gathering the same values and motivations in order to reach the highest summit. If a team manager only selects in accordance with the final ranking, it's not possible to develop and understand the personality of the athletes. The risk is creating a group of individuals without synergy between the athletes.

Moreover, another aspect should be taken in account is the availability of each climber. Everyone agrees that before winning a competition, an athlete has to attend it. That means, the team manager needs to check the availability of all



Figure 67: The whole South Korean national team with his coaches

the athletes before selecting them. The strongest athlete is maybe the busiest. In this case, it may be more pertinent to select the second or the third ranked athlete and be sure that he/she will attend the vast majority or all the events. Another possibility is to organise selection through athlete trials. This requires a dry tooling or ice climbing circuit composed of different events with similar rules and regulations. The team manager and the coach(es) can use the ranking of these different events in order to select the national team. This procedure is fairer than a selection from a one-off

event but doesn't solve the issue of personality and especially the availability. The best solution is a mix between the two processes explained above.

- First step, the federation organizes a competition / selection trials comprising multiple events. At the end, the final ranking is created. The best climbers are clearly identified by their ranking. The coach(es) has also watched the climbers during the trials and is able to identify their ice climbing potential.
- Second step, the team manager with the coach(es) or a staff member, or-

ganize an motivational interview with all the athletes. These interviews offer a unique opportunity to discuss athletes' motivation, goals, availability and also their future plans. The staff can have an overall view on the athlete's potential.

Staff members should avoid criticism, maintain their impartiality and be fair with everyone. Otherwise, these interviews would be redundant and the assessment team could lose its credibility. If this mix of competition / interview is well organized, the results are very interesting ensuring the athletes selected are among the strongest climbers, the biggest team players and always available for selection. The athletes have climbed in multiple events and expressed their point of view during the interview. Their views have been heard and this facet is essential especially when the federation is building a new team around a sport. Some relevant ideas can be expressed by the candidates and be used to improve the process for future selections.

6.2.2 Define the Rules & Regulations

Regarding national selections, it is essential to directly integrate the international UIAA Rules and Regulations. This will enable athletes to study them in advance especially ahead of international events. The document is freely

downloadable from the UIAA website: www.theuiaa.org

In sum, working with the UIAA documents enable saving time for the future competitors.

Nevertheless, the national federation can also use its own rules / or adapt the UIAA rules depending on their national specificities.

6.2.3 Find the structure

A structure is one of the most important elements to have before launching a team. Finding an ice structure is a tangible goal. An ice climbing or, at least, a climbing structure is essential.

The question "with ice or without ice?" may be raised.

In an ideal world organising the national selection directly in line with the true conditions of the sport - in this case on a structure with ice - is preferred.

However, to be registered for competition a national selection usually has to be made at least three or four months before the first event which is usually in December.

Figure 68: The ice tower of Champagny-en-Vanoise is full of ice during the world cup at the beginning of February. Nevertheless, usually, French national selections are held in October on a dry structure



la Plagne

Champagny - Vanôise

Champagny - Vanôise



Figure 69: Ice Climbing judges are in charge of the respect of the rules and the safety of the ice climbers

Few northern hemisphere countries offer winter conditions early in the season, around September or October. So, the national selections are often organized on a dry structure with plastic holds dedicated to ice climbing.

Some federations prefer using the end of the ice climbing season to implement their selection. In this case, they take advantage of the ice climbing walls on good condition at that time. Nevertheless, the team manager and the coach(es) shall propose a training program all summer long. They have also to be sure that the athletes selected continue their training correctly.

To conclude, there are different possibilities when organizing a national selection. Very often, the creativity of the staff members are needed to find the best solution.

6.2.4 Develop a good team

A Team manager, a coach(es) and an official Federation are not enough to organize a National Selection. Some additional skilled people are mandatory.



Figure 70: Following a successful competition, the Cheongsong route-setter team is happy!

6.2.4.1 Judges

Judges are key individuals during a national selection. They are in charge of the respect of the sport rules and they provide the final results.

If the national body already has their skilled judges, the UIAA encourages working with them. Otherwise, the UIAA provides training courses to become recognised UIAA international judges. These people are skilled to judge at international events such as World Cups or World Championships. They can also judge on a lower level of competition: national and regional.

If there is no judge available in the country, the team manager can contact the UIAA, or directly contact an international judge, in order to provide a judge for the host country's event. The official UIAA judges list is available on the UIAA website. Please note, judges usually ask to be paid.

You can also organize a training course in your country in accordance with the UIAA Rules and Regulations. In this case, a UIAA official judge leads a training course, gathering aspirant judges. At the end of the course, the trainees could be appointed as a national judge. They are able to judge on the National



Figure 71: During the lead-difficulty World Championships in Rabenstein, the belayers are members of the Italian Mountain rescue team, mostly UIAGM Mountain Guides. They are skilled, trained, and used to difficult belaying situations.

Selection or on a national event. The strongest candidate could also be appointed President of Jury. They will be in charge of all the sport aspect during the competition.

6.2.4.2 Route-setters

Route-setters are key to any national selection. They are in charge of setting the routes where athletes will climb.

Together with the judges, they are also in charge of the safety of climbers during their ascent.

If the national body already has their own experienced route-setters, the UIAA encourages working with them.

If not, the UIAA provides training courses to become UIAA international Route setters. These people are skilled to set routes on international events as World



Cups or World Championships. They can also work on a lower level of competition: national and regional.

If your country doesn't have recognised route-setters, the UIAA can advise on an international route setter to work on the event. As for the judges, the official UIAA Route-Setters list is available on the UIAA website. Once again, most of the time a route setter will want to be paid, or at least reimbursed for the travel expenses, food, and accommodation. Local organizers can also offer a training course in the country in accordance with the UIAA Rules and Regulations. In this case, a UIAA official route setter will lead the training course composed by aspirant route setters. At the end of the course, the candidates could qualify to become a National Route Setter. They will be able to work on the National Selection Team. The strongest candidate could be appointed Chief Route Setter.

6.2.4.3 Belayers

The team of belayers should to be experienced. Belayers are selected according to their skills, physical condition but also on their faculties of concentration and patience. For example, they often work in extremely cold conditions, with

crampons, gloves and with the pressure of belaying top-level athletes.

Depending of the duration of the event, it is pertinent to allocate two or three belayers per route. In this way, the belayers can alternate and they have the opportunity to drink warm beverages, eat something, or take a few minutes of rest.

6.2.4.4 Event team

A National Selection needs a team of volunteers dedicated to the competition. In addition to the team manager, coach(es), judges, route-setters, belayers, a team of volunteers is required. Indeed, depending of the number of athletes, the organization team has to be composed by:

- Volunteers in charge of logistics: set up big tent, tables, benches...
- Volunteers in charge of the warm-up wall: wooden panels, holds...
- Volunteers in charge of the registration: accreditation, invoicing...
- Volunteers in charge of the isolation zone: control of the entrance and departure...



Figure 72: The team of volunteers of Champagny-en-Vanoise is composed of more than 70 people. Some of them are involved from one year before the event to three months following the competition.

- Volunteers in charge of the transit: athlete' escorts The two positions are separated but work together side by side to offer the best event possible.
- Volunteers in charge of the catering: free or require payment... 6.2.5 Tips for a good selection

In order to gather enough volunteers, it is essential to implement this action at least two months ahead of time.

The team manager is not only dedicated to the sporting aspect of the national team but also the organizational side. That's why, ideally, an Event Manager is necessary in order to guarantee the smooth running of an event.

The D-Day has is arrived. The team manager, and/or event manager, has to be on-site at least three days before the event. They have to coordinate all the aspects of the national selection. They are in charge of the good functioning of the event from the beginning to the end, after the competition.



In order to organize a good selection, the most important is to follow the different steps presented above.

In sum, two aspects exist:

- **Team Manager:** in charge of the sportpolicy and the ice climbing team
- **Event manager:** in charge of the event and national selection at an event

The team manager, and/or the event manager, have to be available for the volunteers at any moment.

Five tips for a good selection:

- Find an adapted structure: if possible with a lot of ice
- Find all the volunteers: in accordance with the size of the event
- Plan a schedule and respect it: be rigorous but also flexible in case of need
- Be clear with the staff: define clearly the mission of all the volunteers
- Be clear with the athletes regarding the schedule, the rules, the expectations...





7. ICE CLIMBING EVENTS

How to organize an ice climbing event? As outlined below, the most essential to organize an ice climbing event is having a full and skilled team dedicated to this event.

Depending on the level of the event, this team needs to be more or less complete.

In this section we will cover the differences between each type of ice climbing event.

The ice climbing events develop from the local training camp to the UIAA Ice Climbing World Cup. There are also some unique guidelines for the UIAA World Championships. These guidelines can evolve every two years depending on the sport, technology and the strategy of the UIAA.

7.1 TRAINING CAMPS

The training camps are the simplest events to organise. Be careful, "simplest" doesn't mean "not interesting". This kind of camp only needs the core elements of the sport:

- Sets of individual climbing gear in enough quantity: ice axes, boots with crampons embed, helmet, gloves
- Sets of common climbing gear in enough quantity: rope, ice climbing holds

Camps have to be interesting and attractive for the trainees. So, the director of the camp has to plan it very carefully. In accordance with the coach or the instructor, a training plan should be implemented and sent before the event to the trainees. The mission of the director is also finding accommodation for everyone. Depending on the duration of the camp and the exercises planned the lead-difficulty routes need to be modified at least every two days. The consequence is hiring one or two route setters all camp long. The route setter(s) has to be available and respect the wishes of the coach regarding the level and the complexity of the routes. During a training camp, it is also important to consider about the social program. Indeed, the trainees will not train all day long during all camp

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long. Usually, some social activities are planned during the rest time of the athletes: city tour, excursions, practice of other sports... At same time, these activities create a true team spirit, which is essential to group integration. This kind of "team building" pushes the athletes to their best.

From the official side, UIAA judges and UIAA route setters are not mandatory. The director is free to organize the training camp as he wishes. Local volunteers can be judges in case of friendly competition. However, as usual, the UIAA encourages the organizers to follow the UIAA rules and regulations. Firstly for the safety of the overall event: organization' members, belayers, athletes. But, also to used to the athletes to follow these rules that are applied during the UIAA Ice Climbing World Tour.

7.2 REGIONAL & NATIONAL COMPETITIONS

The next level of competition in ice climbing are the National events. Regarding these kind of events, a fully-skilled staff is needed: director of the event, national or international official route-setters, national or international judges and a complete team of

volunteers dedicated to the event.

The facilities are also essential. Depending of the format of the event, a lead or a speed ice climbing wall, an isolation zone, a transit zone, a technical incident transit, a warm-up wall... all are needed. A national event is the property of the national body or a private organizer, who manages the organisation of it. Once again, at this level, the UIAA rules and regulations are not mandatory. The national federation can work with their own judges and route setters. In case of a lack of skilled people, the UIAA proposes hiring the UIAA official experts. As for the training camp, the UIAA encourages the organizers to follow the UIAA rules and regulations. The efficiency of the athletes, route setters and judges on will be greater.

7.3 INTERNATIONAL COMPETITIONS

The third level of events are the international competitions. These competitions are similar to the national tournaments but welcome foreign athletes. Like a national competition, an international event belongs to a national body or a private organizer. These events are not under the UIAA flag so the UIAA rules



Figure 74: The end of the UIAA World Championships are always celebrated with a closing ceremony rewarding the best athletes as well as some speeches from the official representatives.

and regulations are not mandatory. An international event gathers more climbers than a national event and the ice climbing level is higher. The director has to take in account all these facts in order to adjust the climbing routes, the facilities, quantity of food, beverages, and accommodation. Usually, an international event gathers athletes from all over the world. In this case, it's essential to pay attention to the cultural specifications. It is important to consider the following points: speaking a common language: typically English, to offer different types of nutrition and

to be tolerant with all the athletes and their staff. The image of the event and the host federation is engaged.

7.4 UIAA ICE CLIMBING WORLD CUP

The top level, and most challenging of organizing a competition, is hosting a UIAA Ice Climbing World Cup. In this case, the organizers work in collaboration with the UIAA Ice Climbing commission and the UIAA Office. A process is needed to be part of the UIAA Ice Climbing World Tour.

- The national body has to organize



an international ice climbing event at least one year before their application (i.e., the host must have a mock/trial run of an international event one year in advance prior to hosting an official UIAA International World Cup).

- A member of the UIAA Ice Climbing commission or the UIAA Events Coordinator has to assess the event. If the event fills all the UIAA guidelines, Rules and Regulations and quality, an agreement is given to apply for the next season's UIAA Ice Climbing World Cup
- The director of the event is invited at the annual UIAA Ice Climbing commission. During this meeting, the members define the schedule of the following winter.
- To conclude, the event organizer and the UIAA office work in collaboration until the event ensues. Following the competition, they remain in touch regarding the invoicing and the debriefing of the event.

A contract is signed between the local organizer and the UIAA. Following the signature of the contract, the two parts are engaged in a common adventure.

In any case, the UIAA is the owner of the event. The organizer has the obligation to follow the UIAA rules and regulations.

The director shall also apply the UIAA guidelines: branding, photographers, live streaming and communication strategy. Regarding the judges and the route setters, the director has to choose on the UIAA official list. These choices have to be accepted by the UIAA Ice Climbing commission.

Before starting to organize a UIAA Ice Climbing World Cup, the UIAA encourages the organizers to carefully read the UIAA guidelines, the Organizer's Handbook, the UIAA Anti-Doping Policy and the UIAA Ice Climbing Rules and Regulations.

The UIAA Office is also available in case of need: iceclimbing@theuiaa.org.

The last paragraph of this section is dedicated to the UIAA Ice Climbing World Championships, Youth and Elite.

The World Youth Championships have been organized each year since their inception in 2013, in different countries. This event is essential for the promotion and the development of ice climbing towards youth. The organization is less complex than an Elite World Championships. However, the guidelines are quite similar to a World Cup event and the required professionalism of the organizers is also at a higher standard. In case of interest, the national body must

officially apply to the UIAA Ice Climbing Commission (ICC). The choice of the host city is determined during the annual meeting of the commission, usually organized in April / May.

Concerning the Elite World Championships, from 2017, lead-difficulty and speed will be gathered in a unique event. For this type of event, a special type of process is requested. The process is a bidding contest, which evolves depending of the UIAA requirements.







8. ANNEX

8.1 WHO HAS CONTRIBUTED TO THIS BOOKLET?

This handbook is the fruit of the work of the UIAA. The UIAA also brings the technical and financial support.

Original idea: Frits Vrijlandt, Sophie Gerard and Urs Stöcker

Petzl: Figure 24 on page 43, Figure 31 on page 49.

Editorial coordination: Sophie Gerard and Etienne Grillot

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Ben Bert: Figure 11 on page 33, Figure 12 on page 34, Figure 26 on page 44, Figure 28 on page 46, Figure 31 on page 49, Figure 42 on page 63, Figure 43 on page 63, Figure 49 on page 69, Figure 51 on page 71.

Sport Event Danmark: Frits Vrijlandt Portrait

Urs Stöcker: Urs Stöcker Portrait, Figure 58 on page 82, Figure 59 on page 82, Figure 60 on page 86, Figure 61

on page 94, Figure 62 on page 98,
Figure 63 on page 99.

Pavel Shabalín: Figure 2 on page 21.

Lukasz Warcheza: Figure 3 on page
23, Figure 44 on page 64.

Leah Kang: Figure 4 on page 26, Figure
17 on page 38, Figure 23 on page
42, Figure 36 on page 53, Figure 39
on page 61, Figure 53 on page 72,
Figure 57 on page 77, Figure 67 on
page 107, Figure 70 on page 111.

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Figure 6 on page 29, Figure 7 on page
30, Figure 9 on page 32, Figure 20
on page 40, Figure 34 on page 51,
Figure 41 on page 62, Figure 55 on
page 74, Figure 66 on page 104.

Ben Bert: Figure 11 on page 33, Figure
12 on page 34.

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Harald Wisthaler: Figure 15 on page
36, Figure 37 on page 54, Figure 74
on page 120.

Eugenia Alekseeva: Figure 16 on page
37, Figure 21 on page 40, Figure 47
on page 66, Figure 48 on page 68.

Rabenstein Eisklettern: Figure 18 on
page 39, Figure 19 on page 39,
Figure 25 on page 43, Figure 27 on
page 45, Figure 32 on page 49,
Figure 35 on page 53, Figure 71 on
page 112.

Max Lowe: Figure 22 on page 41,
Figure 29 on page 47, Figure 46 on
page 65.

Philipp Mooser: Figure 56 on page 77,
Figure 69 on page 110.

Nenad Dikic: Figure 64 on page 101.

Champagny-en-Vanoise: Figure 73 on
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8.3 CONTACT

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Competitive ice climbing is a professional sport with its own characteristics and specificities. This guide presents the status of the sport today and describes various aspects of it, such as equipment, safety, techniques, training plans, rules and competition organization.

This information is devoted to the national bodies, institutions and clubs interested in ice climbing as a competitive discipline. The material covered is pertinent to organizations wanting to understand

everything behind ice climbing. Experienced athletes, beginners, and people who wish to learn more about this challenging sport, may also find this document useful as a first text on the subject. All of the contributors hope that this guide will demonstrate that practicing and developing competitive ice climbing can be an interesting and fun experience. We hope that after reading this document, you too will become part of the ice climbing community.



UIAA

International Climbing and Mountaineering Federation
UNION INTERNATIONALE DES ASSOCIATIONS D'ALPINISME