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How to...

Make a work plan

Why you need a work plan

A work plan is essential because it provides the information a harvesting crew needs to do its tasks safely and efficiently.

Planning is critical to a successful operation. The more planning done before work begins, the smoother – and safer – the operation should go.

Forestry principals and contractors must agree on the work plan, sharing health and safety information and requirements, and what risks can be found at the worksite.

This sharing of information is a requirement under the Health and Safety at Work Act 2015 (HSWA).

HSWA says businesses (known under the legislation as PCBUs, or a Person conducting a business or undertaking) must consult, cooperate and coordinate on safety matters with others in the workplace. This consultation should start well before the job starts – in the planning period.

As part of planning, all businesses that know they will be involved must talk to each about their work, the risks from that work, and what can be done to manage these risks.

This communication means everyone is included in the process and is clear about what has to happen. It also avoids:

- one business thinking the other is taking care of a safety issue – when it's not
- businesses not understanding what the other does and how that adds to workplace risks
- the situation where the business that's managing a risk is not the best one to be doing it
- doubling up unnecessarily – on instruction, supervision, monitoring.

Taking these steps means it's less likely any responsibilities or things that must be done to manage risk will fall between the cracks. The work plan then must include the identified risks that come with all the discussed activities, tasks and circumstances. The right and effective controls must be put in place to manage those risks and ensure workers' safety.

What's in the work plan

What's included in a work plan will depend on the job. Some plans for specific situations won't always be needed, but there are several plans that must always be included. As a minimum, a work plan should include a:

- harvest plan
- skid site plan
- tree falling plan
- traffic management plan
- slash management plan
- chain shot management plan
- shovel plan
- emergency plan.

And if cable logging, a work plan should also include a:

- breaking out plan
- hauler set-up plan (for the kind of hauler being used).

These plans help everyone involved understand how to run the operation safely, what risks to expect and how to control them. Having written and agreed plans also means you (or WorkSafe or the forestry principal) can refer back to them later. This might be to see what you did in a similar situation, or – if something goes wrong – to show you had thorough plans in place to ensure safety. This booklet explains what each plan is, why you need one, and gives some examples of what those plans might look like.

Remember, just having a plan isn't enough. Lots of things change in a forestry setting, and many plans will need to be reviewed, discussed and agreed on each day, usually at the tailgate meeting.

Harvest plan

Every harvesting operation must have a harvest plan before any work starts. Harvest plans become the reference document for the whole operation and are usually developed by the forest owner, forest manager, forestry consultant or the like. Ideally harvesting plans should include the following:

- Emergency details – including GPS co-ordinates, so emergency services can find you in an emergency
- Any known or expected risks and the right controls/management
- Skid design and infrastructure acceptance checklist – see page 4
- Any environmental factors that put restrictions on the operation, including how those factors will be managed or controlled
- How the harvesting will take place – what harvesting method will be used
- Stand details with the mean tree height (MTH), piece size
- Maps, including slope maps if shovel logging or if machines will be working on slopes – see page 27
- Communication procedures, such as which channels to use when using the road or calling emergency services
- Details about the boundaries and any neighbours
- Road/railway/power line control plan, if applicable
- Any other constraints, such as any after-hours trucking/loading restrictions.

Information on and examples of most of these plans are included in this booklet.

Monitoring

Good health and safety management means forest owner/managers must regularly monitor sites to ensure the plans are being put into place.

They usually use a form like this one when they are visiting a site. Forest owners/managers must fill this whole form out at least once a fortnight, although it's better to monitor more often.

Site visit form

Date:	Crew:
Site:	Company name:
Are GPS co-ordinates correct to site?	Yes/no
Has the site induction been done and/or the visitor book been signed?	Yes/no
Are two qualified first aiders on site and identified on the daily tailgate meeting form?	Yes/no Names:
Skid plan in place and accurate to site?	
What is the maximum safe stock load for this skid? Do the current levels exceed this?	
Is there documented evidence on site to show that [*add company name*]..... has clearly identified breaking out and/or extraction/shovel risks (and controls) with the crew? Have breaking out plans and/or extraction plans been discussed with appropriate crew members and checked for any differences from plans supplied to [*add company name*].....?	
Is there documented evidence on site to show that [*add company name*]..... has clearly identified tree falling risks (and controls) with the crew? Have tree falling plans been discussed with appropriate crew member and checked for any differences against plans supplied to [*add company name*].....	
Have there been any near hits/accidents/incidents?	
Are daily tailgate meetings being held and are records up to date?	
Are all emergency procedures in place and current to present site?	
Are all crew on site properly competent to be carrying out the tasks assigned that day? Does this crew have a training programme in place?	
Are regular breaks being taken and are there procedures in place to deal with fatigue?	
Is firefighting equipment present on site (as per the requirements of [*add company name*].....) and are there crew familiar with what to do in a fire emergency? Are two escape routes clearly identified on the site plan?	
Roading condition:	
Trucking status:	
Have all issues from the previous site visit been remedied?	Yes/no
List risks and how they were managed:	
Items discussed/comments:	

Skid site plan

Skid sites must be away from waterways and constructed on solid terrain so the ground won't erode. They must be easily accessible so logging trucks can drive up to them.

They must also be big enough to land and store the number of logs and grades needing to be cut and sorted, without logs building up and the stockpile causing safety risks.

This example of a skid site plan has room to draw a diagram of the planned skid site. The checklist on the left is a guide to what areas need to be included in your skid site plan.

(See also the **Skid design and infrastructure acceptance checklist** on page 4, and **Chain shot management plan** on page 5).

Skid Plan			
Crew:	Skid number:	Prescription	Designated person responsible for visitors and safety instructions
Forest:	Skid size:	Max stock:	Designated person responsible for skid

Skid Diagram

Components	✓
Hauler locations	
Deadman/guyropes	
Surge pile	
Stacks	
Runners	
Slash bench	
Slash pile	
Signs	
Road control	
Caravan/hut	
Zones	✓
Safe area	
Poleman's safe area	
Machine work areas	
No-go zones	
Processing area	
Delimbing area	
Chain shot area	
Truck loading zone	
Truck chain up area	
Parking area	
Fuel area	
Entry and exit	

Risks	E/M	**Controls**

Skid workers understand and agree to the skid plan (sign and date):

Skid design and infrastructure acceptance checklist	
Forest operation:	Date:
Skid number:	Harvesting contractor:
Earthworks contractor:	Cartage contractor:
All efforts have been made to provide a safe and operational skid. If anyone has concerns about their ability to carry out activities on this skid site safely, please contact *[add company name]*..... on *[add contact details]*..... immediately.	

Skid pre-operations checklist		
Item	Y/N	Comments/controls
Is there correct signage on and leading up to the skid?		
Does the size of the skid allow for work activities to be carried out safely?		
Hauler position – is there enough room to safely pull ⅔ of each stem onto the skid?		
Is there enough chute area for downhill yarding?		
Is the skid position safe and practical?		
Is the skid layout safe and practical?		
Are safe zone/s identified on the skid?		
Is there enough room for vehicle parking?		
Is there space for a container/break shelter to be safely housed on the skid?		
Is adequate benching in place?		
Is there room for the required number of log cuts?		
Has the right drainage been included in skid design?		
Is there enough space for people and machines to work together safely?		
Is there enough room to load logs safely?		
Has the chain shot zone been identified on the harvesting contractor's skid plans, and do all visitors know how to avoid chain shot?		
Is there enough space for a surge pile?		
Have emergency escape routes been identified on the harvesting contractor's skid plans, and do all employees and visitors know where these are?		
Are surrounding areas safe and stable – i.e., batters?		
What is the maximum safe stock level for this skid?		
Are there any dangerous trees surrounding the skid – does the skid lie within two tree lengths of any standing trees?		
Means of communication within forest:	Channel:	
Person responsible for directing traffic/visitors to skid:		
Special comments:		

Have all the skid site design requirements been met? Is the contractor (and their employees) satisfied with the skid site and believe they can operate in a safe manner without harm to people and/or the environment?	
Contractor:	**Signature:**
Crew foreman:	**Signature:**
Company representative's name:	**Signature:**

Chain shot management plan

Chain shot, or broken links of chain, can cause serious injuries. In fact, broken chain travels with such force it can smash through safety glass and injure a machine operator sitting in a cab.

Basically, a piece of broken chain is like a bullet. That's why chain shot management is an essential part of skid site planning.

To minimise damage from chain shot, Rule 6.3 of the Forestry Approved Code of Practice (ACoP) says:

"All mechanised processors shall have as a minimum:

- *12.5mm polycarbonate or equivalent strength material in their windscreen*
- *use chain shot protection on main saw."*

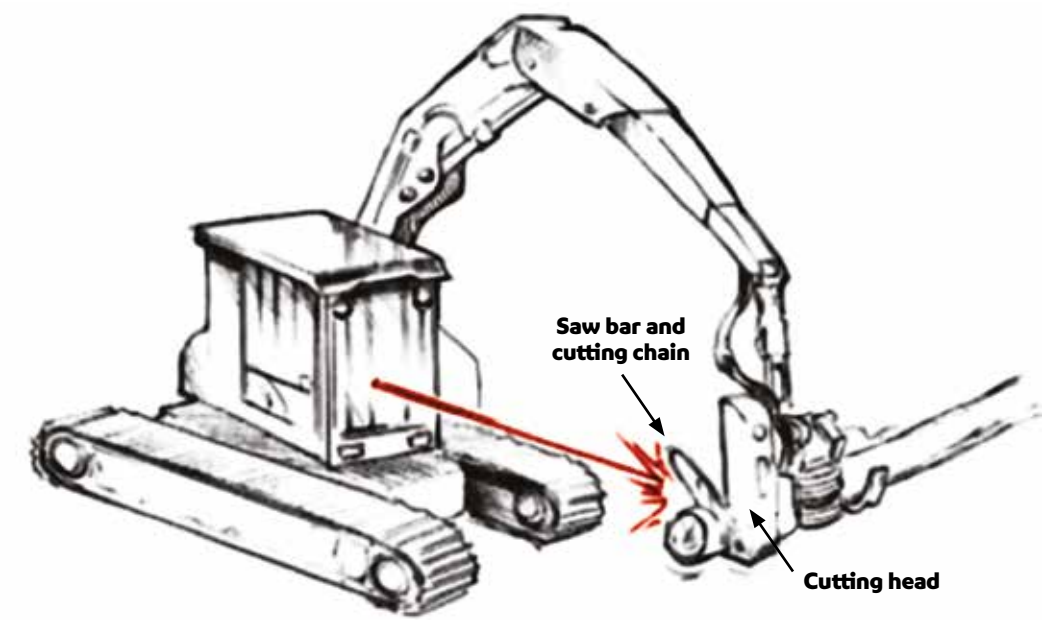
Good planning can also manage the risk of injury from chain shot by including the following:

- Set out chain shot danger zones and mark them on the skid plan (see page 3)
- Arrange work areas and tasks so no one is in a chain shot danger zone - in your skid layout, plan to have the processor cutting away from people and other machinery
- Review and agree on the controls crew will use to minimise chain shot risk.

Other safety measures to follow when chain shot is a possibility include:

- Regularly check the chains for any broken links – good chain maintenance lowers the risk of chain shot, so any cracked or damaged chains must not be used until they are fixed or replaced
- Always operate a saw away from the cab and other workers
- Always keep cab doors and windows closed when operating
- Make sure the chain catcher peg is in place and working – check this every day
- Make sure the correct chain tension is maintained – if available, use automatic chain tensioning devices to reduce chain wear and the chance of chain breakage
- Make sure the chain is sharpened correctly – incorrect depth gauge settings can increase chain wear and chain breakage
- Use a suitable chain stretch tool, if available, to measure chain stretch every time the chain becomes blunt and needs sharpening
- Make sure the chain is lubricated the way the chain manufacturer recommends
- Replace worn cutter bars the way the cutter bar manufacturer recommends
- Make sure the chain speed and cutting pressures are as the manufacturer recommends.

Chain shot danger zones extend from both ends of the guide bar and along its plane, covering the area where chain shot is most likely to travel.



Tree falling plan

Tree falling is one of harvesting's most dangerous jobs. Whether using mechanised or manual falling, it's vital to put together a falling plan.

A falling plan ensures safety but also includes measures to minimise any environmental damage. It also maximises efficiency by making sure the right trees are felled correctly and in the right direction.

A falling plan can also be used to plan and record any training opportunities or necessary supervision. If the faller is under close supervision, make sure you also record their supervision in another appropriate document. This might be the **Tailgate Meeting Form**, **Safe Behaviour Observation form** (SBO) or **Record of Training form**, all available at ***www.safetree.nz***.

The foreman and fallers must write down and discuss the falling plan before any falling begins. Machine operators should also be included in the plan if machine-assisted tree falling is required.

A map must be included in the tree falling plan to identify:

- where the fallers are working
- the falling direction – which direction the trees will fall
- the extraction direction – which way they will be taken out
- any areas with increased risks, such as steep slopes, bluffs, wind throw, snow-damaged trees
- unsafe areas where trees should not be felled
- any historical sites
- boundaries
- stream classes, any significant natural areas (SNAs)
- roads that need traffic management controls during falling.

The plan (see **Tree falling plan checklist** on page 7) should also include the following:

- Falling methods – will it be:
  - manual
  - mechanised
  - manual with machine assistance
  - or a combination of all three.
- Ways of doing certain tasks (refer to ***www.safetree.nz for 'how to' examples***), such as:
  - tree driving
  - unsuccessful tree driving (what to do if a tree drive doesn't work)
  - bad weather (at what point will work stop in windy conditions)
  - dealing with hung up/cut up trees
  - working alone (such as person-check procedures)
  - the two tree lengths rule
  - machine-assisted tree falling.

RISKS:

Wherever you identify a risk, make sure you include in the plan what measures you will take to control those risks.

Tree falling plan checklist

This is an example of a basic tree falling plan checklist. Remember to attach a map of the falling operation.

FALLING PLAN

Forest: Compartment/skid: Start date: Supplier:

☐ Attach a copy of the falling map (marking work areas, risks, falling/extraction direction, boundaries, historical sites, SNAs, roads)

Falling plan:

- ☐ Extraction direction
- ☐ Felling direction
- ☐ Difficult areas
- ☐ Boundaries
- ☐ Unsafe areas to be left
- ☐ Stream classes
- ☐ Road control
- ☐ 2 tree lengths rule in place

Mean tree height (MTH) M

MTH x 2 M

Falling methods:

- ☐ Manual
- ☐ Mechanised
- ☐ Manual – machine assisted
- ☐ Wind strength to stop work – refer to wind chart or Bad Weather safety card which can be found on ***www.safetree.nz***

Five-step falling plan:

- Site assessment
- Individual tree assessment
- Preparation of the work area and escape route
- Fall the tree using safe felling techniques
- Retreat and observe.

Communication:

- ☐ Check-in frequency .....
- ☐ Check-in with .....
- ☐ Person available for assistance, and a second person .....
- ☐ Evacuation plan for bad weather, including a meeting point .....

The faller must obey the two tree length rule, ensuring no people, working ropes or plant without appropriate protective structures are within that distance. No one will enter the falling area without communicating with the faller and without their permission.

Description of plan/instructions to fallers:

Risks: Mark on map and discuss specific dangers and controls. Include at least two controls to effectively eliminate or minimise each risk.

Risk	**Control**

Situations change – this plan should be reviewed daily to make sure all controls are still adaquate and no new risks have developed.

Faller's name	**Skills/training**					**Supervision frequency (per day/week)**		
	Trainee – 17766 / 28560	Competent – 17765 / 28561	Professional faller – certified	Wind throw module – 19765	Wind throw module – 1270	Visual checks – close supervision required	Documented observation (use observation checklist)	Refresher training required (such as for wind throw, hazardous trees, difficult situations, etc)

Plan agreed:	Foreman:	Faller:	Date:
	Supervisor:	Faller:	Date:
		Faller:	Date:
		Faller:	Date:

Breaking out plan

Like tree falling, breaking out is another of harvesting's most dangerous jobs. Again, that's why you must have a breaking out plan for each setting.

The foreman, breaker outs and anyone else involved in this operation must discuss, write and agree on the breaking out plan before any extraction in a cable logging operation begins.

A breaking out plan must also include a map that marks out the setting's danger zones. This means controls can be put in place so the breaker outs stay safe.

Remember, after every line shift the zone must be confirmed or restated by the breaker outs. The hauler operator must document the safe retreat position (SRP) on the daily production sheet. See page 17 for a **Hauler daily production sheet**, also known as a 'daily check sheet'.

(Also see pages 9-10 for examples of **Breaking out plans** and pages 11-12 for more information about danger zones and **Determining safe retreat positions**.)

Breaking out map

A map must accompany a breaking out plan and must include the following:

- Where the breaker outs are working (this must be updated daily, especially to show their positions in relation to the danger zones)
- Extraction direction – which way the logs will be extracted
- Any expected difficult areas
- Risks
- Boundaries
- Unsafe areas to be left
- Stream classes or significant natural areas (SNAs)
- Roads that need traffic management controls during breaking out
- Extraction methods to be used:
  - Systems used – all skyline positions must be recorded
  - Tailhold plan – stumps, mobile tailhold
  - Machine-assisted felling for boundary trees
- All zones, including danger zones and safe retreat positions (see colour-coded guides on pages 11-12).

Policies and procedures

The breaking out plan must also include policies or procedures for doing certain tasks, such as:

- stating that SRPs can't be reduced unless signed off by the contractor
- dealing with fouled drags
- when working ropes have been subjected to shock loading.

DEALING WITH CHANGE

Things change all the time on forestry work sites. Talk about any changes to the agreed plans at your tailgate meeting so everyone knows exactly what's happening that day.

Breaking out plan – example 1

You can use this basic template to make your own breaking out plan.

BREAKING OUT PLAN

Forest: Cmpt/skid: Start date: Supplier:

☐ Attach a copy of the breaking out map (marking work areas, risks, falling/extraction direction, boundaries, historical sites, SNAs, roads)

Extraction plan:	**Extraction method:**	**Communication:**
☐ Extraction direction ☐ Danger areas ☐ Red zone/s ☐ Boundaries ☐ Unsafe areas to be left ☐ Stream classes ☐ Road control	☐ Highlead ☐ Scab ☐ Skyline ☐ Other	☐ Talkie tooters ☐ Radio ☐ Other
	Backline anchor: ☐ Stumps ☐ Machine ☐ Other	MTH.....M Retreat distances..... Zones.....

Description of plan/instructions to breaker outs:

Risks: Mark on map and discuss specific risks and controls. Include at least two controls that will effectively eliminate or minimise each risk.

Risk	**Control**

Situations change – this plan is to be reviewed daily to make sure all controls are still adaquate and no new risks have developed.

Breaker out's name	**Skills/training**					**Supervision frequency (per day/week)**		
	Trainee – 23001	Competent – 24567	HBO – 1258	Professional B/O – certified	Mobile tailhold – 17771	Visual checks – close supervision required	Documented observation (use observation checklist)	Refresher training required (such as for mobile tailhold, block shifts, HBO responsibilities, etc)

Plan agreed:			
	Foreman:	B/O:	Date:
	Supervisor:	B/O:	Date:
		B/O:	Date:
		B/O:	Date:

Breaking out plan – example 2

Below is another template you can use to form your own plan. This covers some information that should also be included in the **Tailgate Meeting Form** found on ***safetree.nz***. Also see **Determining safe retreat positions** on page 11.

Crew name:	Date	Location:
System used:	Stem Length:	Tree height:
Changes to original plan:	Impact on operation:	
Incidents from previous day:	Measures taken to manage them:	

Make up of extraction crew for the day

Role:	Name:	Qualified?		If unqualified, assessed competent to be able to:	Approved by:
		Yes	No		
Head breaker out:					
Breaker out:					
Breaker out:					
Yarder operator:					
Poleman					
Machine operator clearing chute:					

Determining safe retreat positions for the day

If pulling uphill, could dislodged material slide or roll into the retreat position?	Risk:			SRP will be:		*m*
Could anything cause stems to up-end or swing around?	Add risk:			SRP will be:		*m*
Is the retreat position going to be opposite a bite in any working rope?	Yes / No	SRP will be:				*m*
Are there any obstacles that restrict vision or movement?	Yes / No	Can the obstacle be avoided?	Yes / No	SRP will be:		*m*
Could any of the following overhead hazards fall into the retreat position?	Standing trees	Yes / No	SRP will be:			*m*
	Elevated supports	Yes / No				
	Loaded skyline	Yes / No				
Could the retreat position be underneath a backline stump or mobile tailhold failure?	Yes / No	SRP will be:				*m*
Are there stems behind the backline anchor(s)?	Yes / No	SRP will be:				*m*
If the following conditions are met, could retreat distances be decreased to minimise fatigue?	Stems felled for a butt pull Both ends of stems can be seen Terrain falls away from BO No obstacles in front of the drag System used will provide lift SRP above or behind the drag			If all these conditions can be met, SRP will be:		*m*

Note the above SRPs are minimum distances. If needed, the HBO can increase the SRP without seeking authorisation.

Determining safe retreat positions

A vital part of any breaking out plan is mapping out the site's danger zones.

These should be colour-coded in Green, Amber and Red, depending on what risks are present and what controls must be taken. Minimum safe retreat positions (SRPs) are suggested based on the zone's colour.

SRPs may be different depending on whether they are determined with a documented process, or default SRPs are used because there's no documented process.

- **Default SRP:** If crews do not have a documented process for the SRP for each block and/or setting, with every rope movement the **breaker outs must retreat at least 1.5 tree lengths**. They must use visible markers to show where that distance is.

Because breaker outs retreat dozens of times a day, walking this far can result in fatigue. Therefore most crews put in place documented procedures to deal with various risks, allowing them – in very specific cases – to reduce retreat distances.

- **SRPs with a documented process:** This is where the forest owner/manager and the contractor have agreed on the SRPs for each block and/or setting and have a plan to deal with various risks. In this case, according to the ACoP, breaker outs can be as close as 15 metres away from moving ropes during the outhaul. Although, to be extra safe, **Safetree recommends keeping at least 20 metres away**.

See below for more on the colour-coded zones, tips for working in them, and the suggested SRPs if you are working with a documented process.

Zone definitions

GREEN – breaking out plan is in place and working (current key controls are in place)

- Follow best practices
- Have detailed breaking out plan that's reviewed each day and after each shift
- Head breaker out is skilled with the required training and supervisor skills
- Two forms of communication are used and only one person is in charge of communication
- Danger zones are clearly identified on the site map and by physical features or markings on the cutover
- Other risks have been identified and controls are in place to eliminate or minimise the risks
- Safe retreat position is behind and uphill of drag out or swing of ropes or trees.

Retreat position – minimum of 20 metres.

AMBER – risks identified beyond key controls (additional controls required)

- Spotter required due to blind spots
- Drag configurations, downhill hooks
- Remove debris from hill
- Increased retreat or rotational retreat
- Use barriers such as standing trees and ridge to protect people from debris or rocks coming downhill.

Retreat position – minimum of 30 metres and further if there is the risk of debris falling from uphill.

RED – controls not eliminating risk (STOP, change the plan, system, or hauler position, or retreat to Amber or Green Zone)

- Can't get out of danger zone while trees are being extracted
- Debris, rocks, wind throw or a tree coming out of the drag can fall into retreat position
- Retreat position is in the path of possible gravitation of ropes

Retreat position – out of the Red Zone with a minimum of 20 metres retreat past the end of the zone.

Chute management plan

Logs that slide off the skid and back down the chute are a massive danger. That's why there must be absolutely no rope or machinery working in the chute if a breaker out is in the Red Zone of the chute.

Managing the chute operation has the same danger zone colour-coding system based on the possibility of logs hitting ropes or sliding off the landing and back down the hill.

Breaking out working zone	Management
GREEN – can land ²/₃ of mean tree height on skid with no chance of sliding down hill.	• No special requirements.
AMBER – may be able to land ²/₃ of mean tree height on skid.	• Management may still be necessary depending on what zone the breaker outs are working in, as there's still the possibility of logs sliding back down the hill.
RED – can't land ²/₃ of mean tree height on skid so they may hit working ropes and/or slide off the landing and down the hill onto people below.	• No one in zone while hauling logs or ropes are moving. • Use excavator to land stems. • Logs must be cleared from the chute before the breaker outs are allowed in the hook-up area.

Hauler set-up plan

The hauler set-up plan will depend on the type of hauler set-up that's best for your landing site. Whatever set-up you use, create a checklist to tick off before each day's work.

Critical components to check include:

- guy tension and balance
- hauling radius/guy ropes in lead with haul direction
- deadman/stumps/mobile plant for movement
- shackles with grommets
- soil conditions
- breaker out information.

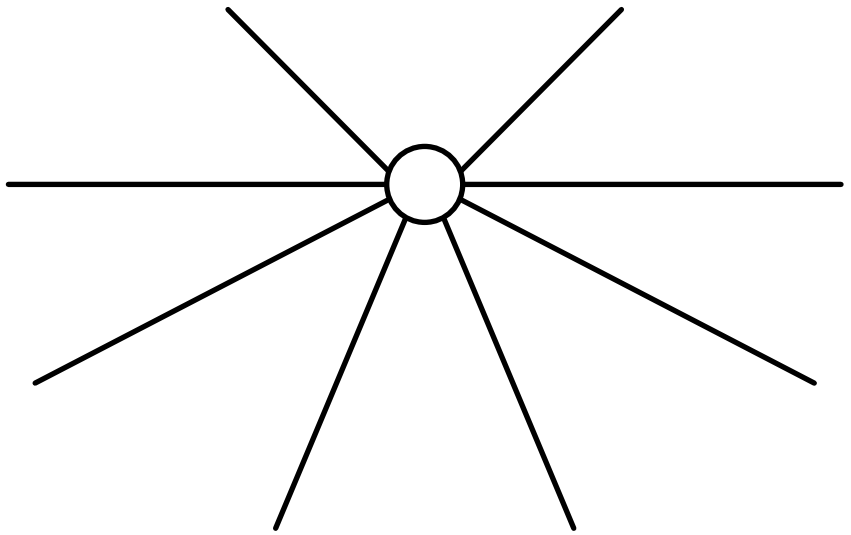
See the following **Hauler set-up plans**, and the **Hauler daily production sheet** (also known as a 'daily production record') on page 17 for an example of what the hauler operator checks off through the shift.

7 GUY HAULER PLAN

Crew	Skid number	GPS Co-ordinates			
Forest	Skid size – Large – Medium – Small	Hot Deck Skid		2 Stage Skid	

Hauler diagram

Components		
GUY # 1	Angle	
	Degrees	
GUY # 2	Angle	
	Degrees	
GUY # 3	Angle	
	Degrees	
GUY # 4	Angle	
	Degrees	
GUY # 5	Angle	
	Degrees	
GUY # 6	Angle	
	Degrees	
GUY # 7	Angle	
	Degrees	



Record on each guy what it's anchored on: Deadman – DM, Stumps - ST
GUY LINES HAVE FLAGS OR OTHER VISUAL INDICATORS IF THERE IS A DANGER THEY CAN BE REACHED OR STRUCK BY PLANT ON SKID – YES / NOT NEEDED

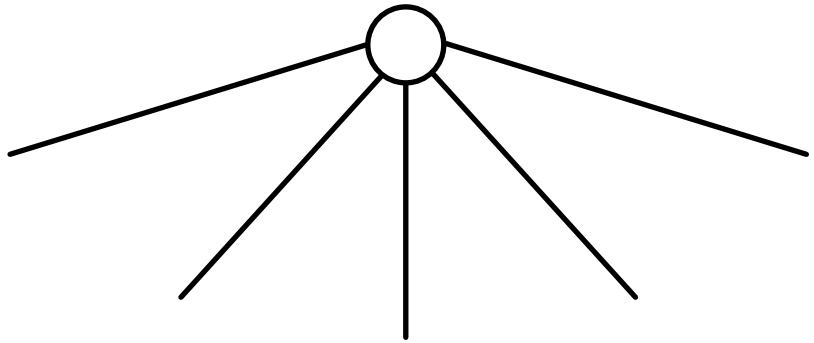
Note risks	E/M	**Controls**

5 GUY HAULER PLAN

Crew	Skid number	GPS Co-ordinates			
Forest	Skid size – Large – Medium – Small	Hot Deck Skid		2 Stage Skid	

Hauler diagram

Components		
GUY # 1	Angle	
	Degrees	
GUY # 2	Angle	
	Degrees	
GUY # 3	Angle	
	Degrees	
GUY # 4	Angle	
	Degrees	
GUY # 5	Angle	
	Degrees	



Record on each guy what it's anchored on: Deadman – DM, Stumps - ST
GUY LINES HAVE FLAGS OR OTHER VISUAL INDICATORS IF THERE IS A DANGER THEY CAN BE REACHED OR STRUCK BY PLANT ON SKID – YES / NOT NEEDED

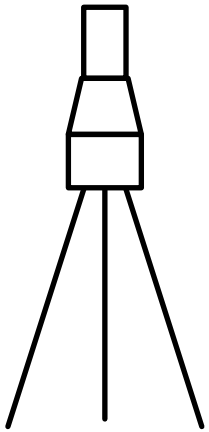
Note risks	E/M	**Controls**

3 GUY SWING YARDER PLAN

Crew	Skid number	GPS Co-ordinates			
Forest	Skid size – Large – Medium – Small	Hot Deck Skid		2 Stage Skid	

Swing yarder diagram

Components		
TOP GUY	Angle	
	Degrees	
MIDDLE GUY	Angle	
	Degrees	
BOTTOM GUY	Angle	
	Degrees	
Record the maximum guy degree allowed	Degrees	
Record the height of the gantry	Height	
		M
Record the distance from hauler	TOP GUY	M
	MIDDLE GUY	M
	BOTTOM GUY	M



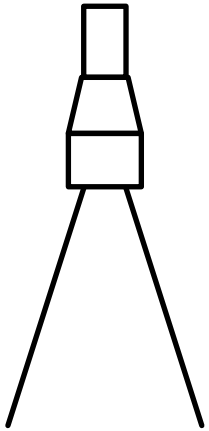
Record on each guy what it's anchored on: Deadman – DM, Stumps – ST, Dozer – DZ, Excavator – EX
GUY LINES HAVE FLAGS OR OTHER VISUAL INDICATORS IF THERE IS A DANGER THEY CAN BE REACHED OR STRUCK BY PLANT ON SKID – YES / NOT NEEDED

Note risks	E/M	**Controls**

2 GUY SWING YARDER PLAN

Crew		Skid number		GPS Co-ordinates		
Forest		Skid size – Large – Medium – Small		Hot Deck Skid		2 Stage Skid	
Swing yarder diagram						

Components		
TOP GUY	Angle	
	Degrees	
BOTTOM GUY	Angle	
	Degrees	
Record the maximum guy degree allowed	Degrees	
Record the height of the gantry	Height	
		M
Record the distance from hauler	TOP GUY	M
	MIDDLE GUY	M
	BOTTOM GUY	M



Record on each guy what it's anchored on: Deadman – DM, Stumps – ST, Dozer – DZ, Excavator – EX
GUY LINES HAVE FLAGS OR OTHER VISUAL INDICATORS IF THERE IS A DANGER THEY CAN BE REACHED OR STRUCK BY PLANT ON SKID – YES / NOT NEEDED

Note risks	E/M	**Controls**

Hauler daily production sheet

Date: Harvest Area: Start Time:
Crew + Yarder: Setting: Finish Time:
Hauler Operator: Target: Machine Hours:

Drag No.	Butts	Shorts	Drag No.	Butts	Shorts	Drag No.	Butts	Shorts	Drag No.	Butts	Shorts	Faller Check in Times								
1			21			41			61			Drive = D				Risk Tree = H				
2			22			42			62			Drive Down = DD				Risk Down = RD				
3			23			43			63			1st Faller.....				2nd Faller.....				
4			24			44			64			7.10			10.10			1.10		
5			25			45			65			7.20			10.20			1.20		
6			26			46			66			7.30			10.30			1.30		
7			27			47			67			7.40			10.40			1.40		
8			28			48			68			7.50			10.50			1.50		
9			29			49			69			8.00			11.00			2.00		
10			30			50			70			8.10			11.10			2.10		
11			31			51			71			8.20			11.20			2.20		
12			32			52			72			8.30			11.30			2.30		
13			33			53			73			8.40			11.40			2.40		
14			34			54			74			8.50			11.50			2.50		
15			35			55			75			9.00			12.00			3.00		
16			36			56			76			9.10			12.10			3.10		
17			37			57			77			9.20			12.20			3.20		
18			38			58			78			9.30			12.30			3.30		
19			39			59			79			9.40			12.40			3.40		
20			40			60			80			9.50			12.50			3.50		
Total			Total			Total			Total			10.00			1.00			4.00		

System: Scab Northbend Shotgun Slackline Highlead Grapple MSP carriage MOT-SP Carriage
MOP-Dropline Carriage Other

Tailhold: Stumps Dozer Excavator	Hauler Shift / Guy Shift Times			
Weather: Dry Wet Windy Fog Snow	Rope Shifts Times	Duration	Zone	SRP
HBO	1	Mins		
BO	2	Mins		
BO	3	Mins		
Zone	4	Mins		
SRP	5	Mins		
MTH	6	Mins		

Daily Checks		Operational Delays
Guy Tension Checked		Shifts
Guy Balance Checked		
Guy Lines in Lead Checked		
Deadman Checked		Refuel
Stumps Checked		Maintenance
Mobile Plant Anchor Checked		
Shackles with Grommets		Breakdowns
Soil Condition		Audits
		Shifts
1st Rest Break		Other
2nd Rest Break		Total =

Summary

Total Drags: Total Butts: Total Shorts:
Total Delays:
Comments:

Traffic management plan

A traffic management plan must be used when forestry operations affect other road users.

You have to use signs to warn road users they are entering a potentially dangerous area. These tell them about the risks to expect and what they have to do to stay safe. That might be to stop, enter only when given the okay, proceed with caution, etc.

Visitors also need information about what operations are under way, such as tree falling, moving ropes or heavy machinery operating.

There are different rules depending on whether you are managing traffic on a public or private road:

- **For public roads and state highways** contact the local council, or see the New Zealand Transport Authority's Code of Practice for Temporary Traffic Management.
- **For private roads (most common for forestry operations)** see the Competenz Best Practice Guidelines for Temporary Traffic Control and the ACoP, Section 2.12. See also the safety card for **Temporary traffic management** at ***www.safetree.nz***.

Traffic controls

Most forestry roads are pretty quiet. Usually traffic is managed by having road signs at all access points, strategically placed to give drivers enough warning about what they have to do before they drive into the operations area.

If the entry points are unmanned, these signs must be used along with banners, tapes and barriers to stop people driving around the signs and continuing into the dangerous area.

But if there's more traffic, such as on an arterial road, you may have to use flagmen (stop-go people) to control traffic. Consult with the forestry company you are working for.

Documenting traffic management

Document the traffic control measures used to manage the risk from the forestry operation, and record what you have done on the traffic management plan.

This shows you have managed the road hazards effectively and complied with best practice. This record can also be used to help improve traffic control measures or decisions in the future.

On the following pages are two different **Traffic management plans** you can use to make up your own plan.

Traffic management plan – example 1

Location:							
Inspected by:				Date:			
Draw layout:							
Advance warning zone(s)				**Direction protection zone(s)**			
Correct signs used?	Y	N	N/A	Correct signs used?	Y	N	N/A
Visibility OK?	Y	N	N/A	Visibility OK?	Y	N	N/A
Sign spacing OK?	Y	N	N/A	Sign spacing OK?	Y	N	N/A
Placement OK?	Y	N	N/A	Placement OK?	Y	N	N/A
Sign condition OK?	Y	N	N/A	Sign condition OK?	Y	N	N/A
Banners/tape				**General**			
Visibility OK?	Y	N	N/A	Hazards effectively managed		Y	N
Placement OK?	Y	N	N/A				
Condition OK?	Y	N	N/A				
Effectively blocks road?	Y	N	N/A				
Comments/improvements							

Traffic management plan example 2

Contractor:	
Date:	
Road:	
Setting ID:	

Firstly define the nature of the risk by ticking the most appropriate boxes below

Nature of risk	Rating		
	Low	Medium	High
Extent (What is affected)	☐ Affects up to 10 metres ☐ Entire hazard zone visible	☐ Affects up to 100 metres ☐ Entire hazard zone visible	☐ Affects 100 metres ☐ Entire hazard zone not visible
Severity (What might happen)	☐ May cause distraction ☐ Indirect injury and/or damage possible	☐ Traffic will have to get out of the way ☐ Injury and/or damage possible	☐ Crew will have to get out of the way ☐ Life may be at risk
Exposure (Who is affected)	☐ Forest workers and vehicles only ☐ Low usage (fewer than 2 vehicles per hour) ☐ Spur/stub roads and tracks	☐ Forest workers and vehicles only ☐ Moderate usage (2-10 vehicles per hour) ☐ Spur/stub - arterial roads	☐ Forest workers and vehicles only ☐ Moderate usage (more than 2 vehicles per hour) ☐ Spur/stub - arterial roads

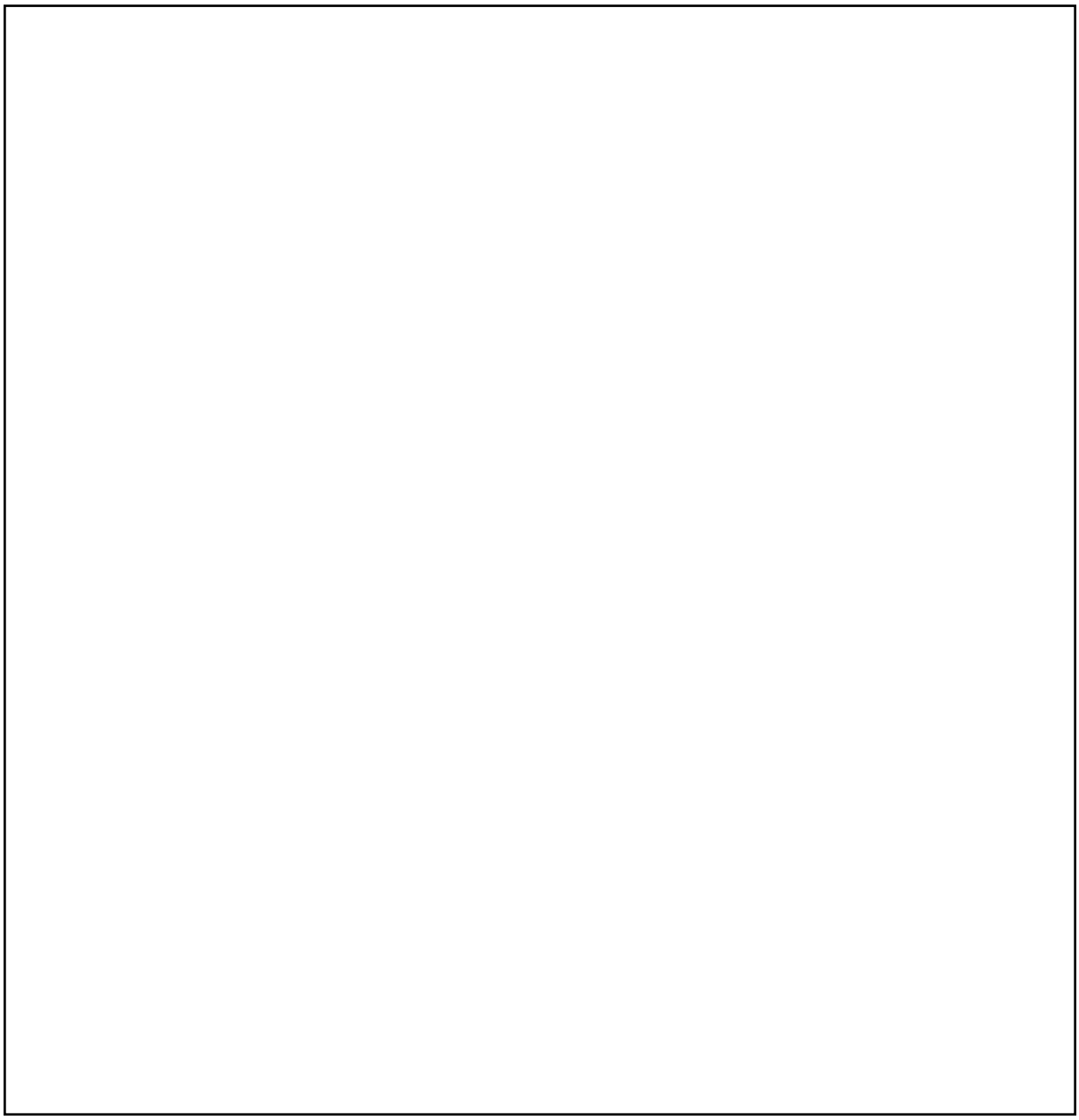
Once you know the risks based on the table above, use the table below to work out the appropriate temporary traffic controls for forestry roads.

Type of Traffic Control	**Nature of risks**
Full road closure	☐ Low to high extent - risk affects entire road width ☐ High severity ☐ Medium to high exposure and detour available, or low exposure
Flagmen-controlled temporary road closure	☐ Low to high extent - risk affects one lane or entire road ☐ High severity ☐ Medium - high exposure (includes non-forestry vehicles or vehicles lacking the necessary communication means)
Unmanned temporary road closure	☐ Low to high extent - risk affects one lane or entire road ☐ High severity ☐ Low - medium exposure (no non-forestry/public vehicles)
Slow and divert traffic through or around the hazard	☐ Low extent (risk affects one lane only) ☐ Medium severity ☐ Low to high exposure
Slow the traffic through the hazard zone	☐ Low to high extent ☐ Low to medium severity ☐ Low to high exposure
Notify traffic of operation ahead	☐ Low to high extent ☐ Low severity ☐ Low to high exposure

Site traffic co-ordinator	
Crew responsibilities	
Crew sign-off (initials)	

Temporary traffic control

Traffic control layout



Comments:

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Slash management plan

Harvesting leaves behind lots of slash – off-cuts, branches, needles and debris. Slash can cause fire or ecological risks if too much tips into waterways or culverts.

On the other hand, it can be a useful tool when used as a cover for haul tracks and to protect the soil or to stabilise embankments, or to create slash bunds to act as sediment traps.

For slash to be useful rather than a hazard, a slash management plan must be in place.

It should consider the following measures:

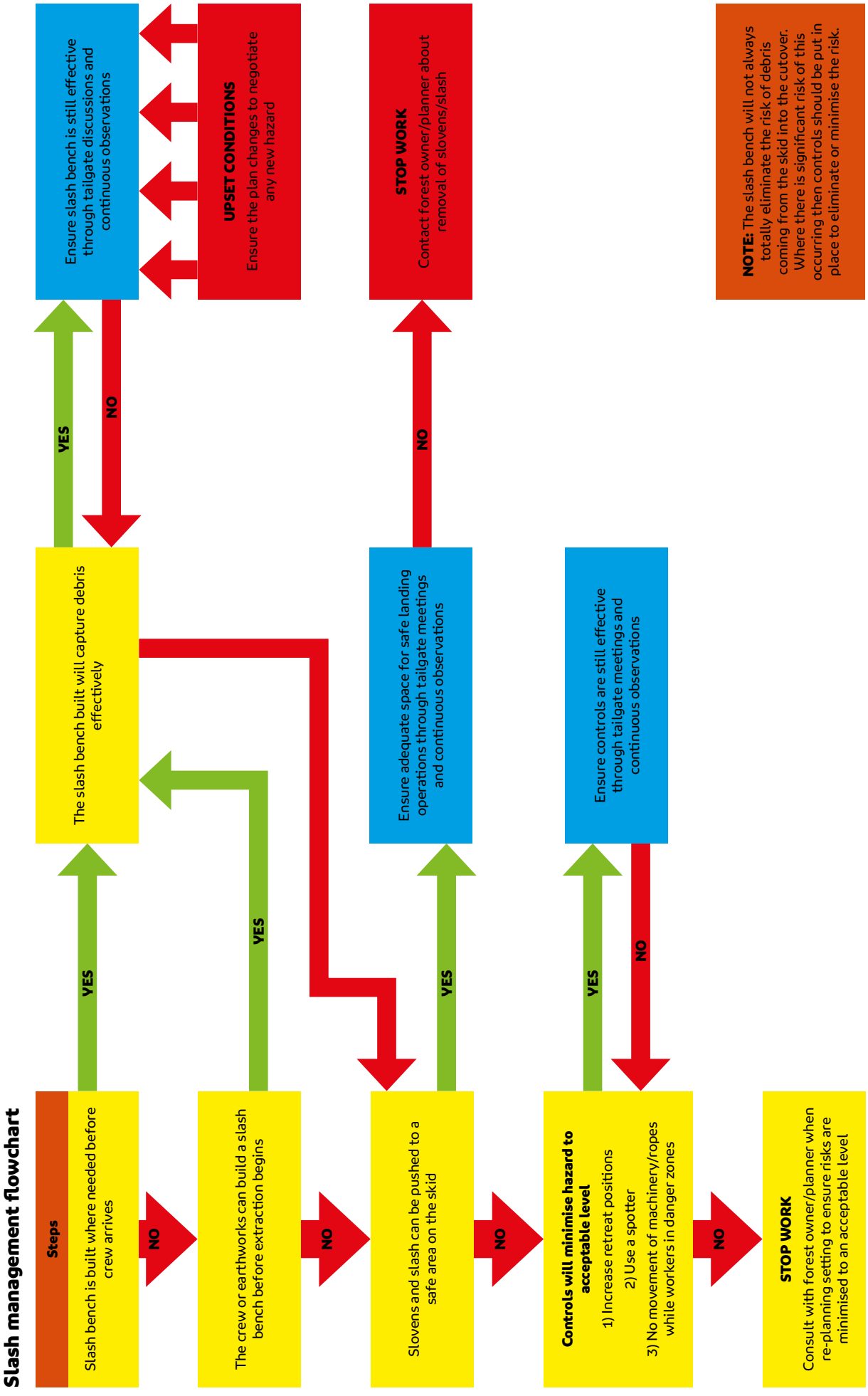
- Each skid to have a slash plan drawn up, identifying areas where slash can be stored
- Slash must be placed where it won't interfere with other operations and can be retrieved by an excavator post-harvest
- A bench must be in place below all slash piles to ensure slash can't move downhill
- Spread slash so it's easy to move or retrieve post-harvest
- All slash is to stay on the forest owner's land unless there is written permission to do otherwise
- Ensure no slash is left in any water channel or where it can be flooded downstream into any watercourse.

If you see any slash management issues you can't manage, contact your forest manager or supervisor.

See the following **Slash management plan** and **Slash management flowchart**.

Slash management plan

Harvest supplier:		Skid number:	
Forest:		Block:	
Road name:		GPS co-ordinates:	
Harvest system:		Skid signed off:	Yes/No
Draw a diagram of the skid, marking in where the slash will be placed.			


Slash management flowchart
Steps
Slash bench is built where needed before crew arrives
NO
The crew or earthworks can build a slash bench before extraction begins
NO
Slovens and slash can be pushed to a safe area on the skid
NO
Controls will minimise hazard to acceptable level
1) Increase retreat positions
2) Use a spotter
3) No movement of machinery/ropes while workers in danger zones
NO
STOP WORK
Consult with forest owner/planner when re-planning setting to ensure risks are minimised to an acceptable level
YES
The slash bench built will capture debris effectively
YES
NO
Ensure slash bench is still effective through tailgate discussions and continuous observations
UPSET CONDITIONS
Ensure the plan changes to negotiate any new hazard
YES
Ensure adequate space for safe landing operations through tailgate meetings and continuous observations
NO
STOP WORK
Contact forest owner/planner about removal of slovens/slash
YES
Ensure controls are still effective through tailgate meetings and continuous observations
YES
NO
NOTE: The slash bench will not always totally eliminate the risk of debris coming from the skid into the cutover. Where there is significant risk of this occurring then controls should be put in place to eliminate or minimise the risk.

Emergency plan

An emergency plan must be completed for all harvest sites to ensure all crew members know where emergency equipment is, and where other key points are in case there's an emergency.

You could also include some of these details on your site map.

The emergency plan should be displayed in an obvious place that's accessible to crew and visitors.

Emergency plan

Forest..... CPT..... Latitude ...../...../..... Longitude ...../...../..... Emergency dispatch channel: Ensure GPS co-ordinates have been updated in all machine cabs and break huts.	
The location of the following emergency equipment/key points must be documented below:	
Emergency equipment/key points:	Description:
Site entry/exit points:	
Secondary exit:	
Phone location:	
Main first aid kit:	
Machines with secondary first aid kits:	
Helicopter landing site:	
Adrenaline kits:	
Spill kits:	
Fire-fighting equipment:	
Water points:	
Site wardens:	
Face shield:	
HASNO data sheets:	

Crew members trained in giving adrenaline:	Crew members trained in first aid:

Shovel plan

Shovelling is when an excavator is used to bunch trees for extraction.

As this technique is often used on steep slopes there is an increased risk of rollover, and good planning is necessary to ensure safety. If shovelling is being used as an extraction process a shovelling plan is required.

The foreman and operator has to develop the shovel plan and have it signed off by the harvest planner, as well as any other relevant PCBUs (person conducting a business or undertaking) before starting.

If the slopes are more than 26°, the shovel plan must also be signed off by the safety manager as more planning is likely to be required.

Remember to only use any machinery following the manufacturer's recommendations. In other words, don't operate machinery on slopes steeper than what the manufacturer believes is safe.

Before writing up your shovel plan (see an example on page 26), you must know the condition of the area the machine will be working in (see the **Steep Slope Risk Assessment** sheet on page 27).

Assess the slope:

- **Determine gradient** – use a clinometer/cellphone app to work out the degree of steepness
- **Instability** – look for whatever might cause instability, such as landslide scars, fractured rock, shallow/exposed/wet soils, young vegetation or fractured rock formations
- **Ground condition** – is it rough and/or rocky, are there gullies or any other ground formations that could affect stability?
- **Soil depth** – this is measured as the average distance from the top of the mineral soil to the bedrock or hardpan layer, and could affect traction or machine stability
- **Debris and understory** – wind throw or stumps, saplings or bush could create obstacles stopping the machine operators manoeuvering.

Other considerations:

- **Operator** – the operator's competency, hours worked, state of mind and health can affect their ability to operate the machine effectively
- **Weather conditions** – high winds, heavy rain, snow, extreme heat, fog and changing weather conditions may also impact on the machine's stability, traction, and the operator's visibility.

Shovel plan

Shovel plan (mark on map and discuss)

☐ Extraction direction	☐ Windthrow	☐ Other machines
☐ Tracking direction	☐ Uneven ground (holes)	☐ Fences
☐ Chute zones	☐ Undergrowth	☐ Signage
☐ Difficult areas	☐ Run out zones	☐ Road control .....
☐ Boundaries	☐ Old tracks	Signs ☐
☐ Stream classes	☐ Batters	Tape ☐
☐ Average slope in degrees	☐ Approval if over 26°	TMP ☐

☐ Attach a copy of the harvest planning map (for marking risks and shovel/extraction direction)

Description of plan

Extraction risks	**E/M**	**Controls**

Operator skills and monitoring

Operator(s) name	Trainee Competent Experienced	Supervision checks

Person available for assistance.....

Communication

☐ Check in frequency .....

☐ After hours procedure.....

Plan agreed

Foreman .....

Operator(s) .....

☐ Changes in communication.....

☐ Changes to plan Date.....

.....

.....

☐ Changes to plan Date.....

.....

.....

Steep slope risk assessment forms

Use information gathered from using this form to create your shovel plan or anything else you have to consider when working on steep slopes.

STEEP SLOPE RISK ASSESSMENT (Form 1)

Risk identification and assessment form.

Forest owner:		Logging contractor:		Date:
Forest:		Compartment:		
Mean tree height:		Tree species:		

Steep slope risk assessment and identification table

RISKS	LOW RISK	MEDIUM RISK	HIGH RISK	Comments
Slope and slope length (tracked machine)	☐ 22° to 27° and slope length <50 metres	☐ 22° to 27° and slope length >50 metres	☐ >27° and slope length >10 metres	
Slope and slope length (wheeled machine)	☐ 19° to 24° and slope length <50 metres	☐ 19° to 24° and slope length >50 metres	☐ >24° and slope length >10 metres	
Terrain stability/ classification	☐ No instability indicators and slopes <27°	☐ Instability indicators and slopes <27°	☐ Slopes >27°	
Ground roughness: boulders, outcrops, depressions	☐ <17° of steep slope area covered by roughness features	☐ <17° to 27° of steep slope area covered by roughness features	☐ >27° of steep slope area covered by roughness features	
Soils	☐ Well drained (e.g. gravel, coarse sand)	☐ Moderately drained (fine sand, silt indicators of sub-surface flows)	☐ Poorly drained or staurated (clay, silt) high water table	
Soil depth	☐ >30 cm to bedrock	☐ 15 to 30 cm to bedrock	☐ Thin soil (less than 15 cm) or bedrock exposures	
Pre-existing and post harvest debris	☐ Open understory, not windthrow	☐ Moderate windthrow, understory, stumps <30 cm	☐ Heavy windthrow, understory, stumps >30 cm	
Human factors: State of mind	C***onsider operator focus, alertness, understanding of plan and how to implement, confidence, stress level, physical and mental workplace distractions, well fed and well rested. AVOID complacency, fatique, rushing***			
Risk ranking	☐	☐	☐	
Operator competency	*Does the operator have adequate training and experience to complete this work? Has the operator demonstrated successful operations using this machine on sites with similar attributes and timber?*			
Risk ranking	☐	☐	☐	
Duration of exposure	*How long will the operator be working on a specific steep slope site? Also consider shift length, number of consecutive shift days, etc...*			
Risk ranking	☐	☐	☐	
Worker isolation – time for assistance to reach operator	☐ <15 minutes	☐ 15 to 30 minutes	☐ >30 minutes	
Weather conditions	☐ Calm day, change unlikely	☐ Chance of changeable weather	☐ Adverse rapidly changeable weather	

4 ticks in high risk or 5 ticks in medium risk, results in a ***"NO GO SITUATION"*** unless additional measures are taken.

Manager/Contractor/Foreman:.....**Signature:**.....

STEEP SLOPE RISK ASSESSMENT (Form 2)

Practices and controls to eliminate or minimise risks

Forest:		Compartment:		Date:
Type of machine:	☐ Feller/Buncher	☐ Skidder	☐ Excavator	
	☐ Processor	☐ Other:.....		
Operator:		**Experience:**		☐ Competent

Mechanical features prescribed to ensure machine stability

☐ Non-tilting cab	☐ Tilting cab	☐ Zero tail swing design
☐ Telescoping boom	☐ Grousers (describe height/spacing)	☐ Extended tracks
☐ Chains on 4 wheels	☐ Tracks	☐ Other:.....

Machine processing head information

☐ Non-swivel head	☐ Rotating head	☐ Intermittent saw	☐ Hot saw
☐ Swing grapple	Head cutting capacity (diameter):.....		
Allowable stump height:.....		Tree/weight handling capacity:.....	
Target bunch/drag size:.....			

Terrain/tracking/slope information and controls

☐ Approach steep slopes from below	☐ Operate during daylight hours only
☐ Utilise existing benches	☐ Uphill, safe turn-around, direct down slope skid
☐ Construct and use machine tracks	
☐ All seasons operations ☐ Summer only ☐ Winter only	
Communications process (e.g. 2-way radio, cellpnone, etc...)	**Check-in frequency (who, how often)**
Poor weather shut-down conditions (describe)	**Available assistance (machine, operator)**
Site-specific requirements and notes:	

Date:	Signature:	Date:	Signature:
Date:	Signature:	Date:	Signature:

Manager/Contractor/Foreman:	I have reviewed the associated steep slope risk assesment and verify its accuracy.	Signature:

About this book

This resource is intended as a guide to help people working in forestry operations put together the work plans they need to do their jobs safely.

It is for educational and informational guidance only and is not legal advice, nor a substitute for legal advice.

Many of the plans in this resource are based on those kindly offered by leaders in the industry. Our thanks goes out to them.

About Safetree

Safetree is a source of information for New Zealand's forestry industry to find the guidance they need to do their jobs without injury or ill health.

Safetree is managed by the Forestry Industry Safety Council (FISC) and has been developed with the support of:

- **Forest Owners Association** – www.nzfoa.org.nz
- **Forestry Industry Contractors Association** – www.fica.org.nz
- **New Zealand Farm Forestry Association** – www.nzffa.org.nz
- **ACC** – www.acc.co.nz
- **Council of Trade Unions** – www.union.org.nz
- **WorkSafe NZ** – www.worksafe.govt.nz

Go to www.safetree.nz to register for updates and to find other resources to stay safe on the job.

An introduction to Safetree™

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