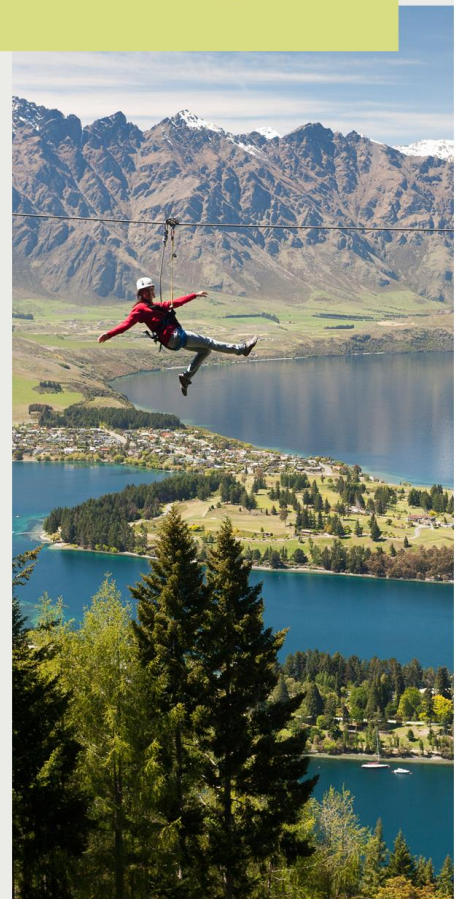


ASG

Activity Safety Guideline

High Wire and Swing



May 2018 Version 3

SupportAdventure.co.nz

SAFETY SYSTEMS DRIVEN BY SAFETY CULTURE

Preface

This High Wire and Swing Activity Safety Guideline is published by Tourism Industry Aotearoa with support from WorkSafe New Zealand. The guideline was facilitated by Tourism Industry Aotearoa and was developed in association with high wire and swing 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 High Wire and Swing Activity Safety Guideline is a web-based document and will be reviewed and updated from time to time. 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 wide variety of activities provided by these sectors is referred to broadly as adventure activities and includes activities provided by adventure tourism operators and outdoor education centres. More information about adventure activity safety guidelines can be found at www.supportadventure.co.nz/about-site-and-government-safety-review.

TIA, WorkSafe, and the New Zealand commercial high wire and swing 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.

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Version 3

Changes from version 2.1	Where
General edit	Throughout
Clarified zipline / flying fox height	1.5: The Legislation and Appendix 3
Added a note on practising rescues	2.2: Managing risks
Added information on: <ul style="list-style-type: none"> Reporting notifiable events Incident trend analysis 	2.5: Incident reporting and learning
Expanded the causes of serious injury	3: The Most Significant Hazards
References to EN 15567-1 and EN 15567-2 updated	4.1: Standards
Added specific via ferrata information	4.2, 4.3, 5.1, 5.2, 8.3, 8.5, 11.1, 11.5
Added information on zipline magnetic braking systems	4.2: Design and build of high wire and swing activities
Expanded the guideline on inspections Added information on magnetic braking systems inspections	4.3: Facility maintenance, testing, and inspection
Expanded the maintenance information on interlocking lanyards	5.4: Equipment maintenance, testing, and inspection
Expanded information on using assistants	8.4: Using assistants to help manage safety
Changed the age that operators commonly require guardian consent to under 18 years	9.1: Ensuring clients are suited to the activity
Modified the minimum age information for children belaying under indirect supervision	10.3: Supervising clients belaying
Added a client belaying and supervision matrix	10.4: Client belaying and supervision matrix
Expanded what should be reviewed	13.2: What to review
Updated health and safety terms	Appendix 1: Health and Safety Terms and throughout the ASG
Referenced relevant zipline guidelines	Appendix 3: Flying Foxes

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Other publications

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

This guidance contains public sector information published by WorkSafe New Zealand, which is subject to Crown copyright (2010).

This guideline refers to the European standards 15567-1:2015 and 15567-2:2015, the UK Ropes Course Guide third edition – March 2011, the Association for Challenge Course Technology Standard for Challenge Courses and Zipline Tours, and the Australian standard 2316.1:2009. Ensure you're using the current versions.

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Definitions

This guideline assumes the reader has technical knowledge of this activity; it 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.

Active braking

A braking system that in order to stop safely, requires a person to actively participate once travel has begun.

Belay system

The physical system to which clients are attached to prevent them falling from height or impacting against objects at speed. There are many belay systems including lanyards, top rope belaying, and swing or zip-line client attachment systems.

Client

A person (participant) for whom staff are responsible, who takes an active role in an adventure activity but is not in a leadership or supervisory role.

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.

Continuous line system (may use rails or cable)

A safety line system that does not require the participant's connection to the safety line to be undone or changed in order for them to progress through the activity or activities.

Critical component

A component of an activity or structure of which a failure is likely to lead to a notifiable event.

Critical connection system

Another term for a belay system.

Direct supervision

Is when the person supervising is in a position to be able to physically intervene and proactively manage anticipated risks.

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.

Health and safety terms

See [Appendix 1](#) for an explanation of the terms *hazard*, *significant hazard*, *reasonably practicable*, *harm*, *risk*, *serious risk*, *notifiable event*, and *notifiable injury*.

Incident

An event that caused or could have caused harm.

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 risks should they develop. There are two types of indirect supervision – proactive and reactive:

- **Proactive indirect supervision** is where the supervising staff member is actively monitoring the client and is in a position to provide verbal assistance to intervene and manage risks should they develop.
- **Reactive indirect supervision** is where the supervising staff member is in a position to communicate verbally and provide assistance to a participant when sought but may not be actively monitoring the client or provide pre-emptive assistance.

Interlocking lanyards

Interlocking lanyards use two clips to attach to the safety line and are engineered so that only one clip can be undone at a time. Some use mechanical systems to achieve this and others use magnets. Some are also engineered so they can only be attached to a certain safety line.

Operator

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

Passive braking

A braking system that does not require a person (staff or client) to actively participate, once travel has begun, in order to stop safely.

Qualified

A person who holds a current nationally recognised qualification.

Risk assessment

A process undertaken by a competent person to identify risks, and to assess them according to their significance.

Safety critical task

A task which if performed incorrectly will likely lead to a serious injury.

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, eg SMP, SOPs, Activity Plans, staff records.

Sector

New Zealand adventure tourism and outdoor education providers, support organisations and associations. A specific part of the sector may be referenced, eg the high wire and swing sector.

Staff

Employees, contractors or volunteers who work for an operator as instructors or guides and are responsible for the safety of clients undertaking high wire and swing activities.

Standard operating procedures (SOPs)

Written information outlining how an operator plans to conduct a particular activity or task.

Technical advisor

A person who has professional credentials such as a high-level, nationally recognised qualification, or extensive knowledge, skills, and experience to assist an operator with various technical tasks, including advising and reviewing the policies, procedures, and practices relating to an activity.

They can be from within the organisation or external to it.



Section 1: Introduction

1.1: What this guideline covers

The guideline describes what high wire and swing operators and technical experts consider is good practice for actively managing safety in providing commercial high wire and swing activities in New Zealand.

High wire and swing activities referred to in this guideline include:

High ropes, ziplines, swings, and other activities involving climbing¹, traversing, or swinging² that rely on some form of belay or critical connection system and a supervisory system to manage participant safety, and where a fall could cause serious injury.

This guideline covers activities that meet this high wire and swing definition, whether or not they're advertised specifically as high wire and swing activities.

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

This guideline is written for commercial high wire and swing 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 high wire and swing activities, such as trainers and people involved with providing non-commercial high wire and swing activities.
- Activities other than high wire and swings that involve similar risks, hazards, and techniques.

This guideline focuses on preventing death and serious injury. It identifies common significant hazards that clients, and the guides or instructors who lead them, may be exposed to during high wire and swing activities. It makes recommendations for managing these hazards.

Low ropes activities aren't within the scope of this guideline as they don't use a belay or critical connection system. However, the oft-quoted concept that no controls are needed where a person faces a three-metre fall or less is incorrect. Manage the risk of falling any time a person could be injured if they fell. The most common form of managing falling in low rope activities is spotting. However, operators should consider padding fall zones for higher elements such as *The Wall*. For information on padding fall zones, see *the Indoor Climbing Activity Safety Guideline*.

¹ The climbing within the scope of this guideline is that done to access elements within a high wire facility or on via ferrata activities. For good practice recommendations on climbing on artificial structures such as rock climbing walls see the *Indoor Climbing Activity Safety Guideline* on www.supportadventure.co.nz

² Bungy jumping and other controlled vertical descent activities aren't within the scope of this guideline. For good practice recommendations on abseiling see the *Abseiling Activity Safety Guideline* on www.supportadventure.co.nz

Some activities may not meet the scope of this guideline but may still have potential to cause harm, eg smaller ziplines, often called ‘flying foxes’. Flying fox activities are common and therefore some safety guidance information has been provided in Appendix 3.

“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

1.2: Purpose of this guideline and the SupportAdventure website

This *High Wire and Swing Activity Safety Guideline* (referred to as ‘the guideline’) aims to provide practical recommendations for commercial high wire and swing operators to actively manage the safety of the high wire and swing 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 aren’t part of the health and safety legislation but following their ‘recommendations will help operators meet legal requirements to take all reasonably practicable steps to identify and manage hazards and risks.

An investigation into an accident may look at how well an operator followed this guideline.

1.3: Use this guideline to build safety

As an operator, you need to have a safety management plan that you use to manage health and safety. You also need to have standard operating procedures (SOPs) for each activity you provide.

This guideline provides good practice safety recommendations to help you develop your SOPs. Many of the section titles in this guideline will correspond with headings in your SOPs document. However, it’s important to consider all the recommendations in this guideline as you develop your SOPs. A significant hazard is often managed by a number of different strategies and, like your SOPs, using a section of this guideline in isolation could lead to missing important safety recommendations.

When developing your SOPs conduct a site-specific hazard assessment, consider the recommendations in this guideline, and add the relevant procedures to your SOPs. Note that where this guideline gives examples, they aren’t exhaustive – think of other examples that could apply to your specific activity.

It’s acknowledged that hazards can be managed in ways other than those recommended in this guideline and achieve at least the same level of safety. Before operating in other ways, seek advice from a high wire and swing technical expert or other competent person. You will need to be able to justify why you use a different method from the guideline.

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

The responsibility for making safe decisions remains with the operator.

1.4: The New Zealand high wire and swing sector

The different aspects of the sector

High wire and swing activities in New Zealand occur within both the outdoor education and adventure tourism sectors. The sector is innovative and varied and includes activities such as high ropes courses, ziplines, canopy tours, via ferrata, and swings.

Different operations are distinguished by:

- The activity they offer.
- Whether they're providing primarily learning outcomes or recreational experiences.
- Whether they rely on clients to perform safety critical tasks.

The high ropes part of the sector has been established for a long time. There are a small number of staff training providers and design and build advisors who are involved across NZ. This helps information sharing across operators. The high ropes sector is well connected with the Association for Challenge Course Technology – an internationally used, US-based association.

The adventure park element of the sector is relatively new to New Zealand and has seen rapid growth over recent years. It's estimated that the sector provides activities to well over 400,000 clients each year. Operators have formed a group called New Zealand Adventure Parks Embrace Safety (NZAPES) and share safety information including operational procedures and requirements for staff competence. NZAPES is strongly connected to the European adventure park sector.

The zipline and canopy tour part of the sector is also fairly new and has seen rapid growth over recent years. Some operators have a strong connection with the international zipline sector. However, New Zealand operators haven't been well connected to each other. The standalone zipline or flying fox activities are an older part of this sector and commonly occur in holiday parks and similar operations as an activity alongside their core business. This group isn't well connected with the rest of the high wire and swing sector.

There are a handful of permanent purpose-built swings in New Zealand, several of which provide activities to a large number of clients. Operators haven't been particularly connected as a group. Swings that are set up for one-off use, such as bridge swings, are generally provided as part of a broader outdoor programme, and operators are more likely to be connected to the high ropes part of the sector than to the operators of permanent swings.



The sector today

The sector provides educational and recreational activities for many hundreds of thousands of people each year.

There have been some incidents, including a fatality, at adventure parks in recent years. This led to NZAPES members moving away from using traditional style lanyards under reactive indirect

supervision, and towards using continuous lines or interlocking lanyards. This significant shift in safety management has been incorporated into this guideline. Operators are making the transition as fast as is practicable and, in the interim, are using additional safety management techniques such as increased levels of supervision, to help protect clients from making errors using traditional lanyards.

There are no nationally recognised qualifications specifically for high wire and swing activities, although there is a broader qualification which covers many of the recommended competencies — the National Certificate in Outdoor Recreation (Instruction) - Adventure Based Learning. The Association for Challenge Course Technology (ACCT) certification scheme has been influential in shaping the skills of the high ropes course part of the sector, and many staff training programmes have evolved from the scheme. The NZAPES group has been supporting each other in establishing staff competence requirements and verification systems.

The different parts of the high wire and swing sector haven't been particularly well connected. However, it's a growing and innovative sector and the development of this guideline was welcomed as an opportunity to come together and share safety information.

1.5: The legislation

Commercial high wire and swing operations, as with all workplaces, are subject to health and safety legislation.

Health and safety legislation that applies to commercial high wire and swing operations includes:

- The Health and Safety at Work Act 2015 – referred to in this guideline as *the Act*.
- The Health and Safety at Work (Adventure Activities) Regulations 2016 – referred to in this guideline as *The Adventure Activities Regulations*. As a rule of thumb, this regulation applies to high wire activities if the participant is suspended more than three metres above the ground, that is, their feet are at least three metres from the ground. A more realistic test is whether the activities could cause a serious injury.
- The [Safety Audit Standard for Adventure Activities 2017](#)

High wire and swing activities that involve moving a participant using a motorised system are likely to be subject to the Amusement Device Regulations 1978.

The health and safety legislation uses both *operators* and *providers* to refer to people or organisations who provide activities such as high wire and swings. This guideline uses *operators* throughout.

The Adventure Activities Regulations

High wire and swing 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 serious risk to the participant's health and safety 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 injury or death 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

1.6: Use this guideline to help you pass safety audits

The Adventure Activities Regulations require high wire and swing operators to obtain and pass independent safety 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 an operator's SOPs must conform to good practice for the activity.

To view the Adventure Activities Regulations safety audit standard, go to:

[file:///C:/Users/admon/Downloads/WKS-17-safety-audit-standard-adventure-activities-operators-requirements%20\(10\).pdf](file:///C:/Users/admon/Downloads/WKS-17-safety-audit-standard-adventure-activities-operators-requirements%20(10).pdf)

This guideline sets out recommended good practice for commercial high wire and swing activities and will help operators and safety auditors assess whether an operator's SOPs conform to good practice.

Section 2: Risk Management Process

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

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

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

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.
- Consulting with other users.
- Reviewing standard operating procedures.
- Reviewing past incident reports and lessons learned.
- Studying maps and photographs where relevant.

Assess all hazards to identify which ones 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 risks

Manage risks according to the *eliminate, minimise* hierarchy of action. Due to the nature of ATV trips, many risks can't be eliminated and can only be minimised.

Risk management should reduce the risk of harm to acceptable levels, depending on the nature of the activity, client ability, and on current good practice.

Monitoring risks

Managing risks includes monitoring them for changes in their seriousness. A higher level of management, such as moving from minimising to eliminating, may be necessary if a risk increases in seriousness. For example, high winds may mean that a high wire or swing activity shouldn't take place, or a change in client group may require a shift from using a belay system that relies on clients to perform tasks to one that relies on staff only.

Practising rescues

Practising rescues for all the risks you identify should be done regularly, particularly for working at height risks. You should focus on staff safety as well as participant safety.

2.3: Managing the drugs and alcohol-related risk

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's being implemented.

To see the WorkSafe guidance document on managing the drugs and alcohol-related risks, 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 risks.

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.

For more information on staff competence, see [Section 8](#).

2.5: Incident reporting and learning

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

Incident-reporting systems need to be used effectively. Induction and ongoing training are vital but are only a part of ensuring 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.

The principle of continuous improvement requires scheduled review of a block of incidents to see if there are trends that should be addressed. Often, this will be part of an annual review, but larger operations will do this more frequently.

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

Ensure that [notifiable events](#) are reported to [WorkSafe](#). See [Appendix 1](#) for a definition note.

Section 3: The Most Significant Hazards

This guideline focuses on preventing death or serious injury. While all significant risks need to be managed, it's acknowledged that there are some that are more likely to be associated with death and serious injury than others. Ensure safety management strategies are focused on managing these risks and that this includes highlighting them in staff meetings and regular risk management reviews.

The most likely causes of serious injury in the high wire and swing sector are falling from height and colliding with objects in the line of travel, followed by entrapment and prolonged suspension trauma.

The hazards considered most likely to contribute to these are:

- Staff error, particularly when attaching participants to safety systems, using technical operational systems, or checking that travel pathways are clear.
- Client error, particularly when attaching to safety systems and using lanyards or belaying.
- Ineffective supervision, either an ineffective supervision system or staff error.
- Ineffective braking systems or anchors.
- Unsuitable facility or site design or build.

Good practice for managing each of these hazards involves a number of different strategies. When developing your SOPs, ensure you consider all the relevant recommendations in this guideline. Using a section of this guideline in isolation could lead to missing important safety recommendations.

Section 4: Design, Build, and Maintenance

This section contains recommendations from the New Zealand high wire and swing sector, and the health and safety legislation requirement to take all reasonably practicable steps to manage risks.

The information in this section shouldn't be considered all-inclusive. It's essential to carry out site-specific and activity-specific risk management processes, and for staff to conduct ongoing dynamic hazard identification, assessment, and management.

The high wire or swing structure itself has potential to cause death or serious injury from falls, collisions, entrapment, and suspension trauma due to unsafe traversing or swinging route design, landing on hard or uneven surface, or structural failure. Focus design and build safety management strategies on preventing these from occurring.

For recommendations on checking structures, see [Appendix 2](#).

4.1: Standards

The construction and safety standards most relevant for the high wire and swing sector are:

- The New Zealand Building Code.
- The European standard EN 15567-1:2015, which can be purchased online.
- The Association for Challenge Course Technology (ACCT) Challenge Courses and Canopy/Zipline Tours Standard – see www.acctinfo.org

This guideline refers to EN 15567-1 as it's a formally recognised international standard. However, the European and ACCT standards are very much aligned and high ropes operators are likely to find the ACCT standard very useful.

This guideline also refers to the *UK Ropes Course Guide third edition – March 2011 (UKRCG)*, published by the Adventure Activities Industry Advisory Committee (AAIAC). The UKRCG is a commented copy of EN 15567-1 and helps operators interpret and comply with that standard – see www.sportandrecreation.org.uk

These standards will be updated from time to time, so ensure you use the most current version.

Other standards

Other standards that are useful for design and build of high wire and swings include:

- *The Indoor Climbing and climbing on other artificial structures Activity Safety Guideline.*
- The Australian Standard 2316.1:2009 Artificial Climbing Structures and Challenge Courses.
- *Best Practice Guidelines for Industrial Rope Access in New Zealand.*

Where an activity involves a mechanical system to move people from a low point to a high point, it's likely to be subject to the Amusement Devices Regulations. Compliance involves approval by a mechanical engineer.

For more information, go to: www.legislation.govt.nz/regulation/public/2011/0234/latest/whole.html

4.2: Design and build of high wire and swing activities³

General facility

All building work in New Zealand must comply with the Building Code and you should also comply with the recommendations in EN 15567-1.

New Zealand building code, Verification Method B1/VM1 is a means of compliance. For loadings, it cites the Standards NZ Handbook SNZ HB 8630, based on AS/NZS1170, and includes loads for 'restricted load structures'. Use the handbook loads when they're more onerous than loads in EN 15567-1.

Discuss with your building consent authority (usually the local territorial authority) regarding consent requirements. Ensure that a structural engineer's producer statement is supplied for any critical components.

EN 15567-1 and UKRCG section 5. When building material standards are referred to, use the corresponding New Zealand standards (preferably those cited in B1/VM1). Ensure the constructor supplies instructions for maintenance and inspection (including frequency) as in the recommendations in EN 15567-1, section 7 and UKRCG, section 5, Obligations of the Constructor.

Design facilities to include safety systems for whenever a person is exposed to a fall that could cause injury. If using spotting to protect people close to the ground, consider padding the fall zone as in the recommendations in the *Indoor Climbing Activity Safety Guideline*.

Ensure the facility includes rescue or retrieval systems to enable the recovery of a client hanging in a harness within a safe time period.

The often quoted 'steel on steel' theory for choosing connectors on wire ropes under load is an option rather than a recommendation. Operators may choose to use alloy carabiners based on the fact that they're easier to monitor and discard than a safety wire. If using alloy carabiners, ensure they're noted as likely to wear quickly and that they receive suitably regular inspections. See [section 5.4](#) for information on inspection.

Plastic-covered wire ropes may be used for safety lines and critical components as long as:

- The lack of easy visibility of the wire is identified as a hazard.
- The sleeves are such that visually inspecting the wire is possible.
- Visually inspecting the wire is prioritised during operational inspections.



³ High wire and swing is a developing sector with potential for large variations in activities and therefore in structural requirements, which may require engineering advice.

- A low margin for error is used for replacement schedules.

For structures that involve a course or a journey and require clients to manage risks, ensure that:

- Activities are sequenced so that progressions are used to build up client technical skills – both for belaying and for undertaking the activity.
- Activities involving complex client-managed or assisted-belay safety systems are in areas that enable easy supervision.
- Activities with more complex rescues are located in accessible areas.

Where relevant, ensure colour-coded signage indicating more difficult activities or a decrease in supervision is consistent throughout the facility – the colours used are the operator’s choice. If activities are under direct or proactive indirect supervision, signage may not be necessary, but ensure clients are informed verbally and check for understanding.

Client safety attachment points

Client safety attachments include the attachments to a client’s harness and onto safety lines or components such as pulleys. Ensure that attachments and their associated critical connection points are:

- Compatible with the rest of the safety system.
- Designed to be used in a way that eliminates cross loading or engineered to allow for the resulting forces.
- Visible during operations, including points such as where the webbing of a lanyard or harness is attached to a carabiner.

Using trees

Use an arboriculturist to determine whether trees are safe to use as part of a high wire or swing structure. Ensure the assessment of the trees follows the recommendations in EN 15567-1 section 4.3.3.3.1.

Ziplines

Design of braking, retrieval systems, and attachment systems are a particularly important aspect of managing zipline safety. Inadequate braking or retrieval systems can result in serious injury due to impact, rapid deceleration, or suspension trauma. Inadequate attachment systems can result in serious injury from falls or entanglement.

When designing ziplines, follow the recommendations for general facility design and build and ensure that:

- There are two independent attachments between the client’s harness and the zipline cable.
- Braking and retrieval systems are independent and not conflicting.

- Ziplines that use active braking have a passive braking back-up system.⁴ Examples of passive braking include deceleration due to line sag, an impact absorption device such as a padded mat, or on-line deceleration devices such as bungees.
- Deceleration is managed at a rate that doesn't cause injury.
- Attachment, braking, and retrieval systems don't cause the client to become entangled in a way that could cause injury.
- Retrieval of a stationary client will occur before suspension trauma becomes an issue. For more information on suspension trauma, see [section 11.2](#).

Magnetic braking systems

Magnetic braking technology has been developed in recent years, eg by Headrush Technologies. The system automatically adjusts the resistance based on the weight of the rider. It's handsfree.

Swings

Inadequately designed swings can result in serious injury due to falls from height or impacts at speed. Follow the recommendations in this section in addition to those for general facility design and build.

Ensure that components of the swing that are influenced by the momentum created by participants allow for a minimum 3G force plus a safety factor of at least three. Components include items such as anchor points, fulcrums, ropes, lanyards, and connections.

Raised platforms and portable lifting structures may need to comply with the Building Act which means getting structural engineer producer statements of suitability for use. If they do aren't subject to the Building Act, a structural engineer's approval is still recommended.

It's acknowledged that swings may require custom-made equipment such as harnesses or lanyards.

Ensure that:

- Equipment has a supplier statement, or equivalent (such as from an engineer), to state that it's fit for purpose.
- Harnesses comply with the dynamic and static testing provisions set out in ANZS 1891 Specifications for Fall Arrest Harnesses. It's acknowledged that full compliance may not be possible due to factors such as labelling and unused additional safety connection points.

Design the system to ensure that anchors will remain secure as the direction of the load moves and that ropes are the correct length to travel through the planned trajectory.

Ensure that portable platforms used to load, launch, or unload participants are designed so they can be cleared from the swing's trajectory.

If using a bottom-loading system involving the lowering of ropes, ensure the system is designed so that ropes are re-set to the correct length before clients launch in their swing.

⁴ Passive-braking back-up systems aren't required for lowered zips (where a staff member lowers a client down a tracking line) because the client's journey is never solely gravity controlled.

Where motorised systems are used to move a client, ensure there is a back-up system in case of failure of the motorised system.

Via ferrata

Consider the following when designing the via ferrata:

- The rock type and environment that the staples will be in, eg epoxy glue-ins in soft rock, corrosion-resistant metal in coastal environments.
- Plan catch loops to avoid fallers hitting a stanchion.
- Ensure the rungs are closer together when the route steepens.
- Avoid downhill travel as much as possible.
- Plan guide rest points where the guide can step aside and observe.



Mobile platforms

Mobile platforms include activities where the client is on a sliding structure which transports them from one place to another. They present risks of falls from height, impact injuries, and entrapment of body parts in moving components.

Ensure constructors supply information on safe parameters for the weight of users and environmental conditions – heavy clients or wet conditions could increase speed.

Ensure braking systems allow safe deceleration – if active braking is necessary, follow the recommendations for braking systems as per ziplines.

If the system is such that if the mobile platform becomes jammed, the client can't otherwise make their way to the end, follow the recommendations for retrieval systems as per ziplines.



Belay systems for vertical travel

Falling while travelling vertically can cause serious injury if fall factors are too high or fall arrest systems don't effectively engage.

Top rope and counterweight belaying are the most common belay methods for managing clients travelling vertically. Operations that use lanyards as a primary belay tool and include vertical travel, commonly use rope/wire grabs on a shock-absorbing safety line system and self-retracting or continuous loop lines.

Design belay systems for vertical travel to ensure the maximum impact force on a person is no more than 6KN. Traditional top rope or counterweight belaying (if done correctly) meets this requirement. However, systems where clients belay themselves will require some consideration to ensure this requirement is met. Focus on ensuring lanyards, or the system they are attached to, have sufficient shock-absorbing capability.

Other factors to consider when designing belay systems for vertical travel include:

- Ensure devices are used within manufacturer’s recommendations and UIAA safety standards.
Note: Via ferrata falls could achieve a fall factor as high as five if the lanyard slides down the length of a cable segment.
- Check and test any rope/wire grab systems to ensure compatibility. Focus on delayed locking and ensure that fall velocity will be sufficient to activate the arrest mechanism – sloped surfaces may not meet this requirement.
- Ensure the route of travel is free of entrapment features on which the line could snag.
- Don’t use a system where clipping to fixed points could result in side loading of carabiners.

More information on fall arrest systems for vertical travel can be found through training agencies for working at height.

4.3: Facility maintenance, testing, and inspection

This section looks at conducting the facility’s initial test, and the maintenance, testing, and ongoing inspection of the overall structure and design of the facility. For information on maintenance, testing, and inspection of equipment, see [section 5.4](#). For information on ensuring the safety of staff working at height, see [section 8.5](#).

Conducting the facility’s initial test

Ensure the structure complies with the New Zealand Building Code and that this compliance includes the applicable elements of the EN 15567-1 initial check⁵. Conduct the initial check taking into account the recommendations in UKRCG section 6, and the recommendations in this section.

If making additions or major changes to an existing facility, such as replacing a tree with a pole, an initial inspection is required. However, if conducting minor works, such as replacing a cable or a rotten platform, it isn’t required.

The initial test recommended in EN 15567-1 includes:

- A visual inspection.
- A functional test.
- Design validation and structural analysis.
- Tree assessment (where applicable).

⁵ The checks required to be certified under the Amusement Devices Regulations 1978 meet the initial test requirements.

Using suitable persons to conduct the initial test

Conduct the initial inspection using an independent professional person, usually a structural or mechanical engineer.

The functional test requires comprehensive knowledge of the operation's high wire and swing activities and how they work. New Zealand has a small population and limited access to engineers with the required activity-specific knowledge, which means that engineers may need to use the services of a person with a comprehensive knowledge of high wire and swing activities. To protect against familiarity affecting hazard assessment, this person would ideally not have been involved in the facility design. Ensure that this person has knowledge of the relevant parts of EN 15567-1.

Ensure tree assessments cover the points in EN 15567-1 section 4.3.3.3.1 and are carried out by a competent arboriculturist.



The Association for Challenge Course Technology (ACCT) has developed an inspector certification to assist professional industry inspectors understand high ropes industry standards. For more information, go to: www.acctinfo.org

Regular maintenance, testing, and ongoing inspection

Ensure structure maintenance, inspection, and testing techniques and schedules are consistent with the constructor's instructions, and the recommendations in EN 15567-1.

When developing inspection schedules, consider the mechanical nature of devices, any environmental impacts on structures and equipment, and components concealed by protective sleeves. Regular inspections recommended in EN 15567-1 include:

- **Pre-activity inspections** every day the structure is in use. These are checks conducted from easily accessible locations and include visual checks of the structure for obvious faults and physical checks of safety equipment serviceability.
- **Operational inspections.** These checks should occur every one to three months, depending on structure usage and manufacturer's recommendations. They're more detailed inspections to check operation and stability of all equipment and wear on any components, particularly moving parts, anchor points, and belay points.
- **Periodic inspections.** These checks are to establish the overall level of safety of the structure and should occur at least annually⁶ even when a structure has low use. This is due to environmental

⁶ EN15567: Periodical inspections should be carried out at least each calendar year and with a maximum interval of 15 months by an inspection body.

effects such as wood cracking, steel rusting, and water pooling; movement caused by wind such as elements rubbing; and changing standards, eg staples in wood are no longer acceptable. Rock staples should be tested in a similar way to bolt anchor testing in other activities – see the *Canyoning, Caving, or Abseiling ASGs*.

Operators are required to notify WorkSafe NZ about undertaking hazardous work (such as working at height). This doesn't include work carried out from a ladder only, or maintenance or repair work of a minor or routine nature. For more information, see section 8 of the WorkSafe NZ *Best Practice Guidelines for Working at Height in New Zealand*.

Using suitable persons to conduct regular maintenance, testing, and inspection

Ensure that persons conducting inspections have operational knowledge of the system and the relevant parts of EN 15567-1.

If using operational staff members to carry out routine visual checks and operational inspections, there is a risk that familiarity with the site will affect hazard assessment. Consider conducting the checks in pairs and alternating the inspection role among staff.

Ensure the person conducting the periodic inspection has a comprehensive knowledge of the facility's activities. Ideally this person wouldn't have been involved in the design of the facility. However, it's acknowledged that New Zealand has a small population and a limited resource of relevant experts. Therefore, periodic inspections may be carried out by a person who was involved in the design of the facility. Consider and mitigate the risk of familiarity affecting hazard assessment.

Zipline magnetic braking systems

Follow the manufacturer's instructions regarding inspection. All devices and webbings should be visually inspected daily for wear, use, and safety. Depending on your device daily, weekly, and bi-annual inspection logs may need to be completed.

Annual recertification by an approved service centre is most likely required.

4.4: Preventing unsupervised use

Design or rig the facility to minimise the risk of public using it without adequate supervision. Ensure there are a minimum of two deterrents to unsupervised use.

If practicable, remove equipment such as access ways, ropes, and anchors. If this isn't practicable, consider locking access and activity participation systems in a way that prevents their use.

Ensure there is signage to warn people of the hazard and to tell them not to use the facility.

ANSI-ACCT: At a minimum this inspection [professional] shall be done annually.

QORF's AAS: ...an annual inspection.

Section 5: Equipment

5.1: Selecting equipment

Ensure that equipment is fit for purpose, in good condition and complies⁷ with relevant internationally or nationally recognised standards such as the International Mountaineering and Climbing Federation (UIAA) and the European Conformity (CE). Technical equipment should be manufactured specifically for climbing or high wire and swing type activities, unless it's generic such as first aid equipment.



Make equipment choices based on the recommendations made in this section, EN 15567-2:2007, and factors such as:

- The high wire and swing activities available at the facility, eg via ferrata activities have specialised equipment such as shock-absorbing lanyards and ergo-shaped carabiners.
- Activity and facility hazards and associated management strategies.
- Emergency scenarios and response plans.
- Other equipment within the system – ensure equipment is compatible.
- Factors such as staff skills, client ability, the requirements and parameters of the supervision system, and environmental conditions.

5.2: General use equipment

This section looks at client and staff equipment recommended for general use during all activities.

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

Client equipment

Ensure equipment is fitted as per manufacturer's instructions and that staff check the fit before use and as needed thereafter, such as after a client has adjusted their harness.

Ensure all clients have the following equipment:

- A method to connect the client to the belay system that is suited to the activity and supervision system and is aligned with the recommendations on client safety attachments in [section 11.3](#).

⁷ It's acknowledged that the high wire and swing sector includes unique activities that may require equipment to be custom made or used in ways other than those specified within the manufacturer's recommendations. Ensure equipment is fit for purpose by obtaining an appropriate professional's evidence-based report, such as an engineer's report, and that this includes inspection and maintenance advice.

- Footwear of a type that enables movement and balance as required by the activity and is unlikely to fall off. Use closed-toe footwear if clients' feet may be exposed to injury. For via ferrata, use boots with a pronounced tread to minimise the risk from slipping off the staples.
- Clothing sufficient to protect clients from risks such as hypothermia, impact and abrasion.

Consider equipping clients with helmets based on the risk of pendulum impacts against hard surfaces or objects falling from above. For via ferrata, helmets are standard.

Ensure each client has a harness suited to:

- The way in which they will be suspended.
- Their body shape.
- The likelihood they may invert while participating in the activity.
- The impact the harness will need to absorb.

Harness options include a waist harness, a waist harness plus a chest harness, a full body harness, or harnesses with attachment points at the back. Ensure the harness is correctly fitted as per manufacturer's instructions and, where appropriate, that the client knows how to check the security and fit of the harness themselves.

Staff equipment

Staff equipment recommendations are the same as those for clients, with the addition of:

- A harness with gear attachment options. Consider the staff member's role in emergency scenarios when choosing a harness.
- A locking carabiner – how many will depend on operational systems and emergency scenarios.
- A lanyard with shock absorbing ability or other personal fall restraint or arrest system, unless the staff role, including in emergency scenarios, doesn't involve being exposed to edges or falling from height.

For information on staff equipment for working at height, see [section 8.5](#).

5.3: Emergency equipment

Accessibility of emergency equipment

Ensure that facility emergency equipment is suitably available and accessible. When deciding whether the equipment should be on a staff member's person or cached on the premises, consider the operational system of the activities on offer, the supervision system, and identified emergency scenarios.

General emergency equipment and first aid supplies

Ensure that emergency equipment is sufficient and based on identified emergency scenarios and their management, particularly those involving the highest and most technical activities.

Consider scenarios such as:

- Accessing a client from every part of the facility, such as from above, below, or traversing through elements of the facility.
- Lowering or raising a client to safety from any part of the facility and within time periods that avoid suspension trauma.
- Releasing the client once they've weighted a safety system, such as by using the existing safety system or transferring to another including using cutaway rescues or mechanical advantage hauling systems.
- Maintaining a client's safety while managing an issue with their primary safety attachment system.
- Retrieving a client should they stop moving through the element before the next standard stopping point, particularly for ziplines and activities that move clients using mechanical systems.

Equipment to consider includes:

- Lanyards.
- Hardware such as locking carabiners, descent devices, pulleys, ascent devices, and hauling or progress capture devices. Consider friction requirements when choosing belay devices.
- Slings. For improvised client attachment systems, anchor building, or supporting clients to help manage potential suspension trauma.
- Rope. A length suitable to manage the highest relevant emergency scenario.
- A light source. Consider daylight hours and ensure sufficient light source is available to manage emergency scenarios
- A knife or scissors suitable for cutting rope.
- Pliers or a spanner.

First aid supplies

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

5.4: Equipment maintenance, testing, and inspection

Ensure maintenance, inspection, and testing techniques and schedules are consistent with manufacturer's recommendations and EN 15567-2⁸, and reflect factors such as:

- Normal operational wear and tear.
- Operational incidents such as exposure to emergency loads.
- The mechanical nature of devices.

⁸The recommendations for regular maintenance of general equipment in EN 15567-2 are the same as those for the overall structure or facility in EN 15567-1. See [section 4.3](#) of this guideline for more information.

- Anticipated emergency loadings.
- Environmental factors such as exposure to high winds or ice.
- Time elapsed since the last check.

Ensure inspections include concealed components such as those in protective sleeves.

Interlocking lanyards have been used for a few years now in New Zealand. They require routine checks, mainly for smooth operational purposes, but the checks also cover their safe operation.

Initial maintenance is low with new devices but increases with the life of the device, client numbers, and weather conditions. It's usually for small operating parts that don't affect the default safety function of the device. Conduct regular inspections.

If critical safety connections are disassembled for inspection, ensure that more than one person is involved with checking that they're reconnected correctly.

Keep records of equipment usage and information as recommended in EN 15567-2.

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

Using suitable staff to conduct maintenance, testing, and inspection

Ensure that staff conducting inspections are competent to do so and have operational knowledge of the system and the relevant parts of EN 15567-1.

Options for verifying competence include qualifications that cover knowledge of the equipment being inspected, or in-house training and assessment conducted by a suitably competent person. For more information on verifying staff competence, see [section 8.2](#).

If using operational staff to carry out inspections, there is a risk of familiarity with the site affecting their hazard assessment. Consider conducting the inspection in pairs and alternating the inspection role among staff.

Periodic inspections may be carried out by a person who was involved in the design of the course. Consider and mitigate the risk of familiarity affecting hazard assessment.

For information on ensuring the safety of staff working at height, see [section 8.5](#).



Photo: Adrenalin forest

Section 6: The High Wire & Swing Environment

All high wire and swing activities occur at height, and managing the associated risk is a focus of every section of this guideline. There are, however, other factors of the high wire and swing environment that could cause serious injury.

The information in this section shouldn't be considered all-inclusive. The significance of environmental hazards varies from one site or facility to another. It's essential to carry out facility and activity specific risk management processes, and for guides and instructors to conduct ongoing dynamic hazard identification, assessment, and risk management.

6.1: Distraction of staff

High wire and swing activities are often conducted in environments where there are many distractions for staff, eg multiple activities happening at once, spectators, high numbers of clients, and a lot of noise.

Ensure staff are aware of and can identify distraction hazards and that they understand the importance of focusing on safety tasks. For more information on staff see [section 8](#).

6.2: Operating above other activities

Some high wire or swing activities operate above other commercial adventure activities or in areas used by the public. This brings the risk of people being hit by falling objects or being hit by clients participating in the activity.

Use safety management strategies based on the associated risk.

Options include:

- Ensuring that other users are aware of the high wire or swing operation. Use signage for public areas.
- Managing the risk of being hit by falling objects as in [section 6.3](#).
- Ensuring there is sufficient clearance below activities so that emergency services can access the site, and so that clients won't affect other people or disrupt safety procedures for other activities.

High wire or swing structures may affect flight paths. Assess this risk and mark any relevant parts as per Civil Aviation Authority recommendations.

6.3: Being hit by falling objects

Falling objects can be a significant hazard and have the potential to injure large numbers of people without warning, eg natural items such as branches, rocks or vegetation; and human-related items such as equipment, cellphones, and bags.

Assess and monitor the facility for the likelihood of falling natural items. Consider the type and quality of the trees, rock, and vegetation at the top of and above the facility. Monitoring should be based on the associated risk.

Options include:

- Choosing a different site.
- Cordoning off areas at the top of the facility where there are loose items such as stones or debris.
- Stabilising loose material. This may be simple or quite complex such as using experts to stabilise or remove loose rock or unstable trees or branches.
- Wearing helmets.

Strategies for managing risks involved with human related falling objects should be based on the seriousness of the risk.

Options include:

- Ensuring the fall zone is clear of people.
- Placing loose equipment back from the edge or attaching it so that it can't fall.
- Ensuring clients and staff near the edge don't carry loose items such as cellphones or cameras that could fall and injure others.
- Wearing helmets.

6.4: Change to hazards

Significant natural events such as strong wind and earthquakes may affect known hazards at a facility or create new hazards. Check the facility after such natural events, record any changes, and notify relevant staff and other users of the facility.

Standard use of the facility may also change hazards. For maintenance and inspection recommendations see [section 4.2](#).

Changes to safety systems, equipment, or operating procedures may also create hazards. Ensure that changes are aligned with the recommendations in this guideline, including the recommendations for proof testing and pre-use checks by suitably competent people.

6.5: Extreme weather and other natural events

Participants can be exposed to the effects of weather events such as high winds, ice, snow, lightning, or other natural events such as earthquakes. These can contribute to people falling from height due to disruption of safety procedures and damage to safety critical equipment or structures.

Ensure guides and instructors know the risk of hazardous natural events associated with the facility and how to plan for, monitor, and react to events should they occur.

Strategies for managing hazards associated with natural events should be based on the associated risk.

Options include ensuring that guides and instructors know:

- The local hazardous weather patterns and indicators such as relevant forecasts and visual signs.
- How and when to cancel the activity due to natural event concerns, such as cut-offs for strong winds.

- The effects of natural events on the performance of equipment, such as friction devices in wet or icy conditions, snow or ice on cables or ropes, wind blowing ropes or other lines, slipperiness of surfaces, and stability of footing.
- The procedures for dealing with a natural event on site, such as how to manage the safety of the people at height, safe waiting areas and evacuation routes
- Which structural aspects of the facility are most likely to be unsafe during or after a natural event, including knowledge of hazards such as trees falling on cables.
- The procedures for managing injuries related to hazardous natural events associated with the facility, such as lightning strikes.

6.6: Extreme temperature

High wire and swing activities can involve the risk of people being without shelter or shade for extended periods of time. If the temperature is particularly cold or hot, this can lead to people struggling to safely participate in activities and becoming hypothermic or hyperthermic.

Strategies for managing the effects of temperature should be based on the associated risk.

Options include:

- Ensuring that people are equipped for the expected temperatures.
- Training guides and instructors to recognise and manage extreme temperature hazards.
- Carrying and using extra thermal clothing, food, and heat sources.
- Managing the start times and duration of the activity to suit the temperature.
- Minimising the time clients are exposed to cold or heat while waiting their turn at the activity, such as using a shelter or running other activities while waiting.



Section 7: Site and Activity Management

High wire and swing site and activity management includes ensuring each activity is staffed and monitored effectively and that the most practicable communications systems are in place.

7.1: Staff knowledge of the site and activities

Use staff competent at the skills required to manage the high wire or swing activities. For recommendations on staff competence see [section 8](#).

Ensure that staff are familiar with the hazards of the facility and site and with the operator's standard operating procedures. The amount of training this requires will vary.

Factors to consider include:

- The specific hazards and associated safety management strategies of the facility and site, particularly those that affect accessing and rigging the site's activities.
- The complexity of the activity and its belay and supervision systems.
- The initial competence of the staff member.

7.2: Site safety responsibility and backup

Monitor and manage overall group safety with a designated on-site role and a suitable backup person.

On-site safety responsibility

Ensure every site has a staff member who has the overall responsibility for monitoring general site safety, ensuring activities follow the operator's standard operating procedures, and managing emergency response procedures.

This person should be an experienced staff member who the operator is confident will exercise good judgement under pressure.

Note: This doesn't remove the responsibility for each individual staff member to manage the safety of clients within their designated supervisory role.

Backup person

Ensure there is a designated person providing backup monitoring who is capable of coordinating emergency response procedures, and that they're contactable while activities are underway.



Photo: Ziptrek Ecotours

7.3: Communication systems

Communication systems need to cover communication between those at the facility or site, and those monitoring the activity or other external emergency support, and sometimes between staff members running the activities.

Communicating with external support

Ensure each site or facility 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, eg:

- Nearby landlines
- Cellphone
- Satellite phone
- Handheld radios
- Two-way texting devices
- One-way devices such as personal locator beacons.

Where a communication device is used that relies on coverage, ensure that staff and backup personnel are aware of coverage and non-coverage areas.

Difficulty in communicating with external support can be a significant hazard if activities are run in remote areas. See [section 12](#) for information on contingencies for limited access to external emergency support.

Communication between staff running the activities

If communication between staff is required to run the activity or conduct emergency response procedures, ensure they have the means to do so effectively.

Communication options include verbal calls, visual signals, and radios.

Section 8: Staff

Incompetent staff are a significant hazard. Using competent staff is one of the mainstays of ensuring safety.

Using a supervision system that provides on-going support for competent staff is critical. For recommendations on supervision systems see [section 10](#).

8.1: Safety responsibilities and 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. When identifying a job's competence requirements, 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 clearly to the client.
- Rescue and emergency management skills, including first aid.⁹

8.2: Verifying competence

It's 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 that aren't covered by qualifications.

Using qualifications

Where a qualification matches a skillset needed for a job that carries responsibility for managing high levels of risk, it should be used. Operators should ensure they know which skills and knowledge a qualification actually measures and check these against those required for the job.

Verifying competence in skills not covered by qualifications

Ensure that skills or knowledge not covered by the qualification are verified by other suitable means. Use a measure that suits the degree of safety responsibility associated with the skills.

Use a suitable person to verify competence. This person should have a qualification to do so or be a technical advisor who also understands national expectations on the standard of competence required.

Keep records of competence verification processes and results.

⁹ 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 activities.

Establishing equivalency between qualifications

To establish equivalency of one qualification with another, an operator should contact the benchmark qualification provider and ask what process they recommend.

Qualifications currently under review

Qualifications on the New Zealand Qualifications Authority (NZQA) Framework are currently being reviewed. Results of this review that affect the recommendations of the high wire and swing sector 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

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

8.3: Specific staff competence

This section looks at competence requirements and verification. It doesn't address broader safety-related roles such as operations management.

Ensure that all the operation's safety responsible roles are identified and staff are competent.

Competency requirements

This section identifies the technical safety responsibilities and competency requirements for guiding and instructing high wire and swing activities.

For the purposes of this guideline the areas of staff responsibilities have been separated into these roles:

- Guide or Instructor
- Perform Rescues
- Senior Guide or Senior Instructor
- Teach belay skills to clients
- Set up and inspect operational and safety systems
- In-house Trainer
- In-house Assessor



Guide or Instructor

Purpose: To guide or instruct high wire and swing activities (excluding teaching clients to belay) under the indirect supervision of a senior guide or instructor.

Assess competencies in this table as related to the activities within the facility.

Safety responsibilities	Safety functions	Safety competencies
Guide or instruct clients participating in high wire and swing activities	Train and assess clients to participate in the activities	Can demonstrate high wire and swing activity skills
	Guide or instruct clients as they participate in the activities	Can apply a process to teach clients high wire and swing activity skills. <i>Note:</i> Teaching client belaying is a separate role. Can demonstrate a process to assess client suitability to participate
	Monitor clients as they participate in the activities	Can identify and correct dangerous client actions and behaviour ¹⁰ Has good situational awareness and visual scanning skills
Ensure the equipment used by the client is used correctly and is safe for use	Allocate and fit safety equipment to clients	Can apply a system to fit and check harnesses and the attachment of clients to belay systems
	Continually monitor and assess all equipment used by the client	Can identify and manage dangerous equipment by replacement or isolation, including harnesses, belay devices, and other equipment used to attach clients to the belay system
Assist in response to emergency scenarios	Assist staff in the <i>Perform Rescues</i> role to perform rescues	Can demonstrate skills to assist in rescue scenarios, including belaying other staff and managing the safety of clients on the ground

¹⁰ In steep and long via ferrata activities, this requires mountain guiding skills

Perform Rescues

Purpose: To perform the practical aspects of rescues for all identified rescue scenarios.

Assess competencies in this table as related to the activities at the facility.

Safety responsibilities	Safety functions	Safety competencies
Responding to emergency scenarios	Perform rescues for all identified rescue scenarios	<p>Can demonstrate skills to safely and efficiently access all areas required for rescue response, including using ladders or other working-at-height systems if necessary</p> <p>Can demonstrate rescues for all identified emergency scenarios:</p> <ul style="list-style-type: none"> • For all high wire and swing activities, this includes a client stuck on a fully tensioned and non-releasable belay system and retrieving belay equipment • For activities involving top rope or counterweight belaying, this includes a stuck climber and excessive slack rope in the belay system and, where relevant, a jammed device • For activities involving the raising of clients, this includes switching to a backup raising system while the original is under load • For activities such as via ferrata, leapfrogging other participants may be required
	Apply the facility's overarching client emergency management process	Can apply the facility's overarching client emergency management procedures, including ensuring all clients are no longer exposed to falling from height or other facility hazards

Senior Guide or Instructor

Purpose: To guide or instruct high wire and swing activities.

This role may only be held by a person with the competencies for both the *Guide or Instructor* and *Perform Rescue* roles.

Assess competencies in this table as related to the activities at the facility.

Safety responsibilities	Safety functions	Safety competencies
Manage the application of the activity's standard operating procedures	Apply and oversee the activity's standard operating procedures Delegate tasks to staff Monitor staff	Can demonstrate knowledge of the application of staff roles within the facility's standard operating procedures Can apply a process to oversee the activity's standard operating procedures Can identify and correct dangerous guiding or instructing techniques and staff behaviour
Manage the application of the facility's supervision system	Apply and oversee the facility's supervision system	Can apply a process to oversee the facility's supervision system
Ensure all safety system equipment is used correctly and safe for use	Continually monitor and assess all equipment in use	Can identify and manage dangerous safety system equipment via repair, replacement or isolation, including safety lines and critical connections
Manage emergency scenarios	Oversee the facility's overarching client emergency management process	Can apply a process to manage the facility's overarching client emergency management procedures Has good visual scanning skills Has strong communication skills

Teach belay skills to clients

Purpose: To teach and assess client belaying skills such as using lanyards, top rope and counterweight belay systems.

Assess competencies in this table as related to a specific belaying activity and assessing clients to belay under a specific level of supervision.

Safety responsibilities	Safety functions	Safety competencies
Teach, assess, and monitor client belaying	Teach and assess client belay skills for a specified level of supervision	Can demonstrate knowledge of current industry good practice in belay skills, including pre-belay safety checks Can apply a process to teach belaying, including teaching pre-belay safety checks as required by the specified level of supervision
	Approve clients as competent for a specified level of supervision	Can apply a process to sign-off clients as competent to belay under a specified level of supervision
	Monitor client belaying	Can identify and correct dangerous belaying techniques

Set up and inspect operational and safety systems

Purpose: To set up activities before they are used and to conduct in-house inspections of operational and safety system equipment.

Assess competencies in this table as related to the specific activities at the facility.

Safety responsibilities	Safety functions	Safety competencies
Set up the activity	Set up the activity's agreed safety and operational systems	Can demonstrate safe and efficient set up of safety and operational systems, including using ladders and other working at height systems where applicable
Assess safety system equipment	Conduct daily and pre-activity inspections of safety system equipment	Can identify and manage dangerous safety system equipment via repair, replacement, or isolation, including safety lines and critical connections

In-house Trainer

Purpose: To train guides or instructors for safety responsible roles for a particular facility or operation.

Key areas	Key safety functions	Key safety competencies
Deliver staff training	Train staff to perform job role functions	Can demonstrate knowledge of job role functions Can apply a system to deliver staff training

Role: In-house Assessor

Purpose: To assess guide or instructor competence in safety responsible roles for a particular facility or operation.

Key areas	Key safety functions	Key safety competencies
Assess staff	Assess staff performance against a standard (internal or external)	Has knowledge of the standard applicable to the skills being assessed Can demonstrate skills and knowledge in the competencies that are being assessed Can assess competence and provide feedback

Recommendations for competence verification

There are no high wire and swing specific nationally recognised qualifications in New Zealand, although there is a broader qualification that includes the required.

Check the competency requirements in this section and ensure that staff with corresponding safety responsibilities have their competence verified in the recommended safety competencies.

Ensure that when the facility is in use, there is at least one staff member on site who is verified as competent in the *Performing Rescues* role.

Broader qualifications that include competencies for high wire and swing activities

There is a qualification that includes the competence requirements of the Guide or Instructor role for high ropes courses.

The qualification is administered by Skills Active Aotearoa Industry Training Organisation (Skills Active). The National Certificate in Outdoor Recreation (Instruction) – adventure-based learning qualification is for people who are instructing and managing high ropes activities and focuses on the technical skills required by instructors.

For more information on this qualification, including more detailed skill breakdowns and experience prerequisites, see www.skillsactive.org.nz

This qualification and other nationally recognised qualifications, particularly those for climbing or abseiling type activities, could be useful for verifying aspects of staff competence in other high wire and swing roles. Operators are encouraged to contact the following qualification providers for more information: New Zealand Mountain Guide's Association (NZMGA) www.nzmga.org.nz, New Zealand Outdoor Instructors Association (NZOIA) www.nzoia.org.nz, and Skills Active www.skillsactive.org.nz

8.4: Using assistants to help manage safety

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

Using assistants increases the possibility that risks won't be managed competently, particularly when the assistant is new to managing the tasks, such as teachers or parents. New assistants especially will likely require careful training and a higher level of supervision and monitoring.

When using assistants ensure that:

- Tasks to be managed, safety responsibilities, and required skills are clearly identified and understood by the assistant and the guide or instructor.
- The assistant is verified as competent in the required skills.
- The assistant manages only the tasks for which they're verified as competent.
- The competence of the assistant is considered when establishing client supervision levels.



8.5: Working at height

This is where staff are exposed to the risk of injury from falling and are using safety systems in different ways from how they would be used during normal operations. Working at height could include working alone, setting up activities, conducting facility or activity maintenance, testing, and inspection.

Ensure the safety of staff working at height by following the recommendations in this section and in the WorkSafe NZ *Best Practice Guidelines for Working at Height in New Zealand*. The guideline also identifies unit standards for verifying staff competence for work at height.

To view the WorkSafe guidelines, go to:

www.business.govt.nz/healthandsafetygroup/information-guidance/all-guidance-items/best-practice-guidelines-for-working-at-height-in-new-zealand

Safety equipment

Staff may use normal operational safety equipment if they're using safety systems in the same way that they would be used during normal operations. Ensure that a risk assessment has been carried out and suitable safety systems are in place. If using the facility in other ways, follow the recommendations in the WorkSafe NZ guidelines.

If staff require protection for vertical travel, use a belay system approved for vertical use and ensure anchors are suitable for fall arrest. Don't use climbing staples for purposes of fall arrest as they're generally untested and not approved as anchors capable of supporting a fall. However, tested via ferrata rock staples are suitable as rest points. For information on designing belay systems for vertical travel, see [section 4.1](#).

Working alone and the risk of suspension trauma

The WorkSafe NZ guidelines recommend not working alone, which involves being exposed to the risks of delayed rescue and suspension trauma. The speed that rescue support needs to be available to manage this risk will vary depending on the nature of the emergency.

Assess emergency scenarios for the risk that the staff member will be suspended and injured or at risk of suspension trauma. Factors to consider include:

- The likelihood that the staff member would suffer an injury if they fell, particularly impact injuries that could affect their ability to self-rescue, alleviate pressure points, or call for help.
- The ability of the staff member to self-rescue if they fall.
- The ability of the staff member to alleviate pressure points if they're suspended – what type of harness are they using, do they have equipment to help them such as slings to stand up in, and are they trained in its use?

Ensure that rescue support is available to staff within time frames that enable effective rescue for identified emergency scenarios. Base safety management strategies on the associated risk and the following recommendations:

- A single staff member working under normal activity or facility monitoring procedures may be suitable if emergency scenarios aren't serious and the staff member is able to self-rescue. Ensure that the staff member has a communication device on their person¹¹.
- If staff could fall and be injured, or not self-rescue, or alleviate pressure points, ensure there are at least two staff members working together and that they're competent to rescue each other.

8.6: Identifying and managing unsafe staff

Don't permit a staff member to guide, instruct, or undertake other safety related tasks if staff believe they're in such a state of impairment that they may be a hazard to themselves or to any person on the activity. Impairment could be due to factors such as alcohol, drugs, or fatigue.

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

Ensure that management strategies suit the significance of the hazard and are outlined in 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.

Ensure that initial hazard management for dealing with unsafe staff includes removing the person from the role requiring performance of safety tasks.

To see the WorkSafe guidance document on managing drugs and alcohol-related risks 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

¹¹ Leaving a communication device on the ground has been shown to be inadequate when a staff member has been immobilised.

Section 9: Client Information

Managing safety is more effective if clients are suited to the activity and well informed on its risks and participation requirements.

9.1: Ensuring clients are suited to the activity

Assess clients to check that they're suited to participate in the activity. This should happen before the activity begins and be ongoing during the activity itself. This section looks at assessing clients, establishing age guidance, and identifying and managing unsafe clients.

Assessing clients

Use information gathered while assessing clients to inform activity options, client supervision levels, and safety management techniques.

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. Ensure client assessment is consistent across staff and reflects the requirements of the activity.

Factors to consider when assessing clients include:

- Fitness and physical ability.
- Psychological factors such as the ability and likelihood to follow instructions, fears and phobias, and confidence at height.
- Age.
- Medical issues, particularly pre-existing injuries.
- The technical skills required for the activity.

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*.

Establishing age guidance

Establish minimum age guidance for each activity. Factors to consider include:

- The specific hazards of the activity.
- The specific hazards of the site.
- Whether the client fits the safety equipment.
- The ease of site access and escape.
- The ability to access external emergency support.
- Supervision levels.
- The experience and skill of guides and instructors.

There are no overarching age recommendations for participating in all high wire and swing activities. However, there are recommendations for participation in the belaying of other clients and for the supervision of clients using lanyards. For more information, see [section 10.4](#).

Note: It's common practice for operators to require children aged under 18 to have guardian consent to participate in adventure activities.

9.2: Delivering safety information

Ensure staff delivering safety information are verified as competent to do so – ideally, they would be an experienced staff member.

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, eg videos, pictures and diagrams, demonstrations, or written instructions in the client's language.



9.3: Pre-activity risk disclosure

Before beginning the high wire or swing activity, inform every client of the following information:

- This is an adventure activity involving risk of serious injury or death.
- The swing operator can't totally guarantee the client's safety.
- The activity may be mentally and physically demanding and requires the client to be operating at height (emphasise these points to suit the particular activity).
- The client needs to follow staff instructions at all times and understand that this is critical to their safety and that of others.

Mention significant hazards that can't be avoided or place extra responsibility on the client. These include indirectly supervised activities, activities that use belay systems involving clients performing safety critical tasks, and facilities with limited access to external emergency support.

Note: High wire and swing activities often involve children. Ensure pre-activity risk disclosure information is given to the correct people, such as parents and teachers. This may mean the information needs to be delivered twice.

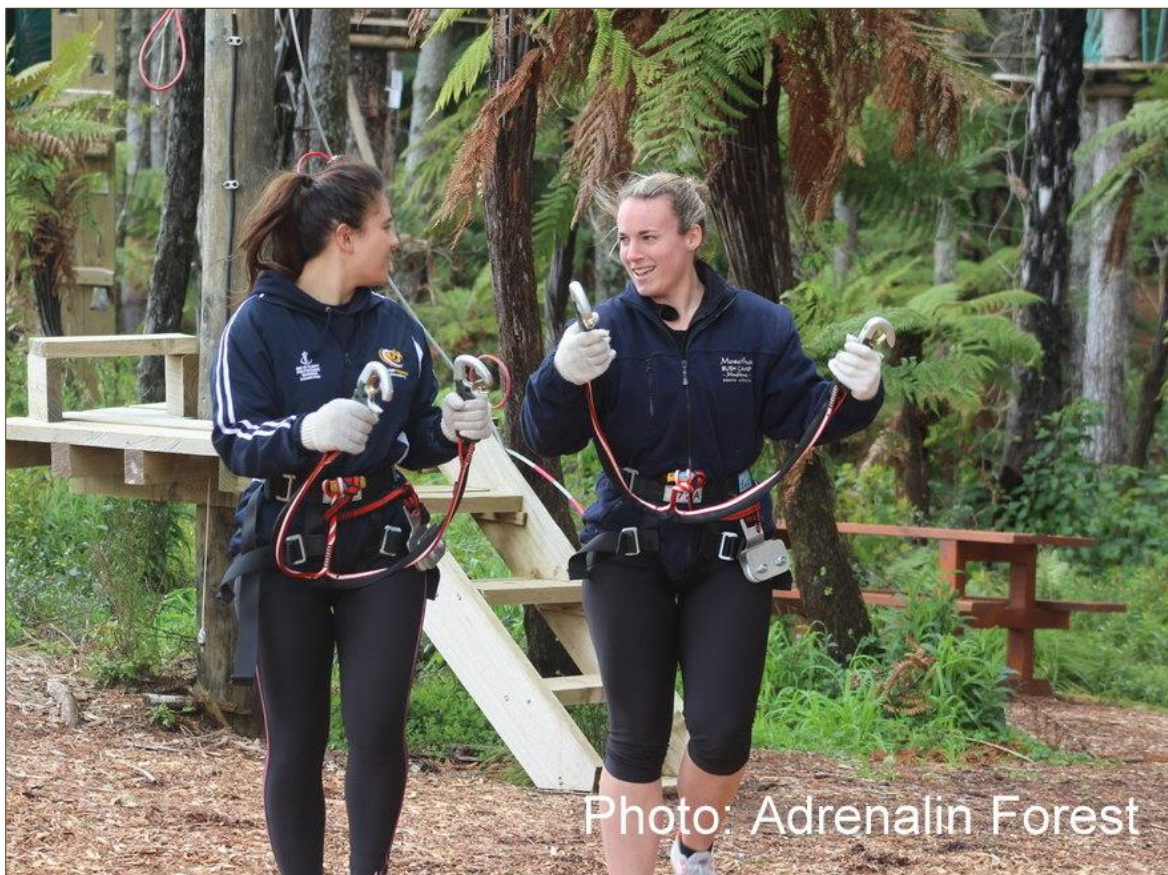
9.4: Using demonstrations and activity progressions

Use demonstrations and activity progressions where practicable, particularly for more difficult activities, to help ensure clients are prepared and fully understand what they're required to do. Demonstrations may include video footage.

Note: Progressions are particularly important for indirectly supervised activities and those using belay systems where clients perform safety critical tasks.

9.5: General safety information

Before clients participate in the activity, instruct them in general high wire and swing safety awareness and techniques.



Factors to cover include:

- Awareness of how the activity works.
- Warnings about the hazards.
- Warnings not to adjust safety equipment once it has been fitted and checked by staff.
- Procedures for managing general exposure to edges and impact from falling objects, such as staying out of fall zones and back from edges.
- Any relevant supervision system information such as parts of the course where supervision levels change, how to identify staff, and how and when to communicate with staff or assistant supervisors.
- Any relevant facility signage or markings, eg to indicate more difficult activities or areas with different supervision levels.
- Emergency procedures for managing the risk of suspension trauma, including trying to stay upright and adjusting harness pressure points.
- Emergency procedures for the site, eg staying where they are and waiting for instructions from staff.
- Methods for maintaining body temperature when relevant.

For parts of the activity involving a significant hazard, or requiring technical skill to participate safely, inform clients of:

- The hazard and its dangers.
- Options for avoiding the hazard, eg choosing different activities within a high ropes or adventure park course.
- The techniques required to negotiate the hazard or participate in the activity, eg procedures for use of technical equipment and performing technical actions.
- Applicable emergency procedures or self-rescue techniques.

9.6: Identifying and managing unsafe clients

Don't permit a person to participate in a high wire and swing activity if they're in such a state of impairment that they may be a hazard to themselves or other people. Impairment could be due to factors such as alcohol, drugs, injury, 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 associated risk and include options such as increasing supervision levels or removing them from the activity.

Section 10: Supervision Systems

Supervision systems are a vital tool for managing hazards and ensuring that staff and clients correctly carry out their safety responsibilities.

Some of the most likely factors associated with serious injuries are staff or clients ineffectively using belay methods, braking systems, or checking pathways of travel. Focus supervision systems on ensuring these tasks are performed correctly.

10.1: Establishing a supervision system

Establish a supervision system that supports staff and clients manage themselves and others safely. Supervision systems for operations where clients don't perform safety critical tasks are much less complicated, but no less important, than for those that do.

This section looks at what to take into account when establishing a supervision system and what to include in a supervision system.

What to take into account

Assess the level of risk that clients or staff will make errors leading to serious injury.

Factors to take into account include:

- Whether clients perform safety critical tasks, such as operating belay or brake systems.
- For systems where clients perform safety critical tasks, the competence of clients, the likelihood that they will follow instructions, and their acceptance of responsibility for managing hazards
- The number and competence of staff.
- The complexity and margin for error of the safety critical tasks.
- The number of people exposed to falling from height or colliding with objects at any one time, including clients who are waiting or have finished an activity.
- The nature of staff safety tasks, including the number of clients they're managing and over what period of time. Consider hazards such as task repetition and fatigue.
- The general hazards of the activity and the site or facility. For the most significant hazards, see [section 3](#).
- Industry good practice client supervision levels.

10.2: What to include

Ensure there is a staff member at the site responsible for managing the supervision system. This person should be an experienced staff member who the operator is confident will exercise good judgement.

Consider the points above and ensure the supervision system is based on the associated risk and includes:

- Maximum client numbers and minimum supervision levels for the site and its activities.

- Clarity on any activity-specific actions that are safety critical requiring particular attention.
- Clarity on staff supervision responsibilities, such as site areas, activities or client groups. This is particularly important for systems using indirect supervision.
- Strategies to enable staff maintain the level of focus required to supervise effectively, eg timely breaks, moving from one area of responsibility to another, buddy systems, and minimising distractions.
- Clarity on procedures for ensuring supervision levels are maintained during unplanned staff breaks such as toilet stops.
- Procedures for managing clients who are waiting to participate in the activity or who have had their turn.
- Guidance on when the supervision system may need adjustment, eg an increase in the number of clients participating in an activity, a change in competence of clients, a change in the number of young children, an increase in the level of distraction, a change in environmental conditions, or less experienced or confident staff.

Systems requiring differing levels of supervision

For operations involving activities requiring differing levels of supervision, ensure the supervision system also includes:

- Information on any areas or activities within the site designated for different levels of client supervision.
- Information on how to ensure clients requiring different levels of supervision are clearly identifiable, such as using designated areas or activities.
- A way to ensure that clients are clear on what they're approved to do, and on what to do if they change to an activity requiring a different level of supervision.

Systems where clients perform safety critical tasks

For operations where clients perform safety critical tasks, ensure the supervision system also includes:

- Requirements for training, assessing, and ongoing supervision of clients. For recommendations on clients belaying other clients or using lanyards, see [section 10.5](#).
- Guidance on when the supervision system may need adjusting due to the competence of clients and the likelihood that they'll perform the safety critical tasks correctly.

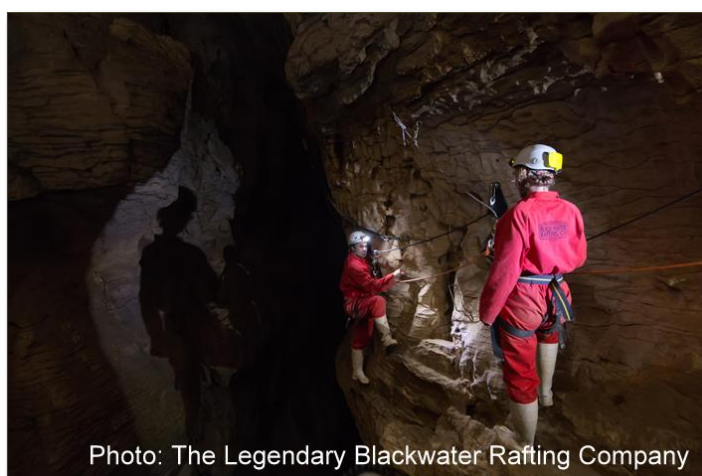


Photo: The Legendary Blackwater Rafting Company

Systems for repetitive tasks or a high number of clients

When staff are performing repetitive tasks or managing a high number of clients, use additional supervision strategies, eg simple and consistent systems, checklists, and a safety supervisor to monitor staff and backup safety checks.

10.3: Establishing the type and level of supervision

Client supervision levels are a crucial part of an operator's supervision system. They provide information on the ratio of staff to clients and the type of supervision (how closely the clients should be supervised).

For the purposes of this guideline, there are three types of supervision – direct, proactive indirect, and reactive indirect. They correspond to those in EN 15567-2 but the names are different to align with terminology in the New Zealand sector.

This section looks at what to consider when establishing supervision levels, and at staff roles and client competence requirements for each type of supervision.

What to consider when establishing levels of supervision

Establish supervision levels for each activity and site. Ensure they contain information on:

- The number of staff to client.
- The type of supervision – direct, proactive indirect, or reactive indirect.

When choosing supervision levels, consider all the factors in [section 10.1](#), particularly assessing the complexity and margin for error of the safety critical tasks. Establish supervision levels based on the associated risks. Don't base choices solely on client competence.

There are no supervision level recommendations that cover all high wire and swing activities. There are, however, recommendations for supervising clients using lanyards and clients belaying other clients – see [sections 10.3 and 10.4](#).

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

- Staff who lack confidence or are less experienced.
- Clients who are less physically able, younger, less confident, or less likely to follow instructions.
- Activities that involve long wait times where those waiting are exposed to significant hazards.

If using an assistant to help supervise consider which hazard management tasks they're verified to perform unsupervised before factoring them into supervision levels. For more information on using assistants, see [section 8.4](#).

Direct supervision – staff roles and client competence

Direct supervision is where staff are able to physically intervene and manage risks.

Ensure staff are close enough to clients to enable effective direct supervision.

Directly supervise any client who staff feel is unlikely to perform the activity safely or who has yet to be approved for indirect supervision. This includes clients who profess to be competent but whose competence is unknown to staff.

Indirect supervision

This section looks at ensuring client competence for indirect supervision, and at staff roles and client competence requirements for proactive and reactive indirect supervision.

These two levels of indirect supervision acknowledge that some situations will require closer indirect supervision than others. For example, clients will be more or less competent, and some safety critical tasks are simpler and have a greater margin for error than others.



Ensuring client competence for indirect supervision

Ensure that clients are assessed as competent before being indirectly supervised, and that the assessment specifies whether the client is to be proactively or reactively supervised. Use a staff member verified as competent to conduct the check.

Outline the skills to be checked in the operator's safety management system. Ensure there is a particular focus on safety critical tasks such as attaching to or using belay or brake systems. Include any activity-specific points as recommended under ***Client briefings and checks*** in section 9.20.

Check client skills during a directly supervised client demonstration in a low consequence environment unless one of the following conditions is met:

- A staff member who is competent to check client suitability for indirect supervision has previously observed the client perform the skills and is confident they'll perform them correctly. This could have occurred during a recreational climbing session at another location.
- The operator has a record that the client has been previously accepted for indirect supervision. This record should be recent enough to assure skill currency.
- The client has a recognised national qualification relevant to the skills to be checked. See [section 10.5](#) for information on supervising clients with qualifications.

Proactive indirect supervision

Proactive indirect supervision is where the supervising staff member is actively monitoring the client and is in a position to provide verbal assistance to intervene and manage risks should they develop.

To be under pro-active indirect supervision, the client is one who staff are confident will, in the normal course of events, participate in the activity safely.

Reactive indirect supervision

Reactive indirect supervision is where the supervising staff member is in a position to communicate verbally and provide assistance to a participant when sought but may not be actively monitoring the client or provide pre-emptive assistance.

To be under reactive indirect supervision, the client is one who staff are confident will participate safely in the activity in both normal and adverse conditions, eg a distracting atmosphere, establishing initial familiarity with the activity, or focusing for long periods of time while belaying a particularly slow-moving client.

10.4: Client belaying and supervision matrix

This matrix for when clients are belaying other clients was kindly provided by Project Adventure New Zealand Associates (PANZA).

Type of supervision required	Direct supervision		Pro-active indirect supervision	
	Learning	Novice	Intermediate	Advanced
Belayer category	Learning	Novice	Intermediate	Advanced
Description of belayer competence	Skills are new to client <i>and/or</i> client is not confident with skills and techniques required (participant in 'Ground Belay School')	Client has recently learnt to belay; <i>and/or</i> has belayed before but with a different device; <i>and/or</i> has belayed before but not for a significant period of time	Client has been observed by staff to competently belay without requiring regular active coaching or interventions	Client independently belays confidently and their ability has been verified by staff present
Staff responsibility	Instructor is responsible for a number of 'ropes' on the ground (but only 1 'rope' if a climber off the ground)	Instructor is responsible for a maximum of 2 'ropes' but with only one climber on a loaded 'rope' at any one time	Instructor is commonly responsible for 2 'ropes' but this may be increased depending on the proximity of 'ropes' and elements being used	Instructor may be responsible for more than two 'ropes' with Advanced belayers
Staff role	Instructor is in a teaching role and is coaching and providing direct and immediate feedback	Instructor is actively coaching and providing reminders and may need to physically intervene/assist on occasion	Instructor is an active observer and occasionally provides reminders	Instructor no longer needs to remind belayers re appropriate technique but remains an active observer

Type of supervision required	Direct supervision		Pro-active indirect supervision	
	Staff positioning	Instructor is positioned to be able to actively coach (and to be able to physically intervene if a climber is off the ground)	Instructor is positioned to be able to quickly respond to poor client technique and to physically intervene, that is, 'grab the rope'	Instructor is positioned to be able to quickly respond to poor client technique
Client responsibility	Clients usually do not have other clients climbing off the ground	Clients belay other clients under very close direct supervision	Clients belay other clients	Clients belay other clients
Example	Clients practicing belay technique without leaving the ground with a horizontal or vertical rope	Clients doing first 'vertical practice' belay with another client at height	Clients moving on to using other elements after competent 'vertical practice' observed	Clients have demonstrated sufficient competence as Intermediate belayers

10.5: Supervising clients belaying

Clients belaying other clients often occurs at high ropes courses.

This section looks at the parameters for direct supervision and indirect supervision of clients belaying other clients. Follow these recommendations in addition to the recommendations for establishing supervision systems and levels in [sections 10.1 and 10.2](#).

Note: For the purposes of this section, a rope refers to all the clients actively using one belay rope, eg one rope may involve a client at height, a belayer, and a backup belayer.

Parameters for direct supervision

This section looks at the actions that require direct supervision, the techniques for effective direct supervision, and minimum staff-to-rope direct supervision levels.

Actions requiring direct supervision

Directly supervise applicable clients any time they're involved with belaying another client and that other person could be injured if they fell.

There are three actions identified as having the most potential to be associated with serious injuries. Focus direct supervision on preventing these from occurring. The three actions are:

- Incorrect attachment to the belay system.
- Incorrect belaying when transferring to lowering.
- Incorrect belaying while braking a falling climber.

Techniques for effective direct supervision

When directly supervising, consider using additional safety management techniques such as:

- Staging activities so that not all ropes require direct supervision at once, eg asking one rope to hold in a locked-off position while another rope weights the system before lowering.
- Using back-up belayers.

Note: The use of a client back-up belayer shouldn't in itself be grounds for moving to indirect supervision.

Recommended minimum staff to rope supervision ratios

The recommended minimum staff to rope direct supervision level is 1:2.

Note: Most high wire and swing environments require belay ropes to be separated such that one staff member is unlikely to be able to directly supervise more than two ropes.

Parameters for indirect supervision

Check clients are competent for indirect supervision as in the recommendations in [section 10.2](#). Ensure that competence checks include the skills listed above in the **Actions requiring direct supervision** section and any top rope or counterweight belaying specific checks listed above.

It's unusual for clients to belay other clients under reactive indirect supervision. If it does occur, it's likely to be within an instructional environment where the clients have been following a learning progression over a number of sessions.

When indirectly supervising:

- Ensure children are 13 years of age or older, unless there are special circumstances, eg most of the group is older or more mature, the children have had previous experience.
- Train and use back-up belayers.
- Ensure clients under proactive indirect supervision have a designated staff member supervising.
- For sites with both types of indirect supervision, ensure that clients under each type are clearly and distinctly identifiable. Options include restricting them to designated activities.

Minimum staff-to-rope ratios

There are no overarching ratio recommendations for indirect supervision of clients belaying other clients.

Consider the information in this section and [sections 10.1 and 10.2](#) and establish supervision numbers based on the associated risks.

10.6: Supervising clients using lanyards

This section looks at the parameters for training and indirect supervision, and the supervision of children for both traditional and interlocking lanyards. Follow the recommendations in this section in addition to the recommendations for establishing supervision systems and levels in [section 10.1 and 10.2](#).

Parameters for training and indirect supervision

This section looks at training and indirect supervision of clients using traditional and interlocking lanyards, and minimum staff-to-client ratios.

Ensure clients have been verified as competent before they use lanyards under indirect supervision at heights from which a fall could cause injury. Use activity progressions to teach skills and check competence.

Ensure training is under direct supervision and includes:

- Using a practice course that includes sufficient tasks for the client to consolidate learning and demonstrate competence in lanyard use, particularly around avoiding a complete unclip. If using traditional lanyards, ensure the practice course includes a minimum of five elements.
- Checks that clients are competent in the skills listed in the applicable (horizontal or vertical) **Client briefings and checks** information in [section 11.2](#).

Focus supervision for lanyard use on preventing a complete unclip and ensuring lanyards are connected to the correct part of the safety system.

Traditional lanyards

Using traditional lanyards is the highest risk option for lanyard use. It isn't suitable for many high wire and swing activities, and where it is used needs to be closely supervised.

Good practice alert for supervising the use of traditional lanyards

In 2013 there was a fatality at an adventure park where traditional lanyards were being used by clients under reactive indirect supervision. This has resulted in the ASG working group making the following recommendation for the supervision of clients using traditional lanyards within the high wire and swing sector:

Use staff to perform all the safety-critical tasks for traditional lanyards unless clients are:

- trained and assessed as competent, and
- under direct or proactive indirect supervision, or
- under reactive indirect supervision using a system designed so that all clips don't need to be undone at the same location (such as using two safety lines with staggered unclipping points), or the lanyards have three arms and clips, or buddy checks occur at reclipping points, or assistant supervisors help supervise.

This recommendation particularly affects adventure parks. Most adventure park operators are now using interlocking lanyards or continuous safety lines.

Note: Other sectors or activities may have different strategies for using lanyards. See the relevant activity safety guidelines or, if there are none, consult a technical advisor.

If using assistant supervisors, ensure they focus on avoiding a complete unclip, that they're allocated to a specific group of clients, know which actions to supervise, and are competent to do so. For more information on using assistants, see [section 8.4](#).

Reactive indirect supervision may be acceptable without the above measures where traditional lanyards are used as part of a longer instructional course with skills-based outcomes. Ensure that staff have previously taught or observed the client performing the tasks required and have absolute confidence that they'll use the lanyard correctly in all conditions, particularly around avoiding a complete unclip.

Interlocking lanyards and continuous line lanyard systems

Using continuous line lanyard systems or interlocking lanyards requires considerably less client training and supervision than for traditional lanyards.

They may be used under any of the three types of supervision. Follow the recommendations in [section 10.2](#) for ensuring client suitability for indirect supervision, and base supervision levels on the associated risk.

Minimum staff-to-client ratios

There is no recommended staff to client supervision ratio for direct or indirect supervision of clients using traditional or interlocking lanyards.

Consider the information in this section and [sections 10.1 and 10.2](#) and establish supervision ratios based on the associated risks.

Ensure children are supervised as in the recommendations below.

Supervising children using lanyards

Conduct a risk assessment of the site and its activities, consider the minimum supervision levels recommended in this section, and establish supervision levels for children based on the associated risk.

Minimum supervision levels for children using lanyards

This table represents supervision levels after training.

Type of lanyard	Aged under 6	Aged 6 to 13
Traditional	Don't use	Direct
Interlocking	Indirect proactive	Indirect proactive
Interlocking and engineered to attach only to the specified safety line, or used on a course designed to ensure the same	Indirect proactive	Indirect reactive
Continuous lines	Indirect reactive	Indirect reactive

Although the table uses age as a reference, operators should also consider using client height if it's relevant to the effective use of the safety system.

10.7: Supervising clients with qualifications

Client participating in activities involving assisted or self-managed belaying may hold qualifications that cover the required safety skills. If the qualification is current and covers the required skills, as outlined in the operator's safety management system, the client may not need supervision.

If allowing the client to participate unsupervised, ensure they agree to operate independently and understand that they won't be supervised.

This doesn't absolve the responsibility of the operator to ensure that:

- Relevant safety information is shared as outlined in [section 9](#).
- The client is competent to participate unsupervised. For some operators, this is achieved by sighting the current qualification, but others may require a directly supervised client demonstration of activity-specific, safety-critical actions.

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

Examples of suitable supervision levels

Note: Supervision levels are only part of the overall supervision system.

- 1. Swing.** Staff directly supervise the client. They attach the client to a safety line and then to the swing belay system. Once the attachment of the swing belay system has been checked, staff undo the original safety line and launch the client off. Two staff are involved in attaching and checking the belay system. They have regular scheduled breaks and simple consistent systems and checks. Other clients are waiting in a designated safe zone until it's their turn.
- 2. High ropes.** A client is belaying on a climbing activity. It's their first time belaying. They've been trained and assessed as competent to belay safely in normal conditions and have a competent back-up belayer. The operator uses proactive indirect supervision.
- 3. Adventure park.** A client is using interlocking lanyards. They're 16 years old, have been trained and assessed as competent to use the lanyards, and are diligent and focused on their tasks. Training was under direct supervision in the practice area. The operator checks the original attachment of the lanyard and then uses reactive indirect supervision.

Section 11: High Wire and Swing Operation

Serious injuries associated with high wire and swing activities are most likely to be due to human errors: incorrect use of safety attachments or belay or braking systems, inadequate checking of pathways of travel, or inadequate client supervision.

Focus operational safety management strategies to prevent these from occurring.

This section looks at key operational topics, the significant hazards they usually involve, and good practice for managing these. This section doesn't look at client supervision. For recommendations on supervision, see [section 10](#).

The information in this section shouldn't be considered all-inclusive. It's essential to carry out site and activity-specific hazard management processes, and for staff to conduct ongoing dynamic hazard identification and risk management.

Additional sources of information and technical advice on managing risks associated with high wire and swing technical operations include Project Adventure New Zealand and New Zealand Adventure Parks Embrace Safety (NZAPES).

11.1: All activities – managing the risk from falling from height

The risk that people will fall and suffer a serious injury is inherent to all high wire and swing activities. It's important to consider the entire facility, including access and egress routes.

Note: The often-quoted concept that no controls are needed where a person faces a three-metre fall or less is incorrect.

Manage exposure to the risk of falling by:

- Ensuring that people stay far enough away from edges. This will often include establishing safe zones back from edges and communicating these clearly to clients, or accessing activities using stairways or other options that conform with the Building Code.
- Ensure that for vertical sections of via ferrata, only one participant is on each cable segment. This doesn't necessarily apply to horizontal sections, which sometimes become 'collection points'.
- Ensuring that supervision systems are suited to the associated risk of people being exposed to edges. Follow the supervision recommendations in [section 10](#) and give particular consideration to the recommendations on using assistant supervisors and buddy systems.

Where exposure to edges cannot be avoided, belay clients and staff, or attach them to a safety point.

It's common to focus on clients rather than staff. Ensure that staff are protected from falling from height.

11.2: All activities – managing exposure to suspension trauma

All high wire and swing activities involve exposing people to the risk of suspension trauma, which results from being suspended for an unsafe period of time.

Ensure that operational procedures don't involve people hanging in harnesses for long and being unable to adjust pressure points.

Establish safe suspension time limits that consider the activity, the equipment in use, and the rescue options. Ensure that guides and instructors know the time limits and are aware that, for unconscious people, it can be from as little as five minutes.

Ensure emergency scenarios include the recovery of a suspended and unconscious person. In the event of a prolonged rescue scenario with a conscious suspended victim, consider providing the victim with some way to relieve pressure points, such as a sling in which to stand up and relieve pressure.

Ensure that guides and instructors know how to identify and manage a person who has suspension trauma and ensure that any person who has been unconscious while suspended receives immediate medical attention. Likely signs and symptoms of suspension trauma include a tingling of the toes and fingers, numbness, sweating up the side of the head, disorientation, and nausea. More information on suspension trauma and associated current first aid practice can be found at www.resus.org.au



11.3: All activities – managing client safety attachments

Client safety attachments include the attachments to a client's harness and onto safety points or lines, including connecting components such as pulleys. These safety attachments are critical components – if they fail it's likely to lead to a serious injury.

If the activity allows, pre-weight the safety attachment system before relying on it to protect the user from falling. Where this isn't practicable, such as for swings, identify this as a hazard and inform staff of the increased importance of all other aspects of the operation's attachment management system.

Ensure that attachments will stay closed when required to do so. The simplest way to achieve this is by using a direct tie by a competent person, or an attachment that requires a tool to be undone. Where this is not an option, such as when the attachment is required to be regularly opened and closed, ensure that carabiners or clips are of a multi action locking type (do not use twist lock and other single action) or are part of an engineered interlocking system.

Ensure that attachments are correctly connected to safety points or lines. Use a direct tie-in by a competent person or two points of attachment where practicable, or where recommended to do so in the activity specific recommendations in [sections 11.5 to 11.10](#). The activities in these sections have additional activity-specific recommendations for attachments.

If using a single point of attachment ensure that more than one person is involved with checking that it's attached correctly. This check could include another staff member asking for verbal confirmation

that checks have been done or asking a client to visually confirm that point A is attached to point B and to squeeze a carabiner to show it is closed. The aim is to have a 'stop and check' moment to ensure the primary staff member hasn't made an error.

11.4: All activities – choosing to use clients to perform safety critical tasks

This section looks at what to consider when choosing whether to involve clients or to rely solely on staff, and at the overarching safety management recommendations for each.

If safety critical tasks aren't performed correctly, it's likely to result in a serious injury, such as a person falling from height or colliding with an object. When choosing a safety system, consider the recommendations in this section and ensure this risk is managed.

Whether a safety system relies on clients or solely on staff to perform safety critical tasks is one of the main differentiating factors between different high wire and swing operations. Many belay methods, such as using lanyards or top rope belaying, could be applied using either approach.

What to consider when choosing whether to involve clients

Whether clients are involved in safety critical tasks has a large impact on all operational safety procedures, and on the client's overall experience in terms of learning or recreational outcomes.

Choose a system that ensures the risks of falling from height or colliding with objects can be managed.

Factors to consider include:

- Which belay and braking methods are practicable for the activity, including how complex they are and their margin for error.
- The practicalities of supervising the particular activity, facility or site, including how many clients are exposed to the risk of falling from height or colliding with objects at any time.
- The age and degree of competence of clients at performing the safety-critical tasks.
- The client's expectations of exposure to risk and acceptance of responsibility for managing risk.
- The desired outcomes of the activity – learning, recreational, personal development, or a combination.

Managing the risk when relying solely on staff

Relying solely on staff means staff physically doing all the safety critical tasks, including the attachment of clients to safety points, eg swings, guided zipline tours, and adventure parks with continuous lines where staff perform the initial attachment of clients to the line.

These systems involve the risk of a serious injury due to staff error. Staff who are otherwise competent are most likely to make errors associated with fatigue, distraction, or task repetition.

Manage the risk of staff error by ensuring staff are competent as in [section 8](#) and supporting them to perform their roles by using a suitable supervision system as in [section 10](#).

Managing the risk when involving clients

Involving clients means that they perform at least one safety-critical task within the safety system. The task could involve managing the safety of themselves or others, eg performing the attachment of their own lanyard to a safety line or top rope belaying another client.

Involving clients requires significantly more risk management than relying solely on staff. It includes client training, assessment, and supervision. These systems involve the risk of a serious injury due to either client or staff error.

Activities that commonly involve clients include high ropes courses and adventure parks, with the most common belay methods being use of lanyards, top rope belaying, and counterweight belaying.

Identifying hazards

Identify hazards likely to cause staff error as in the recommendations above.

Factors to consider when identifying hazards associated with client error include:

- The complexity and margin for error of the safety-critical tasks.
- The competence and diligence of the particular client.
- Situations where a staff member is supervising high numbers of clients at one time, particularly clients who are exposed to the risks of falling from height or colliding with objects.
- The degree of distracting factors.

Managing the risks

Manage risks involved with staff error as in the recommendations above.

Establish a supervision system and supervision levels as in the recommendations in [section 10](#).

Don't rely on a client under reactive indirect supervision to perform a safety critical task where a mistake in one step of the process would result in a serious injury.¹²

Establish clear operating parameters within which clients can be involved safely. Ensure staff know how to monitor the parameters and understand when to step in and perform the safety-critical tasks themselves.

Ensure the operating parameters include information on:

- Which tasks can be performed by clients and which are only to be performed by staff.
- The level of experience required of staff to supervise clients involved with safety critical tasks.
- Client factors such as age, competence, and acceptance of responsibility for managing risk.
- The maximum numbers of clients allowed to perform safety critical tasks at any time. Pay particular attention to the limitations of the facility's supervision system.
- Likely distractions (consider both staff and clients) and how to monitor and manage them.

¹² The exception is a client who is part of a longer skills-based educational-type programme who has been assessed as competently performing the task on many occasions and who is trusted by the instructor or guide to diligently perform the task. Use experienced instructors or guides to make this decision.

Ensure clients are informed of general safety information as in [section 9.50](#), and trained and assessed in the relevant activity specific information outlined later in this section, eg using lanyards and belaying.

11.5: Using lanyards

Lanyards (cow's tails, safety tethers, anchor chains, leashes) are used in conjunction with safety lines or points to prevent a serious fall from occurring.

There are three main approaches to lanyard use within the sector – the traditional lanyard, interlocking lanyards, and continuous line systems.

The different lanyard systems

This section looks at the key safety characteristics to consider when operating continuous line, interlocking, and traditional lanyard systems.

Continuous lines

Continuous safety lines require lanyards to be attached only once – at the beginning of the activity.

They could be used with traditional, interlocking, or custom-engineered lanyard systems. Continuous safety lines are constructed so that once the lanyard is attached to the safety line, it doesn't need to be unclipped and reclipped in order for the client to complete the activity. This greatly reduces the chance of accidental unclipping of the lanyard.

Safe operation of continuous line systems relies on the correct initial attachment of the lanyard.

Interlocking lanyards

Interlocking lanyards use two clips to attach to the safety line and are engineered so that only one clip can be undone at a time (some use mechanical systems and others use magnets). This greatly reduces the chance of accidental unclipping of the lanyard. Some are also designed so they can only be attached to a certain safety line and some courses are designed to achieve this.

Safe operation of interlocking lanyards relies on initial and subsequent connection to the correct part of the safety system.

Using interlocking lanyards requires considerably less training and supervision than is required for traditional lanyards.

Interlocking lanyards are relatively new technology to the New Zealand high wire and swing sector. Operators should carefully consider and understand the limitations of their use, and particularly their inspection and maintenance requirements.

Traditional lanyards

Traditional lanyards are those involving two carabiners and two lengths of webbing (or similar) that are clipped to a safety line.

Safe operation relies on remembering to reattach one carabiner before detaching the other (avoiding a double unclip) and connecting to the correct part of the safety system.

Using clients to manage traditional lanyards on a non-continuous safety line is the highest risk option for lanyard use. It requires careful training, competence assessment, and ongoing supervision and isn't suitable for many high wire and swing operations.

For via ferrata, these lanyards require built-in shock absorbers and work best with specialised carabiners (usually doubled and reversed), but otherwise operate the same way as traditional lanyards.

Note: the *Canyoning and Caving Activity Safety Guidelines* may give different good practice guidance for the horizontal use of lanyards.

Using lanyards for horizontal travel

The recommendations in this section are for all the different lanyard systems.

Appropriate supervision is a critical tool for managing the safety of clients using lanyards. This section doesn't look at supervision. For recommendations on supervision, including a good practice alert about a significant shift in good practice for supervising the use of traditional lanyards, see [section 10.6](#).

Identifying the hazards

Hazards to consider when using lanyards for horizontal travel include:

- Lanyards not correctly attached to the client's harness or safety line/point.
- Carabiner gates or clips opening accidentally.
- Inadequate supervision.
- Clients completely unclipping and losing balance.
- Frequent times where the lanyard needs to be unclipped and reclipped.
- Placement of anchors or safety lines not adequately protecting people from falls.
- Over-climbing the lanyard (the climber being above the point where the lanyard connects to the safety line) and potentially resulting in a high peak force.
- Being unable to easily reach clip and unclip points when clients are performing the clipping and reclipping tasks.

Managing the risks

The recommendations in this section apply to all types of lanyards unless stated otherwise.

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

Technical systems

Ensure the lanyard is attached to the client's harness by a direct tie in or an appropriately rated device that won't undo accidentally, such as a rapide or multi-action locking carabiner.

Use simple and consistent systems to identify clip and unclip points. Ideally, design the course so it isn't possible to clip to the incorrect part of the structure.

Minimise the number of times the lanyard has to be unclipped and reclipped.

Ensure anchors and safety lines are positioned to adequately protect exposure of people to falling over edges.

Ensure unclip and clipping points are within safe reach of users – easy-on, easy-off.

Rig safety lines so that lanyard attachments stay above waist height.

Consider peak forces, including vector effects, on people and equipment when establishing safety line angles and anchors, and when choosing safety line and lanyard material.

Client management

Follow the supervision recommendations in [section 100](#).

Ensure the original attachment of interlocking lanyards to the safety line is performed by staff or is directly supervised.

Where the lanyard has a single clip, such as those used while waiting to participate in the activity, ensure that its attachment to safety lines or anchors is either performed by staff or is directly supervised.

Client briefings and checks

If using a system where staff perform all the safety critical tasks, brief the clients on the importance of waiting for staff to manage lanyard attachments and:

- How to avoid a complete unclip.
- The possible consequences of a complete unclip in the hazard zone.
- Any relevant supervision system points such as supervisor communication requirements, or areas where the activities move from one level of supervision to another.
- The importance of keeping the safety line above waist height.

If using a system where clients perform safety critical tasks, brief clients on the above points and on:

- How to work the mechanics of the lanyard, using carabiners or interlocking clip systems.
- How to identify clip and unclip points.
- The importance of maintaining a balanced stance when clipping and unclipping.
- Traditional lanyards – their responsibility for managing the risk of a complete unclip.
- Traditional lanyards – strategies for staying attached, such as ‘add before you subtract’ and the carabiner ‘squeeze’ test.

Using lanyards for vertical travel

Using lanyards to protect vertical travel requires more complex management than for horizontal travel as there are potentially higher fall factors involved.

Good practice recommendations include all those for horizontal travel plus those in this section.

Identifying the hazards

Vertical travel using lanyards involves the risk of serious injury through the fall-restraint system not absorbing the impact of the fall.

Factors to consider when identifying hazards for using lanyards for vertical travel include the factors listed for horizontal travel plus:

- Mistaking a top rope climb or other vertical line for a vertical lanyard safety system.
- Incorrect transition from a vertical climb to a lanyard attachment.
- Clothing becoming snagged in a fall – a climber suspended by their clothing.
- Self-retracting lines – climbing with a slack line due to climbing too fast for the system or the line becoming snagged.
- Climbers falling onto other clients.

Managing the hazards

Include strategies for managing hazards in technical systems, client briefings, and skill checks. Follow the recommendations for managing horizontal travel plus those in this section.

Technical systems

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. For information on system design and build see [section 4.20](#).

Ensure that the transition from the vertical safety system to the next safety attachment is clearly identifiable and easy to use.

Ensure lanyards or other attachments to safety points are short or attached above waist level to minimise the chance of over-climbing.

Ensure fall zones are clearly identifiable – use signage and/or verbal briefings.

Client management

Supervise clients as per the recommendations in [section 10](#).

Client briefings and checks

Conduct the checks in this section when assessing clients for different levels of supervision and during ongoing supervision:

- Ensure climbers understand how to identify vertical lanyard safety systems versus other vertical lines.
- Brief clients on how to manage the transition from vertical travel to the subsequent attachment systems (when relevant).
- Brief climbers to manage the lanyard attachment point so it stays above their waist.
- Self-retracting lines – brief clients not to climb faster than the 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 to stay clear of them.

11.6: Clients belaying other clients

The most common belay methods are traditional top rope belaying, belaying using a group to manage a simple friction wrap around a structure such as a rix-a-trix, or team counterweight belaying. This section looks at identifying and managing significant hazards for each of these methods.

Activities where clients belay other clients within the high wire and swing sector occur almost exclusively in high ropes courses.

Appropriate supervision is a critical tool for managing the safety of clients belaying other clients. This section doesn't look at supervision. For recommendations on supervision see [section 10](#).

For the purposes of this section, *climber* refers to the client being belayed, whether they're climbing or moving in another way such as traversing or swinging.

Traditional top rope belaying

For the purposes of this guideline, traditional top rope belaying refers to top rope belaying using a rock climbing belay device, such as an ATC or Petzl Gri-gri.

This type of belaying requires a high level of technical skill. Focus safety management strategies on competence checks and suitable supervision.

Identifying the hazards

Factors to consider when identifying hazards for top rope belaying include:

- Using safety attachment systems incorrectly, eg harnesses and rope attachment systems.
- Using incorrect belay technique, particularly around managing the transfer to lowering, or not following belay device manufacturer's recommendations.
- The belayer being distracted or not focusing on the task.
- The climber moving too quickly for the belayer and creating slack rope.
- The belayer's hair or other loose items becoming jammed in the belay device.
- Ineffective communication of safety information between climber and belayer.
- Traversing activities – the overhead anchor out of line with the climber, causing pendulum falls.
- Slippery ropes such as new or glazed ropes that decrease friction in the system.

- The belayer being unable to effectively catch a fall due to a size mismatch between the belayer and the climber.
- The belay rope or the climber not following the correct route, including during lowering or falling, such as on the wrong side of the structure.
- The climber putting their hands or feet into entrapment features, including nets, eye bolts or other structural attachments.

Note: A significant contributing factor to belayers using incorrect belay technique is the perception that a belay device is self-locking. This occurs particularly with assisted braking belay devices such as the Petzl Gri-gri, including the latest version.



Managing the hazards

The recommendations in this section are in addition to those on general exposure to edges and falling, suspension trauma, and using clients to perform safety-critical tasks in [sections 11.1 to 11.3](#).

Include strategies for managing hazards in facility design and build, technical systems, client management, and client briefings and skill checks.

Technical systems

Use a direct tie-in or a multi-action locking carabiner, such as a screwgate or trip lock, to attach the climber to the belay rope. If you're using reactive indirect supervision, use two locking carabiners or a direct tie-in tied by a client verified as competent to do so and checked by another.

Orientate climber attachment carabiners to minimise the risk of opening accidentally. Consider the likelihood of interaction with other equipment or parts of the structure.

Clearly identify new ropes, eg verbal warnings, signage, or labels.

Ensure routes of travel are clearly identifiable, eg signage such as colour codes or labelling routes and leaving space between different routes. See [section 4](#) for more information.

If the weight difference between the climber and belayer could cause belayer movement during a fall, take extra care around the belayer's stance and location relative to the climber. Consider securing the belayer or adding friction to the system.

Ensure the belay rope is following the correct route through or around the structure before clients begin the activity.

Client management

Follow the recommendations for supervision in [section 10](#).

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

Use back-up belayers.

Client briefings and checks

Conduct the checks and give the instructions in this section when training and assessing client competence for different levels of supervision and as needed during ongoing supervision.

Climbers and belayers

Check that clients know how to attach to the belay rope, use the harness correctly, and have safety systems in place to check these before they climb, eg buddy checks, the three C's, and a squeeze test.

Check that clients' clothing or other items doesn't interfere with easy visual inspection of their attachment to the system.

Ensure that clients use effective climbing calls, particularly around beginning climbing, deliberately weighting the rope (resting), transferring to lowering, and falling.

Check that clients' clothing, hair, or other loose items don't interfere with the belay device or with closing carabiners or other attachment systems.

Inform clients of the precautions to take if new ropes are in use, such as being particularly diligent when lowering due to the potential for decreased friction.

Before lowering, ensure the climber and belayer know which side of the structure to lower from and any particular lowering procedures, eg if lowering off a horizontal beam, lower slowly and instruct the climber to use their arms to protect them from swinging in and hitting the beam.

Belayers

Check that the belayer understands the importance of correct and diligent belaying techniques and the consequences of belay failure.

Check that the belayer uses a belay technique suited to the belay device and system in use and in accordance with manufacturer's instructions, particularly around managing the change over from climbing to lowering and catching a fall.

Climbers

Check that climbers know the importance of moving at a speed suited to their belayer and to ensure overhead anchor stays in line with the climber.

Instruct climbers, either verbally or with signage, not to put hands or feet into entrapment features. If the activity involves a net, inform clients how to manage the entrapment risk.

If it's important to fall in a certain direction or on one particular side of the structure, inform clients how to manage their fall.

Ensure climbers aren't wearing things that could contribute to entrapment or injury, such as bulky rings or inappropriate footwear.

Group belaying using a simple friction wrap

Group belaying using a simple friction wrap around a structure, such as a rix-a-trix or belay post, doesn't require a high level of client technical skill but does need participants to remain diligent and

understand the importance of their role and the consequences of belay failure. Focus safety management strategies on instruction and suitable supervision.

Identifying the hazards

Factors to consider when identifying hazards for counterweight belaying include those listed for traditional top rope belaying plus:

- Belayers becoming distracted or losing focus and not holding the belay line.
- Insufficient number of wraps around the belay structure.
- Insufficient number of belayers.
- Incorrect belay technique such as taking in slack too slowly, ineffective management of the friction wrap, or lowering too quickly.
- Belayers' working space not allowing them to manage the friction wrap.
- Belayers' hands, fingers, or clothing caught in the wrap.

Managing the hazards

Hazard management recommendations include those listed for traditional top rope belaying plus those in this section. Include strategies for managing hazards in technical systems, client management, and client briefings and skill checks.

Technical systems

Ensure the number of wraps around the belay structure and people in the belay team are sufficient to manage the belay.

Locate structures used for friction wraps so that belayers can stand in line and have room to manage the belay.

Client management

Supervise belayers as per the recommendations in [section 100](#).

Ensure the amount of slack in the system is safe and that belayers are holding onto the rope.

Client briefings and checks

Instruct belayers on the importance of diligent belaying, not letting go of the rope, and how to manage the speed of the belay.

Instruct belayers how to manage the friction wraps so there isn't a dangerous amount of slack in the system and the rope can move easily when required.

Ensure belayers understand not to place their hands between the wraps and the friction structure and generally how to keep their hands, fingers, and clothing from being caught in the friction wraps.

Counterweight belaying

Counterweight belaying is when a group of belayers physically control the belay line using their weight, and without the use of a belay device or friction wrap. Some counterweight belaying activities also include hauling a client up into the air, such as the flying kiwi.

Counterweight belaying doesn't require a high level of client technical skill but does need participants to remain diligent and understand the importance of their role and the consequences of belay failure. Focus safety management strategies on instruction and suitable supervision.

Identifying the hazards

Factors to consider when identifying hazards for counterweight belaying include those listed for traditional top rope belaying plus:

- Belayers becoming distracted or losing focus and not holding the belay line.
- Insufficient number of belayers.
- Incorrect belay technique such as taking in slack too slowly or lowering too quickly.
- Activities involving hauling – the climber being hauled too far or too fast and hitting the top of the structure, or interfering with the belay rope, or being dragged on the ground.
- Belayers taking the wrong pathway, or the pathway being obstructed or too short.

Managing the hazards

Hazard management recommendations include those listed for traditional top rope belaying plus those in this section. Include strategies for managing hazards in technical systems, client management, and client briefings and skill checks.

Technical systems

Ensure the weight of the belay team is at least twice that of the climber and attach at least two people to the belay line. Options include using a direct tie.

Ensure area where belayers are standing or moving is free of obstacles, isn't slippery and is of sufficient length to manage the belay.

Hauling

Establish minimum and maximum hauling distances.

Attach an object to the belay line to mark the maximum haul height and to stop the line from travelling through the top anchor point.

Attach at least one belayer to the belay line and ensure there are sufficient belayers to haul the climber up.

If the activity involves the climber swinging, ensure that the swing arc is clear of obstacles.

Client management

Keep tight control of belaying speed and hauling distance.

Ensure the belay team moves back and forth to control the belay rather than passing the rope through their hands.

Client briefings and checks

Pay particular attention to instructing belayers on the importance of diligent belaying, not letting go of the rope, and how to manage the speed of the belay.

If hauling, instruct belayers on maximum and minimum hauling distances and speeds.

11.7: Swings and jumps

Swings are often provided as a discrete activity but are sometimes part of a high ropes course or adventure park facility. For the purposes of this guideline there are three different types of swings – the difference being at which point in the swing’s arc the client is attached and detached.

Jumping refers to activities that involve jumping into space, such as the trapeze or leap of faith, or jumping from platform to platform. These activities are usually part of a high ropes course or adventure park facility.

Appropriate supervision is a critical tool for managing safety. This section doesn’t look at supervision. For recommendations on supervision see [section 100](#).

Swings

This section describes the most common types of swing then looks at identifying and managing significant hazards for each.

Bottom loading and bottom detach

This is when the client is connected to the swing apparatus at the low point, either from a portable lifting structure or by lowering the swing ropes, and then:

- Mechanically retracted to the highest point of the arc.
- Launched to swing and swings until momentum stops or is stopped at the low point.
- Lowered to the ground or to a portable lifting structure, or having a portable structure brought to them and disconnected.

Top loading and top detach

This is when the client is:

- Connected to the swing apparatus at the highest point of the arc.
- Launched to swing and swings until momentum stops or is stopped at the low point.
- Retracted to the launch point and disconnected.

Top loading and bottom detach

This is when the client is:

- Connected to the swing apparatus at the highest point of the arc.
- Launched to swing and swings until momentum stops or is stopped at the low point.
- Lowered to the ground or to a portable lifting structure or having a portable structure brought to them and disconnected.

Identifying the hazards

Factors to consider when identifying hazards for swings include:

- Clients hitting obstacles in the path of travel, including lack of sufficient ground clearance.

- Incorrectly positioned fulcrum points for the belay system so that the client swings back, hitting the launching platform.
- Clients being caught in slack rope.
- Impact of peak forces on people and equipment.
- Clients launching incorrectly, including unsafe holding of equipment or structures.
- Clients unintentionally suspended upside down.
- Unstable take-off areas.
- Clients suspended in a harness for an extended period of time.

Managing the risks

Follow the recommendations in this section in addition to those on general exposure to edges and falling, suspension trauma, and using clients to perform safe critical tasks in [sections 11.1 to 11.3](#).

Include strategies for managing risks in facility design and build, technical systems, client management, and client briefings and skill checks.

Technical systems

Set the swing to a length that ensures sufficient clearance of obstacles and doesn't entangle clients in slack rope. This may require a re-set for swings using bottom loading and detaching systems.

If using portable platforms or ladders, ensure the platform is cleared from the swing's trajectory before the client launches.

Ensure take-off areas are sufficiently stable so that they'll not cause a person to fall.

Attach the belay system to a location on the client's harness that ensures they aren't caught in the rope when it becomes tight and don't become suspended upside down. This may require the attachment to be on the front or the back of the harness, depending on the type of swing.

Client management

Ensure that staff check the connection of clients to the belay system before they launch.

Supervise clients as in the recommendations in [section 10](#).

Client briefings and checks

Instruct clients in safe take-off and, where relevant, landing positions, including positions for body, head, hand, and limbs.

Jumps

Many of the hazards and management strategies for jumping are the same as those for swings. A key difference is that jumping activities often involve clients belaying other clients using a traditional top rope method.

Follow the recommendations in this section in addition to those for top rope belaying and for swings.

Identifying the hazards

Factors to consider when identifying hazards for jumps are the same as those for swings and for top rope belaying.

Managing the risks

Follow the recommendations in this section in addition to those on general exposure to edges and falling, suspension trauma, and using clients to perform safe critical tasks in [sections 11.1 to 11.3](#).

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



Technical systems

Ensure that the position of the belay system fulcrum point and the rope length means the client won't swing back into the take-off structure.

Jumps with a free fall. Use a sit harness and add a chest attachment if the client is likely to invert. Consider factors such as whether the client is top heavy and how easily they can hold themselves upright.

Jumps involving leaping forward. Use a full body or seat and chest harness and attach the belay system at the back (behind the client).

Unstable take-off areas. Jumps will sometimes deliberately design a take-off area to wobble. Ensure that the fulcrum point of the belay system and the rope tension are such that the client won't impact against the launching platform if they launch unexpectedly.

Client management

Increase client screening for belayers. Jumps are more challenging to belay than standard top rope belaying.

Directly supervise belayers.

Ensure communication systems between the belayers and the climber involve a check that the belayers are in a hold/locked off belay position before the climber jumps.

Client briefings and checks

Ensure belayers are competent to belay jumps and that they understand that top rope belaying for jump activities is more challenging than for standard climbing activities.

Jump activities where the belayers need to move:

- Check that belayers understand when to move and where to, and that they're in a hold/locked off belay position while they're moving.
- Ensure that the climber knows when the belayers will need to move and is stationary and stable while they do so.

11.8: Ziplines

Ziplines expose people to the risks of falling from height and colliding with objects at high speed.

Appropriate supervision is a critical tool for managing safety. This section doesn't look at supervision. For recommendations on supervision, see [section 10](#).

Identifying the hazards

Factors to consider when identifying hazards for ziplines include:

- Incorrect attachment to the zipline.
- Clients not stopping in time or stopping too abruptly due to inadequate braking systems.
- Clients hitting obstacles in the path of travel or stopping zones.
- Impact of peak forces on people and equipment.
- Zipline attachments causing entanglement or interfering with retrieval or braking systems.
- Clients suspended in a harness for an extended period of time.
- Clients' hands, hair, or clothing being in positions where they could be caught in pulleys.

Managing the risks

Follow the recommendations in this section in addition to those on general exposure to edges and falling, suspension trauma, and using clients to perform safe critical tasks in [sections 11.1 to 11.3](#).

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

Good practice alert for using ziplines

Recently there have been two near miss incidents involving clients connected to ziplines by one point of attachment. This has resulted in both WorkSafe and the ASG working group making the following recommendation for the use of ziplines:

Use two points of attachment between the client's harness and the safety line.

Ensure that attachments don't cause an entanglement hazard or otherwise interfere with other parts of the safety system such as braking or retrieval systems.

Technical systems

Ensure the zipline is clear of obstacles, including the last user, before launching another person. Where simple voice or visual signals aren't possible or technology is required (such as radios), use two checks before confirming the line is clear.

Where clients perform active braking with their hands, ensure they use gloves that protect their hands and enable effective braking.

Client management

Supervise clients as in the recommendations in [section 10](#).

Client briefings and checks

Conduct the checks and give the instructions in this section when training and assessing client competence for different levels of supervision and as needed during ongoing supervision:

- Instruct clients on safe hand positions that will ensure their hands won't become entrapped in pulleys or breaking systems.
- Clients involved in active braking – ensure that clients know what to do to brake and, where relevant, to stop themselves sliding back along the zipline once they've reached the end point.



Photo: ZiptrekEcotours

11.9: Mobile platforms

Mobile platforms are activities where the client is on a sliding structure that transports them from one place to another. These activities occur in adventure park facilities and present risks of falls from height and impact injuries, and also of entrapment of body parts in moving components.

This guideline assumes that mobile platforms do not require active braking. If active braking is involved, follow the relevant recommendations as in the ziplines section.

Appropriate supervision is a critical tool for managing safety. This section doesn't look at supervision. For recommendations on supervision, see [section 10](#).

Identifying the hazards

Factors to consider when identifying hazards for mobile platforms include:

- Clients not stopping in time or stopping too abruptly due to inadequate braking systems.
- Heavy clients causing the platform moving faster than it was designed to.
- Wet or slippery components causing the platform to move faster than it was designed to.
- Clients' hands, hair, or clothing caught in pulleys.

Managing the risks

The recommendations in this section are in addition to those on general exposure to edges and falling, suspension trauma, and using clients to perform safety critical tasks in [sections 11.1 to 11.3](#).

Include strategies for managing hazards in facility design and build, technical systems, client management, and client briefings and skill checks.

Technical systems

Ensure staff are aware of safe parameters for client weight.

Ensure staff know how to monitor and check for safe parameters for environmental conditions.

Client management

Supervise clients as in the recommendations in [section 10](#).

Ensure clients are within the platform's safe weight parameters.

Client briefings and checks

Conduct the checks and give the instructions in this section when training and assessing client competence for different levels of supervision and as needed during ongoing supervision:

- Ensure clients are briefed on which activities involve moving platforms and understand that these activities present the additional risks of entrapment of body parts and clothing.
- Instruct clients on safe hand and body positions that will ensure they won't become entrapped in moving components.

11.10: Multi-person activities

Multi-person activities are those where two or more people are participating in an activity at the same time and where this directly affects the requirements of their belay systems, eg tandem swings and ziplines, and high ropes course multi-person climbing activities such as the giant's ladder.

Appropriate supervision is a critical tool for managing safety. This section doesn't look at supervision. For recommendations on supervision, see [section 10](#).

Identifying the hazards

Factors to consider when identifying hazards for multi-person activities include:

- Clients becoming competitive to the extent that they no longer participate safely.
- Additional weight and forces on equipment and structures.
- Clients colliding with each other.

- Belay system components becoming entangled.
- Climbers travelling off route – pendulum falls and interference with other climbers.
- Where clients are belaying other clients – difficult communications between climbers and their belayers.
- Where clients are belaying other clients – belayers becoming confused as to which climber they're responsible for.

Managing the risks

The recommendations in this section are in addition to those on general exposure to edges and falling, suspension trauma, and using clients to perform safety critical tasks in [sections 11.1 to 11.3](#).

Include strategies for managing hazards in facility design and build, technical systems, client management, and client briefings and skill checks.

Technical systems

Where relevant, ensure staff are aware of safe parameters for total client weight.

Ensure that clients are positioned so that they won't interfere with each other's safety at any stage during the activity. For tandem swings, ensure that clients are close together.

For multi-person climbing activities, lower one person at a time and consider using different coloured ropes for each climber.

Ensure there is sufficient room so that belayers can belay safely and that belay systems for each climber won't interfere with the others.

Client management

Supervise clients as in the recommendations in [section 10](#).

Where relevant, ensure that clients are within the safe weight limits.

For tandem swings, ensure that staff correctly position and brief clients so that they launch together.

Client briefings and checks

Conduct the checks and give the instructions in this section when training and assessing client competence for different levels of supervision and as needed during ongoing supervision:

- Ensure clients are aware that multi-person activities involve additional hazards.
- For tandem swings, brief clients on correct body and limb positions, including how to hold onto each other.
- For multi-person climbing activities, brief clients on the correct route to take and on the dangers of entangling ropes.
- For multi-person climbing activities, brief clients on clear communication systems between climbers and belayers. Consider using names and minimising noise during transfers to lowering.

Section 12: Emergencies

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

This section looks at good practice for accessing suitable external emergency support. Other important factors that contribute to effective emergency management are covered elsewhere in this guideline and include:

- [Section 5](#) and [section 8](#), which look at emergency equipment and staff competence.
- [Section 7](#), which looks at site and activity management and communication procedures.

Accessing suitable external emergency support

Ensure that suitable external emergency support is available as soon as is practicable and within a planned period of time – ideally within daylight hours. Specify this period of time in the operation’s emergency procedures.

When conducting emergency planning and developing emergency procedures, consider factors that could impact on the availability of suitable external emergency support.

These include:

- The ability to call for external support from the site.
- The type of external emergency support required by each emergency scenario.
- Site access and evacuation options.
- Capacity and ability of local rescue resources such as community rescue agencies and other high wire and swing operations.

Contingencies for limited access to emergency support

Where sites are at locations with limited access to suitable external emergency response, injured clients may spend longer without secondary emergency care. This risk needs to be managed. Management strategies should be based on the associated risk.

Options to consider include:

- Informing clients of the risk of a prolonged wait for emergency support in the event of an accident.
- Using more experienced guides or instructors and ensuring they’re competent to manage identified emergency scenarios for an extended period of time.
- Finishing activities early in the day to allow time for external emergency response.
- Considering accessibility when determining client supervision systems and levels, assessing clients, and setting competence requirements for staff.
- Taking extra care and considering excluding avoidable higher risk activities.
- Training on activity access and escape options, and training with local rescue response personnel on site.

- Making resources available to manage an injured client for longer periods of time. Consider additional first aid equipment or shelter.

For more information on developing procedures for emergency management, go to:

www.supportadventure.co.nz/safety-management-plans/emergencies



Photo: Ziptrek Ecotours

Section 13: Safety System Reviews

Regular internal and external safety system reviews or audits are a crucial part of running safe high wire and swing operations.

13.1: When to review

High wire and swing operators are required by the Adventure Activity Regulations to undergo an external audit before they begin operating, and at regular intervals after that.

Always conduct an internal safety system review after an incident that caused a serious injury or might have caused a serious injury. Consider involving an external reviewer too.

Schedule internal reviews as part of the annual safety routine. Before and after the busy season are often good times.

13.2: What to review

Reviews should consider:

- All incidents in the period, looking for trends.
- All complaints in the period, looking for trends.
- The hazard register, including the drug and alcohol hazard. See the WorkSafe website www.business.govt.nz/worksafe/information-guidance/
- Technical advisor input to activity management plans.
- Audit reports.
- Engineers' reports.
- The SupportAdventure website: www.supportadventure.co.nz
- Any sector learnings, eg from conferences, workshops, investigations, and prosecutions.
- The *High Wire & Swing Activity Safety Guideline*.
- Operational performance against safety goals and objectives.
- The requirements of current legislation are being met, eg overlapping duties and top leadership responsibilities as required by the Health and Safety at Work Act 2015.

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 high wire and swing operators.

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

Appendix 1: Health and Safety Terms

The guideline uses several terms you need to understand to be sure you comply with the health and safety legislation.

Hazard and risk

The Health and Safety at Work Act 2015 requires operators to take all reasonably practicable steps to manage the risks arising from hazards.

Hazard

Anything that does or could cause harm, including a person's behaviour when it may cause harm, eg due to the effects of fatigue or drugs and alcohol.

Significant hazard

A hazard that does or could cause a notifiable event.

Harm

Illness, injury, or both, including physical and mental harm caused by work-related stress.

Risk

A chance of harm.

Reasonably practicable

The Act requires operators to safely provide activities, considering:

- The likelihood of harm occurring.
- The severity of any harm that may occur.
- How much is known about the hazard or risk and the ways to eliminate or minimise the risk.
- The availability of ways to eliminate or minimise the risk.
- The cost and whether it's disproportionate to the risk (after considering the points above).

Where there is a serious risk, a greater cost in providing safeguards may be reasonable. If there are significant hazards and the measures are too expensive, unavailable, or ineffective, the only reasonably practicable step might be to cancel the activity.

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

Serious risk

A chance of a notifiable event.

Notifiable event

The Act states that a notifiable event means any of the following events that arise from work: the death of a person, a notifiable injury or illness, or a notifiable incident.

Notifiable injury

For operators, this will usually mean any of the following injuries that require the person to have immediate treatment (other than first aid) or treatment within 48 hours:

The amputation of any part of their body

- A serious head injury
- A serious eye injury
- A serious burn
- The separation of their skin from an underlying tissue (such as degloving or scalping)
- A spinal injury
- The loss of a bodily function
- Serious lacerations.

For the legal definition, see the [Health and Safety at Work Act 2015, section 23](#)

Appendix 2: Checking Structures

Verify that existing high wire and swing structures have structural integrity and are suitable for high wire and swing activities.

Proof of design and build suitability may be achieved via manufacturer's instructions, building consents, or engineers' reports. Ensure that such documentation has taken into account peak forces likely to be generated by high wire and swing activities.

Where none of these are available, ensure the structure undergoes an initial check as described in EN 15567-1, taking into account the recommendations in [section 4.3.0](#) of this guideline.

The frequency and focus of future checks should be informed by the above inspection and the recommendations in EN 15567-1.



Appendix 3: Flying Foxes

There are ziplines not subject to the Adventure Activity Regulations and outside the scope of this guideline. These include some ziplines where the participant isn't attached by a belay system or critical connection. Also, ziplines suspending participants less than three metres above the ground may not be subject to the regulations if they haven't the potential to cause a serious injury. For the purposes of this appendix, these ziplines are referred to as flying foxes.

This appendix assists flying fox operators provide safe experiences. The recommendations are from relevant sections of the Accident Compensation Corporation (ACC) code of practice for flying foxes. This ACC code of practice is no longer published.

The information in this appendix shouldn't be considered all-inclusive. It's essential to carry out site and activity-specific hazard management processes.

Additional sources of information and technical expert advice on managing risks associated with flying foxes include Project Adventure, New Zealand Adventure Parks Embrace Safety (NZAPES), New Zealand Standard 5828:2004, *Playground equipment and surfacing* and European standard EN 1176-4:2008, *Playground equipment and surfacing – part 4: Additional specific safety requirements and test methods for cable ways*.

Design, build, and inspection

Follow the recommendations in this section and in [section 4](#) of this guideline. This section looks at flying fox seats, braking systems, surface padding, and checking the design and build.

Seat

Ensure that:

- There is a device that enables passengers to be seated throughout the flying fox journey, such as a T-bar, button seat, or a harness.
- The seat is connected to the cable as in [section 4.2](#).
- The unloaded passenger seat is no higher than 1800mm off the ground.
- The height of the seat is such that, when under a 90kg load, it's no lower than 500mm and no higher than 1000mm above the ground.
- The height of the cable is sufficient that, while carrying a 90kg load, it remains a minimum of 2200mm above the ground at any point during the ride.
- The distance between the seat and the cable is sufficient to stop entanglement with the cable by the passenger or their clothing.

Braking

Ensure that:

- The speed of arrival of the passenger at the end of the flying fox is no greater than three metres per second.
- There are two braking systems that can each independently stop the passenger, eg gravity, brake blocks, and tyre brakes.

Surface padding

Provide a protection surface along the path of the flying fox that is sufficient to absorb impact and prevent injury, eg 300mm of bark.

Checking design and build

Check with the local building authority on their interpretation of the Building Act 2004 and whether it applies to the flying fox.

Ensure there is documented proof of design and build suitability and that it's provided by a person competent to do so, eg manufacturers' instructions, building consents, and engineers' reports.

The frequency and focus of ongoing inspections should be informed by the above documentation and the use, current condition, and exposure to damage of the flying fox, but time between ongoing inspections shouldn't exceed four weeks.

Ongoing inspections should include a particular focus on critical connections, the cable, moving parts, and the braking systems.

Ensure there is an annual check of structural integrity by a person competent to do so.

Operating

Operating parameters

You should establish:

- A maximum safe weight for passengers to ensure that the flying fox is operated within the parameters recommended in the design, build, and inspection section. Consider line sag, seat height, travel speed, and braking systems.
- A maximum number of passengers who can safely use the flying fox at one time – one person is recommended.
- A minimum age for passengers.
- A non-encroachment zone of at least 2400mm along either side of the path of the flying fox.

Signage

Use signage to indicate the boundaries of the non-encroachment zone and consider using barriers.

Use signage to inform participants of the limits of the operation, including:

- The conditions of supervision, that is, unsupervised or hours of supervision.
- The maximum number of passengers.
- The maximum load in kilograms.
- The minimum age for passengers.
- Any operational instructions.
- A declaration of risk and consequences of not following the above information.
- Contact names, phone numbers, and addresses for reporting accidents and for first aid or emergency assistance.