safetree

Cable Yarder Safe Access and Guarding

Best Practice Guidelines

Foreword

The Forest Industry Safety Council's Safe Access and Guarding Best Practice Guidelines aim to make yarders safer to work around. The BPG addresses the lack of clarity and consistency forest managers and yarder logging contractors have on access and guarding requirements. The BPG creates straightforward visual guidance around the different aspects of safe access and compliant guarding and helps promote the acceptable standard irrespective of yarder type, age, and brand.

The BPG was jointly funded by FISC and FICA, and developed with expert advice from a technical advisory group supported by forest owners, FICA, Worksafe and machinery manufacturers. The BPG will be updated. Please provide any feedback to enquiries@fisc.org.nz

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FOREST INDUSTRY SAFETY COUNCIL
TOGETHER TOWARDS ZERO

FICA
FOREST INDUSTRY CONTRACTORS ASSOCIATION

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Disclaimer

The Cable Yarder Guarding and Safe Access Best Practice Guidelines is a guide and do not supersede legislation or equipment manufacturers' recommendations.

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In this chapter, you will find out: 40

Introduction

The Best Practice Guide's purpose

The purpose of this guide is to assist operators, contractors, and supervisors:

- ✓ Improve understanding of guarding and safe access to yarders.
- ✓ To provide guidance on what is considered best practice.
- ✓ Help improve the safety on yarders.
- ✓ Assist manufacturers, importers, suppliers, modifiers, forest companies, logging companies, and contractors in understanding and meeting the law.
- ✓ Help assessors and regulators with compliance.

Duty of care

The Best Practice Guide helps fulfil the duty of care requirements within the H&S at Work Act 2015 on Persons Conducting a Business or Undertaking (PCBU). These require PCBUs to provide and maintain a safe work environment, safe plant and structures and safe work systems. Everyone must play their part, including employers, workers, machine designers and manufacturers.

Symbols used in the guide

The term "yarder" in the BPG refers to integral and free-standing towers, swing yarders and Harvestline extraction systems.

Warnings

Warnings specify hazards associated with a task, location, or equipment.

Examples of good and poor practice:


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Part A

Managing access and guarding hazards and risks

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.

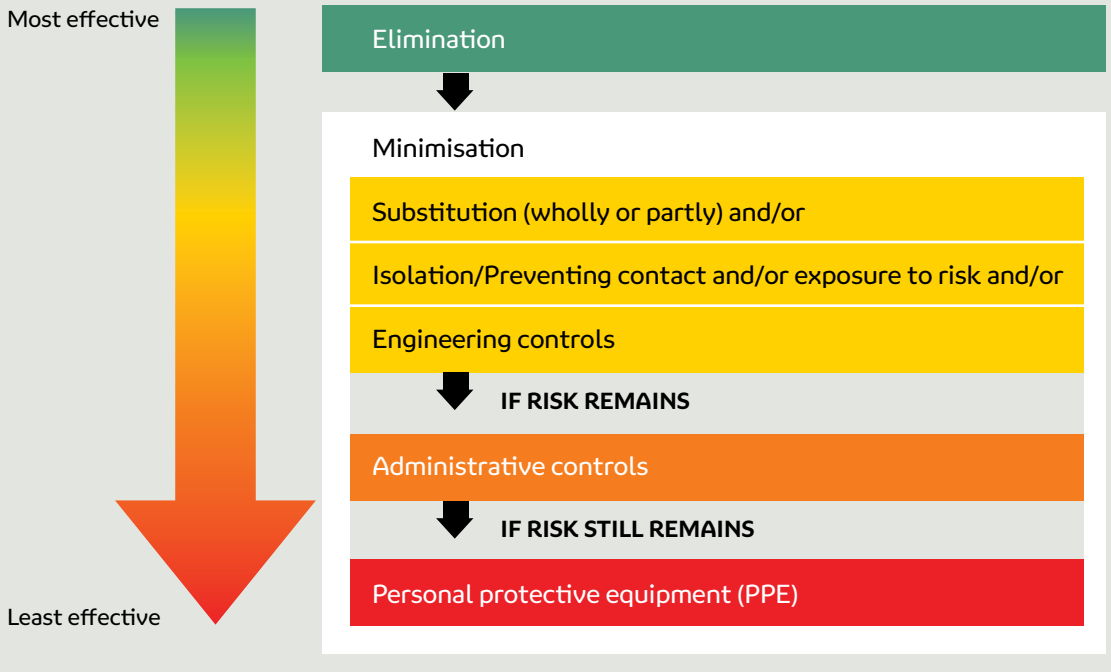
Risk management process

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 to be taken.
- How urgently it needs doing.

The risk management process should include the following steps:

Hierarchy of controls



Safetree Reference: How to manage forestry risks
www.safetree.nz/resources/managing-risk-in-forestry-operations

Potential hazards

A Height - fall from height

B Moving parts e.g. drums, wire ropes

Examples of other hazards are (not exhaustive list): poor or ineffective design, rotating shafts, clutches, hot parts, chains, nip points, winch rope

Potential risks

There are many risks around each of the hazards found on yarders. The same risk can apply to multiple hazards, e.g. slipping from height and slipping through ineffective design.

Risks - Falling from height

Tower grease points on the deck eliminate climbing or lowering the tower to grease.

A risk eliminated by a key lock becomes a risk by attaching the key to the access controller.

Risks - from Moving parts

Moving parts are hazards. They create the risks of entrapment, crushing, cutting, or being injured from heat generated by the moving parts.

Post-manufacture railing and grease points reduce risk from heat (yellow arrow), trips and slips (blue), entanglement (black), and falls (white).

Retrofitted kick plates reduce the risk of things falling onto someone or something.

Risks - Poor or ineffective design

A - The exposed exhaust is at waist height immediately next to the accessway. The manufacturer's label indicates it was a known problem.

B – The narrow accessway and guyline winch location has created hazards. Control these hazards by physically restricting access to the area using self-closing and latching gates. Provide alternative safe access if required.

C – The three lowest steps are only a single boot wide which puts the body off balance when climbing.

Normalising hazards and risk

Working around moving ropes, engines, and narrow and often muddy accessways is far from normal. However, it may appear normal to those operating or working around yarders due to familiarity.

Normalising working around a yarder and its potential risks can give workers a false sense of security. The everyday nature of the work can lead to inadequate planning, operational checks, and controls due to ignoring or downplaying the identification, monitoring, actions, and consequences. Working around yarders, like other aspects of harvesting, requires constant and careful management.

Do not normalise the hazards and risks around yarders.

Excellent access steps choked with mud, now a hazard due to slipping and leg grating down the steps' serrated edges. The amount of mud indicates the risk is normalised.

Right: The toolbox, hose, and 20-litre container location forces the operator towards a narrow walkway next to unguarded main winch ropes. Also, standing on top of the toolbox makes the guard rail below the required height.

Manage safe access and guarding issues

Addressing access and guarding issues makes the work place safer. It is critical to develop an improvement plan. A plan helps ensure work happens, e.g. during annual maintenance or other downtime. A plan also means items can be budgeted. 'Access' includes egress and general movement around the yarder, as one can't be done without the other.

Not all problems are easy or cheap to fix. There are many reasons for this. They include:

- Machinery type and design
- The amount and type of Original Equipment Manufacturer's (OEM) protection
- The practicality of eliminating, minimising, or improving the problem.

Be aware of unintended consequences when retrofitting.

Isolate, lock, and tag

During day-to-day operations, operators or service people will do maintenance. It is essential to isolate the yarder from being able to be turned on if maintenance or other work is happening. WorkSafe provides helpful guidance on their website page, 'Keeping workers safe with machine lockouts'.

- The switch has been isolated, locked and tagged
- This could be a battery isolator which would effectively lock the machine out (lock out tag out)

- The key is in the machine
- A tag on a key is not a lock out

Always lock out, tag, and de-energise before doing any maintenance. Hydraulic systems must also be de-energised. This could be a battery isolator which would effectively lock the machine out (lock out tag out).

Health and Safety at Work Act

The Health and Safety at Work Act focuses on eliminating risks. Contractors are responsible for eliminating risks.

The meaning of 'reasonably practicable' in the Act

In this Act, unless the context otherwise requires, reasonably practicable, in relation to a duty of a PCBU set out in subpart 2 of Part 2, means that which is, or was, at a particular time, reasonably able to be done in relation to ensuring health and safety, taking into account and weighing up all relevant matters, including—

(a) the likelihood of the hazard or the risk concerned occurring; and

(b) the degree of harm that might result from the hazard or risk; and

(c) what the person concerned knows, or ought reasonably to know, about—

(i) the hazard or risk; and

(ii) ways of eliminating or minimising the risk; and

(d) the availability and suitability of ways to eliminate or minimise the risk; and

(e) after assessing the extent of the risk and the available ways of eliminating or minimising the risk, the cost associated with available ways of eliminating or minimising the risk, including whether the cost is grossly disproportionate to the risk.

Cost is the last criterion, and for consideration, it must be "grossly disproportionate to the risk".

Part B

Best practice for safe access - all yarders

In this chapter, you will find out:

- ✓ What best practice yarder access looks like.
- ✓ What poor yarder access looks like.
- ✓ Ideas on ways to improve access.
- ✓ Things to check regularly to make sure the yarder is safe access compliant.

What is safe access?

Safe entry, movement and exit provide workers with a safer work area. Safe access helps reduce or minimise the risk of slips, trips, falls, or falling objects. Access includes getting off the yarder (egress).

Access to cable log yarders should be of a better standard than many other workplaces because of the added risks from:

- Mud, dirt, oil and pine needles
- Closeness to moving ropes and parts
- Proximity to an engine

The following five documents help define what safe access means:

- WorkSafe NZ publication (July 2019) Best Practice Guidelines for Working at Height in New Zealand
- AS/NZS 1657 Fixed platforms, walkways, stairways and ladders. Design, construction and installation
- AS/NZS 1891.2 Industrial fall-arrest systems and devices. Part 2: Horizontal lifeline and rail systems
- AS/NZS 1891.4 Industrial fall-arrest systems and devices. Part 4: Selection, use and maintenance
- AS5327:22 Earth-moving machinery - Access systems

Safe access also focuses on what could hit a worker from above. For example, there are hazards and risks from falling, dropping, or kicking objects.

What type of safe access is needed?

The best practice guide aims to help show what safe access means in practice. However, ultimately, it comes down to the Person Conducting a Business Undertaking (PCBU) to assess the yarder-specific hazards and risks and putting in place measures that address safe access.

The type of access will depend on how often machine parts need accessing and what needs doing. Some regularly accessed areas, like the operator's cab, must have safe and convenient access for any worker.

The myth of the 'three-metre rule'

Worksafe's 'Best Practice Guidelines for Working at Height in New Zealand' is very clear around the mistaken belief that no controls are needed when a person faces a fall of less than three metres. In the guide, they state 'that if there is a potential for a person at work to fall from any height, reasonable and practicable steps must be taken to prevent harm from resulting. Doing nothing is not an option.'

Falls from low heights can be hazardous, and people must be protected.

Hierarchy of controls

The most effective controls are engineered solutions rather than procedures and personal protective equipment. The chapter will show many examples of opportunities to eliminate or minimise, including isolating, problems through improved design. Relying on people to always make the right decisions leaves contractors vulnerable, especially when there are other ways to improve because 'reasonably practicable' steps may not have been taken.

Chapter layout

There are many differences between swing yarders and towers. Similarly, there are significant differences between makes and models and their layouts or designs.

The guide has looked at access and guarding broadly because although there may be many technical differences, most yarders have similar features at a functional level. For example, yarders have cabs, winches, engines, and ropes regardless of the type, age, make or size.

The chapter will have sections on:

1. Access to the cab
2. General access
3. Access to tower/gantry components

Access/Egress

Steps

- Slip-resistant steps
- Tread has a good profile
- Suitable with muddy boots
- Good protection from slips, trips and falls

- Smooth steps are not slip-resistant
- Reduced protection - slips, trips and falls
- Hand rail also does not have a mid-rail.

- Slip-resistant tread
- Tread has a good profile

- Steps made of tube steel without grip
- Difficult to access off tracks
- Reduced protection - slips, trips and falls

- A good excavator base step
- 1st step is the correct height off the ground
- Step shows signs of being used!

- 1st step is too high (thigh height, yellow arrow)
- Reduced protection - muscular strains, slips, trips and falls

- Using a smooth, oiled-soaked excavator base
- The top of the tracks are too high as a first step
- Reduced protection - slips, trips and falls

- The first step is a log biscuit
- The biscuit is unstable, of poor shape and can be slippery
- Reduced protection - slips, trips and falls

- Undamaged, well-spaced steps
- Good tread
- Large lower step
- The first step is close to the ground

- Smooth tube steel
- Small, not square step and only for the left foot (yellow arrow)
- Reduced protection - slips, trips and falls

- Portable steps help access service areas
- Wide step area
- Well-spaced steps

- There are no steps to access the service area
- The operator has a large step-up off a narrow access ledge
- No protection from slips, trips or falls

Gates

- The gate is solid and effective
- The gate only swings up to the post
- The gate is 1100mm off the deck
- The gate has a quality latch

- The gate is not self-closing and latching
- The OEM gate bracket was removed so it cannot latch and lock
- No protection - falling

Handrails

- There are handrails on both sides
- Outside rail has a top and mid-rail

- The cab access handrail is only on the right side
- There is no mid-rail
- Reduced protection - falling risk

- Strong enough for the expected forces
- Adequate diameter railing of minimum 40mm
- Rails do not move more than 40mm under load

- The railing is too small in diameter and is thin-walled
- Railing can easily bend or deflect
- Reduced protection - falling risk

- All areas are protected with guarding
- No gaps are in the guarding

- Sections of no railing
- Reduced protection - falling risk
- Also, there are no kick plates

- The railing is at the correct height, between 900 mm and 1100 mm
- Low risk of falling over the rail
- Effective kickplates

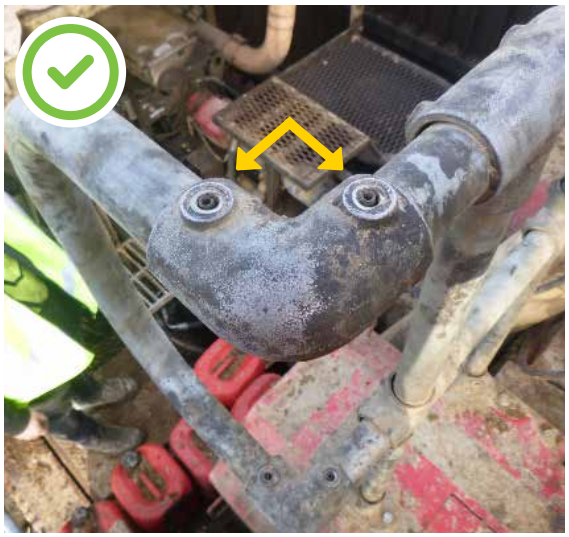
- The railing is not at the correct height
- There is a possibility of toppling over the rail in 2 locations in the image
- Reduced protection - falling risk

- The railing level conforms to the location of the walkway
- The railing is the approved height
- The retrofitted railing adds the required protection around the strawline drum
- Low risk of falling over the rail

- The railing is level, but the walk area rises, making it too low in parts – less than 900mm
- The gap in the railing is too wide – minimum 75mm –120mm (target) (yellow arrow)
- Reduced protection - falling risk

- Railing has a mid-rail and top rail
- Low risk of falling under or through railing

- Single top rail, without mid rail
- Rail supports are spaced widely
- Also, no kick plates on the far side of the hauler



- Key clamps are OK for railings
- Where there is direct pulling on them, like stairs, use roll pins to eliminate pulling out (yellow arrows)

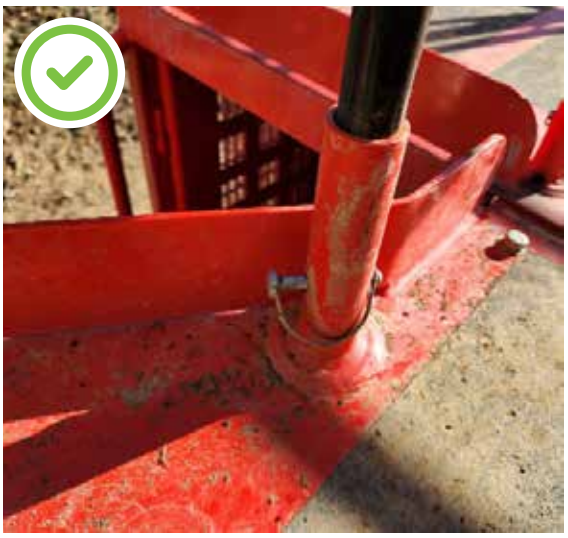
- A chain is not adequate (white arrow)
- A chain does not meet safety standards
- The chain will not give fall over protection

- Steel tubing is capped (yellow arrow)
- No possibility of trapping a finger

- Exposed pipe ends create finger traps because the ends are not capped

- Rails do not converge
- Fingers or hands cannot catch or jam

- Converging rails can catch or wedge fingers and hands
- Rings and watches increase the risk of entanglement

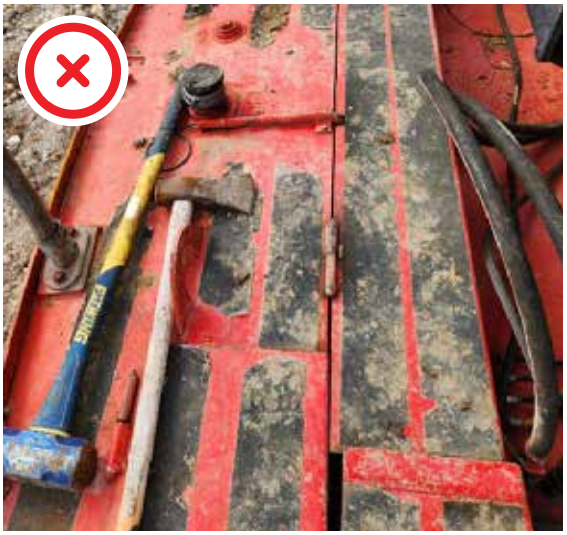


- Railing secured by quick release pins
- Railing cannot move

- Railing not secured down
- Sections of the railing could move

Kick plates (required on the working platform/area and not on stairs)

- Kick plate stops things falling off
- A gap under the toe plate is high enough to drain water but not be a finger trap
- The plate is welded regularly for strength



- The kick plate is too low
- The lack of a gap may cause water to pool and not drain
- The axe and sledgehammer are not only a trip hazard but also a falling hazard
- Poor protection - items falling

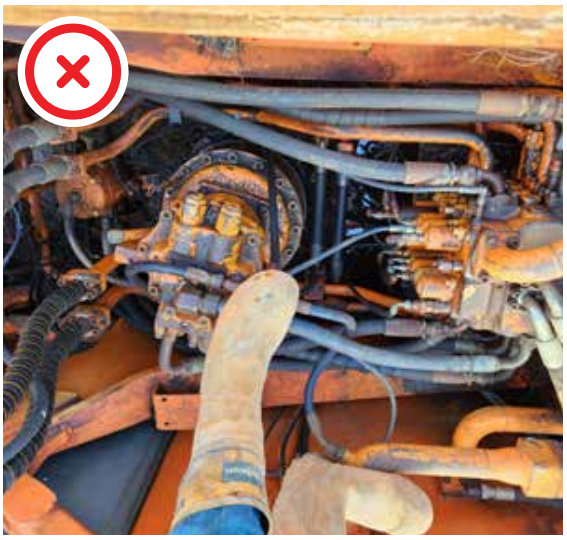
- Retrofitted kick plates
- Made from 100 x 6mm mild steel flat
- The plate does not deflect by more than 30 mm

- No kick plate
- No protection - items falling off walkways are not trapped

- There are missing sections of kick plate
- Tools from the toolbox can fall off the work area to the ground

Walkways

- A wide walkway with good tread
- A retrofitted kick plate with an appropriate gap
- No trip hazards

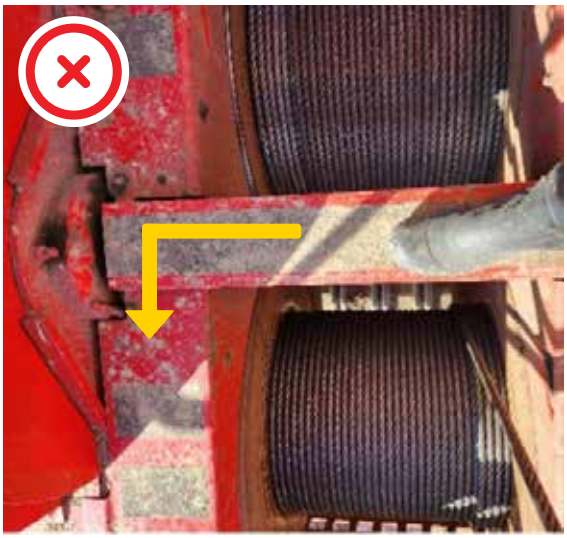


- Gaps in the walkway as OEM's cover is removed permanently
- The operator needs to walk over this area regularly to service the hauler
- Reduced protection - slips, trips and falls

- Good tread
- The image shows two acceptable tread types
- Steel mesh gives better slip protection

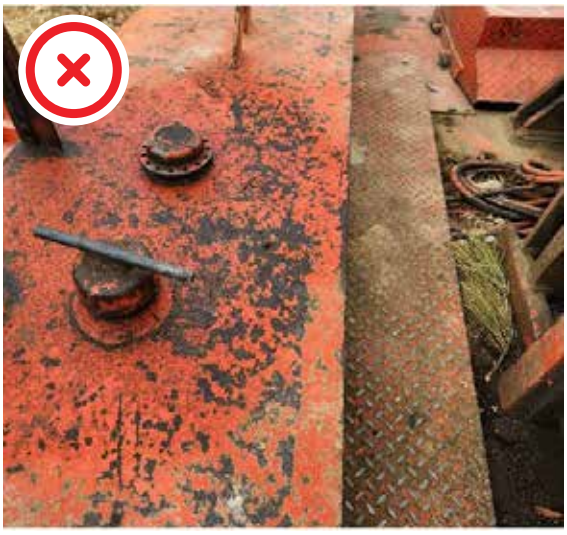
- Smooth walkway. There is no tread on the painted surface
- Paint wear indicates that the area is well-used
- No protection - slips, trips and falls

- A wide walkway with good tread
- Reduced risks of slips, trips and falls



- Narrow walkways
- The tread indicates walking over this is expected
- The tight turn adds increased risk (yellow arrow)

- Walkway clear of protruding parts
- Low risk of falling



- The treaded walkway is too narrow to walk The non-treaded walk area has trip hazards.
- Diesel and pine needles are slip hazards
- Also, there are no kickplates

- The location of the toolbox and hose has narrowed the walkway
- The walkway is now next to unguarded drums
- Reduced protection - slips, trips and falls

- The walkway has protruding parts and hydraulic hoses coiled around it

- A major gap in the walkway could lead to a 2m fall
- Plate steel should extend, or there should be an additional railing

- There are gaps in the walkway (blue arrow)
- The narrow walkways also have uneven surfaces
- The walkways are unguarded next to the winch drums

Access to tower/gantry components

Access to the tower/gantry creates additional risks. Where possible, solve hazards through engineered solutions rather than relying on processes and training, e.g., shift grease points to the base rather than at height. Anchor points and appropriate climbing equipment are also essential.

- Grease points on the deck

- Climbing creates significant additional safety risks

- Restricted ability to use a safety rope and harness
- No protection - falling risk

- The narrow access ladder creates temptation to climb guy winch drums to reach the upper tower ladder
- No protection - falling risk
- No protection - slips, trips and falls
- No protection - crushing and entanglement

- The operator's position (green arrow) is away from lowering or raising ropes (yellow arrow).

- When lowering the tower, ropes may droop over the operator (yellow arrow is control unit)
- No protection - crushing and entanglement.

Checklist: Identifying safe access compliance/ non-compliance

The checklist can help identify areas where access improvements can be made.

Compliant with BPG/standards?

Access to cab

Cab access handrail

- ☐ Handrail position
- ☐ Handrail diameter/strength

Steps

- ☐ Step surfacing, e.g. slip resistant
- ☐ Distance off the ground to first step
- ☐ 1st step location and construction
- ☐ Spacing between steps
- ☐ Step condition, e.g. not damaged

Access to tower /Gantry components

Tower

- ☐ Operator is in a safe position when lowering the tower
- ☐ Tower access railing/steps
- ☐ Safety systems, e.g. fall arrestors

General access

Gates

- ☐ Gate mechanisms and functioning
- ☐ Gate location

Hand railing

- ☐ Diameter/strength e.g. 40mm
- ☐ Location
- ☐ Completeness, e.g. all required areas
- ☐ Height, e.g. 900 – 1100mm
- ☐ Mid rail
- ☐ Finger/hand traps
- ☐ End capping
- ☐ Non-converging rails

Kick plates

- ☐ Distance off the deck, e.g. < 10mm
- ☐ Width and thickness, e.g. 100mm x 6mm
- ☐ Location, e.g. all required areas

Walkways

- ☐ Surfacing, e.g. non-slip
- ☐ Width
- ☐ Completeness, e.g. all required areas
- ☐ Non-protruding parts

1 – Refer to the Standards on Page 20.

Checklist: Solutions to safe access compliance issues

The purpose of the checklist is to help give solutions to common access areas that need improvement. The specifics are in the BPG images or within the Standards, listed on Page 20.

Non-complying	How to solve
Cab access handrail only on one side	Add a handrail, or section of handrail to assist access.
Cab access handrail too small in diameter or not strong enough	Replace with approved diameter tubing.
Steps smooth, e.g. smooth plate steel	Add non-slip tread.
Steps made of tube steel without grip	Add non-slip tread, or replace with an approved steel tread profile.
1st step is too far off the ground	Add a lower first step, many options depending on configuration.
1st step is a log or log biscuit	Add a lower first step. There are many options depending on the configuration.
The steps are too far apart	Meet approved spacing between steps.
Damaged steps	Fix damage.
Lowering tower ropes may droop over the operator	Contain ropes so that the operator is protected.
Access requires climbing guy winch drums to reach the tower ladder	Add steps. There are many options depending on yarder configuration.
Railing does not allow for a safety rope connection to harness	Meet approved protection standards for climbing ladders.
Gates not self-closing	Make gates self-closing, depending on yarder configuration and practicality.
Railing too small diameter	Replace the railings to meet adequate strength and diameter.
Railing not at the correct height - widespread	Lift railing to meet the standard.
The railing is level, but walk areas are not level, leading to sections too low in parts	Adjust low sections so that all railing is at standard.
The railing has no mid rail, only a top rail	Install mid-bar railing.
The railing has a fold-over hinged barrier arm	Install a self-closing gate to remove crushing risk, if practicable. If not, cap all exposed pipe or box steel ends to remove finger traps.
Railing - non-capped ends	Cap all exposed pipe or box steel ends to remove finger traps.

Issue	How to solve
Railing - converging railing	Replace all converging sections of railing or in-fill so the railing doesn't catch or wedge.
Missing sections of handrails, e.g. on the rear deck	Install extra railing sections.
Modular railing junctions held by grubscrews	Replace with fittings that go through tubing, e.g. spring tension pins or roll pins.
Kick plate too high	Lower kick plates.
No kick plate	Install kick plates.
Missing sections of kick plates	Install missing sections.
Gaps in walkways	Eliminate gaps, where possible. Otherwise, install other options to reduce risks.
No walkways	Install walkways that meet the approved standards.
Narrow walkways	Widen walkways, where possible.
Smooth walkways, e.g. plate steel	Add slip protection.
Walkways have protruding parts	Remove or redirect protruding parts, where possible.

Access Specifications

The following specifications will help create certainty that improvements will meet compliance requirements.

Safe access type	Standard Requirements (AS 5327: 2022)		
		Minimum (mm)	Target (mm)
Platforms and walkways	Handrail height above floor surface	1,000	1,100
	Mid rail height	50% Handrail	50% Handrail
	Gap between handrail sections	75 - 120	100
	Radius of handrails (ladder or step)	15mm	≤ 25mm
	Radius of handrail (platform rail)	15mm	50mm
	Kickplate height	50	100
	Platform & walkway width	300	600
	Platform & walkway length	400	
	Walkway surface opening size		≤ 20 diameter
	Handrail diameter	33.7 (25 NB)	42.4 (32 NB)
	Handrail strength	100 kg force in any direction without visible permanent deformation	
Stairs	Angle	20°	≤ 50°
	Tread rise		180
	Tread width	240	400
	Height of first step above ground		400 (≤ 600)
Track frame or recessed step	Riser height	230	300
	Toe clearance - horizontal	150	200
	Toe clearance - vertical	100	
Ladders	Rungs - if circular	20	60
	Rungs – if square or rectangular	12	50
	Rung width	320	400
	Riser height	230	300
	Height of first step above ground		400 (≤ 600)

Notes:

1. Permanent fixed access systems are required for daily maintenance requirements
2. Less frequent maintenance items may have removable access systems or personal work positioning/fall arrest systems. All harness attachment points (anchors) are to be certified by a CPEng.

Part C

Best Practice for guarding - all yarders

In this chapter, you will find out:

- ✓ What yarder guarding best practice and poor practice looks like.
- ✓ Ideas to improve guarding.
- ✓ Things to check regularly to make sure the yarder is guarding compliant.

What is effective guarding?

Guards protect people from contact with hazards. People need suitable work access and guarding to reduce the risk of falling from or into machinery.

The best practice guide helps show what effective guarding means in practice. However, ultimately, it comes down to the Person Conducting a Business Undertaking (PCBU) assessing the yarder-specific hazards and risks and implementing measures that address guarding.

There are many hazards needing guarding on yarders to keep people safe. There are hazards from:

- The engine and exhaust
- Guyline winches
- Main winches
- Chains, activators, and pawls
- Pulleys, pumps, and hydraulics
- Uneven surfaces
- Working at height
- Objects falling, or breaking

Making guarding safe also includes keeping people out of areas they are not approved to be in. For example, limit access to areas that only mechanics or service people should enter, like the engine bay. Therefore, some guards will need catches, latches, or fasteners, requiring specialty tools, e.g. anti-tamper screws, rather than hex head bolts.

Do not remove guarding until rotating parts have stopped moving. Safety interlocking makes it impossible to open or remove the guard until the machine stops.

Hierarchy of controls

The most effective controls are engineered solutions rather than procedures and personal protective equipment. The chapter will show many examples of opportunities to eliminate, minimise, and isolate problems through improved design. Relying on people to always make the right decisions leaves contractors vulnerable, especially when there are other ways to improve because 'reasonably practicable' steps may not have been taken.

Chapter layout

There are many differences between swing yarders and towers. Similarly, there are significant differences between makes and models and their layouts or designs.

The guide has looked at access and guarding broadly because although there may be many technical differences, most yarders have similar features at a functional level. For example, yarders have cabs, winches, engines, and ropes regardless of the type, age, make or size.

The chapter will have sections on:

1. Engine compartment
2. Engine exhaust
3. General guarding
4. Guyline winches
5. Latches
6. Main winches
7. Strawline drum

General guarding

- The area is enclosed
- The mesh is small to stop access
- The guarding eliminates the accidental risk of crushing and entanglement

- The guard is open while the engine is operating. Also, access must be restricted to authorised maintenance personnel.
- No protection - crushing and entanglement

- The only access is through a latched and locked service cover
- The access is only available to service people
- The access ladder has non-slip steps

- Although this is a latched and locked bay, the ladder (a good idea to improve access) does not have non-slip steps

- The OEM guard is on and working effectively

- The OEM cover is removed
- Reduced protection introduces a crushing and entanglement risk

- The guarding limits access to the whole area
- The guarding is latched
- Guarding eliminates accidental risk of crushing and entanglement

- This engine bay has no guarding
- Access is not restricted even when the yarder is operating

- The exhaust is guarded
- Painting the guarding a different colour would reduce trip hazard

- The exhaust is not guarded
- Exhaust is also a trip hazard
- No protection from hot surfaces

- The exhaust is only partially guarded
- Guarding should extend further as the upper exhaust is still within reach
- Guarding reduces risk of burns

- The exhaust is only partly guarded to waist height
- The exposed exhaust is at the top of the steps where access gets narrow
- It needs a full enclosure to stop accidental rubbing or grabbing

Guyline winches

- The chains have an effective guard

- No guarding of exposed sprockets and chains
- No protection from crushing and entanglement
- The boot location is immediately next to the hazard

- The guarding provides protection from the chains, pawls and drums
- There is still access to the guyline winches

- No guarding from exposed rope and rachet pawls
- No protection - crushing and entanglement

Latches and locking systems

- Access is restricted to those with the key or specialised tool

- The OEM's latch is damaged
- The latch, is closed with a screwdriver
- Assess is not restricted to service people or approved persons

- The access has a good latch
- The latch is not locked to restrict access

- Engine guarding secured with a molly, not a bolt (tools required), as designed.

Main Winches

- Good winch guard railing
- Guarding on all exposed sides
- Guarding at 1.1m

- There is no railing to limit drum access
- Free access to drums as indicated by dirt on the tread

- Inadequate guarding as it is secured with wingnuts rather than a less tamper proof fixing
- The OEM's guarding was removed (brown arrow) because it was difficult to unbolt and access

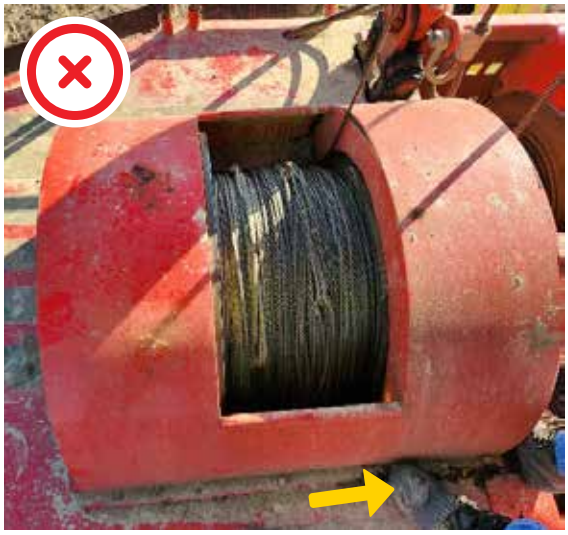
- The OEM guard has been partially cut out and an aftermarket hatch installed (yellow arrow) with just wingnuts
- The manufacturer built the original guarding to protect from moving parts.

- Lagged drums have many advantages over normal drums
- Rope spools evenly and consistently
- No manual guiding required
- Eliminates working with moving ropes

- Standard or non-lagged drum
- Manual guiding required
- Requires more direct access to the drums

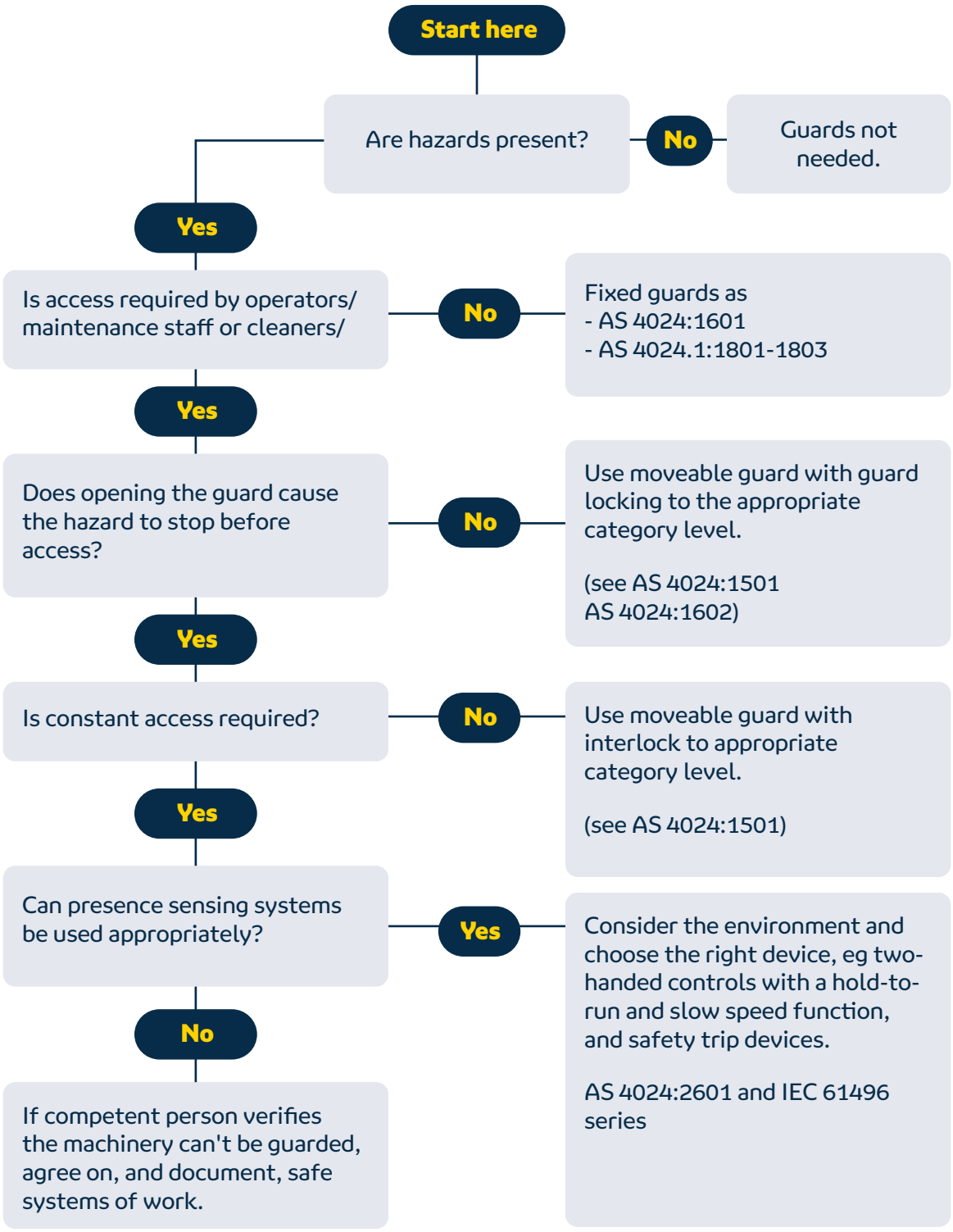
Strawline drum

- Practical steps taken to guard railing



- No guarding (yellow arrow points to a boot)
- Guiding done with a stick next to drum

Flowchart: Deciding if something needs a guard



Checklist: Identifying guarding compliance/ non-compliance

Compliant with BPG/standards?

Engine compartment

- ☐ Guarding - parts under pressure
- ☐ Guarding - hot parts including exhaust
- ☐ Guarding - rotating parts, pulleys, belts, chains, rotating pump shafts

Engine exhaust

- ☐ Guarding - exposed exhaust

General guarding

- ☐ Covers open
- ☐ OEM covers
- ☐ Service windows cut in covers
- ☐ Access only to those approved

Guyline winches

- ☐ Guarding - exposed chains
- ☐ Guarding - exposed rachet pawls

Latches

- ☐ Locking mechanisms working
- ☐ Access restricted, e.g. to approved personel
- ☐ Automatic latches functioning

Main winches

- ☐ Guarding - access restrictions to drums
- ☐ Guarding - exposed chain transmission
- ☐ Guarding - exposed clutches, brakes and actuators

Strawline drum

- ☐ Guarding – access restriction to drum

Checklist: Solutions to guarding non-compliance

Issue	How to Solve
No guarding - hot parts, including exhaust	Add guarding
No guarding - rotating parts, pulleys, belts, chains, rotating pump shafts	Add guarding
No guarding - exposed exhaust	Add guarding
Covers open	Close covers, fit with mechanisms that need specific tools to open.
OEM covers removed	Re-install covers, fit with mechanisms that need specific tools to open.
Service windows cut in covers	Install additional covers with locks, or replace with OEM guarding.
Some guarding that requires specific tools or keys to open does not	Fit with mechanisms that need specific tools to open.
No guarding - exposed chains	Fitting guards that allow fleeting using a suitable implement but prevent contact by workers' hands
No guarding - exposed ratchet pawls	Fitting guards that allow fleeting using a suitable implement but prevent contact by workers' hands
Unlocked latches	Lock latches, fit with the appropriate mechanisms, including specific tools to open.
No latches	Fit latches with mechanisms that need specific tools to open.
No automatic latches (where they are specified)	Install automatic latches that do not allow access when the yarder is operating.
No gates restricting access to drums	Add gates
No guarding (removed to give access or not installed)	Re-install OEM guarding, other guarding, or install new guarding.
Exposed chain transmission	Add guarding
Exposed clutches, brakes and actuators	Add guarding
No guarding	Add guarding

Guarding Specifications:

The following specifications will help create certainty that improvements will meet compliance requirements.

Hazard to guard	Safe Use of Machinery BPG and AS/NZS 4024 requirements
Hot or moving parts	Mesh or other aperture size to prevent anyone being able to reach the hazardous item. Maximum size of the aperture depends on the distance to the hazard. If close, then fingers must be prevented from touching the hazard. If further away, then the object remains the same – to prevent any body part contacting the hazard. Remember: – Some people have small hands – Some people have long arms and legs – Prevent access to the hazard by reaching over, under or around a guard – A guard over a hot part (like an exhaust) may need to be thermally insulated from the heat source to prevent the guard itself becoming a hazard.
Guyline and main winches	Distance guarding (as above, guarding that keeps limbs away from hazards) to prevent any part of the body contacting ropes (crushing), winch ratchet pawls (crushing) or chain drives (crushing/entanglement). Guarding can be designed to allow access with an implement such as when fleeting ropes while preventing contact with a hand or foot.

Appendix A
Verification Template Example

XYZ Engineering Company Limited

Verification Number:	001

XYZ Engineering Company Limited has **Duties of PCBU** who installs, constructs, or commissions plant and structures and **Duty of PCBU** who manufactures plant, substances, or structures, under the **Health and Safety at Work Act 2015**.This document is an evidential record that authenticates the work undertaken.

FABRICATOR DETAIL	
Fabricators Name	Best T Welder
Fabricators trade cert number	256341
Welding qualification Number	12345
PRE-MODIFICATION	
Photos before repair or Modification	Yes, 5 photos taken.
Delivery Date	23 April 2024
MACHINE DETAIL	
Plant Owner	Lots of Logs Gisborne Limited
Make & Model	Komatsu 300 excavator
VIN/Serial Number	SN 1234567AD
WORK COMPLETED	
Description of Work	
Fabricate and attach fall protection rails.	
Photos after Repair, modification	Yes, 6 photos taken
Standard applied	AS, NZ 1657 AS 5327
Supporting evidence	Best Practice guidelines for haulers
COMPLETION	
Fabricators Signature	Best T Welder
Completion Date	30/4/2024

Useful information sources

- ✓ Worksafe NZ 2017 fact sheet explaining 'reasonably practicable'
- ✓ WorkSafe NZ publication (July 2019) *Best Practice Guidelines for Working at Height in New Zealand*
- ✓ WorkSafe NZ publication (May 2014) *Best Practice Guidelines for Safe Use of Machinery*
- ✓ AS/NZS 4024 Safety of Machinery
- ✓ MBIE (June 2013) Ergonomics of Machine Guarding Guide
- ✓ AS/NZS 1657 Fixed platforms, walkways, stairways and ladders. Design, construction and installation
- ✓ AS/NZS 1891.2 Industrial fall-arrest systems and devices. Part 2: Horizontal lifeline and rail systems
- ✓ AS/NZS 1891.4 Industrial fall-arrest systems and devices. Part 4: Selection, use and maintenance
- ✓ AS5327:22 Earth-moving machinery - Access systems


safetree