WORLD OBSTACLE | ADVENTURE RACING

EVENT SAFETY

Guideline

Version History
2023-03
2022-07 (FISO)
2015-01 (IORF)
2006-12
2000-02 (MSOQ)
1997-11 (PARA)

1. Overview

This guideline outlines the procedures and practices for the design, execution, maintenance, inspection, and delivery of adventure race competitions ("Events") produced, sanctioned, or associated with World Obstacle, the Fédération Internationale de Sports d'Obstacles, its member federations, leagues, associations, and other related organisations. Relevant sections may be applicable, at the discretion of the user, to training facilities that employ obstacles.

This guideline does not address all safety concerns associated with its use. It is the responsibility of the race organizer, directors, and producers to establish safety, health and environmental practices and determine the applicability of regulatory limitations prior to use.

This guideline cannot replace knowledge, education, expertise, and experience required to deliver a safe adventure race and should be used in conjunction with professional judgment. Not all aspects of this practice may be applicable in all circumstances.

This guideline is not intended to represent or replace the standard of care by which the adequacy of a professional service must be judged, and it is not appropriate to apply this document without consideration of circumstances specific to the event environment, conditions, or circumstances. These may include, but are not limited to the venue, terrain, vegetation, extreme weather, traffic, social / cultural norms, number of competitors, duration, competition rules, and event format.

The word "guideline" in the title indicates that the document is not a standard but should be used in conjunction with any standard(s), codes, regulations, and approvals applicable to the city, county, region, province, state, and/or country in which the Event is located.

2. Safety Guide History

This guideline was initiated because of a fatality in the 1997 ESPN X-Games and serious injuries and deaths in subsequent events worldwide. Version 1997-11 was used as a guideline for the Presidio Adventure Racing Academy (PARA) and Colorado Adventure Training (CAT) programmes and events. Version 2000-02 was used as the safety framework for the final five editions of the [Mild Seven] Outdoor Quest (MOSQ, 2000 – 2004). The event included seven sport disciplines with extreme altitude (15,000 ft), mountaineering, extreme cold (-40 wind chill), extreme heat (160 heat index), open ocean, under water, white water, high mountain ropes, marine, tropical, temperate, sub-alpine, alpine, and high mountain conditions over 25 race days with no serious injuries or fatalities. Version 2015-01 was adopted by the International Obstacle Racing Federation (IORF) for national governing body members that supported Adventure Racing. Version 2002-07 was updated for FISO members and sanctioned events.

3. Reference Documents

This guideline requires references to international consensus and industry standards for equipment and operations of sport disciplines commonly included in Events. Standards may include ASTM International, ISO/IEC, UIAA, Snell, European Standard (CE EN), industry and national standards. If doubt exists as to the application and use of this guideline, the applicable standard shall take precedent.

NOTE: Event Producers should be aware that local, regional, national, and continental laws, regulations, codes, and standards may also apply to their events and / or facilities.

4. Definitions

Adventure Race (AR): a timed competition requiring competitors (teams or individuals) to traverse or navigate a wilderness, rural, and/or urban racecourse, marked by check points (CPs) from a start point to a finish point using non-motorized means. The race route may or may not be provided to competitors in advance of the start. The duration of

the event may range from several hours to multiple days.

Check Point (CP): A check point is a manned or unmanned location on a racecourse designated by grid coordinates (Universal Transverse Mercator - UTM), latitude and longitude (Lat Long), marked map(s), description, or other means for specifying its location.

Competitor: an individual who is competing in an event.

Danger: A combination of hazard and risk.

DZ (DZ): A location, route, or area where travel is prohibited between pre-determined clock times, for example dusk to dawn, sunset to sunrise, civil twilight, nautical twilight.

EMS: Emergency Medical Services

Event: An event includes the Adventure Race(s), pre- and post-race activities, and all other race related functions

Event Organization: The Event Organizers collectively. The Evet Organization referred to herein may include all or some of the Event Organizers, depending on context.

Event Organizers: The people responsible for the management of the event. Event organizers may include the race producer, race organization, course director(s), technical director, medical director, logistics director, communications director, media director, volunteer coordinator, and others (collectively "Event Staff"). These people are responsible for making decisions before, during, and after the event.

Hazard: A **hazard** is any source of **potential** damage, harm, or adverse health effects on someone.

Headquarters (HQ): An office, usually at a base camp, that coordinates all event functions. HQ includes the communications centre and must have reliable connections to cell and data to connect to external emergency services and authorities.

Remote location: A location, area, or region largely devoid of civilization and people.

Risk: The likelihood of exposure to a hazard.

Support Crew (also known as Logistics Crew): A person or people who provide logistical support for a race team. Competition rules restrict support crews access to the racecourse. Usually only start, finish and transition areas.

Sweep: An individual or team of experienced Event Staff that follows or accompanies the last competitor(s) on the racecourse.

Team: Adventure race teams may consist of two, three, four or more people, and may be co-ed (mixed gender with at least one woman and at least one man), or single gender teams of only women or only men.

Transition Area (TA): An area where competitors are required to switch sporting disciplines. Transition areas are commonly also a check point.

5. Hazards, Risk, and Danger

Hazards are intrinsic to adventure racing, and many hazards can be mitigated with thoughtful course design, planning, communication, mandatory equipment, and competition rules.

When and where possible, hazards should be eliminated. When it isn't practical to eliminate a hazard, it should be guarded against or warned about. Fundamental rules of practice for safe course design:

A. **Principle One**. Hazard Elimination. If practical, design the hazard out of the event by eliminating high risk

environments such implementing DZs to prevent movement on whitewater rivers at night.

B. **Principle Two**. Safety Guards. If you can't eliminate the hazard entirely, guard it to protect the user. For example, wearing the correct volume and style of lifejacket for the conditions.

C. **Principle Three**. Safety Warnings and Instructions. If you can't guard the hazard, warn, or instruct the athletes as to dangers under reasonably foreseeable conditions.

6. Emergency Management Plan

Event directors should develop an Emergency Management Plan ("EMP" that details incident response procedures. An example is a certified whitewater safety team including robust communications and emergency evacuation equipment, protocols, and vehicles.

An EMP should include:

A. Chain of Command

Identification of the point of contact in the event of an emergency. The point of contact is a race organizer designated by the organization.

B. Communications System

Communication systems should provide reliable communication between all event organizers, staff, and volunteers. This may include two-way radios, satellite telephones, cellular telephones, GPS locator beacons, GPS trackers, and satellite messenger devices. The communication system should be set up and managed by a Communication Director with a dedicated staff.
Communication protocols should be established to ensure clear, concise, and efficient communication.

1. **Clarity:** Your voice should be clear - speak slowly, in a normal tone, do not shout.
2. **Simplicity:** Keep your message simple.
3. **Brevity:** Be precise.
4. **Security:** Do not transmit confidential information on a radio unless you know the proper security technology is in place. Frequencies are shared, you do not have exclusive use of the frequency.

C. Radio Communication Language

Radio Check	What is my signal strength? Can you hear me?
Go Ahead	You are ready to receive transmission.
Stand-by	You acknowledge the other party, but I am unable to respond immediately.
Roger or Ten Four	Message received and understood.
Negative	Same as "No".
Affirmative	Same as "Yes". Avoid "yup" or "nope" as they are phonetically indistinct and difficult to understand.
Say Again	Repeat, re-transmit your message.

Over	Your message is finished.
Out	The conversation has ended and the channel is clear
Break, Break, Break	You are interrupting in the middle of communication because you have an emergency.
Read You Loud & Clear	Response to “Radio Check”. Means your transmission signal is good. Also use” Read you 5-by-5”. The first number refers to volume, the second number is clarity.
Come in	You are asking the other party to acknowledge they hear you.
Copy	You understand what was said
Wilco	Means “I will comply”.
Repeat	Used before you repeat something. ex: “I require 9-5, repeat 9-5, gallons of diesel fuel. Over.”

Standard phonetic alphabet used for radio & phone communication

When you are spelling out a name, location, code, registration number, postcode etc., over a noisy or faint radio or phone link, it is easy for letters and numbers to be misheard. Using the phonetic alphabet to spell out names, locations, times, distances, etc., make understanding messages a easier, because letters can be confused when heard over a crackly radio link (B, C, D, P, T and M, N and F, S, etc.)

Using the NATO phonetic alphabets helps convey information accurately. The standard "NATO" phonetic alphabet (the International Radio-Telephony Spelling Alphabet) is:

Alfa, Bravo, Charlie, Delta, Echo, Foxtrot, Golf, Hotel, India, Juliet, Kilo, Lima, Mike, November, Oscar, Papa, Quebec, Romeo, Sierra, Tango, Uniform, Victor, Whiskey, X-ray, Yankee, Zulu. Numbers are pronounced as normal, except often 9 is pronounced "Niner" so it doesn't get confused with 5.

When an EMP is activated, the following information should be included:

- Communication and contact details.
- Escape route and location.
- Team names, team members, contact details for all competitors and race staff.
- Medical forms and patient details.
- Transportation routes and details.

D. Emergency Procedures

EMP procedures must be documented and communicated to all Event Staff prior to the start of the race(s) and will be implemented in the event of:

- Serious injury or fatality.
- Threats to personal safety from high-risk environmental conditions such as extreme temperatures, lightning, extreme weather events, flooding, tornadoes, hurricanes, ice storms, blizzards, etc.
- Lost teams, competitors, media, Event Staff, support crews, spectators

Procedures should include:

- Prioritizing tasks: immediate, secondary, tertiary
- Roles and responsibilities for all Event Staff and competitors
- Exit routes, emergency, and evacuation procedures.
- Injury evaluation and triage.
- Lost competitor protocol.
- Contact details for headquarters.
- Contact details for local police, search & rescue, and medical services.
- Communication modes and protocols.
- Vehicular, boat, foot, and airborne access.
- Location and contact information for all accessible medical facilities.
- Identification of natural hazards and proscribed response for events.
- Post incident management: incident report, contact of insurer, legal procedures, post incident trauma counselling.

7. Event Details

A. Event Description

A detailed description of the race(s) and event should be created for reference and planning purposes. The process should start with the initial course scout and should be published 12 months in advance of the event start date. Details should include:

- The type of race: sprint, 24-hour, multi-day, expedition, non-stop, stage race
- Description of terrain: urban, rural, alpine, desert, tropical, forest, marine, wilderness with access, remote wilderness, etc.
- Sporting disciplines include road cycling, mountain biking, in-line skating, skiing, orienteering, swimming, diving, whitewater, sea kayaking, sailing, fixed ropes, caving, climbing, mountaineering, horse riding, etc.
- Identification of high-risk areas: roads with traffic, moving water, river crossings, open ocean, unstable terrain, exposure to wind and cold, exposure to heat, high mountains, alpine conditions, extreme altitude, presence of dangerous animals, etc.
- A risk assessment and management plan.

B. The Racecourse

The racecourse, including any variations, alternate, and optional sections should be planned at least 12 months prior to the event. This is done to ensure likely seasonal, extreme weather, and environmental conditions are planned for, and accurate section times are established. Event planning must be done in collaboration with permitting bodies and emergency services.

Course maps should be provided to competitors, Event Staff, and emergency services. Independently verified grid coordinates numbered in order of CP/TA on original topographic maps and GPS software should detail the course and probable routes. Event Staff and emergency services should have mater maps that include CP/TA locations with descriptions such as altitude, peak, ridge, saddle, moraine, scree slope, valley, intersection of valleys, east bank of river, north side of island, road intersection, etc.

The racecourses should be traversed in its entirety, at the time of year planned, and using the sport disciplines specified. Course segments (between TAs) should be completed in daylight hours to verify hazards, and at night if night travel is possible for some teams. If possible, a course flyover should be conducted and the course photographed and filmed, identifying all check point locations, course features, transport, and evacuation corridors.

C. Contact Information

Event organizers must have a list of primary contact information (contact numbers and physical locations) where all parties can be reached before, during and after the event for the:

- Event producer
- Event directors (medical, safety, communication, course, etc.)
- Emergency medical services (fire, police, park services, rangers, ambulance, EMS, coast guard, etc.)

Pre-event contact information should include mailing address(es), email, fax, and telephone.

D. Staff Listing

An accurate list of Event Staff should be provided to local authorities and EMS prior to the start of the event. This list must indicate their location, how they can be contacted, and their competencies (first aid, paramedic, wild water rescue, ocean rescue, mountaineering rescue, etc.)

E. Event Schedule

A detailed event schedule should be provided to all relevant parties prior to the event. The event schedule should include race start time and time estimates for fastest and slowest teams in each section of the course, verified by running each leg in expected conditions.

F. Safety Plan

The safety plan must include search and rescue, Event Staff, EMS, and local authorities. The plan should detail emergency access/evacuation points.

G. Course Recce and Review

The course recce should include:

- Running all course legs, listing possible course deviations by competitors.
- Test communication systems.
- Review the emergency response plan.
- Coordinate with service providers and staff, e.g. equipment suppliers, river safety, mountain rescue, climbing riggers, coast guard, etc.
- Verify CP coordinates, manned CP access, TA access and transport corridors.

8. Course Management

Course management is the way a racecourse is set up, documented, permitted, and staffed.

A. Permits, Notification and Documentation

Permits must be obtained for some jurisdictions and/or private properties along the course. Government agencies may include:

- Forestry Services
- State, provincial, and federal lands
- Public lands & parks
- Coastal and navigable waterways
- Roads and vehicular trails

- City, county, provincial and local government, and their agencies (police, fire, park & recreation, etc.)

Permitting approvals afford local authorities and landowners to be prepared for the event and potential emergencies.

Complete course maps showing likely routes, distances and expected times between TAs and between manned CPs should be provided to Event Staff and posted for staff at the start, finish and TAs. This assists with tracking competitors and alerting Event Staff and agencies to potential overdue competitors.

B. Hazard Identification and Prevention

The racecourse must be scouted, vetted, and assessed for hazards before it is confirmed as safe for use. Knowledge locals, maps, and guidebooks are useful tools for identifying hazards. Areas where there is a likelihood of encountering other users must be identified, for example, dirt bikes/quads, recreational vehicles, motorized watercraft, forestry equipment, etc.

The competitors race handbook must identify areas that contain hazards such as cliffs, waterfalls, rockslides, water that is difficult to navigate or contains obstacles. Written instructions, signage, flagging, danger tape, and other means should be used to alert competitors of hazards. Areas where risk of injuries or death could occur must be always staffed with safety personnel. Examples include fixed ropes, glacier traversing, mountaineering, whitewater paddling, and open ocean.

C. Access and Checkpoint Planning

Event safety staff must have reasonable access to all areas of the racecourse. An access plan for each area should be created. Accessibility may require recreation vehicles, ATVs, motor bikes, horse, canoe, jetboat, helicopter. Access must be planned for all areas of the course. On remote sections, possible escape routes for the competitors must be identified.

Distance between manned CPs and TAs must be spaced so competitors can report emergencies and exit the course to alert authorities in the event of a medical emergency.

CP and TA staff should remain in position until all competitors have departed, and the sweep has confirmed no competitors behind on the course. Competitors may return to their last known point seeking help.

There must be motorized vehicular access to all transition areas (car, truck, boat, snow mobile). Checkpoints may be remote or trail accessible. Race Staff at remote CS must have effective communications with back up battery power / charging ability, food, water, shelter and medical supplies for competitors requiring assistance.

D. Public Roadways

Significant road crossing (i.e.: highway or major road) must be manned by Race Staff. Competitors must be prevented from crossing roadways until clear. Inclusion of vehicular roads in a racecourse is strongly discouraged.

Use of vehicular roads at night should be prohibited. If travel on a vehicular roadway is allowed, “Caution – Race in Progress” and other signs as required by local authorities must be placed 500m leading into the section and every 1,000 m along the entire roadway, facing both directions. A race vehicle should always patrol the road to check for compliance with race rules for road travel. Competitors on a road must travel in single file, remine on the shoulder and obey all traffic laws. Bicycles ridden on vehicular roadways must display bright forward facing white lights and red flashing rear lights day and night.

E. Communications

There must be radio, cellular or satellite contact along the entire racecourse. Contact means reliable voice and/or text communication. Dead zones should be eliminated by radio repeaters between checkpoints or other staffed areas. Competitors must be required to carry a communication device if traveling at night. Communication systems should be validated during course scouting and must be reconfirmed during event set up.

9. Emergency Response

Emergency response requirements for Events should be reviewed for the length, difficulty and complexity of their event.

Risks related to the event and sport disciplines must be published on the event and registration pages. Competitors must be notified of the level of proficiency required for each of the sport disciplines on these pages, and details sent with confirmation of registration.

Risks may include animals, poisonous plants, heat or cold, water temperature, moving water, cliffs, caves, extreme weather, etc.

10. Sport Disciplines

GENERAL REQUIREMENTS

A. Testing Requirements

Events that require sport specific competency must include certification requirements for all competitors. Validation of current certification and skills testing must be verified prior to the start of the event. Sport competencies may be required for:

- Land navigation
- Marine navigation
- Sea kayaking
- Sailing
- Whitewater canoe, kayak, pack rafting, rafting, and body boarding.
- Swimming, snorkelling, and diving
- Climbing: fixed ropes, descending, ascending, traversing, passing anchors, via ferrata, lead climbing, anchors
- Mountaineering: glacier travers, crevasse rescue, avalanche awareness and rescue, self-arrest
- First aid, CPR

If the event requires a level of skill that needs to be certified and/or verified through a test, and if the certification process includes testing to the satisfaction of the event organization, then it satisfies the criteria, and testing may not be required at the event.

This puts the onus of deciding the level of skill, testing and verification on the event organization. It is not stated as or intended to create an obligation for testing for any discipline.

B. Pre-Race Briefing

The race briefing / technical meeting shall include a list of known and potential hazards and instructions on how to

reduce risks for each one.

C. Waiver & Release of Liability

All competitors must sign a waiver and release of liability meeting the requirements of the laws of the host country. This document should be approved by a legal professional that works in this area.

D. Communication / Signal Devices

During the race, all staff members on course should be able to be in communication with the race organization or race headquarters should an emergency arise.

Also, during events where competitors are travelling in remote locations all teams must be provided a device, which would allow communication with event organizers in the event of an emergency. The following are examples of communication devices:

- Satellite phone
- 2-Way radio
- GPS unit with text

Teams in wilderness events must carry emergency signalling and locator devices. These devices can increase the ability of a team to alert race staff or emergency services. Signalling devices may include:

- GPS communication beacon, e.g., SPOT, InReach, cellular phone with GPS emergency alert
- GPS tracking device, e.g., vehicle trackers, Airtag
- Whistle
- Mirror
- Flare
- Smoke bombs
- Waterproof lighter to start a fire

Teams must demonstrate their proficiency using the race specified devices. The event Organizers must provide emergency contact numbers, channels, etc.

COASTEERING / COASTALEERING

Coasteering is travel along the coast of a body of water such as a river, lake, or ocean. Travel may include traversing sand, rocks, boulder, cliffs, climbing, cliff-jumping, wading, and swimming.

A. Hazards

Hazards may include strong current, tides, animal danger (e.g. Seal rookeries), plant danger (e.g. kelp), temperature extremes, water temperature, boat traffic, extreme weather patterns, out of bound areas, etc.

B. Testing Requirements

Skill testing requirements for coasteering may include:

- Swimming
- Ropes skills

C. DZs

The Event Organization may prohibit travel in the coasteering sections from dusk to dawn if there is a greater risk to competitor safety by travelling while dark.

D. Suggested Mandatory Gear

- Personal floatation device
- Wetsuit (thickness based on water temperature)
- Hard-soled shoes
- Neoprene gloves
- Neoprene hood
- Waterproof distress flares
- White strobe light
- Whistle
- Knife
- Waterproof bag

CYCLING, SCOOTERING & SKATING

Cycling may include on-road, off-road, cyclo-cross, hybrid, or other human powered vehicles.

In-line skating may include roller blade or roller skate type equipment.

Scooters are a standing platform suspended between two wheels and propelled by foot and/or gravity. Scooters with bicycle wheels must have bicycle type disc or "V" brakes and are not allowed to contain any type of pedalling mechanism.

A. Hazards

Hazards may include animals, plants, temperature extremes, vehicle traffic, technical trails, loose surfaces, extreme weather, out of bound areas, etc.

The Event Organization shall emphasize that competitors must abide by all local, regional, and national laws.

B. Testing Requirements

Vehicles must be mechanically sound. The Race Organization shall inform competitors that the standard will be verified prior to the race start.

C. Vehicle Verification may include:

- Wheels: no signs of damage e.g., scalloped-rims, cracks, loose spokes, broken or missing spokes
- Tires: no cuts, perishing, or excessive tread wear
- Brakes: brakes should be in good working order; brake pads and discs should contain enough material to last the duration of the race
- Frames: should be free of cracks, dents, or damage that could compromise the frame. Forks, suspension, seat post, handlebars, and stems should be free of damage.
- Drivetrain: chain should be clean, crank arms and bottom bracket should be secure
- Attachments: all attachment should be properly tightened and secure e.g., headset, brake handles, gear shifters, quick release mechanism, etc.
- Handlebars must have bar-end plugs.

- Tri bars, bull horns, bike racks, and other aftermarket attachments must be secure.

D. Communication

If the leg includes roads with vehicle traffic, warning signs shall be placed along roadways. Road closure or permits may be required. Races signs and coordination with the authorities / road owners regarding the number of people/teams and dates /duration of the event may be required.

If public roads are in the course, require single file riding, no more than one meter from the rideable shoulder and the requirements of the traffic law. A front facing white light and rear facing red light must be on between sunset and sunrise, while riding.

E. DZs

Travel on vehicular roads from dusk to dawn Sunday through Thursday should be strongly discouraged or prohibited, and travel on vehicular roads in areas of moderate or heavy traffic from dusk to dawn Friday and Saturday must be prohibited.

F. Mandatory Gear List (sample)

- National or international standard certified, labelled, bicycle helmet with no visible damage (ASTM, Snell, CE EN, BSI, AS/NZS, JIS, KOVFS, CAN-CSA)
- Spare-inner tubes (1 per rider)
- Tube patches
- Spare tire or tire repair for cuts or tears
- Chain tool and replacement links
- Multi-tool with all bike tools or all individual bike tools
- Front mounted white light
- Rear mounted red light
- Hand-pump or CO2 with replacement cartridges
- Spare brake-pads
- Chain lubricant
- Spoke wrench
- Reflective vest or leg / arm bands

HORSE RIDING

Horse riding (horseback riding) may refer to riding other animals such as Camels, Donkeys, elephants, etc.

A. Hazards

Competitors must be informed of the level of proficiency for the horse riding leg(s), saddle types, tack, and terrain.

Hazards may include temperature extremes, technical trails, loose surfaces, steep trails, water crossing, other animals, plants, temperature extremes, vehicle traffic, extreme weather, out of bound areas, etc.

B. Testing Requirements

Skill testing requirements for coasteering may include:

- Riding skills (trot, cantor, and gallop)
- Mounting skills

- Bridle, harness and saddling skills
- Basic knowledge of what to watch for with horses in case of injury, etc.

C. Veterinarian Stations (Vet Checks)

If the horse riding leg(s) is more than four hours, or if it travels through difficult terrain, the race organization shall ensure that vet checks are in place. Athletes that overheat, injure or kill a horse should be subject to a time penalty or disqualification if due to negligence or mistreatment.

D. Gear List (Sample)

- Helmet with a labelled international standard (ASTM, Snell, CE EN, BSI, AS/NZS, PAS, CAN-CSA)
- Hard soled shoes with a heel (to prevent shoes sliding forward and jamming in the stirrup)
- Hoof pick
- Leather palmed gloves
- Jodhpurs, chaps, or tights under trousers to reduce chafing

MOUNTAINEERING & ALPINE TRAVEL

All travel above the tree line in alpine settings is referred to as alpine travel. Mountaineering may involve rock, snow, ice, glaciers, travel on steep unstable slopes, rope work, etc.

A. Medical

Rugged terrain and the high altitude can lead to an increase in medical emergencies.

Altitude is defined on the following scale:

- High altitude: 8,000 – 12,000 feet (2,438 – 3,658 meters)
- Very high altitude: 12,000 – 18,000 feet (3,658 – 5,487 meters)
- Extremely high altitude: 18,000+ feet (5,500+ meters)

In races where athletes spend time above 2,400 meters (8,000ft), EMS staff must be trained and prepared to deal with of high altitude pulmonary edema (HAPE) and high altitude cerebral edema (HACE). Latitude and geography effects physiological response to altitude. Higher latitudes have amplifying effects due to the climatic conditions and other factors.

Athletes must be educated on altitude acclimatization and sickness and how to prevent, detect, and treat it. Events including travel at high to extreme altitude must include an altitude acclimatization programme, and a course that is designed to acclimatizes competitors to the highest sustained altitude while they race.

- Read about acclimatization to high altitude here.
- Tips on preparing to high altitude are available here.
- International Climbing and Mountaineering Federation (UIAA) recommendations for traveling in mountain regions are available here.

Race organizers must be prepared for helicopter evacuation of teams.

The Event Organization must have EMS and evacuation personnel throughout altitude legs to assess competitors and for medical evaluation under pre-determined conditions, for example injury, altitude sickness, avalanche danger, lightening, blizzards, extreme weather.

B. Extreme Weather

The Event Organization must constantly monitor the weather, before and during the race because extreme weather poses a constant threat in alpine areas and can develop with little or no warning.

The Event Organization should consider spacing checkpoints in mountain areas for team tracking, safety, and communication. This limits the risk of competitors getting lost and spending longer periods in harsh conditions.

The Event Organization must plan alternate routes as a weather contingency.

- Unseasonal heat (avalanche and rock fall danger)
- Spring thaw
- Heavy snowfall and avalanche risk
- Rain and avalanche / rock fall risk
- Blizzards
- Gale force winds
- Persistent heavy fog
- Heat, rain, and wet snow can cause thawing that loosens rocks, and can result in rock fall.

Creek and river crossings should be avoided at altitude in warming weather / morning thaw that can quickly and significantly increase flow and depth.

FIXED ROPES & CLIMBING

The term “fixed ropes” refers to Tyrolean traverses, zip-lines, rappel, via ferrata, and fixed line ascending. Travel may be vertical, low angle (near vertical), or overhanging (rappel [abseil], ascent [jumar], fixed-line ascent), or horizontal (Tyrolean traverse, zip-line, via ferrata).

A. Fixed ropes must be:

- Free from loose rock and debris
- With a safe and obvious approach for competitors
- Accessibility for safety and medical crews
- With suitable anchor points for rigging
- With emergency evacuation routes or access for extraction by air

Qualified riggers must be used for setting ropes.

B. Rigging Requirements

Professional judgment is required and should be done by professional mountaineers or climbers.

C. General Requirements

- All systems must be designed with a system factor of safety of 15:1 in urban settings, 10:1 in any other settings.
- Equipment must meet ASTM F887[1], UIAA[2], DIN EN 15567[3], CE, ISO, SIGMA-3, CSA, NFPA or equivalent standards[4].

[1] https://www.astm.org/f0887-20.html
[2] https://theuiaa.org/safety/safety-standards/
[3] https://www.en-standard.eu/
[4] https://www.technicaloutdoorsolutions.co.uk/2012/10/en-numbers-simplified/

- Equipment must be used in accordance with the manufacturer's recommendations.
- Competitors and the Event Organization must comply with all local, regional, and federal regulations.

D. Anchors

- The anchor system must be redundant.
- Anchor systems must meet industry best practices.

E. Edges, leges, and rock faces

- All points where a rope and or webbing comes in contact with the rock must be protected from abrasion.
- Rope passing over a ledge must be checked for wear after each use.
- Loose objects must be removed from the cliff and top approach.
- Edge protection may include canvas, plastic water pipe, bicycle tire sections, and manufactured edge protectors.

F. Climbing and rigging hardware

Hardware must be in inspected and meet manufacturers operational standards prior to use. Hardware that has been dropped or damaged be retired from service.

G. Rope

- Certified climbing or rigging ropes (UIAA)
- Must be 10.5 mm in diameter or larger.
- Must be designed for life support purposes.
- Static rope must be used at all times when a rappel, ascent, or highline is employed.
- Dynamic climbing ropes must be used for lead climbing or top rope climbing.

H. Operations

- A certified climbing helmet (UIAA, CE EN) must be worn when approaching and while in a climbing section.
- A belayer must be available for rappel stations that do not require for skills certification.
- A qualified person must inspect the system prior to use. It is acceptable that this qualified person come from the same crew provided they are nationally certified mountaineering or climbing guide (AGAI, AMGA, SNGM, VOBS, ENSA, IFMGA, AEGM, ACMG, AAGM)
- Emergency situations must be evaluated, and rescue measures predetermined prior to use.
- Rigging methods and operating procedures must be documented.
- Fall protection must in place on all approaches.
- Operating hours must be established.
- Competitors and staff climbing competency must be verified pre-race.
- Competitors must have an equipment and safety check prior to starting a ropes section

I. Rescue Guidelines

Rescue procedures must be documented and rehearsed at the completion of rigging and prior to the race start, and the ropes course shall be designed for rescue.

In the event of a rescue the ropes course shall be closed until the rescue is completed

A belay should be used during rescue unless the leader of the rescue believes that it will:

- Threaten the safety the rescue crew.
- Threaten the life of the victim.
- Hinder the rescue effort.

Staff must be trained and certified in rescue techniques by a professionally certified mountaineering or climbing guide.

J. Personal Protective Equipment

- Certified climbing helmets must be used in rope sections whenever there is a risk of falling objects from above, e.g., climber, staff, loose rock. Other certified helmets may be used if there is zero risk of falling objects, e.g., zip lines or Tyrolean traverses under some circumstances.
- Harnesses must be in good working condition and be labelled as meeting an international standard. Harnesses should not be any more than 5 years old.
- Full finger, leather gloves must be worn at all ropes sections when hands can contact rope.
- All hardware must be in good working order and free from damage or visible wear.
- All equipment must be used in accordance with the manufacturers recommended use guidelines.

K. Staffing

- Staff working at the rope site shall be qualified by a professionally certified climbing or mountaineering guide. All certifications of staff must be recorded and submitted to the race organization.
- Staff must not work longer than 4-hours without break. Breaks shall be a minimum of 30-minutes. Staff shall not work more than three (3) consecutive 4-hour shifts without an 8-hour break.
- Rescue staff must always be available at ropes sections, generally located at the top and bottom of a ropes course, and at other points depending on the size of the course.
- Staff must always be present at each end of a rope section.
- Rigging staff should be present throughout a ropes course to aid competitors with equipment, skills, injury or other difficulties.

L. Extreme Weather

The race organization and the rope staff must constantly monitor the weather for high wind, lightning, snow, ice, heavy rain, extreme temperatures, etc. Contingency plans shall be documented and operational throughout the event.

TREKKING / HIKING / RUNNING

Trekking, tramping, hiking, and running refers to travel by foot. This may include road running, trail running, orienteering, off-trail (wilderness) trekking, and bush whacking.

A. Hazards

- Water crossings
    - Rapids
    - Entrapments
    - Strainers
    - Precipitation, local and remote (catchment area)
    - Dam release
    - High flow rate
    - Deep water
    - Water temperature
- Steep terrain

    - Loose rock
    - Weak rock
    - Rock falls
    - Talas slopes
    - Scree
    - Couloirs
    - Cliffs
- Mountainous terrain
    - Moraines
    - Crevasses
    - Avalanche chutes
    - Avalanche traps
    - Recent snow or rain
    - Glaciers
- Animal hazards
- Plant hazards
- Extreme weather

B. Navigation Testing

A navigation test should be required if off-trail/wilderness travel is included in the race and is further than 5km from an emergency access point.

Navigation Testing should include:

- Plotting and identification: UPTM, Lat Long, land, marine
- Map age
- Map scale
- Map datum
- Topographical features
- Compass declination / deviation
- Triangulation
- Calculating distances
- Route Selection
- Contour Line/Feature Identification

C. Equipment

Sample Gear Lists.

Personal – depending on climate and conditions (arctic, alpine, marine, desert, jungle, forest, prairie, etc.)

- Flashlight/Headlamp (extra batteries)
- Emergency blanket (bag/bivvy)
- Compass
- Whistle
- Knife (fixed or locking blade)
- Warm hat
- Sun hat
- Warm gloves
- Protective gloves

- Water bottles and/or bladder, volume for conditions
- Long or short sleeve synthetic shirt for conditions
- Long pants or tights
- Windproof jacket
- Waterproof pants
- Helmet
- Personal Flotation Device (PFD) / life preserver / life jacket for water corssings
- River Knife attached to PFD
- Waterproof Emergency Strobe (5km visibility)
- Pogies (paddle and bike hand covers)
- First Aid Kit
- Sleeping Bag
- Sleeping Pad (torso length minimum)
- Packraft (paddles (hand or collapsible))
- Medical Insurance
- Long sleeve fleece top
- Long fleece pants
- Balaclava
- Winter Gloves/Mitts
- Chemical hand/foot warmers
- Waterproof winter over mittens
- Waterproof hiking shoes
- Over booties
- Avalanche beacon
- Avalanche probe
- Snow shovel
- Snowshoes
- Gaiters (for snow, sand, thick under vegitation, or scree)
- Wetsuit / dry suit

<u>Team</u>

- Altimeter (1 per team)
- Red distress flares / rockets (2)
- Smoke Signals/Smoke Flares (2)
- Survival Mirror
- Waterproof tarpaulin, big enough to shelter team
- Team first aid kit
- Sunscreen and lip balm with sunscreen
- Shovel for human waste
- Lighter or waterproof matches
- Dry bags for all clothing and equipment
- Maps (usually provided)
- Dry bag for maps
- Pen & Pencil
- 2-way radio & instructions (if provided)
- Tracking GPS & instructions
- Satellite phone & instructions (if provided))
- Emergency Beacon & instructions (if provided)
- 4 person shelter (bivvy, tent, tarpaulin for conditions)

- 20 m rope x 7 mm climbing accessory cord
- Climbing Rope (50m, min. diameter 8.5mm)
- Stove and fuel
- Container to heat water

WATER SPORTS

Water sports require competitors to traverse water legs. Travel may occur in streams, rivers, ponds, lakes, and oceans. Water sports may include:

- Canoeing
- Kayaking
- Outrigger paddling
- Native boats
- Rowing
- Stand up paddle boarding (SUP)
- Rafting
- Pack-rafting
- Swimming: open water, river, lake
- Sailing
- Snorkelling
- Scuba diving

A. Hazards

- Extreme weather
- Technical paddling - Class III or higher whitewater
- Shallows, reefs, coral, rocks
- River entrapments: strainers, boulders, trees
- Large ocean swell
- Rough open water
- Strong currents
- Large tidal range
- High wind
- Cold water

B. Suggested Gear

The Event Organization shall specify mandatory gear for each discipline, activity, length, technical difficulty, expected conditions and rescue times, e.g., wetsuits, shelter, stove.

- Certified personal floatation device (PFD) designed for the conditions.
- Certified paddling helmets for the conditions. Must have drainage holes.
- Light sources for night travel.
- Whistle easily accessible.
- 15 m throw rope (buoyant) with throw bag.
- Fixed blade or locking knife easily accessible.
- Dry top
- Dry pants are prohibited in moving water
- Rash guard
- Gortex top

- Warm head gear (wool, synthetic, neoprene)
- Wetsuit top / vest / farmer john / full
- Paddling pants (neoprene)

Safer Locations during Thunderstorms and Locations to Avoid

- No place is completely safe from the lightning danger.
- Large, enclosed structures (substantially constructed buildings) are safer than smaller or open structures.
- The risk for lightning injury depends on whether the structure incorporates lightning protection, the construction materials used, and the size of the structure.
- Fully enclosed metal vehicles such as cars, trucks, buses, vans, fully enclosed farm vehicles, etc. with the windows rolled up provide good shelter from lightning.
- Avoid contact with metal or conducting surfaces outside or inside a vehicle.

Avoid being in or near:

High places, open spaces, sports fields, isolated trees, unprotected small structures, rain or picnic shelters, baseball dugouts, communications towers, flagpoles, light poles, bleachers (metal or wood), metal fences, open topped vehicles, golf carts, water (ocean, lakes, swimming pools, rivers, etc.).

When inside a building avoid:

Use of a telephone, contact with water or any conductive surfaces with exposure to the outside such as metal door or window frames, electrical wiring, telephone wiring, cable TV wiring, plumbing, etc.

Safety Guidelines for Individuals

If an individual can see lightning or hear thunder, they are at risk. Louder or more frequent thunder indicates that lightning activity is approaching, increasing the risk for lightning injury or death. If the time delay between seeing the flash (lightning) and hearing the bang (thunder) is less than 30 seconds, the individual should be in, or seek a safer location. *This method has severe limitations due to the difficulty of associating thunder to the corresponding flash*.

High winds, rainfall, and cloud cover act as precursors to actual cloud-to-ground strikes notifying individuals to act. Many lightning casualties occur as the storm approaches. Many lightning casualties occur after the perceived threat has passed. Lightning threat persist for more than 30 minutes after the last sound of thunder. When thunderstorms are in the area but not overhead, the lightning threat can exist even when it is sunny, not raining, or when clear sky is visible.

Pay attention to extreme weather warning devices such as extreme weather radio and/or credible lightning detection systems but do not let this information override common sense.

Considerations for Small Groups and/or when the Evacuation Time is less than Ten minutes

An action plan must be known in advance by all Event Staff.

Local extreme weather forecasts, extreme weather radio, or appropriate channel should be monitored prior to the event to ascertain if thunderstorms are in the forecast. Event Staff should monitor forecasted extreme weather and observe on-site developments to keep everyone informed when potential threats develop.

Observation of lightning may be insufficient and information such as a lightning detection system or extreme weather information may be required to ensure consistency, accuracy, and advance warning.

Technology and instrumentation are effective but cannot guarantee safety. Instrumentation can be used to enhance warning during the initial stages of the storm by detecting lightning proximity to the racecourse. Advance notification of the storm's arrival should be used to warm people and instruct them to seek safety. Detectors are also a valuable tool to determine the "All Clear" (last occurrence of lightning within a specified range), providing a time reference for safe resumption of activities.

Safety Guidelines for Large Groups and/or when the Evacuation Time is more than Ten minutes

When larger groups (at TAs, start and finish) are involved, the time needed for evacuation increases. Extending the threat range also decreases the chance that a localized cell or thunderstorm can reach the area giving the erroneous impression of a "false alarm".

Lightning is always generated and connected to a thundercloud but may strike many miles from the edge of the thunderstorm cell. Acceptable downtime (time of alert state) has to be balanced with the risk posed by lightning. Accepting responsibility for larger groups of people requires more sophistication and diligence to assure that all possibilities are considered.

Important Components of an Action Plan

Monitoring should begin several days ahead of an event.

A protocol needs to be in place to notify all people at risk from the lightning threat. Depending on the number of individuals involved, a team of people may be needed to coordinate the evacuation plan.

Safer sites must be identified beforehand, along with a means to route the people to those locations. Vehicles provide excellent lightning shelters that can be provided (strategically placed around various locations) by organisers.

The "All Clear" signal must be identified and should be considerably different than the "Warning" signal.

The Action Plan must be periodically reviewed.

Include lightning safety tips and the action plan in event programmes, flyers, etc., and place lightning safety placards in areas where lightning strikes is a risk.

First Aid Recommendations for Lightning Victims

Most lightning victims can survive a strike with prompt medical treatment. Individuals struck by lightning do not carry a charge and it is safe to touch them to render medical treatment. Follow these steps to try to save the life of a lightning victim:

1. Call emergency services to provide directions and information about the likely number of victims.

2. Make no more casualties. If the area where the victim is located is high-risk (mountain top, isolated tree, open field, etc.) with a continuing thunderstorm, the rescuers may be placing themselves in danger.

3. In an active thunderstorm, rescuers need to choose whether evacuation from very high-risk areas to an area of lower risk and should move the victim rapidly if necessary. Rescuers should minimize their exposure to lightning.

4. It is unusual for lightning strike survivors to have major fractures that would cause paralysis or major bleeding unless they have suffered a fall or been thrown by the strike.

5. Resuscitation: Alert on-site emergency medical responders and follow current CPR and resuscitation procedures.

APPENDIX B - COURSE DESIGN AND MANAGEMENT

Attach a list of permits required and obtained? Yes No N/A

Local authorities have been contacted and provided with event details? Yes No

A document is available at all CPs and TAs showing distances / times for competitor arrivals?

Yes No

All sections of the race have been scouted?

Hiking Biking Paddling Ropes Other Other Other

Safety personnel have contracted (list)?

Ropes Open water Moving water Cycling Mountaineering

Attach a list of areas with hazards.

Competitors have been notified of hazardous areas? Yes No N/A

Safety Personnel are staffing hazardous locations? Yes No N/A

Safety personnel have reviewed ropes / mountaineering site(s)? Yes No N/A

Do competitors cross or travel on roadways? Yes No

If Yes, is there signage and staffing? Yes No

Is there an emergency access plan? Yes No

Attach a list of areas of restricted access and escape routes.

Racecourse staff have been informed of gear and time in the field? Yes No

Communications tested? Yes No

Have communication dead zones been identified and addressed? Yes No

Is a radio repeater needed? Yes No

APPENDIX C - EMERGENCY RESPONSE

Has the public been informed of the risks before the race started? Yes No

Have competitors been notified of the required skills and proficiency for the race? Yes No

What skills will be tested at check-in?

Navigation Water Skills Swift Water Rescue Swimming Ropes Mountaineering Other

Pre-race briefing? Yes No

Waiver and release of liability forms? Yes No

APPENDIX D - COASTEERING

Have the competitors been informed of the risks? Yes No

Have the competitors been informed of the skills and proficiency level required for the race? Yes No

Is swimming required over 1,000 m without the possibility of rest? Yes No

Will there be safety boats on the course? Yes No

Was the swimming ability assessed pre-race? Yes No

Did you highlight hazards at the pre-race briefing? Yes No

Is the emergency medical response team equipped to deal with injuries? Yes No

Are DZs in place for coasteering? Yes No

Are there sites to overnight along the coasteering leg? Yes No

APPENDIX E - CYCLING

Are there road sections in the bike course? Yes No

Have competitors been notified of risks? Yes No

Have competitors been informed of the difficulty of the bike course? Yes No

Do sections of the cycling leg use private roads? Yes No

Have property owners been notified of the dates of the event? Yes No

Were bicycles checked for mechanical soundness? Yes No

Have lights and safety gear been checked? Yes No

Were competitors notified of hazards in the cycling legs? Yes No

Will you be using warning signs to alert drivers of cyclists on the road? Yes No

APPENDIX F – HORSE-RIDING

Have the competitors been informed of the risks of horse riding?	Yes	No
Have the competitors been informed of the skills required for horse riding?	Yes	No
Have the competitors been informed of the difficulty of the horse-riding leg?	Yes	No
Are there veterinary checks during the horse-riding leg?	Yes	No
Were the horse-riding skills assessed pre-race?	Yes	No
Were hazards highlighted for the horse-riding leg pre-race?	Yes	No
Is the emergency medical staff equipped to deal with injuries?	Yes	No

APPENDIX G – SCOOTERING / IN-LINE SKATING

Have competitors been notified of the distance and the type of surfaces in the course? Yes No
Are any of the following hazards present on the course?

- Vehicular roads
- Narrow road shoulders
- High traffic roads, parks, bike paths, or sidewalks
- Rough, loose, or uneven surfaces
- Dangerous animals
- Water

How are risks mitigated?

APPENDIX H – TREKKING / HIKING / RUNNING

Have competitors been notified of the distance, terrain, and course conditions? Yes No
Are hazards in the course explained in the pre-race briefing? Yes No

- Water Crossings
- Steep Terrain
- Cliffs
- Canyons
- Loose Rock
- Avalanche Danger
- Animals
- Plant Hazards
- Impenetrable vegetation
- Inclement Extreme weather

Will teams have to pass a navigation test before the race? Yes No

List skills required:

- Compass declination
- Map deviation
- Dead reconning
- Course plotting
- Plotting coordinates
- Feature recognition
- Sighting
- Map feature knowledge
- Map scale
- Water depth
- Currents
- Tide charts

Is there a mandatory gear check? Yes No

Attach a list of all mandatory gear.

Will there be on-course gear checks? Yes No

APPENDIX I - WATERSPORTS

Have competitors been informed of water conditions, temperature, and hazards? Yes No
Have competitors been informed of the skills? Yes No

Are any of the following hazards present on the water sections?

- Strong currents
- Rapids
- Whitewater (indicate class I – IV)
- Dams
- Weirs
- Road crossings
- Rip tides
- Tidal currents
- Large tidal range
- Cold water
- Open water
- Swell / Surf
- Shore breaks
- Shoals / reefs
- Animal danger (sharks, whales, rays, box jellyfish, poisonous shellfish)
- Low trees
- Strainers
- Entrapments
- Ice or icebergs,
- Motorized traffic

Are these highlighted in the pre-race briefing? Yes No

What water sport skills will be tested at check-in?

- Flat Water
- Swift Water
- Open water
- Swimming
- Self-rescue
- T-rescue
- Surf entry and exit

List the water safety craft.

List emergency equipment

Are medical staff equipped for the conditions? Yes No