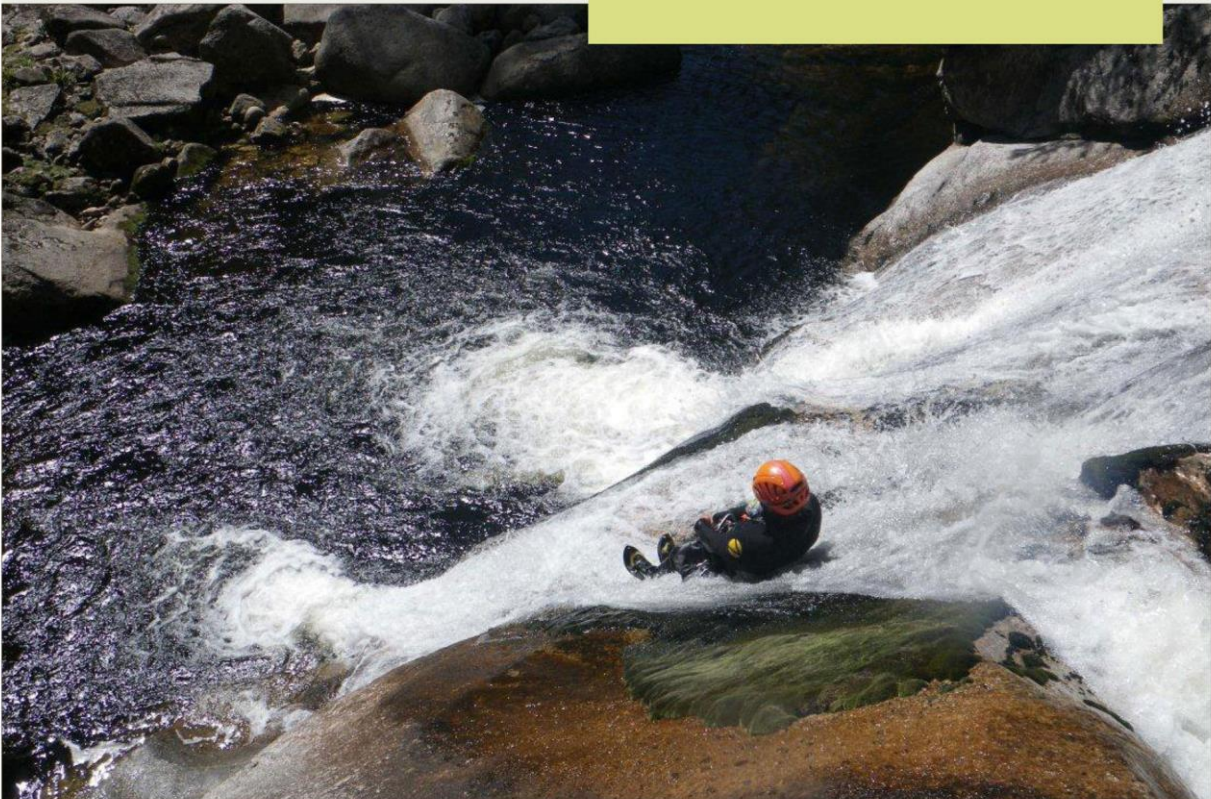# ASG

Activity Safety Guideline

Canyoning

March 2016 Version 2

SupportAdventure.co.nz
SAFETY SYSTEMS DRIVEN BY SAFETY CULTURE

Preface

This Activity Safety Guideline for Canyoning is published by the Tourism Industry Association of New Zealand (TIA) with support from WorkSafe New Zealand. The guideline was developed in association with experts from the canyoning sector and other relevant technical experts. More information about the guideline development process can be found at www.supportadventure.co.nz/activity-specific-good-practice-information/activity-safety-guidelines

The guideline is a web-based document and will be reviewed and updated as required. The current version is available at www.supportadventure.co.nz/activity-specific-good-practice-information/activity-safety-guidelines Users should periodically check the date and version number of the current online document to ensure that their printed copies are up-to-date.

Activity Safety Guidelines are the result of a recommendation from the final report of the 2009/10 government review of risk management and safety in the adventure and outdoor commercial sector in New Zealand. The variety of activities provided by these sectors is referred to broadly as adventure activities, and include activities provided by adventure tourism operators and outdoor education centres. More information about the government review can be found at www.supportadventure.co.nz/about-site-and-government-safety-review

TIA, WorkSafe New Zealand, and the canyoning community have made every effort to ensure that the information contained in this guideline is reliable. We make no guarantee of its accuracy or completeness and do not accept any liability for any errors. We may change, add to, delete from, or otherwise amend the contents of this publication at any time without notice.

Development was managed by the Tourism Industry Association New Zealand: www.tianz.org.nz with the support of WorkSafe New Zealand: www.business.govt.nz/worksafe

Document control

Version 2

Changes from Version 1.1	Where
Updated the health and safety regulator's name	Throughout document
Revised references to the health and safety legislation	Throughout document
Revised the technical expert definition	Definitions
Revised the guidance on vertical lanyards to be consistent with guidance in other ASGs	Section 4.2
Changed the age that operators commonly require guardian consent to under 18 years	Section 7.1
Add a section on proof testing bolts to be consistent with guidance in other ASGs	Section 8.3

Published

ISBN 978-0-9941265-5-9 (Online)

Version 2, March 2016; Version 1.1, February 2013; Version 1, December 2012

Cover photo: Toine Houtenbos in Falls River, Abel Tasman National Park. Photo: Daniel Clearwater

Acknowledgements

Other publications

This guideline contains adventure tourism and outdoor commercial sector information published on the SupportAdventure website.

This guideline contains public sector information published by WorkSafe.

Consultation

The guideline was developed in consultation with the canyoning sector and other relevant experts. The following experts comprised the working group and are acknowledged for their advice and support:

- Cam Bowen   www.awoladventures.co.nz
- Mike Enright   www.canyoning.co.nz
- Neil Foxcroft   www.canyonz.co.nz
- Toine Houtenbos   www.abeltasmancanyons.co.nz
- Grant Prattley   www.bigrockcanyons.co.nz
- Dave Vass   www.deepcanyon.co.nz

The following groups are also acknowledged for their input and support:

Canyoning Activity Safety Guideline Support Group; New Zealand Canyon Guides; Aviation, Tourism and Travel Training Organisation; Maritime New Zealand; Mountain Safety Council; New Zealand Outdoor Instructors Association; Outdoors New Zealand; outdoor Safety Auditors; Qualmark; the Tourism Industry Association New Zealand; Water Safety New Zealand.

Contents

Definitions

This guideline assumes the reader has technical knowledge of the activity, and defines only those terms that may be unique to this guideline, are used in a specific way, or that would otherwise be open to interpretation.

For the purposes of this document the following definitions apply:

Competent person (at a specific task)

A person who can correctly perform the task. They have usually acquired the knowledge and skills to do this through a combination of training, qualification and experience.

Client

A person or participant who takes an active role in an adventure activity but is not in a leadership or supervisory role.

Direct supervision

When the person supervising is in a position to be able to intervene and manage anticipated hazards.

Edge

The place over which a person could fall if they are not attached to a safety system.

Good practice

The range of actions currently accepted within the adventure and outdoor sector to manage the risk of harm to staff, participants and visitors.

Guide or instructor

A person who is responsible for guiding or instructing clients.

Health and safety terms

See the [Appendix](#) for an explanation of the terms *all practicable steps, hazards* and *significant hazards,* and *serious harm.*

Incident

An event that caused or could have caused harm to any person.

Indirect supervision

Is when the person supervising is able to communicate with the person being supervised, but may not be able to physically intervene to manage hazards should they develop. There are two types of indirect supervision:

- **Proactive** is where the supervising staff member is actively monitoring the client and is in a position to provide verbal assistance to intervene and manage hazards should they develop
- **Reactive** is where the supervising staff member is in a position to communicate verbally and provide assistance to a client when sought, but may not be actively monitoring the client or

providing pre-emptive assistance.

Operator

Person or other legal entity (whether an employer, principal, or self-employed person) that provides an adventure activity to a client.

Qualified

A person who holds a current nationally recognised qualification.

Risk

Effect of uncertainty on objectives.

Risk assessment

A process undertaken by a competent person to identify risks and their associated hazards, and to assess the hazards according to their significance — potential severity of impact and probability of occurrence.

Safety management plan (SMP)

The written plan outlining the systems an operator will use to manage safety.

Safety management system (SMS)

The overarching management system for directing and controlling an operation in regard to safety.

Sector

New Zealand adventure tourism and outdoor education providers, support organisations and associations. A specific part of the sector may be referenced, e.g. the canyoning sector.

Staff

Employees, contractors or volunteers who work for an operator and are responsible for the safety of clients undertaking canyoning activities.

Standard operating procedures (SOPs)

Written guidance that provides health and safety information about a particular activity or task — such as how it should be conducted.

Technical expert

A person who has professional credentials such as a high level, nationally recognised qualification, or extensive knowledge, skills, and experience. They advise auditors and operators on technical tasks, including reviewing activity practices.

Section 1: Introduction

This guideline is split into 10 sections.

In section 1 you will find:

- a description of the New Zealand canyoning sector

- an introduction to the safety context for canyoning activities in New Zealand

- an explanation of the purpose of this guideline and how it relates to the laws around health and safety

- an explanation of the scope and application of this guideline: what it covers, and how to use it to build your standard operational procedures and pass safety audits.

Section 2 is about the hazard management process. Sections 3 through 9 provide canyoning-specific safety recommendations and section 10 gives information about reviewing your safety systems.

1.1   The canyoning sector

Commercial canyoning in New Zealand occurs both in outdoor education centres and adventure tourism operations. Trips in the higher grade canyons tend to be more common within the adventure tourism operations.

The adventure tourism canyoning sector is fairly small and some operations are fairly new however, it is well connected to the New Zealand recreational canyoning community and the international canyoning community. Many operators, guides and instructors work within the well-established and highly regulated European canyoning sector.

Photo: Mike Enright

There is a small but knowledgeable recreational canyoning community in New Zealand. There is a recreational canyoning website at www.kiwicanyons.org

The New Zealand commercial canyoning sector developed canyoning specific qualifications with the New Zealand Outdoor Instructors Association (NZOIA) in 2011. The New Zealand Canyon Guides (NZCG) is a commercial operators group formed in 2009. Canyoning operators are encouraged to join this group – for more information contact the working group members listed on page 2 or NZOIA www.nzoia.org.nz

1.2   The legislation

Commercial canyoning operations are subject to the Health and Safety in Employment Act 1992 (the Act) and the Health and Safety in Employment (Adventure Activities) Regulations 2011 (the Adventure Activities Regulations).

The health and safety legislation uses both *operators* and *providers* to refer to people or organisations who provide activities such as climbing on artificial structures. This guideline uses *operators* throughout.

The Adventure Activities Regulations

Canyoning activities expose the participant to risks of the kind defined in the Adventure Activities Regulations. The Adventure Activities Regulations cover activities where:

- the recreational or educational experience the participants have is the main purpose

- the participants are guided, taught, or otherwise assisted to participate in the activities

- the design of the activities deliberately exposes the participants to a risk of serious harm that must be managed by the operator of the activity

- failure of the operator's management systems (such as failure of operational procedures or failure to provide reliable equipment) is likely to result in serious harm to participants, or participants are deliberately exposed to dangerous terrain or dangerous waters.

The regulations require operations providing these activities to be registered and undergo an external safety audit.

For more information, go to the SupportAdventure website: www.supportadventure.co.nz/registration-and-audits#Regulation

---

1.3   Purpose of this ASG & the SupportAdventure website

This Canyoning Activity Safety Guideline (referred to as *the guideline*) aims to provide practical recommendations for commercial canyoning operators in New Zealand to actively manage the safety of the canyoning activities they provide.

The SupportAdventure website – www.SupportAdventure.co.nz – provides practical guidance for adventure activity operators on developing good practice safety management systems. It includes information and examples for developing a safety management plan.

This guideline and the SupportAdventure website act as companions to the health and safety legislation. They are not part of the health and safety legislation, but following their recommendations will help operators to meet legal requirements to take all practicable steps to identify and manage hazards.

An investigation into an accident may look at how well an operator followed this guideline. Hazards can be identified and managed by following this guideline directly, or in other ways that achieve the same level of safety (or better). Before departing from the recommendations given here, seek advice from a canyoning technical expert or other competent person. An operator will need to be able to

justify why they use a different method from the guideline.

The responsibility for making safe decisions remains with the operator.

1.4 What this guideline covers, and how to use it

This guideline defines canyoning as:

Photo: Mike Enright

> An activity involving the descent or ascent of a watercourse using specific techniques and/or equipment but excluding a craft. The watercourse often contains water and often has vertical sides and/or difficult egress and access, and is not a cave.

This guideline covers activities that meet this definition, whether or not they are advertised specifically as canyoning.

The Canyoning Activity Safety Guideline describes what canyoning operators and technical experts consider to be good practice for actively managing safety in providing commercial canyoning activities in New Zealand.

This guideline is written for commercial canyoning operators (the primary audience) and also for safety auditors (the secondary audience) as a benchmark for current good practice.

It will also be useful for:

- other people involved in canyoning, such as trainers and people involved with providing non-commercial canyoning activities
- activities other than canyoning that involve similar risks, hazards, and techniques.

This guideline focuses on preventing death or other serious harm. It identifies common significant hazards that clients, and the guides or instructors who lead them, may be exposed to during canyoning trips. It makes recommendations for managing these hazards.

Activities associated with taking clients to and from canyoning activities are outside the scope of this guideline. Operators who provide these activities need to manage the associated hazards.

> *'Safety management systems are made of a safety management plan underpinned and driven by a positive safety culture.'* www.SupportAdventure.co.nz
>
> For information on building a safety management system, go to:
> www.SupportAdventure.co.nz

1.5   Use this guideline to build safety

As an operator, you should have an overall safety management plan that you use to manage health and safety in everything you do. Your plan should contain standard operating procedures (SOPs) for each activity you provide.

This Canyoning ASG outlines good practice safety recommendations that are specific to canyoning. Conduct a site specific hazard management process, consider the recommendations in this guideline, and add the relevant procedures to your SOPs.

This guideline gives examples to explain hazards and other concepts. The examples are not exhaustive — think of other examples that could apply to your specific activity.

It is essential that, alongside site specific assessments and the use of this guideline, guides and instructors conduct ongoing dynamic hazard assessment and management.

1.6   Use this guideline to help you pass safety audits

The Adventure Activities Regulations require canyoning operators to obtain and pass independent safety audits. Following this guideline will help operators who provide canyoning activities to satisfy these requirements and pass audits.

Safety audit standards specify the standards or requirements that adventure activity operators must comply with to reduce risks when providing adventure activities. Safety audit standards will specify:

- the general standards and requirements for all operators
- that there are relevant technical standards and requirements for each specific adventure activity.

To view the Adventure Activities Regulations safety audit standard, go to: www.business.govt.nz/healthandsafetygroup/information-guidance/all-guidance-items/safety-audit-standard-for-adventure-activities-2013-requirements-for-a-safety-audit-of-operators-march-2013

This Canyoning ASG sets out relevant technical standards and recommendations for commercial canyoning activities. The guideline will help safety auditors to assess whether an operator is complying with good practice for canyoning activities.

Section 2: Hazard Management Process

This section looks at the following steps in the hazard management process:

- identifying and assessing hazards

- managing hazards

- managing of the hazards of drugs and alcohol

- using competent persons

- incident reporting and learning.

The hazard management process is a key part of an overall safety management plan. The steps involved enable hazard management to be built into standard operating procedures (SOPs).

Hazard management processes need to be driven by a positive safety culture. Apply hazard management processes to all operational situations including new activities, standard activities, and when there are changes to equipment or hazards.

Hazard management involves both a scheduled and dynamic approach to identify, assess, manage, communicate and record hazards in every part of an operation.

For an explanation of the terms *practicable steps, significant hazard,* and *serious harm,* see the Appendix.

2.1   Identifying and assessing hazards

Identify significant hazards both systematically and dynamically. The systematic part of identifying hazards should use a variety of methods such as:

- inspecting sites physically

- studying maps and photographs of catchment areas

- consulting other users

- reviewing standard operating procedures

- reviewing past incident reports and lessons learned.

Assess all hazards to identify which are significant. Align assessment and rating systems with current good practice and take into account the nature and context of the activity.

2.2   Managing hazards

Manage hazards according to the 'eliminate, isolate, minimise' hierarchy of action. Due to the nature of canyoning many hazards cannot be eliminated or isolated, and can only be minimised.

Hazard management should reduce the risk of harm to acceptable levels. What these acceptable levels are will depend on the nature and context of the activity, client ability and on current good practice.

Managing hazards includes monitoring them for changes in their significance. A higher level of

management — such as moving from minimising to eliminating — may be necessary if a hazard increases in significance. For example, a change in conditions might mean a trip should no longer go ahead.

2.3   Managing the hazard of drugs and alcohol

The Adventure Activity Regulations explicitly require operators to manage the drug and alcohol-related risks in their workplaces, starting with a clear drugs and alcohol policy in their safety management plan. Auditors will expect to see a policy suited to the risk within the operator's workplace, and evidence that it is being implemented.

> To see the WorkSafe guidance document on managing drugs and alcohol-related risk in adventure activities, go to:
>
> www.business.govt.nz/healthandsafetygroup/information-guidance/all-guidance-items/guidance-for-managing-drug-and-alcohol-related-risks-in-adventure-activities

2.4   Using competent persons

Use suitably competent people to identify, assess, and manage hazards.

Ensure the competent person is familiar with the operator's safety management system, client market, relevant site specific information, and has access to historical information on site hazards and incidents.

2.5   Incident reporting and learning

Report, record and analyse all incidents and concerns that affect safety or have the potential to affect safety. This is done to enable learning and to help stop the incident from happening again. Act on anything you learn.

Incident reporting systems need to be used effectively. Induction and on-going training are vital, but are only a part of ensuring that this happens. The system must be openly and regularly used, particularly by senior staff, to have any chance of success.

To encourage responsible reporting, take care to think of reporting and recording separately from the incidents themselves. Avoid penalising people for reporting incidents. Good reporting and recording should be seen as positive behaviour alongside whatever faults may have led to an incident.

> For more information on hazard management processes, go to:
> www.supportadventure.co.nz/safety-management-plans/hazards
>
> For more information on incident reporting, go to:
> www.supportadventure.co.nz/safety-management-plans/incidents

Section 3: The Canyoning Environment

The source of one of the most likely causes of death while canyoning is drowning when in canyons during an unexpected rise in water levels. Focus safety management strategies on preventing this.

This section identifies good practice safety management strategies for dealing with six key aspects of the canyoning environment:

- how canyons are graded for difficulty

- the risk of rising water levels

- the difficulty of getting assistance in canyons

- the effects of cold temperatures on people

- the risk of rock fall

- changes to hazards within the canyon.

The information in this section should not be considered all-inclusive. It is essential to carry out site and activity specific hazard management processes, and for guides and instructors to conduct ongoing dynamic hazard identification, assessment and management.

Photo: Daniel Clearwater

Note: Some of the most likely canyoning activity serious harm injuries are impact injuries associated with jumps or slides. For more information on this and other activity based risks, see section 4.

3.1   Grading canyons for difficulty

New Zealand canyons are graded using the French grading system. This guideline refers to two levels of canyons:

- Level 1 – up to approximately French grade V3, A3, 2

- Level 2 – above this grade.

For more information on the French grading system, go to www.kiwicanyons.org

3.2   The risk of rising water levels

The potential for rises in water levels is a significant hazard when canyoning. Water levels can rise for several reasons, including heavy or persistent rain or snow melt in the canyon water catchment area, dam collapse and/or release, or landslides or avalanches into the water source.

Ensure that guides and instructors are well aware of the causes of rising water for the canyons they work, and that they know how to monitor, plan for, and react to rising water levels.

To do this they should know:

- local catchment areas and any associated dangerous weather patterns or dam and slide hazards

- likely water rising rates for particular weather patterns and catchment surface conditions

- the best weather forecasting service available (most up to date and most accurate) and how to use it

- how and when to cancel a trip due to water level concerns

- methods for monitoring water rising rates, water level indicators and maximum safe water levels

- procedures for dealing with rising water levels in a canyon, such as safe waiting areas, escape routes, and evacuation procedures

- landslide or avalanche hazards that could affect the catchment, how to monitor these, and any associated activity cancellation parameters.

3.3 The difficulty of getting assistance in canyons

The limited access of many canyons can make emergency evacuation difficult and lead to lengthy waits for external emergency support.

Strategies for managing difficult canyon access should be based on the associated risk. Options include:

- mapping options for access and escape

- pre-rigging emergency access ropes or ladders

- caching emergency evacuation equipment

- induction training and ongoing practice for guides or instructors on access and escape routes

- training or informing local emergency services about your access systems and their limitations

- considering accessibility when determining guide or instructor to client ratios, assessing clients, and setting competence requirements for guides or instructors

- ensuring that sufficient equipment is available to ensure group safety during a delay leaving the canyon, such as warm clothing and high-energy food.

3.4 The effects of cold temperatures on people

Cold air or water temperatures can lead to clients becoming hypothermic or struggling to safely participate in activities.

Strategies for managing cold temperatures should be based on the associated risk. Options include:

- ensuring that clients are equipped for the expected temperatures

- managing the start times and duration of trips to suit the temperature

- encouraging people to minimise their time in cold water

- carrying and using extra thermal clothing, food, and heat sources

- training guides and instructors to manage cold temperature hazards.

3.5 The risk of rock fall

Assess and monitor the canyon for likelihood of rock fall. Assessment and monitoring should be based on the associated risk — consider the type, shape, and quality of the rock of the canyon, as

well as vegetation.

Strategies for managing rock-fall should be based on the significance of the risk. Options include:

- avoiding the area by choosing a different route through the canyon or cordoning off the area
- moving quickly through the area
- wearing helmets.

3.6 Changes to hazards within the canyon

Significant environmental events such as floods, tree falls, and rock falls may affect known existing hazards on a canyoning trip or create new hazards.

Ensure that systems are in place to check canyons and specific activities within canyons are checked after environmental events that could have changed or created hazards. Record any changes and notify relevant staff and other canyon users.

Section 4: Canyoning Activities

Some of the most likely canyoning activity serious harm injuries are impact injuries associated with jumps or slides. Safety management strategies should focus on preventing these from occurring.

This section looks at five common canyoning activities. It identifies significant hazards usually involved and good practice for managing those hazards. They are:

- swimming and wading
- being exposed to edges and falling from height
- ziplining
- abseiling
- slides and jumping into water.

Photo; Mike Enright

The information in this section should not be considered all-inclusive. It is essential to carry out site and activity specific hazard management processes, and for guides and instructors to conduct ongoing dynamic hazard identification, assessment and management.

The most common non-serious harm injuries while canyoning usually occur while scrambling and walking.

Note: The most likely cause of death while canyoning is drowning associated with an unexpected rise in water levels. For more information on this and other environmental risks see section 3.

4.1   Swimming and wading

Canyoning often involves swimming and wading in water, and therefore exposes people to the risk of drowning.

Identifying the hazards

Hazards to consider when swimming or wading include:

- clients with limited or no swimming ability
- water that is fast flowing
- water that is too shallow or too deep
- unstable or slippery river bottom
- aerated water – reduced buoyancy
- features that could trap people.

Managing the hazards

Include strategies for managing hazards in technical systems, client management techniques, and client briefings.

Technical systems

- Establish maximum safe water levels for swimming, wading and other water related activities — operate within these levels.

- Choose swim or wade activities that match client abilities.

- Choose swim or wade routes, and manage client equipment to eliminate, isolate or minimise entrapment risks to acceptable levels.

- Use additional buoyancy devices as per the recommendations in [section 8](#).

- Check clients' swimming competence before activities that demand strong swimming ability

- Assess swims and wades to ensure that guides or instructors can supervise and intervene as needed to manage safety.

- Directly supervise difficult swim or wade exit points where exiting at that point is integral to safety

- Only allow clients to swim over drops when the landing area is deep and obstacle free.

Client management

Guides and instructors should understand the characteristics of the group and manage the safety of each member, e.g.

- identify and manage weak swimmers — consider avoiding the swim or wade, swimming with the guide or instructor, or using extra buoyancy as per [section 8](#)

- ensure that supervision levels and strategies are in line with the group's needs.

Client information

Ask clients to inform the guides or instructors if they have limited or no swimming ability.

Include information on suitable hazard avoidance techniques in safety briefings for swimming or wading should. Examples include:

- wading and/or swimming techniques suited to route to be negotiated

- ways to recognise hazards where appropriate, such as trees or undercut walls

- actively swimming away from hazards

- entrapment avoidance techniques such as white-water float position and active swimming.

Note: See also [sections 3.2](#) and [3.4](#) for recommendations on managing the hazard of rising water levels and the effects of cold temperatures on people.

4.2   Exposure to edges

Negotiating canyons often involves exposing clients and guides or instructors to edges and the risk of falling from height. Specific techniques for moving near edges also bring their own hazards. This section looks at reducing the risk of falling, using cow's tails and lanyards, deep-water belaying, and using clients to belay.

Additional sources of information and technical expert advice on managing activities at height include the New Zealand Canyon Guides, the New Zealand Outdoor Instructors Association, and the New Zealand Mountain Guides Association.

Reducing the risk of falling

Manage general exposure to the risk of falling by ensuring that people stay far enough away from edges to isolate or minimise the risk. This will often include establishing safe zones back from an edge and communicating these clearly to clients.

Sometimes exposure to edges cannot be avoided. Belay client and instructors or guides, or attach them to a safety point, when in the opinion of a technical expert or suitably qualified person:

- they are likely to fall and the fall is likely to cause serious harm, or
- a guide or instructor needs to be attached in order to protect the client safely.

Assess the likelihood to fall by looking at factors such as:

- how close people are to the edge
- how much the surface slopes downward
- how unstable or slippery the surface is
- the ability of the client and guide or instructor.

Guides and instructors should use other safety techniques to protect clients from lesser falls that may still cause serious harm, e.g. spotting techniques when clients move in technically difficult terrain.

Using cow's tails and lanyards

Cow's tails and lanyards are commonly used in conjunction with safety lines and anchors as a fall restraint.

Identifying the hazards

Hazards to consider when using cow's tails or lanyards include:

- clients totally unclipping lanyards in a hazard zone (a full unclip)
- clients being unable to reach clip and unclip points
- carabiner gates opening accidentally
- high peak forces on people and equipment in the event of a fall.

Client management

You should:

- Check clients' ability to use lanyards and cow's tails correctly, particularly around avoiding a full unclip.
- Practice first in a low consequence environment.
- Ensure that individual clients' supervision levels and strategies are in line with their needs.

Using lanyards for vertical travel

Lanyards used to protect vertical travel require more complex management than those for horizontal travel as there is risk that the fall restraint system may not absorb the impact of the fall, causing serious harm to the climber.

Identifying the hazards

Factors to consider when identifying hazards for using lanyards for vertical travel include:

- mistaking a top rope climb or other vertical line for a vertical lanyard safety system
- transiting incorrectly from a vertical climb to subsequent lanyard attachment
- snagging clothing in a fall, resulting in the climber being suspended by their clothing
- climbing on self-retracting lines with a slack line due to climbing too fast for the system, or the line becoming snagged
- falling onto other clients.

Managing the hazards

Include strategies for managing hazards in technical systems, client briefings, and skill checks.

Technical systems

You should:

- Ensure vertical lanyard safety lines are clearly identified and distinct from other vertical lines.
- Use lanyards for vertical travel in conjunction with a safety system designed specifically for that use.
- Ensure that transiting from the vertical safety system to the next safety attachment is easy to use and clearly identifiable.
- Ensure lanyards or other attachments to safety points are short or attached above waist level to minimise the chance of 'over-climbing' and increasing the shock load if there is a fall.
- Clearly identify fall zones through signs or verbal briefings.

Client briefings and checks

Conduct these checks when assessing clients for different levels of supervision and during ongoing supervision:

- Brief clients on carabiner use and orientation, such as 'the squeeze test'.
- Ensure climbers understand how to identify vertical lanyard safety systems as distinct from other vertical lines.
- Brief clients on how to manage the transition from vertical travel to the subsequent attachment systems, e.g. 'add before you subtract'.
- Brief climbers on managing the lanyard attachment point so it stays above their waist.
- Brief clients not to climb faster than a self-retracting line retracts.
- Brief climbers on the risks of loose clothing catching on the climbing surface and ensure loose clothing such as hooded jackets and tops is safely managed.
- Ensure clients know the location of (or how to identify) fall zones and stay clear of them.

Note: The High Wire and Swing ASG and the Abseiling ASG may give different good practice guidance for the horizontal use of lanyards depending on the context.

Deep-water belaying

This is a term for a safety system where a deep-water landing is used to protect people falling from

height. Belay ropes are not used.

Identifying the hazards

Factors to consider when identifying hazards for deep-water belaying include:

- shallow or aerated water, and obstacles in the landing zone
- unexpected or uncontrolled take offs or landings.

Managing the hazards

Include strategies for managing hazards in technical systems, client management techniques, and client briefings.

Technical systems

Choose locations low enough that clients can land safely even if surprised by the fall.

Assess landing zones to ensure that their depth and nature means that a client's fall will be safely managed by landing in the water — consider water aeration.

Client management

Space clients at distances that ensure they will not cause each other to fall, and so that if more than one falls they will not land on each other.

Client briefing

Instruct clients how to take off and land safely if they lose balance or control of the activity above the water.

If abseiling, instruct clients to abseil slowly and explain what to do if they lose control of the rope.

Using clients to bottom brake belay

Clients are often used to bottom brake belay on canyoning trips.

Identifying the hazards

Factors to consider when identifying hazards for using clients to belay include:

- the belayer using incorrect belay technique
- the belayer using safety equipment incorrectly, such as harnesses and rope attachment systems
- the belayer being distracted or not focusing on the task.

For information on using clients to bottom brake belay for abseiling in waterfalls see section 4.4

Managing the hazards

Include strategies for managing hazards in technical systems, client management techniques and client briefings.

Technical systems

Safety when bottom brake belaying relies more on client management and briefings than technical systems.

Client management

Pay particular attention to assessing clients and allocating belaying tasks to a suitable person.

Directly supervise client belayers if they are less than 14 years old.

Either directly supervise client belayers 14 years old and over, or use an adequately trained and supervised client as a back-up belayer. Indirect supervision may be acceptable if all the following conditions are met:

- the client belayer has been approved for indirect supervision by an experienced guide or instructor verified as competent in the skills of the NZOIA Level 1 Canyoning qualification, or a guide or instructor verified as competent in the skills of the NZOIA Level 2 Canyoning qualification.

- the guide or instructor has previously taught or observed the client belayer performing the task required and has absolute confidence that the client will perform the skills correctly in normal and adverse conditions.

Ensure the client belayer and the guide or instructor can communicate throughout the belay process. Ideally they would be able to see each other.

Client briefing

Instruct clients on the belay techniques for the system and equipment in use. Stress the importance of correct and diligent belaying techniques and the consequences of belay failure.

4.3 Ziplines

Canyoning trips often involve ziplines, which expose people to the risks associated with falling from height and moving at high speed.

Additional sources of information and technical expert advice on managing zipline activities or constructing ziplines include commercial zipline operators, the New Zealand Canyon Guides, the High Wire and Swings ASG and technical rescue training associations such as the Search and Rescue Institute of New Zealand and Rescue 3 New Zealand.

Identifying the hazards

Factors to consider when identifying hazards for ziplines include:

- incorrect attachment to the zipline
- exposure of people to edges and falling
- impact of peak forces on people and equipment
- lack of ground clearance in take-off areas
- clients hitting obstacles in the path of travel or stopping zones
- clients not stopping in time or stopping too abruptly due to inadequate braking systems
- clients suspended in a harness for an extended period of time
- clients' hands, hair, or equipment being in positions where they could be caught in pulleys.

Managing the hazards

Include strategies for managing hazards in technical systems, client management techniques, and client briefings.

Technical systems

Ensure that:

- Zipline routes and landing zones should be free of obstacles that could cause injury.
- Zipline angles and client retrieval systems should enable efficient client travel and rescue.
- Launching and stopping systems should ensure clients do not endure impact likely to cause harm.
- Ropes, wires, anchors and other system components should be able to manage the likely forces of normal zipline use and emergency procedures.[1]

Client management

Ensure that:

- The connection of the client's zipping device to the zipline before they launch.
- Clients are protected from unsafe exposure to edges as per the guidance in section 4.2.

Client briefing

Ensure that clients:

- Use on safe hand positions to ensure that their hands will not become entrapped in pulleys or breaking systems.
- Know what to do to stop sliding back along the zipline when they reach the end point.

---

[1] Strength requirements for load bearing ropes in zipline systems will almost certainly exceed the recommendations made for general use ropes in section 8. Examples of ways to manage the additional forces include using double ropes or metal cables for low angle, horizontal, or highly tensioned ziplines.

4.4   Abseiling

This section covers conventional and guided abseiling of clients, and abseiling in waterfalls or into water. These activities all involve the risk of falling from height and have their own unique hazards.

Also see section 4.2, which describes strategies for managing the risks of using clients to bottom brake belay.

Conventional and guided abseiling

Canyoning often involves client abseiling and occasionally includes guided abseils.

Identifying the hazards

Factors to consider when identifying hazards for abseiling include:

- exposure of people to edges and falling
- incorrect client abseiling technique or equipment use
- a difficult abseil starting area affecting the ease of weighting the rope and client ability to practise abseil technique
- abseiler suspended in a harness for an extended period of time
- top heavy clients — possibility of inverting while abseiling
- objects falling from above — landing on abseiler
- long abseils — compromised ability of guide or instructor to communicate with the client
- guided abseils — increased load on equipment and anchors
- guided abseils — not avoiding the hazard as intended.

Managing the hazards

Include strategies for managing these factors in technical systems, client management techniques, and client briefings.

Technical systems

Technical systems need to take into account equipment loadings, the time a client spends hanging in a harness, and abseiler ability.

- Ensure abseiling systems are releasable or include another option for recovering the abseiler in 'stuck' abseiler scenarios. Examples include hauling systems or lowering using another rope.

- Choose abseil sites and starting point set ups to enable clients to safely weight the abseil rope

- Choose abseil sites and instructor or guide supervision positions to enable suitable supervision of the client's descent, such as being able to see and talk with a nervous client during difficult sections.

- Provide clients with equipment to maintain them in an upright position if the instructor or guide thinks they may invert while abseiling.

- Ensure that on guided abseils:

  - anchors and equipment are suitable for the extra load on the system.

  - line tension and angle is sufficient to avoid the relevant hazard.

- Keep the edge at the top of the abseil site clear of loose equipment and objects such as rocks.

- Protect ropes and webbing from sharp or abrasive surfaces — use edge protection such as padding or re-directing ropes.

Client management

Ensure clients have a safety backup system while abseiling. This will usually involve being belayed by another person. Clients using a self-managed backup system such as prusik, will generally only occur in an instructional rather than a guided environment.

The decision to allow a client to use a self-managed backup system or to check their own abseil device connection should be made by an experienced guide or instructor verified as competent in the skills of the NZOIA Level 1 or 2 Canyoning qualification — for information on guide and instructor competence and qualifications, see section 6.

Check the connection of each client's abseil device to the rope before they abseil unless all the following conditions are met:

- the guide or instructor has previously taught and/or observed the client performing the skill set required and has absolute confidence that in normal and adverse conditions the client will perform the skills correctly

- buddy checks are used

- the initial weighting of the client's abseil set up is backed up by another form of safety, e.g. the client being attached by a lanyard.

Client briefing

Instruct clients:

- On correct abseil body position and on techniques for speed control and braking.

- To secure loose items, such as hair and clothing that could catch in the belay device.

Abseiling in waterfalls or into water

Abseiling in waterfalls or into water adds the risk of drowning to that of falling from height. The degree of risk involved will usually increase with the amount of water, the number of entrapment features, and the length of the abseil.

Identifying the hazards

Factors to consider when identifying hazards for abseiling in waterfalls include:

- features in the rock behind the waterfall trapping the abseiler — cracks, chockstones, hanging pools
- water hitting the abseiler or belayer, affecting their ability to abseil or belay
- surface slipperiness leading to foot entrapments or inability to maintain abseil stance
- difficult communication between client and the instructor or guide
- client bottom belayers needing to assist with complex rescue scenarios
- abseiler becoming entangled in rope when abseiling into water.

Managing the hazards

Include strategies for managing hazards in technical systems, client management techniques, and client briefings.

Technical systems

If abseiling into water with high water flow, ensure the abseil line finishes at or above water level, and the abseil device allow easy rope release.

Note: This assumes the abseiler is not being bottom brake belayed.

Ensure there is no knot in the end of the rope.

Packs should not be worn when abseiling in waterfalls with significant water flows.

Client bottom brake belayers should stand back from the waterfall, have stable footing and good visibility of the abseiler.

Use a PFD to provide buoyancy if moving water and features within it are assessed as significant hazards for that particular client.

Factors to consider include:

- the swimming ability of the client
- the likelihood of a client to be trapped by hazards such as the river bottom, hydraulics, recirculation, siphons, strainers and hanging pools in waterfalls
- the aeration of the water – how much buoyancy can it provide?
- the likelihood of a client being flushed downstream or being in moving water for a long time.

Client management

Client assessment and progressions should be used to ensure clients are suited to managing their role when abseiling in waterfalls.

Abseilers should be within sight of the guide or instructor in the parts of their descent involving significant water flows, ledges containing pools of water which present a drowning risk, or rock features which present an entrapment risk.

If bottom brake belayers need to assist in complex rescues, such as those requiring them to assist with moving the abseiler out of the main flow, observe them competently performing the tasks

required to assist in the rescue before they belay.

Client briefing

Briefing information will vary greatly depending on the actual hazards of a particular waterfall. Points to consider include instruction on managing slippery surfaces, avoiding entrapment features, and ways to maintain a breathing space, such as body and head positions.

If abseiling into water instruct clients on how to get clear of the rope.

If using clients to bottom brake belay an abseil where they may need to assist in a rescue and move the abseiler out of the main flow, ensure they have been previously trained and observed competently performing their part of the required rescue techniques.

4.5   Sliding and jumping

Sliding and jumping are the two canyoning activities most likely to cause serious harm. They involve hazards associated with height, speed, water, and the inability to directly manage the client throughout the activity.

Photo:Mike Enright

Identifying the hazards

Hazards that should be considered when jumping and sliding include:

- exposure of people to edges and falling

- difficult and exposed access routes

- unstable take-off areas

- lack of confidence or ability of client

- long horizontal distance of landing zones from the take-off position

- obstacles in route of travel

- landing zone too shallow or containing obstacles

- non-aerated water in landing zone, particularly for high jumps causing hard landings

- high speed of client on landing

- equipment impacting the jumper on landing, particularly packs when jumping

- fast flowing water in the landing zone flowing into hazards.

Managing the hazards

Include strategies for managing hazards in technical systems, client management techniques, and client briefings.

Technical systems

Technical systems need to consider access and take-off areas, landing zones and run-out.

- Directly control client take-off positions if it is integral to safety, e.g. the guide or instructor being attached to a safety point at the top of a jump to enable the hands-on guidance of the client.

- Protect clients from falling as they access take-off areas, e.g. include using fixed lines and lanyards or direct guide or instructor assistance.

- Assess landing zones to ensure they have sufficient depth and no dangerous obstacles.

- Assess landing zones to ensure any impact on the client is acceptable; consider both water aeration and likely client speed.

- Position a guide or instructor to stop clients from being washed downstream in landing zones with exits that actively flush clients towards hazards. For lesser flows this may be substituted by techniques such as a rope across the exit of the pool.

- Slides — consider the use of padding to protect the client, particularly their spine, e.g. neoprene, PFDs.

- Jumps — clients should not wear packs when jumping, and guides or instructors should consider forces resulting from landing wearing a pack before doing so themselves.

- Jumps — actively manage difficult landing zones, e.g. position a guide or instructor at the bottom to indicate the safe landing area and/or mark a hazard.

- Jumps — consider using buoyancy aids for particularly high jumps into non-aerated water.

Client management

Client assessment should be more stringent for jumps which have difficult access, take-offs or landings.

Manage clients so that they do not interfere with each other's stability in access and take-off areas, nor land on each other in landing zones.

Client briefing

Instruct clients in take-off and landing positions including body, head and limb positions.

Inform clients that they can do a less risky activity where relevant, such as a lower jump, abseiling, or being lowered.

Note: clients should be informed before a trip commences if a trip contains high risk activities with no alternative options.

Section 5: Trip Management

Trip management includes ensuring each trip is staffed and monitored effectively and that the most practicable communications systems are in place.

Guide or instructor knowledge of the trip

Ensure that guides or instructors are familiar with the hazards of the canyon they are working and with the operator's standard operating procedures. The number of trips and amount of training this requires will vary.

Factors to consider include:

- the grade of the canyon and the specific hazards associated with the trip
- the competence of the guide or instructor
- the canyon familiarity of other guides or instructors working the trip.

5.1   Trip monitoring

Monitor trip safety with a suitable backup person who is not on the trip, and with a suitable person on the trip itself.

Backup monitoring

The person providing backup monitoring is responsible for initiating emergency response as per the procedures in the operator's safety management plan.

They should not be in the canyon and should be as contactable as is practicable while the trip is underway.

On-trip monitoring

Ensure every trip has a guide or instructor who is responsible for monitoring general trip safety and ensuring the trip follows the operator's SOPs.

This person should be an experienced guide or instructor who the operator is confident will exercise good judgement under pressure.

Note: This does not remove the responsibility for each individual guide or instructor to manage the safety of clients within their supervision ratio.

5.2   Communication systems

Communication systems need to cover communication between those in the canyon and those monitoring the trip or other external emergency support, and between guides or instructors within the canyon.

Communicating with external support

Ensure each canyoning trip has a primary communication system, and that a backup system is available if the primary system is likely to be compromised. Compromising factors could include getting wet or suffering from impact damage.

The primary system should be the most effective option practicable, and ideally be two-way. Examples of communication systems include:

- a satellite phone

- handheld radios

- two-way texting devices

- a cellular phone

- access to nearby landlines

- scheduled meetings with other operators or backup personnel

- one-way devices such as personal locator beacons.

Where a communication device is used that relies on coverage, ensure that guides or instructors and personnel monitoring the trip are aware of coverage and non-coverage areas.

Difficulty in communicating with external support is a significant hazard associated with many canyons. Limited communication options can affect access to emergency support. See section 9 for information on contingencies for limited access to external emergency support.

Communicating between guides or instructors within the canyon

Communicating within a canyon is often difficult due to distance, gradient and water noise.

Ensure that guides or instructors are trained in the use of an agreed set of signals. These will often include hand, whistle, and rope signals. Examples of some commonly used signals can be found on the New Zealand Rafting Association website www.nz-rafting.co.nz

Section 6: Staff

Using competent staff is one of the mainstays of ensuring safety.

This section looks at four key factors of staffing your operation:

- identifying safety responsibilities and competence requirements
- verifying competence
- canyoning specific guide and instructor competence recommendations
- identifying and dealing with unsafe staff.

Photo: Mike Enright

6.1 Safety responsibilities & competence requirements

Ensure the safety responsibilities and competence requirements of each job within the operation are correctly identified. These jobs should include operations management, and guiding and instructing. Identify the skills and knowledge required to meet these responsibilities.

When identifying a job's competencies, factors to consider include:

- levels of experience and judgement
- personal technical skills, including equipment knowledge
- risk management, group management and leadership skills
- ability to operate in accordance with standard operating procedures
- familiarity with and understanding of the operational environment
- ability to communicate safety requirements/directions clearly to the client
- rescue and emergency management skills including first aid.[2]

6.2 Verifying competence

It is the responsibility of the operator to ensure that staff are competent. This section looks at how to use qualifications to verify skills, and how to verify those skills which are not covered by qualifications.

Using qualifications

Operators should ensure they know which skills and knowledge a qualification actually measures. The operator should then check these against those required for the job. Any skills or knowledge not covered by the qualification should be verified by other suitable means, see section 6.3.

---

[2] Ensure the number of staff with first aid qualifications, and the type of qualifications they hold are suitable for the likely first aid scenarios of the canyon in use.

Establishing equivalency between qualifications

When establishing equivalency of one qualification with another (or parts of another), an operator should contact the benchmark qualification provider and enquire as to the process they recommend.

Qualifications review

Qualifications on the New Zealand Qualifications Authority (NZQA) Framework are currently being reviewed. Any results of this review that affect the canyoning sector's recommendations for verifying competence will be included in this guideline as they become available. For more information on this review, go to www.skillsactive.org.nz

NZOIA is continually reviewing its qualifications. Results of reviews that affect the sector's recommendations for verifying competence will be included in this guideline as they become available. For more information, go to www.nzoia.org.nz

Skills not covered by qualifications

Verify competence in skills not covered by nationally recognised qualifications using a measure that suites the degree of safety responsibility associated with the skills.

Use a suitable person to verifying competence. This person should have a qualification to do so, or be a technical expert in the skill to be verified who also understands national expectations on the standard of competence required.

> For more information on verifying staff competence, go to:
> www.supportadventure.co.nz/safety-management-plans/staff

6.3   Canyoning-specific competence recommendations

This section looks at competency recommendations for canyoning guides or instructors, and assistants.

NZOIA currently administers two commonly used New Zealand canyoning specific qualifications:

- Canyon 1: this qualification is for people who run canyon trips with short pitches, e.g. less than 30 metres, that can be negotiated using simple rope descent techniques and with physical and water difficulty up to moderate difficulty, e.g. canyons up to approximately grade V3, A3, 2.
- NZOIA Canyon 2: this qualification is for people who organise and lead people in more difficult canyons, e.g. above grade A3, V3, 2 at normal flows, teach and guide all aspects of canyoning, and organise and supervise canyoning programmes.

For more information on these qualifications, including more detailed skill set breakdowns, experience prerequisites, and minimum recommended first aid certification, see www.nzoia.org.nz

Recommendations for guides and instructors

Ensure that canyoning guides and instructors operating within the scope of the above qualifications:

- hold the current NZOIA qualification corresponding to their job requirements or
- hold an equivalent qualification, or

- are verified as competent in equivalent skills.

Recommendations for assistants

An assistant guide or instructor is responsible for managing some tasks within the guide or instructor role, but not all. Skills required will vary depending on the tasks to be managed.

When using assistant guides or instructors ensure that:

- tasks to be managed, safety responsibilities, and required skills are clearly identified

- the assistant guide or instructor is verified as competent in the required skills

- the assistant guide or instructor only manages the tasks for which they are verified as competent

- the competence of the assistant guide or instructor is considered when establishing client supervision levels.

6.4   Identifying and managing unsafe staff

Do not permit a staff member to undertake any safety related tasks if staff believe they are in such a state of impairment that they may be a hazard to themselves or other person. Impairment could be due to factors such as alcohol, drugs, or fatigue.

Identify as a hazard any person who is unable to perform the safety tasks required in their role.

Management strategies should suit the significance of the hazard and be outlined in the staff management aspects of the operator's safety management system. The Adventure Activities Regulations require that drug and alcohol hazards are specifically addressed through an explicit drugs and alcohol policy.

Initial hazard management for dealing with unsafe staff should include removing the person from the role requiring performance of safety tasks.

See also section 7.1 for information on managing unsafe clients.

> To see the WorkSafe guidance document on managing drugs and alcohol-related risk in adventure activities, go to:
>
> www.business.govt.nz/healthandsafetygroup/information-guidance/all-guidance-items/guidance-for-managing-drug-and-alcohol-related-risks-in-adventure-activities

Section 7: Clients

This section identifies good practice for three key areas of client safety management:

- ensuring clients are suited to the trip and its activities
- informing clients about safety
- supervising clients.

7.1   Ensuring clients are suited to the trip

Assess clients to check that they are suited to participate in the canyoning trip and its particular activities. This should happen before the trip begins and be ongoing during the trip itself. This section looks at assessing clients and identifying and managing unsafe clients.

Photo:Mike Enright

Assessing clients

Use information gathered while assessing clients to inform trip options, client supervision levels, and activity choice within the trip.

Clearly identify what to assess in the operator's safety management plan. Staff other than guides or instructors, such as front-of-house staff or drivers, may be involved in assessing clients. Client assessment should be consistent across staff, and should reflect the requirements of each trip.

Factors to assess include:

- fitness and physical ability
- psychological factors such as the ability and likelihood to follow instructions, confidence in the environments of the canyoning trip, and phobias or fears – particularly of heights and water
- medical issues, particularly pre-existing injuries
- the technical skills required for the trip or a particular activity, such as swimming.

Information on managing clients with mixed abilities can be found at www.supportadventure.co.nz/other-resources#MixedAbilities and in the Mountain Safety Council Outdoor Safety Manual – *Risk Management for Outdoor Leaders*.

Age restrictions

Establish minimum age guidance for each canyoning trip.

Factors to consider include:

- the grade of the canyon
- activities within the canyon and their specific hazards
- whether the client fits the safety equipment

- the ease of canyon access and escape

- the ability to access external emergency support

- supervision levels

- experience and skill of guides and instructors.

There are no overarching age recommendations for canyoning in New Zealand. However, there are recommendations on the minimum age of client belayers. See section 4.4.

Note: It is common practice for operators to require children aged under 18 to have guardian consent to participate in adventure activities — New Zealand law does not give clear guidance on this topic.

Identifying and managing unsafe clients

Do not permit a person to participate in a canyoning trip if they are in such a state of impairment that they may be a hazard to themselves or to any person on the trip. Impairment could be due to alcohol, drugs, or fatigue.

Identify as a hazard any client who is unable to perform safety procedures as outlined in the safety instructions. Management strategies should suit the significance of the risk and include directing the client towards less risky activities, increasing supervision levels, or removing them from the trip.

See also section 6.4 for information on managing unsafe staff.

7.2   Informing clients about safety

Managing safety is more effective if clients are well informed, particularly on the risks and requirements of the canyoning trip. This section looks at the five key aspects of informing clients about safety:

- delivering safety information and checking for understanding

- pre-trip risk disclosure

- general safety information

- safety information for specific activities or hazards

- using demonstrations and activity progressions.

Delivering safety information

Safety information should be delivered by a guide or instructor who has been verified as competent to do so, ideally this person would be an experienced guide or instructor.

Ensure, as best as is practicable, that the client has understood the safety information. A safety information aid should be readily available to any client who has difficulty understanding the initial briefing, e.g. include videos, pictures and diagrams, practical demonstrations, or written instructions in the client's language.

Pre-trip risk disclosure

Before setting off on a trip, inform every client of the following information:

- canyoning is an adventure activity involving risk of serious harm or death. Clients should be aware that the commercial canyoning operator cannot guarantee the client's safety
- the trip is mentally and physically demanding and requires the client to be comfortable and confident with moving over uneven and possibly slippery terrain, being in the water and dealing with heights (these points should be emphasised to suit the particular trip)
- the client should follow guide or instructor instructions at all times and understand that this is critical to their safety and that of the group.

Mention specific hazards and emphasise whether or not they can be avoided and any extra responsibility they place on the client. These include sole guided trips and activities such as swimming or wading in moving water, jumping from height, abseils and slides.

Inform clients of any difficulties regarding escaping from the canyon and communicating with external emergency support.

General safety information

Instruct clients in canyoning awareness and general techniques. This may occur before and during the trip. Factors to cover include:

- awareness of and warnings about the hazards of the canyon

- the importance of listening to the guide or instructor

- procedures for routine movement through the canyon, such as how to move on slippery and unstable rocks, staying back from edges, and taking care around the exits of pools

- communication systems such as the 'OK' signal

Photo: Mike Enright

- methods for maintaining body temperature (for colder canyoning trips)

- emergency procedures such as staying where they are and waiting for instructions from the guide or instructor.

Safety information for specific activities or hazards

For parts of the canyon involving a significant hazard, or requiring technical manoeuvring to negotiate, inform clients of:

- the hazard and warn of its dangers

- options for avoiding the hazard such as alternative routes or techniques

- the location of safe zones, such as waiting areas back from edges

- the techniques required to negotiate the hazard or participate in the activity, such as procedures for use of technical equipment and performing technical actions. Note: for guidance on points to cover for specific activities see section 4

- applicable emergency procedures or self-rescue techniques.

Using demonstrations and activity progressions

Use demonstrations and activity progressions where practicable, particularly for more difficult activities, to help ensure clients are prepared and fully understand what they are required to do.

7.3 Supervising clients

This section looks at establishing levels of supervision, minimum recommended client supervision levels, and parameters for sole guiding.

Establishing levels of supervision

Establish maximum number of allowable clients and minimum client supervision levels for every trip.

Increase supervision levels when operational situations are less than optimal. Examples of these situations include:

- less experienced or confident guides or instructors
- less physically able, younger or less confident clients
- challenging environmental conditions.

Recommended minimum client supervision levels

These supervision levels do not take into account the use of assistant guides or instructors. Consider which hazard management tasks an assistant guide or instructor is verified to perform unsupervised before factoring them into supervision levels. For more information on assistant guides or instructors see section 6.

Recommended minimum guide or instructor to client supervision levels

Number of guides or instructors	Guide or instructor skill level	Level 1 canyon	Level 2 canyon
Sole guide or instructor	NZOIA Canyon 1	1:8	N/A
	NZOIA Canyon 2	1:10	1:8
2 or more guides or instructors	NZOIA Canyon 1	1:8	N/A
	NZOIA Canyon 2	1:8*	1:8**

* At least one guide or instructor has skills at the level of the NZOIA Canyon 2 qualification.
   Note: numbers are not increased as the overall trip size is assumed to be larger and therefore requires additional management.

**This supervision level assumes that all guides or instructors have skills at the level of the NZOIA Canyon 2 qualification.
   Note: a guide or instructor with skills at the level of the NZOIA Canyon 1 qualification is considered an assistant guide or instructor in this type of canyon.

For more information on establishing levels of supervision, go to:
www.supportadventure.co.nz/safety-management-plans/clients

Parameters for sole guiding or instructing

Sole guided or instructed trips involve an increased risk of clients being inadequately supervised or spending extended periods of time in the canyon in an emergency scenario.

The increased risk of clients spending longer in the canyon in an emergency scenario is also present in trips with limited access to external emergency support. Sole guiding on these trips may not be suitable. For more information, see section 9.

Only sole guide trips where clients, guides or instructors, and the canyon rigging all enable a safe trip.

Assessing and informing clients on sole guided or instructed trips

When establishing parameters for assessing clients for a sole guided or instructed trip, factors to consider include:

- increasing minimum age requirements

- increasing technical ability or training requirements

- increasing psychological suitability requirements — such as high confidence in the canyon environment and likelihood to follow instructions.

Photo:Daniel Clearwater

Inform clients of the risk that they may be inadequately supervised and spend extended periods of time in the canyon in an emergency scenario. Inform clients how they can assist with managing these risks. This should include:

- emphasising the heightened responsibility sole guiding places on them

- emphasising the importance of following instructions

- training them in signals as required to assist with communication within the canyon

- training them how to maintain body temperature and how to use and access warmth sources

- training them in what to do if the guide or instructor becomes unable to assist them, such as instructing them to stay where they are, training them in how to call for outside help, instructing the group how to escape the canyon, and supplying a map showing escape routes.

Requirements for sole guides or instructors

Ensure that guides or instructors working sole guided trips are experienced and verified as competent to manage the trip alone. Factors to consider include:

- their level of experience and ability in the skills required for leading the trip, including managing emergency scenarios

- their degree of familiarity with the environmental particulars of that canyon trip

- their degree of familiarity with the operator's standard operating and emergency procedures.

Rigging canyons for sole guided or instructed trips

Ensure that canyon rigging allows clients to be supervised or contained in a safe place. Examples include using:

- stacked or tethered abseils

- clearly identified 'safe' areas

- additional safety attachments such as lanyards and hand lines.

Section 8: Equipment

Ensure that equipment is suitable and in good condition. Equipment choices should be based on:

- the canyoning activities on the trip
- identified hazards and associated management strategies
- emergency scenarios and response plans
- factors on the day such as guide or instructor skills, client ability, and environmental conditions.

This section looks at general use equipment, emergency equipment, and equipment maintenance, testing and inspection.

8.1 General use equipment

Use equipment according to manufacturer's recommendations and current industry use.

Use equipment that complies with relevant internationally or nationally recognised standards such as the International Mountaineering and Climbing Federation (UIAA), the European Conformity (CE), and the New Zealand and Australian standard (AS/NZS). Equipment should be manufactured specifically for rock climbing, abseiling, canyoning, or white-water.

This section looks at four key areas of general use equipment:

Photo: Mike Enright

- client equipment
- guide or instructor equipment
- life bearing ropes (excluding ziplines)
- anchors, bolts and rigging.

Client equipment

Correctly fit equipment as per the manufacturer's instructions. Check equipment for fit as suitable throughout the trip, e.g. before using a harnesses.

This section looks at client equipment for all trips, for trips requiring buoyancy, and for those requiring technical equipment for vertical environments.

Client equipment for all trips

Clients should have:

- Thermal clothing or wetsuits that are sufficient to protect clients from trip risks such as hypothermia, impact, and abrasion.
- A helmet designed for the most relevant significant hazard presented by the canyon, e.g. obstacles in white-water or falling rocks.

Client equipment for trips requiring buoyancy

On trips that expose clients to the risk of drowning, and where the risk is not managed by techniques such as clipping clients to fixed lines to keep them out of the water, ensure the clients' equipment

provides sufficient buoyancy for them to float. Equipment that provides buoyancy may include neoprene or a personal flotation device (PFD).

Use a PFD to provide buoyancy if moving water and features within it are assessed as significant hazards. Factors to consider include:

- the swimming ability of the client
- the likelihood of a client to be trapped by hazards such as the river bottom, hydraulics, recirculation, siphons, strainers, and hanging pools in waterfalls
- the aeration of the water – how much buoyancy can it provide?
- the likelihood of a client being flushed downstream or being in moving water for a long time.

Note: Use of a PFD should be considered to assist with managing shallow water landings, managing impact on the torso (such as during slides), and managing the ability to hold on to a person — such as when 'catching' a client at the exit of a pool and redirecting them away from a hazard.

Client technical equipment for the vertical environment

Technical equipment for the vertical environment will depend on the activities of the trip. It needs to enable hazard management and emergency response strategies to be carried out, and will often include a harness, descent device, carabiner/s, and a lanyard.

Guide and instructor equipment

Guides' or instructors' equipment recommendations are the same as those for clients, with the addition of:

- clothing sufficient to enable participation in emergency response, for example a dry top and thermal beanie
- a whistle suited to a wet environment
- a knife of a type suited to, and rigged in accordance with, the trip's emergency scenarios .

Life-bearing ropes – excluding ziplines

Choose ropes based on the expected use of the rope and the information in this section. Life-bearing canyoning ropes (excluding ziplines) are usually:

- in the 18–22kN range for rope breaking strength (mbs)
- static, low stretch, or semi-static
- kernmantle or braid-on-braid design
- compliant with one of the following standards: EN 1891, AS4142.3, AS4142.2, ANSI Z133, CI1801.

For information on rope length, see <u>section 8.2</u> 'emergency equipment for vertical environments'.

Anchors, bolts, and rigging

Ensure anchor construction, rigging, and bolting is carried out by a person competent to do so and follows these recommendations:

- one point anchors should only be used if deemed a 'bombproof' anchor
- rigging of multipoint anchors should result in load sharing

- bolt anchors should have at least two bolts where they are expected to hold a fall or a two-person load
- bolt diameters and types should be suited to the rock in which they are placed and be able to support normal operational and emergency use; e.g. using bolts and hangers rated to 22KN for life-bearing loads
- anchors should be placed where they can be protected from expected floods and debris – if this protected placement is not possible, the anchor should be identified as a hazard and monitored within the operator's hazard management system
- metal should be preferred over webbing or rope in permanent anchors, or those which are left in place for extended periods of time – if it is not practicable to use metal, the use of webbing or rope should be identified as a hazard in the operator's hazard management system
- rigging and rope systems should be protected from sharp edges or particularly abrasive surfaces.

Additional information and expert advice on bolting in the natural environment is available through the New Zealand Canyon Guides, New Zealand Mountain Guide Association, the New Zealand Alpine Club, and New Zealand Outdoor Instructors Association. Information on bolts and fall arrests can also be found in AS/NZS 4488 and AS 1891.4.

Information on good practice anchor construction can be found in the book *Climbing Anchors* by John Long.

8.2 Emergency equipment

This section includes information on the accessibility of emergency equipment, general emergency equipment and first aid supplies, and emergency equipment for vertical environments.

Accessibility

Ensure that trip emergency equipment is suitably available and accessible. The nature of the canyon trip and environment will determine whether equipment is attached to the guide or instructor's harness, carried in a backpack, and/or cached in the canyon.

Note: packs used to carry gear in canyons where water is a significant factor should have flotation.

General emergency equipment and first aid supplies

Ensure that emergency equipment is sufficient and suitable for managing group safety and chosen based on identified emergency scenarios. The following items should be considered:

- throwbags
- shelter and heat sources such as space blankets, heat packs, bothy bags, ground insulation, high energy food, and additional thermal clothing
- a diving mask
- pliers
- a length of hollow tube – for breathing assistance in submersion scenarios
- a backboard or stretcher – consider including rated attachment points for hauling and helicopter strop use, and stationing it strategically within the canyon.

First aid supplies

Ensure that first aid supplies are suitable for the identified first aid scenarios of the trip. Suggestions for first aid kit contents can be found at www.supportadventure.co.nz/other-resources#firstaid

Vertical environments

Ensure that there is equipment available to manage emergencies on the most technical or longest vertical pitch, e.g.

- for canyons with committing abseils without escape — static rope/s equalling twice the length of the longest non-avoidable abseil, and potentially some extra length as backup

- webbing

- hardware such as carabiners, descent devices, ascent devices and a hauling or progress capture device.

When choosing hardware consider rope types and whether they are likely to be wet or dry; particularly when considering mechanical rope grabs versus prusik cord.

8.3   Equipment maintenance

Maintain, inspect, and test equipment regularly and thoroughly enough to ensure its reliability. This section makes recommendations on:

- establishing maintenance, inspection, and testing schedules

- proof testing of bolts and other fixed anchor points.

Pay particular attention to safety equipment that is permanently installed, or that is left set up for extended periods of time, e.g. anchors, bolts, ropes, webbing, and cables.

Where a site has multiple users, it is recommended to share information and responsibilities on shared equipment maintenance, inspection, and testing. Keep records of equipment information as per the recommendations in the equipment section of www.SupportAdventure.co.nz

Additional information on equipment inspection can be found at www.aspiring.co.nz. Although it is designed for situations outside the scope of this guideline, useful information on equipment, maintenance, testing, and inspection can be found in the *Industrial Rope Access in New Zealand; Best Practice Guidelines.*

Establishing maintenance, inspection, and testing schedules

Inspect equipment before it is used. Focus on identifying any major issues that could affect the performance of the equipment, and any other issues that require testing or maintenance.

Ensure ongoing maintenance, inspection, and testing techniques and schedules are consistent with manufacturers' recommendations and reflect factors such as:

- normal operational wear and tear

- operational incidents such as exposure of ropes to sharp edges or emergency loads

- anticipated emergency loadings

- environmental factors such as the nature of the rock supporting a bolt or anchor

- time elapsed since the last check

- exposure to environmental factors that could have damaged the equipment, e.g. sea spray, rockfall, freeze-thaw action, avalanche, or flooding.

Ensure inspection includes concealed components such as those in protective sleeves; e.g. anchors around trees that are wrapped in protective material.

Proof testing of bolts and other fixed anchor points

Through-bolted engineered anchors do not require testing and, in fact, should not be tested. These anchor types do, however, require maintenance and periodic inspection by a competent person in accordance with the designer's specifications. This competent person will usually be a chartered professional engineer.

Proof test bolts and other non through-bolted engineered fixed anchors such as posts (or obtain evidence that they have already been tested). Examples of proof testing techniques include the use of load cells.

Conduct a risk assessment to determine when proof testing should occur, if sampling is suitable and, if so, what sampling schedule should be used. The risk assessment should consider factors such as:

- anchorage type, such as chemical or friction

- frequency of use

- exposure to environmental factors

- years in service

- expected wear and tear.

If sampling is used, ensure that it is sufficient to give assurance of overall anchor and equipment reliability and does not extend beyond six years between tests for any particular anchor. This maximum time frame aligns with the Department of Conservation's backcountry structure proof testing regime.

Ensure that anchors are able to support a 22KN load. When proof testing anchors, use test loads 50% of the strength limit state capacity of the anchors, e.g. to check an anchor is sufficient for a 22KN load, test to 12KN and, if the anchor has multiple legs, test each leg to 6KN.

Note: do not test legs to less than 6KN due to the difficulties of accurately predicting load sharing between linked anchor legs.

When proof testing anchors, ensure that:

- testing is done with certified and calibrated equipment and by a competent person

- proof test loads are applied gradually and held for at least two minutes — a positive test will show no signs of the anchor yielding or reduction of the load applied.

Using load cells to apply an axial pull is a practicable test for bolts. However, it may not be a practicable test for other fixed anchors such as pickets or posts. Other testing options include loading anchors in shear. If testing anchors in shear, ensure that:

- loads are applied in the direction the anchor will be used

- loads are sufficient (friction will decrease the load) — options include using a load cell in between the anchor and the load

- anchor movement is measured against a fixed point — use a measuring device such as a dial gauge that indicates movement in at least millimetres increments – a positive test will show no deformation of the anchor and no movement at ground level**.

Additional sources of information and experts on bolt testing and load cell use include industrial rope access companies and engineers.

* These recommendations are based on engineering advice.

**It is acknowledged that some anchors may show marginal movement at ground level and still be able to safely support a 22KN load. If an anchor shows movement at ground level, seek expert advice or treat the test as a fail.

Section 9: Emergencies

Develop clearly documented and practised procedures for the full range of emergencies relevant to their operation — from incident management through to crisis response.

Train staff and ensure that suitable equipment is available to manage each identified emergency scenario. For information on staff competence, see [section 6](#). For information on emergency equipment, see [section 8.2](#).

Trip monitoring and communication procedures are key components of your safety management system. They feature in both normal daily procedures and procedures for managing emergencies. They are addressed in [section 5](#).

This section looks at good practice for accessing suitable external emergency support.

9.1   Accessing emergency support

Ensure that suitable external emergency support is available within a planned period of time; ideally within daylight hours. This period of time should be specified within the operator's emergency procedures.

Emergency planning and procedures should consider factors that could impact on the availability of suitable external emergency support. These include:

- the ability to call for external support from within the canyon
- the type of external emergency support required by each emergency scenario
- canyon access and evacuation options
- capacity and ability of local rescue resources such as other canyoning operations and community rescue agencies.

9.2   Contingencies

Where access to suitable external emergency response is limited, groups may spend longer in the canyon in an emergency scenario. This risk needs to be managed, using strategies such as:

- informing clients of the risk of a prolonged stay in the canyon in the event of an emergency
- increasing client assessment requirements
- finishing trips early in the day to allow time for an overdue trip response and rescue
- training with rescue response personnel, particularly on using canyon access and escape routes
- permanently rigging access and escape routes and storing evacuation equipment in the canyon
- using more experienced guides or instructors and ensuring they are competent to manage the emergency scenario for an extended period of time
- taking extra care throughout the trip and considering excluding avoidable higher risk activities
- considering running only multiple guided or instructed trips — particularly for Level 2 canyons
- having resources available to maintain group safety for an extended stay in the canyon, such as

food, warm clothing, and heat sources.

For more information on developing procedures for emergency management, go to:
www.supportadventure.co.nz/safety-management-plans/emergencies

Section 10: Safety System Reviews

Regular internal and external safety system reviews or audits are a crucial part of running a safe canyoning operation.

Canyoning operations are required by the Adventure Activity Regulations to undergo an external audit against the Safety Audit Standard before beginning operating, and then at regular intervals. To see the audit standard, go to: www.business.govt.nz/safety audit standard for adventure activities – requirements for a safety audit of operators

Conduct an internal, and potentially external, safety system review after an incident that caused serious harm, or might have.

Schedule internal reviews as part of the yearly safety routine — before and after the busy season are often good times. Reviews should check that:

- safety systems and procedures are aligned with the recommendations in this guideline and are at or above industry good practice
- the safety management plan accurately reflects the operator's systems and procedures
- everyone in the operation follows the agreed safety systems and procedures.

One person should have responsibility for ensuring that reviews take place, but everyone in the operation is responsible for being part of the process.

Record the process and the results, and share any relevant learning with staff and other canyoning operators.

> For more information on safety system reviews, go to:
> www.supportadventure.co.nz/safety-management-plans/checking-your-systems

Appendix: Health & Safety Terms

The guideline uses several terms you need to understand to be sure you comply with the health and safety legislation. This appendix looks at those terms, and what they mean for managing hazards.

The terms are:

- practicable steps

- hazards and significant hazards

- serious harm.

All practicable steps

The health and safety legislation says you must take all practicable steps to safely provide adventure activities. You must take all steps that are reasonably practicable in the circumstances considering:

- the nature and severity of any injury or harm that may occur

- the likelihood of that harm occurring

- how much is known about the potential harm and the measures for eliminating, isolating or minimising the hazard from which the harm may arise

- the availability and cost of those measures.

Note: The 'circumstances' are those that an operator knows about, or ought reasonably to know about, taking into account good practice and knowledge throughout the adventure and outdoor sector.

The operator is responsible for balancing the likelihood and seriousness of potential harm against the cost, effort, and effectiveness of measures.

Where there is a risk of serious or frequent injury or harm, a greater cost in the provision of safeguards may be reasonable. If there are significant hazards and the measures are too expensive, unavailable, or ineffective, the only reasonable safeguard might be to cancel the activity.

Any judgement of whether a safeguard was reasonably practicable will take into account good practice and knowledge throughout the industry.

> The SupportAdventure website has a guide – 'Health and Safety Act Made Easy'
> www.supportadventure.co.nz/health-safetylegislation/health-safety-act-made-easy

Hazards and significant hazards

The Act says an adventure activity operator must take all practicable steps to systematically and regularly identify, assess, and manage significant hazards. Hazards that are not significant also need to be managed and this process may be applicable to those hazards too.

'Hazard' describes a danger or a potential source of danger. It is anything that does or could cause

harm including harm due to exposure to the hazard over time. So a hazard may be:

- always present, such as a sharp edge that may injure or snag a client or equipment
- potentially present, such as water levels that might rise after rain, or guide fatigue.

'Significance' is a combination of the likelihood of the potential harm and the seriousness – how bad the harm could be if it occurs, even if it is unlikely to happen.

The Act defines 'significant hazard' as a hazard that does or could cause:

- serious harm; or
- harm due to exposure over time; or
- harm that does not usually occur or become apparent until a significant time after exposure to the hazard.

Note: A hazard may include a person's behaviour including the effects of drugs and alcohol use, and physical or mental fatigue.

> For more information on hazards and hazard management go to
> www.supportadventure.co.nz/safety-management-plans/hazards

Serious harm

Harm is illness, injury or both, and includes physical and mental harm. Serious harm is death, or harm of a kind defined to be serious for the purposes of the Health and Safety in Employment Act 1992. The Act does not give a simple definition of serious harm, but gives examples including:

- death
- conditions that result in permanent loss of bodily function, or temporary severe loss of bodily function such as eye injuries or bone fractures
- loss of consciousness from lack of oxygen
- harm that requires hospitalisation for 48 hours or more.

Hazards that could result in harm other than serious harm also need to be managed. The most common minor injuries associated with climbing on artificial structures are sprains due to poorly managed landings, soft tissue injuries associated with a lack of warming up before climbing, poorly managed climbing and pre-existing injuries. Managing the hazards associated with these injuries reduces the likelihood of both minor injuries and unexpected serious harm.

> To read the Health and Safety legislation definition of serious harm go to
> www.supportadventure.co.nz/health-safetylegislation/health-safety-act-made-easy