Chapter 8

Risk assessment and management

In this chapter you will find out:

- ✓ Some of the hazards and risks you need to manage.
- ✓ Ways to reduce them.
- ✓ Some useful reference material.

Hazards and risks

Hazards have the potential to cause harm including serious injury or death.

Risks are what could happen if someone is exposed to a hazard.

Risk considers both the likelihood and consequences of exposure. Risks can be to people, environment, and property.

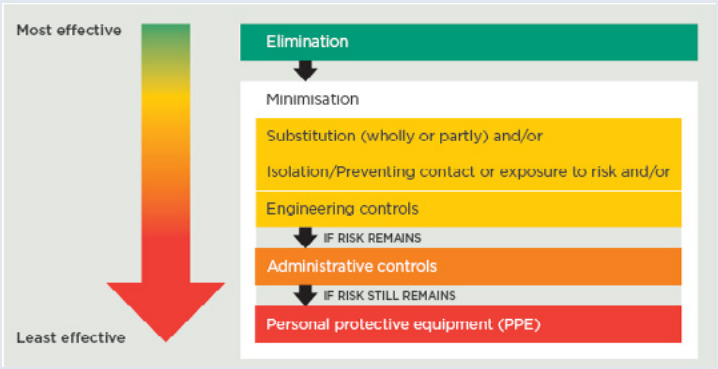
Risk management process

The risk management process should include the following steps:

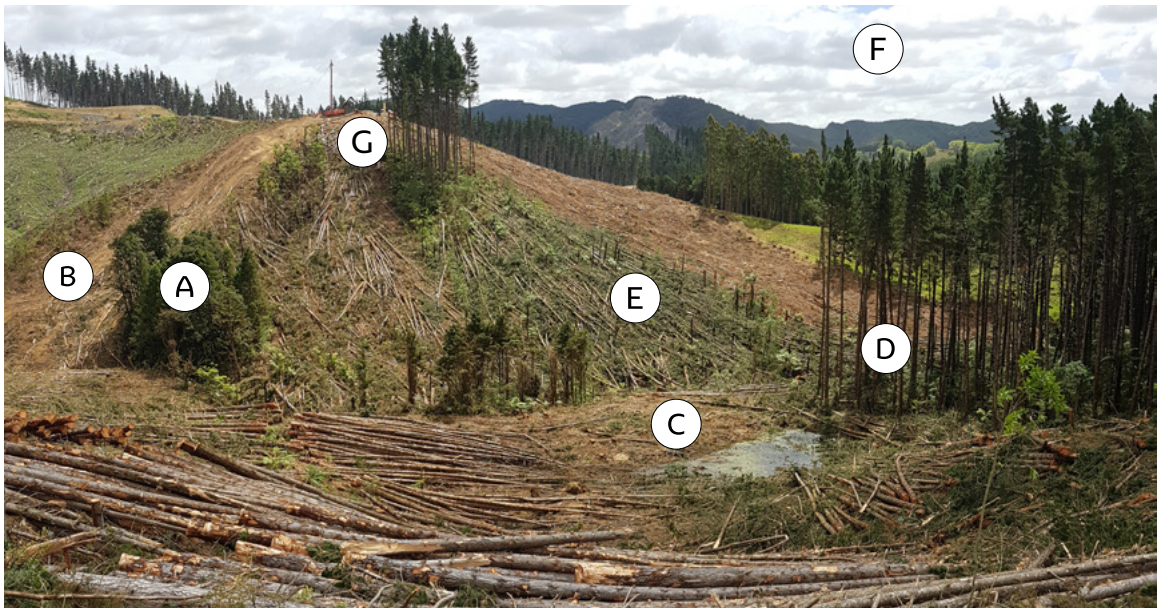
A risk assessment will help decide:

- How severe is a risk.
- How likely it is to occur.
- Whether existing control measures are effective.
- What additional action needs taking.
- How urgently it needs doing.

The following table provides information on each of the steps in the above diagram.

Process	Consideration
Identify Hazards	Find out what could cause harm or damage to people, property and the environment. For example: – Physical work environment including site factors – People and tasks – Work design and planning – Plant and equipment
Assess Risks	Understand the harm that could be caused by the hazard, how serious the harm may be, and the likelihood of it happening.
Eliminate Risks	It is best to try and **eliminate risk**. If eliminating the hazards and associated risks is not reasonably practicable, you must **minimise** the risk by one or more of the following control methods: 
Control Risks	If it is not reasonably practicable to eliminate the risk, implement effective control measures to **minimise risk**. (Refer to the hierarchy of control measures in the above diagram). Ensure the controls are: A Fit for purpose B Suitable for the nature and duration of the work C Installed, set up and used correctly D Understood by those exposed to the hazard. Also consider whether your preferred control measures introduce new hazards or unintended consequences.
Monitor / Review	Monitor controls, and periodically review them. This helps ensure they remain fit for purpose, are being implemented correctly and are working effectively. Also, consider if there are any new risks. Where relevant and available, reviews should include inspection, consultation, testing and analysis of records and data.

Potential hazards



A Native vegetation and fish habitat

B Soil and rock type

C Rivers and wetlands

D Diameter and height, and spacing of the trees

E Steepness and ruggedness of the area

F Amount of rainfall and storms

G Rolling debris

Risk likelihood/consequence matrix

A common way to determine the likelihood and consequence of a risk is through a standard risk matrix. It is a way to assess the potential seriousness of a possible incident. Once the risks are understood, appropriate controls or protection can be put in place. The greater the risk, the stronger the controls need to be. The following is an example of a risk matrix.

Consequence Increasing \ Likelihood Increasing	Negligible	Unlikely	Possible	Likely	Almost Certain	Certain
Catastrophic	Medium	High	Extreme	Extreme	Extreme	Extreme
Extreme	Medium	Medium	High	High	Extreme	Extreme
Major	Low	Medium	Medium	High	High	Extreme
Moderate	Low	Low	Medium	Medium	High	High
Minor	Low	Low	Low	Low	Medium	Medium
Insignificant	Low	Low	Low	Low	Low	Medium

Bowtie risk assessment

The bowtie diagram is a form of risk assessment. It helps to visualise the risks, causes and controls on a single page.

The centre of the bowtie is a main hazard. To the far left are potential threats or causes for the central hazard. To the far right are potential consequences if the central hazard happened. For example, in the bowtie diagram below, injury and machine damage can be caused by weather and site conditions, who is doing the work, how it's planned and what equipment you are using. As a consequence of injury and machine damage is a trapped or injured operator, a damaged machine including fire, an environmental incident, and a legal problem.

Preventative controls on the left side interrupt the threat so it either does not occur, or if it did, does not result in an injury or machinery damage. For example, in the top left gold box is poor site conditions and weather. There's several preventative measures that include stopping work by either not working or moving to safer part of harvest area. Recovery controls on the right side make sure that if the central hazard does happen, it either does not escalate into an actual incident, or if it did, the impact of the incident is minimised. For example, the recovery controls for a trapped and injured operator are one or more of the recovery controls which include: multiple access to the cab, and having someone onsite that can give first aid.

Cause or threat	Prevention controls		
Physical work environment			
Poor site conditions eg. high wind, rain, soil type and moisture, slope	Avoid or reduce operating in high-risk conditions	Follow the adverse weather policy. Check the weather forecast. Meet the environmental standards	Cease work – leave or move to safer part of block
People and their tasks			
Impairment eg. fatigue, health, drug and alcohol	Follow fatigue management plan. Health checks	Complete 'fit for work' on the day (unit 22994)	Cease or suspend work Monitor operator logbooks
Operator lacks competency, is inexperienced or inadequate supervision	Work practices are monitored (SBO)	Follow business induction, training and operational requirements	In-cab device to monitor working slope & rope tension
Rules, policy, guidance not followed eg. ACOP/good practice guides/regulations/ manufacturer's documents		Stop work, reassess plan and risk controls	Practices/guidance is periodically reviewed
Work design/planning			
Work plan poor or flawed	Have detailed and agreed harvest plan for block. Eg. slope map, no go zones	Review felling plan daily. Monitor via SBO/ site visits	Operator awareness of site hazards/risks & how to manage them
Plant & equipment			
Mobile anchor moves or tips over	Follow process to monitor anchor integrity/stability	Test initial position stability Install auto stop braking mechanism	Minimum of 1 layer wrap on winch drum
SSH tips over while repositioning	Follow manufacturer's guidance	Move one machine at a time. De-tension rope	Develop procedure to manage machine repositioning
Anchor machine power loss		Check machine daily	Install over-riding drum braking system
Harvester forwarder, or skidder power loss			Install over-riding braking system to stabilise machine
Winch-assist system failure eg. rope, connector, or fitting	Comply with the CP ENG certification and the Worksafe fact sheet	Active operational monitoring eg. rope, fitting & connector checks	Manage rope 'bight'
Machine failure through general machine wear & tear	Undertake required inspections specified by the designer, manufacturer or supplier		
SSH hit by object and cabin penetrated	Cab guarding meets industry standards. Structural damage assessed and repaired in a timely manner	Ensure 'working alone' process in place	

Note: Using this guide will help develop preventative and recovery controls for many of the threats and consequences. Winch-assist contractors are advised to complete their own risk assessment.

Personal injury and/or machine damage

	Recovery controls			Consequences
Investigate incident	Minimum 2 (preferably 3) emergency exits with two accessible from the outside. Follow Emergency Response Plan (ERP) including emergency procedures		Provide first responder assistance	Trapped or injured operator that can't exit machine
	Follow ERP safely	Recover machine	Ensure fire suppression available. Test periodically	Machine fire damaged
			Find alternative work or temporary stand crew down	Machine damaged (no fire)
		Notify relevant persons/ authorities	Provide first responder assistance. Ensure site is frozen	Worksafe notifiable event
	Undertake remedial work		Advise management. Seek advice	Environmental damage
				Prosecution, fine, notice, or another liability
Assess risks and plan and implement alternate work methods				Loss of production

Emergency plan

General emergency plan

- Follow the crew emergency response procedures.
- If a winch-assisted machine operates across multiple crews, then the emergency plan followed is with the machine's crew.
- Display emergency procedure stickers prominently on the worksite and in all vehicles and machines.
- If an emergency occurs, ensure emergency services are contacted and dispatched as soon as practical.
- GPS Emergency location coordinates must be current for each work site for emergency services. These are often on the harvest map or plan or written up on the crew container white board.
- Know your nearest Emergency meeting point (if that system is used) or the identified helicopter landing area.

Know the emergency plan.

Emergency preparedness

- Test check-in procedures.
- Inspect and test escape hatches. Schedule drills to ensure that the operator can fit through the hatch.
- Have a plan for evacuating an operator off the hillside.
- Have a plan for repairs and delivering heavy parts to a downslope machine.
- If possible, move machines to safe areas to perform maintenance. Ensure machines are de-energised and stable.
- Clean and inspect build-up of flammable materials or leaks within the engine compartment.
- Fire suppression systems should work in any orientation.
- Have procedures for using and maintaining a handheld tool for the operator to cut their way out in the event of a rollover or rescue procedures for crews to cut operators out.
- Check that the two escape hatches can be accessed outside the cab.
- Know what to do if there's a loss of communication between the WAM and the mobile plant being assisted.

A machine in an unstable position

Evaluate different scenarios and come up with emergency plans for the most likely. Make them part of the general emergency plan. An emergency plan could have the following:

- Stay in the cab. Exiting the cab often is a poor decision as it may increase the risk of personal safety.
- Secure yourself against injury should machine movement occur.
- Establish radio contact with your supervisor or onsite contact.
- Identify your location, explain the situation, request assistance.
- Evaluate the situation, e.g. will releasing the load improve or reduce machine stability? Will raising or lowering the blade/boom/attachments increase or decrease the likelihood of a rollover?
- If the evaluation comes up with some solutions, attempt to improve the situation, e.g.
  - Activate the blade braking device on the assisted machine if available.
  - Activate the track or wheel brakes on the steep slope harvesting machine.
  - Use the head's grapple to hold on a tree or stump or set the head or heel rack (if available) into the ground to provide further braking resistance.
- Wait for assistance to arrive.
- Exit the cab only if safe to do so once the assisted machine is fully immobilised.
- If your assessment determines the least risk option is to exit the cab, first survey the area for hazards, e.g. uneven ground, falling or rolling debris, unstable logs. Communicate your plan before exiting.

When to stop winch-assisted felling?

Operators must be clear about under what conditions operations should cease. These might include:

- Changes in weather that increase the risk to an unacceptable level, e.g. high winds, heavy rain, thick fog, darkness.
- Changes on the felling face, e.g. saturated or unstable soils, storm damage, rock, steepness.
- Damaged equipment, e.g. radios, electronics, hydraulics, damaged safety features.
- Fatigue, e.g. unable to maintain concentration or focus.
- Operator confidence.

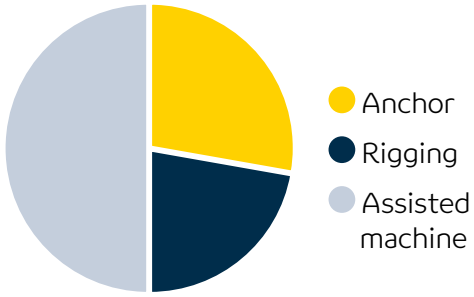
Unplanned events, or changed plans, can lead to accidents. If something changes, stop work, and review the plan with others.

Don't be pressured into felling more when you have decided to stop.

Winch-assist incidents

It's best practice to consider findings from accidents and incidents and apply these learnings to operations. The Forest Owners Incident Reporting and Information System (IRIS) records incidents for a range of activities and periodically publishes its findings. Analysis of IRIS data shows the recent WAM incidents are split between the key three components.

Winch-assist incidents



Anchor set up, and anchor components were about **a third** of all incidents. This included winch components, controllers and site factors. Anchor lead angles incidents were included.

Rigging related incidents were about **one in five** incidents. This included ropes, chains, connectors, and unintentional factors like binding and redirects.

Assisted machine (most commonly a harvesting machine) accounted for **half** the incidents. This covered harvester stability, trees falling onto the machine, other felling issues, cab and operator specific incidents like slips, trips and falls.

Safetree Reference: How to... manage forestry risks

safetree.nz/wp-content/uploads/2017/03/Managing-risk-in-forestry_March-2017.pdf

Regulations

Two recent regulation examples that will impact on winch-assisted harvesting are the General Risk and Workplace Management (2016) and the Plant and Structures Regulations currently under development (at 06/22). The former requires businesses to manage risks associated with remote or isolated work, working under raised objects and falling objects.

The latter will likely require plant registration (design and item of plant), periodic inspection and installation of safety devices.

Harvesting activities must meet many regulatory requirements including the Health and Safety at Work Act 2015. Refer to chapter 11, page 113.