



LOG HAULAGE INDUSTRY

Code of Practice

A registered Industry Code of Practice under Section 706 of the Heavy Vehicle National Law

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PREFACE

Heavy vehicles are an essential part of the forestry industry, but their use brings additional risks to workers in the sector, and to the public who share roads with logging vehicles.

In all Australian states and territories, except Western Australia and the Northern Territory, the use of heavy vehicles is regulated by the *Heavy Vehicle National Law* (HVNL).

The Log Haulage Industry Code of Practice (LHC) is designed to assist participants in the logging industry to comply with duties, imposed by the HVNL, to eliminate public risks.

This code was developed and registered in accordance with [Guidelines](#) published by the NHVR under s706 HVNL. The substance of the code is based on comprehensive advice, recommendations and assistance from members of the forestry and log haulage industry in collaboration with the Australian Forest Contractors Association (AFCA). A full list of contributors is shown on page 43.



LEGAL FRAMEWORK

Heavy Vehicle National Law requirements for logging vehicles

The HVNL applies to the use of all vehicles with a GVM over 4.5t and has many detailed requirements including mass and dimension limits, prescribed work and rest hours, vehicle standards, and loading requirements. These requirements apply first and foremost to drivers and operators of heavy vehicles but in some cases, also apply to other persons such as record keepers, employers and loaders.

One chapter of the HVNL creates a separate legal duty, called the primary duty, which is a requirement to eliminate or minimise risks to public safety. This part of the law applies to parties in the chain of responsibility (CoR) for logging vehicles, not to drivers. Executives of CoR parties also have a duty under this part of the law.

Purpose and scope of the code

The LHC is intended to assist parties in the CoR and their executives to meet their duties to ensure safety. It does so by bringing together industry knowledge about hazards and risks, as well as options for systems, processes or equipment that will help to eliminate or minimise public risks.

The Code is relevant to all businesses involved in log haulage operations such as forestry owners or managers, harvest or haulage contractors, centralised despatching service providers, mill owners and other facilities that receive logs.

Employed heavy vehicle drivers are not parties in the CoR and do not have the same duty, but many drivers and other workers will become aware of recommendations in the code because their employers and business partners incorporate control measures into their operations.

Legal status of the Log Haulage Code

The LHC does not create new legal obligations or replace existing requirements in the HVNL or its regulations.

It is primarily guidance material for the sector; however, the code may be used by a court as evidence in relation to a breach of the primary duty or the executive duty.

Specifically, its content may be used as evidence of what CoR parties and executives know, or ought to know, about hazards, risks, risk assessments and controls relevant to the safe use of heavy vehicles in log haulage. Knowledge of these is relevant to the question of what is reasonably practicable.

Relation to Master Code

The LHC is regarded as a supplementary code to the Master Code of Practice, because it does not address all heavy vehicle hazards and risks. The Master Code is a general code written for the whole of the heavy vehicle industry. The LHC refers in some places to relevant content in the Master Code, however it is up to the person using the LHC to satisfy themselves that they have also considered relevant guidance in the Master Code.

Other legal obligations

The LHC provides guidance to parties in the CoR about some hazards and risks in log haulage but is not a guide to compliance with the HVNL or any other law.

It should be read in conjunction with the HVNL, the Load Restraint Guide, WHS law, relevant Australian Standards, and other industry specific guidance. To be clear, all those materials may be relevant in a consideration of whether a CoR party had done what was reasonably practicable to ensure safety and to eliminate (and, to the extent it was not reasonably practicable to eliminate, minimise) public risks.

The LHC does not provide guidance about compliance with forest management and environmental protection which are subject to separate regulation specific to each state jurisdiction.

The Primary Duty – key terms

The primary duty requires a party in the CoR to ensure, so far as is reasonably practicable, that it carries out its transport activities in relation to a heavy vehicle in a way that ensures safety.

This is a duty to eliminate public risk so far as is reasonably practicable, and if it is not reasonably practicable to eliminate a risk, then to minimise the risk so far as reasonably practicable. It also requires a party to ensure that its conduct does not cause or induce a driver to speed, or a driver or any other person to breach the HVNL.

Who is a party in the CoR?

A business or an individual is a 'party in the Chain of Responsibility' when they, or their employees perform any of these functions in relation to a heavy vehicle:

- employ a heavy vehicle driver (employer)
- engage a self-employed driver to drive a heavy vehicle under a contract for services (prime contractor)
- direct the control and use of a heavy vehicle (operator)
- schedule the transport of goods and passengers in a heavy vehicle, or schedule a driver's work and rest hours (scheduler)
- consign goods for transport by a heavy vehicle (consignor)
- receive goods delivered by a heavy vehicle (consignee)
- pack or assemble goods for transport in a heavy vehicle (packer)
- manage premises where five or more heavy vehicles are loaded or unloaded each day (loading manager)
- load a heavy vehicle (loader)
- unload a heavy vehicle (unloader)

(Full legal definitions of each term can be found in the Glossary).

Individual employees can be parties in the CoR, but the business that employs them is expected to take the lead in ensuring that the primary duty is discharged. This is because employers generally control hiring, procurement, training, work practices and resources.

Meaning of public risk

“Public risk” includes a risk to drivers, passengers, other road users and members of the public in the vicinity of roads and public places. It also includes the risk of damage to property, including vehicles and loads, damage to road infrastructure and harm to the environment.

Meaning of transport activities

A party’s “transport activities” are anything it does that is associated with the use of a heavy vehicle on a road. The term would include, for example, business practices, facilities maintenance, human resource management, policy development and review, safety systems, and board decisions, as well as the activities typically associated with heavy vehicles such as loading, maintenance, scheduling etc.

Meaning of reasonably practicable

Doing what is “reasonably practicable” is the standard for complying with the primary duty. The definition is very similar to the equivalent WHS definition. Put simply, it describes what is reasonably able to be done, in relation to a duty, weighing up all relevant matters.

It requires a proportionate response to a risk or hazard, after an assessment of the degree of risk, including the likelihood of potential outcomes, and their seriousness, as well as the existence, availability, suitability and effectiveness of control measures.

The cost of implementing controls is one of the factors mentioned in the definition, including whether the cost is grossly disproportionate to the likelihood of the risk.

What would be reasonably practicable requires objective assessment, i.e., what an independent person with the same information would conclude, not an assessment based on the duty holder’s opinion or preference.

Generally, more and/or more effective controls would be required when there is greater risk because the outcome is more serious, and/or more likely to happen. However, this does not mean that a low overall safety risk can be ignored particularly if there are suitable controls available.

A party would not be expected to implement a control if its cost would be grossly disproportionate to the risk, but this will not be an excuse for failing to implement any control. Another control, or a different way of performing an activity may be warranted.

There may be some risks that are so serious that if there are no available, effective, or affordable controls, then the activity that creates the risk should be avoided altogether.

See the glossary for the definition of “reasonably practicable” or follow the links to find more information about the term on the NHVR website¹, or to read Regulatory Advice² about the topic.

What is the Executive Duty?

If you are an executive of a business that is a party in the CoR for a heavy vehicle, you have a duty to exercise due diligence to ensure the business complies with its primary duty. If the business fails to do so, then you could be held

personally liable for a breach of s26D of the HVNL. The term “executive” includes an executive officer, a manager or another person who takes part in the management of a business. It also includes a director of a company or a partner in a partnership.

Exercising due diligence requires you, among other things, to actively acquire and maintain up-to-date knowledge about conducting transport activities safely. If this code of practice is relevant to your business’s activities, then as an executive you should be familiar with its contents, and use it to identify hazards and risks, and consider (or re-assess) appropriate controls.

More information about the Executive Duty can be found on the NHVR website.



¹ <https://www.nhvr.gov.au/safety-accreditation-compliance/chain-of-responsibility/the-primary-duty/primary-duty-definitions>

² <https://www.nhvr.gov.au/safety-accreditation-compliance/chain-of-responsibility/regulatory-advice/reasonably-practicable>

ABOUT THE LOG HAULAGE CODE

How codes of practice assist duty holders

The primary duty and executive duty require duty holders to ensure safety, to the appropriate level, but don't say exactly how to do that. This reflects the diversity of environments in which parties work, and the many and varied ways they operate.

A registered code of practice is a tool that fills in some of the gaps between the overarching duty, and the detail of day-to-day operations. It does not prescribe how every party should operate, but it provides safety information and options.

Other hazards and risks

It's important to note that a registered code cannot capture every single hazard and risk but concentrates on those that are widespread and most serious.

Duty holders have a duty to identify all hazards and eliminate or minimise all risks associated with their transport activities, regardless of whether they are identified in a registered code of practice.

Adopting controls recommended by the code

It is not obligatory to use controls recommended by a registered code, so long as there is effective risk management in place, that meets the standard of reasonable practicability.

There may be good reasons why a business uses different controls for example, customised controls due to local conditions or equipment, requirements of a contract, or a niche product.

Because the primary duty and executive duty are obligations that pre-date the code, businesses should already have had safety measures in place. If they were already doing what was reasonably practicable to ensure safety, then they need not make changes unless the code identifies new hazards or risks.

In any case, registration of the code is a useful prompt for businesses to review their own risk management systems, to confirm that relevant hazards and risks have been identified, and to consider whether different controls or combinations of controls may be more effective.

Guidance about load restraint

From the outset, industry participants involved in this code identified load restraint as a key hazard in log haulage, and a topic where industry guidance was sorely needed.

There are already detailed prescriptive requirements about load restraint in the HVNL and Schedule 7 of the *Heavy Vehicle (Mass, Dimension & Loading) National Regulation*, but a bit like the primary duty, those provisions state the outcome to be achieved, but not how to do it. The Load Restraint Guide provides some of that guidance, but being general in nature, does not cover every aspect of restraining logs.

During consultation and development of the code, it was identified that prescriptive recommendations about types and numbers of lashings would not be useful. Instead, the LHC highlights the importance of vertical clamping as the key to effective restraint using the tie-down method.

It also identifies many of the factors that affect how well loads are restrained, and a range of controls that respond to those factors e.g., procurement of equipment, load construction, training, systems, monitoring and information sharing between parties, etc. These controls are relevant to the discharge of the primary duty and would be considered by an investigator if there was a primary duty or executive duty investigation.

Whether or not a load is in fact restrained in a way that meets the LPS is a separate question, and one that would be assessed by an authorised officer in the ordinary way. As already noted, the offence of failing to comply with the loading requirements (S111, HVNL) is generally an offence against a driver or an operator, but a pattern of driver breaches might indicate failures by CoR parties. Following the guidance in the LHC should reduce the likelihood of those breaches.

Safety – A system with many parts

The underlying principle of the CoR is the recognition that many parties play a role in keeping heavy vehicles safe on the road.

The guidance in this code is divided up among different activities – actions or decisions carried out at different times and places, by different duty holders. Each activity presents different opportunities for controlling hazards and the combined effect of all of those controls is better safety management.

Information and training are critical for the effective implementation for each part of the system, but communication, feedback and discussion between parties is necessary for the system to function as a whole.





USING THE LOG HAULAGE CODE – A PRACTICAL GUIDE

Key components of risk management are:

1. Identifying hazards
2. Assessing risk
3. Selecting control measures
4. Implementation and training
5. Monitoring and reporting on the effectiveness of controls
6. A process for periodic review of the system and a process for responding to incidents, lead and lag indicators, and new risks

Registered codes of practice will help you to identify hazards, assess risks, and choose suitable controls. A system that integrates all the components of risk management into a single system can be described as a safety management system (SMS). Such systems are prescribed for some transport sectors and represent best practice for the heavy vehicle industry as well.

For guidance on the principles of risk management, the NHVR recommends *AS/NZS ISO 31000:2018 Risk Management – Principles and Guidelines*. You might also find *AS/NZS ISO 45001: 2018 Occupational Health and Safety Management Systems* contains some useful guidance on managing your safety risks.

More information about risk management is available from Safe Work Australia, or your state or territory's workplace health and safety regulator.

The NHVR website has resources about developing, documenting and implementing an SMS.

1 Identifying hazards

Consider all the hazards described in the LHC to see whether they are present in your transport activities. This includes considering whether your activities contribute to risks affecting others.

Some hazards will exist in some businesses, but not others, according to their circumstances.

Codes of practice document known hazards and risks in an industry, but they may not capture every one of them. As a party in the CoR, your duty is to eliminate or minimise all risks to public safety associated with your transport activities, so you also need to look for hazards and risks besides those mentioned in this code. (See figure 1)

2 Assessing Risk

Assess the likelihood and seriousness of each risk that you identify whether from the code, or from your own investigations. The same hazard may create a different degree of risk in one business than another, because of differences in the way they operate, their location, staffing, equipment, work hours etc. (See figure 1)

3 Selecting control measures

You should choose controls, or a combination of controls, that will eliminate each risk that has been identified, or where it is not reasonably practicable to eliminate the risk, to minimise it so far as reasonably practicable.

Choose controls that will work and be effective in your business. It may be necessary to use a combination of controls of different kinds. For example, to deal with one risk, you may need to purchase or adapt equipment, change procedures, and re-train employees. Another risk may be eliminated by assigning employees to a new task and hiring a new staff member. (See figure 2)

Figure 1. Illustration – Using the LHC to identify hazards and assess risks (see page 7)

Each company considers the Activities in the LHC and decides whether the Hazards described are present, and if they create a low, medium, or high risk.

Each company identifies that Hazard 4 creates a risk in their operations, but at different levels.

	Company A Forest owner Contracts a haulage contractor to haul logs from designated coupes to mills	Company B Mill owner Contracts with a forest owner to purchase logs transported by a haulage contractor	Company C Haulage contractor Contracts to harvest and haul logs from specified coupes to various mills
Activity			
Hazard 1	Yes - High	No	No
Hazard 2	Yes - Low	No	Yes - High
Hazard 3	No	Yes - Low	Yes - High
Hazard 4	Yes - Medium	Yes - High	Yes - Low

Figure 2. Illustration – Using the LHC to select control measures for each hazard (see page 7)

All three companies need to address Hazard 4. They consider the controls from the LHC and decide which would be reasonably practicable for them to implement.

Each company comes up with a different combination of Controls to manage the Hazard, including some from the LHC and others they have developed themselves.

Implementing the combination of Controls allows each company to eliminate or minimise the risk arising from the Hazard, so far as is reasonably practicable.

	Company A Forest owner	Company B Mill owner	Company C Haulage contractor
Hazard 4	Yes	Yes	Yes
1. Code control		☑	
2. Code control	☑	☑	☑
3. Code control	☑	☑	☑
4. Code control	☑		
5. Code control	☑		
6. Alternative control		☑	☑
7. Alternative control		☑	
Controls to implement	2, 3, 4, 5	1, 2, 3 and alternative controls	2, 3 and alternative control

In many situations, the best way to manage a risk will be for a number of parties to implement complementary controls. Because different parties do different things, at different times and places, they don't all have the same opportunity to manage each risk. For example, one business controls things at the start of a trip; another business only sees the end of the journey. Some control measures happen weeks in advance, monitoring happens during operations, and feedback is always after the fact.

You can collaborate with your business partners to work out which control measures each of you can implement, to create a more efficient and effective risk management system. If there is some doubling up in such a system, it should give you greater confidence. However, you should be cautious about relying entirely on other parties' control measures, unless you know or can assure yourself that the control measures are in place, are being used, and are effective.

Figure 3. Illustration – Co-operating to implement controls

Three businesses consider the hazard of workers working alone. This hazard is addressed in three separate Activities within the LHC.

Each business assesses all the Controls and finds out what other businesses have implemented or will implement. Each business implements Controls that are reasonably practicable, in light of the overall risk.

The best safety outcome is achieved by the combined effect of all the controls, especially when parties collaborate to create a system where all the elements are integrated.

	Company A	Company B	Company C
	Forest owner	Mill owner	Haulage contractor
Hazard: Lone workers cannot call for help (Hazards 4.6, 5.7, 6.7)	Yes	Yes	Yes
5.7.1 Control: Install telecommunications relays or boosters, to enable workers to seek assistance if required, and to enable duress alarms to be effective.	✓		
6.7.1 Control: Inform harvesters and transport operators about available telecommunication options at loading areas.	✓	✓	
4.6.1 Control: Plan operations to eliminate or minimise the need for workers to work alone.		✓	✓
4.6.2 Control: Implement emergency communication procedures so that workers who may experience problems on site are able to access support.		✓	✓
4.6.3 Control: Provide workers with duress alarms including fall detection when working alone, particularly in darkness or in isolated areas.			✓
4.6.4 Control: Work with other parties to ensure that there is telecommunications coverage available in the area being worked, so that duress alarms can be effective.	✓	✓	✓

Note: This diagram is an example only. It should not be taken to indicate that specific businesses should implement specific controls. In different circumstances, each company could implement a different combination of controls. What's reasonably practicable always depends on the circumstances.

Is it compulsory to use control measures recommended in the Log Haulage Code?

You do not have to use every control recommended by the LHC. You only need to implement sufficient controls to ensure safety so far as reasonably practicable.

You may use different controls altogether - ones not mentioned in the LHC - if they eliminate or minimise risk just as effectively. A control measure from outside the LHC might be more readily available, or more effective in your business because it suits your circumstances better. You can also use a combination of controls from the LHC and other controls.

So long as you are eliminating or minimising each risk to the required standard, then you are meeting your duty. The purpose of the LHC is to assist you to do this; the code does not create a new legal obligation.

If available controls will not be sufficient to eliminate or minimise a risk, you must find another way to achieve the same outcome, or cease carrying out the activity that creates the risk.

Other sources of information about hazards, risks, and controls

You can find more information about managing risk by referring to codes of practice or other publications produced by safety regulators, such as [Safe Work Australia](#) and its state equivalents, or in relevant Australian and International Standards (AS/NZS, ISO, ECE Regulations).

Your industry and its networks may be another source of advice and data. An example of organised information exchange is the [Safer Together](#) initiative in the oil and gas sector whose regular working groups develop bulletins and safety alerts that are sent to members and subscribers.

Currency of technical standards and references

References in this code to technical standards and information resources were current at the time of publication. If you refer to any of them, you should ensure that you are consulting the current version.

4 Implementation and training

Once you have identified hazards, assessed each risk, and determined the appropriate control measures, you need to ensure that they are implemented in your business. It is critical that executives are involved in the process, as this is part of their due diligence duty. They must be aware of the outcome of the assessment process and should be leading the process of integrating control measures into the systems of the business, or ensuring that this occurs.

To implement new controls, your business will have to review its existing policies, procedures, equipment, premises, staffing, contracts, and business practices and make appropriate updates. If it is not possible to implement all suitable control measures immediately, then you should prioritise measures that eliminate or minimise the most serious risks. Executives should be involved in decisions about which control measures will be implemented and their timing. They must also ensure the availability of the resources necessary to put controls in place.

It is recommended that you document the assessment process, including its scope and timing, personnel

involved, sources of information and the reasoning supporting each decision. You should also document decisions, timing, costs, and actions relating to the implementation of each control measure. These records will be useful to your business in the future.

Training will be an essential component of implementing new measures. In some cases, training will itself be one of the control measures, but training about all the new measures will be required. Develop all-staff training to introduce the overall changes, including an explanation of the risk assessment process and the business' legal obligations, so that staff understand the importance of the training.

Identify and deliver specific training for staff according to the functions they perform, where and how they work, and the equipment and resources they use. Include sales, human resources, and public relations staff in the training program. Deliver training in a way that suits the working environment and gives trainees enough time to learn and adapt. Provide training support during the change period and ensure that staff know how to access training documentation.

You should also identify training needs of your business partners and clients. In some cases, e.g., when you change procedures at your premises, it may be necessary to include their employees in on-site training with your own employees. Otherwise, it may be sufficient to know that those employees have received comparable training. For your clients, it may be sufficient to provide written information or update web content.

Note: Identifying and fulfilling training needs is part of a business's "transport activities".

5 Monitor and report on the effectiveness of controls

You will need a way to monitor whether the control measures you implement are effective. If you have already been monitoring appropriate safety indicators, you should be able to compare outcomes after the controls have been implemented and assess whether they are improving your business' safety.

Care needs to be taken in choosing what you measure or monitor. Some measures based on outcomes - e.g., the number of crashes - may not provide useful insights. For example, there may be long periods when by good fortune there are no crashes despite the existence of a hazard that could cause them, so this measure would provide no information.

Use what you learned from the risk assessment process, and your detailed knowledge of your own business, to identify indicators that will inform you whether the measures are being implemented consistently across your business, and what effect they are having on known hazards and risks. You may need to combine different kinds of information and information from several sources to achieve this, e.g., driver surveys, absenteeism rates, engine data, technical reports, near misses, maintenance records, customer complaints, audit reports etc.

It may be possible to perform continuous monitoring. If not, you should establish a monitoring cycle that's appropriate for the level of risk associated with your activities. Decide what should be considered normal variation in the indicators that you measure, and what changes warrant further investigation or intervention.

Monitoring the effectiveness of controls, ensuring that employees can report issues and be heard, and making necessary changes are all part of an executive's due diligence duty.

6 Review

Your safety management system should be reviewed if your monitoring demonstrates that the measures in place are not effective at eliminating or minimising risk.

There are also other events that might trigger a review, for example:

- concerns raised by employees
- a serious incident or near miss
- major changes to business operations e.g. new client, business expansion, new staff etc.
- emerging hazards and risks
- changes to the physical or regulatory environment

You should also establish a cycle of periodic review. A combination of minor and incremental changes over time can escape notice but create a substantially different risk environment. Regular review allows a business and its executives to confirm that systems are still fit for purpose. They are also an opportunity for executives and staff to re-focus on safety and avoid complacency. The frequency of review should depend on the overall risk associated with your business. If the risk is higher, then reviews should be more frequent.

Your business may have the resources to conduct its own review. You may also consider engaging external experts from time to time, or to review some parts of your system.

The review process should follow the same steps as the initial assessment, and the same requirements for implementation and documentation apply.

If the outcome of the review is that changes should be made, then training should be developed and delivered for employees, business partners and clients (see above.)

OVERVIEW OF HAZARDS AND RISKS

Log haulage is, by its nature, a challenging operational task. It belongs to the two most dangerous industry sectors – agriculture and transport – and it takes place on poor roads, in remote environments. Distance from medical and emergency services increases the potential seriousness of injuries. This section summarises some of the known hazards and risks in log haulage. These are addressed in more detail in the following sections of the code. This overview should not be construed as a complete list of all hazards and risks associated with log haulage.

Risks

Rollover has been the most critical safety risk for log haulage, with multiple rollovers occurring every year. Rollovers pose the risk of death or serious injury to drivers and to other road users. Hazards that contribute to this risk include road characteristics, vehicle stability, load construction, inappropriate speed and driver inattention or fatigue.

Collision or Loss of Control incidents pose a risk of death or serious injury to drivers and other road users. Hazards contributing to these risks include roading or traffic management, damaged or worn vehicle components, driving behaviour, scheduling and management of fitness to drive.

Load loss incidents pose a risk of death or injury to other road users, and damage to road infrastructure and the environment. Causes of load loss include use of inappropriate vehicles or routes, poor load construction or load restraint, and defective or unsuitable load restraint equipment.

Injury to workers (apart from vehicle accidents) is a substantial risk due to features of the environment such as uneven ground, poor light, falling branches, the actions of other workers and the operation of heavy machinery. Drivers are further exposed to risk when they are outside their vehicles at loading coupes, when they throw chains over the top of loads, and when they stop at the roadside to check their vehicle or load restraint.

Note: Eliminating or minimising the risk of injury to workers and drivers is a legal duty under Occupational Health and Safety/Work Health and Safety laws. Control measures applied to these risks may be required under both the HVNL and the relevant OHS or WHS law. See s18, HVNL, which addresses the overlap between the duties under the two frameworks.



Hazards

Forest roads substantially increase the risk of rollovers or crashes and accelerate wear and tear of vehicles and components. They require more skill to be driven safely and may contribute to driver fatigue.

Unsuitable or defective vehicles contribute to the risk of rollovers or crashes and reduce the ability of a driver to avoid or respond to an incident.

Unsuitable or defective load restraint equipment contributes to the risk of logs becoming unrestrained.

Fatigue, distraction, or being unfit to work are recognized hazards for heavy vehicle drivers, contributing to the risk of crashes when drivers fall asleep, suffer medical episodes or fail to watch the road. They are hazards in all workers, affecting reaction time, judgment, awareness of environment, observation, memory, communication, balance and agility. Affected workers are less able to carry out safety critical tasks such as restraining a load, making scheduling decisions, or supervising operations or to respond in an emergency.

Inadequate training of any worker creates risks and prevents control measures being implemented effectively.

Ineffective communication between parties, or within businesses creates risks, and prevents control measures being implemented effectively.

Ineffective or inconsistent procedures can lead to confusion for workers and to gaps in safety management. For many of the risks associated with the log haulage task, coordination between parties in the CoR and with their workers is critical.



ACTIVITIES, HAZARDS AND CONTROLS

The sections above are a guide on using this code and on managing safety in your transport activities. The controls below are suggested actions to assist you to ensure your activities are safe.

The LHC provides guidance only. Your responsibility is to assess each circumstance on its own merits to ensure that so far as is reasonably practicable, public risk is eliminated, and, to the extent it is not reasonably practicable to eliminate such risks, they are minimised. As noted above, that may require additional steps to those suggested below.

Many of the controls require action to be taken by workers, including drivers. These workers must be properly trained, supported, and empowered to make decisions and take actions that ensure safety within the course of the duties they perform on your behalf. Your responsibility is to support and instruct your workers, with good equipment, high-quality training and effective operating processes, so that they can do their job for you with confidence that they are working safely.

1 Activity: Making contracts

Contracts not only define job requirements and payment terms; they also enable the contract parties to set terms that will help them work safely together. Such collaboration helps each party discharge its Primary Duty under the HVNL and improves public safety.

Note: Under the HVNL, a party in the CoR cannot transfer their primary duty to another person or business or lessen their responsibility through a contractual agreement or arrangement.

1.1 Hazard: Contract terms cause or encourage unsafe practices

- 1.1.1 Control: Avoid contract terms that would create an incentive for drivers to speed, drive while fatigued, or fail to follow prescribed work and rest hours.
- 1.1.2 Control: Avoid contract terms that may create incentives for exceeding safe load heights or masses.
- 1.1.3 Control: Include payment terms for drivers based on hours worked, rather than distance travelled or mass carried.

1.2 Hazard: Failure to address safety at the contract stage

Insufficient consultation with business partners, prior to contract, can result in an agreement that impedes effective safety management, or that misses opportunities to improve safety. Initiatives before and during the contract phase that improve safety outcomes include:

- 1.2.1 Control: Work with other parties to identify hazards, risks and controls, and include them in the contract. For example: working hours, roading standards, maximum load height, proficiency of drivers and workers etc. Develop joint plans or procedures for daily operations and for responding to emergencies.

- 1.2.2 Control: Identify the information that each party needs to manage safety and create obligations in the contract to share or report information.
- 1.2.3 Control: Afford rights to contract parties to request information, to visit sites, to speak to workers, to inspect vehicles or loads etc.
- 1.2.4 Control: Agree on common terminology to be used in the performance of the contract.
- 1.2.5 Control: Agree to share information about safety including research, findings and experts.
- 1.2.6 Control: Establish communication channels, regular meetings, and contingency plans.
- 1.2.7 Control: Afford drivers the right to refuse to carry loads that they assess as unsafe and empower all workers to refuse to carry out tasks that create a risk to themselves, other workers, or to the public.
- 1.2.8 Control: Establish a means for all workers to report unsafe practices, or behaviour that affects their fitness to work, and support workers who provide information.

1.3 Hazard: Delay

Delays increase potential risks across the supply chain as workers with less time to complete tasks may rush to do them. Drivers may also be induced to speed or to skip rest breaks, to catch up. Contract terms should not only avoid such incentives; they should also help manage the consequences of delays.

- 1.3.1 Control: Allow flexibility regarding time limits, so that all parties absorb the loss when delays are beyond their control.
- 1.3.2 Control: Include mechanisms for parties to identify and manage the causes of delay.
- 1.3.3 Control: Include requirements for communicating delays to other parties.
- 1.3.4 Control: Establish contingency pathways for different kinds of delay.

1.4 Hazard: Payment and productivity terms do not support safe work practices

Contracts that do not allow for the cost, and the time required, to perform business support functions, can result in failures or long-term deterioration of safety and performance.

Example: failing to factor in time off-road for vehicle maintenance may induce an operator to delay vehicle maintenance in favour of maximising haulage capacity. The long-term results may be unsafe vehicles and/or vehicles that are out-of-service for lengthy repairs.

Example: failing to allocate time for training and consultation may result in uncertainty and inconsistency about how tasks should be performed.

Example: insufficient time for drivers and other workers to obtain fitness assessments and health care, including mental health care, can reduce their fitness to work, resulting in less safe and efficient work practices, increased time off, and higher rates of staff turnover.

- 1.4.1 Control: When setting productivity targets, include terms that:
 - Allow for the time and cost of vehicle maintenance and out of service periods
 - Afford flexibility for emergency repairs
 - Allow time for employees to obtain training, fitness assessment, health care, and to consult with other workers, including from other businesses.
 - Enable appropriate work-life balance for workers.

1.5 Hazard: Contract is not adaptable when conditions change

- 1.5.1 Control: Include a schedule of contract review dates, or the right to ad-hoc reviews.
- 1.5.2 Control: Specify conditions, such as changes in the economic or operating environment, in which performance of the contract may be reviewed or varied.
 - For example, the mass limit of a bridge is reduced, requiring smaller loads or substantial detours.

2 Activity: Establishing procedures and working with other parties

Clear, documented procedures allow each party to understand what they and others should be doing to ensure the safe use of heavy vehicles. They also provide clear instructions to workers about how to safely perform their tasks and when and how to escalate safety concerns.

2.1 Hazard: Different procedures for the same thing

When parties whose employees work together each have procedures for the same operation, differences between the procedures may create confusion, disagreement, uncertainty or delay.

When a party assumes that another party is addressing a particular risk, it's possible to overlook a risk, even though there are readily available and effective controls.

- 2.1.1 Control: Consult with other parties when developing procedures that involve workers from more than one party, for example:
 - Choice and placement of logs on a vehicle
 - Decisions about allocating vehicles to routes
- 2.1.2 Control: Agree upon a single procedure that explains how decisions are made, how things are done, and how employees work together.
- 2.1.3 Control: Document agreed procedures and make them accessible to all parties and workers.
- 2.1.4 Control: Include information about how to report issues or conflicts and the way that those issues will be addressed and resolved.

2.2 Hazard: Procedures are hard to follow

- 2.2.1 Control: Involve workers in the development of procedures and encourage them to provide feedback once procedures are implemented.
- 2.2.2 Control: Develop procedures that are suitable for the intended users.
 - Procedures should closely follow natural workflows; if they interrupt the flow of work, they are more likely to be disregarded.
- 2.2.3 Control: Use plain language and include diagrams to document procedures.
- 2.2.4 Control: Translate written procedures so that any worker who performs or supervises the procedure, or needs to understand it, can read it in their first language.
- 2.2.5 Control: Provide the necessary resources, including on-going training and monitoring, to support workers to implement procedures.
- 2.2.6 Control: Reevaluate the relevance and usability of procedures, based on feedback, or at a scheduled review date, and revise as necessary.

2.3 Hazard: Poor communication delays feedback

If procedures are not being followed, or are not suitable, or if safety hazards are observed or identified during operations, the information should be communicated as soon as possible.

- 2.3.1 Control: Identify who should be notified about each kind of hazard, or problem with procedures.
- 2.3.2 Control: Ensure all workers have ready access to current contact information for making reports, including alternative contacts for when people are absent.
- 2.3.3 Control: Use a communications system that enables immediate reporting.

2.4 Hazard: Procedures are not effective

Effective risk management requires ongoing monitoring to ensure that controls are being implemented, and that the chosen controls are effective at eliminating or minimising risks.

Changes to procedures may create confusion and reduce efficiency, so they should not be made without reason. However, there should be a plan to review procedures from time to time, to make them more effective, to respond to changes, or to address new hazards.

- 2.4.1 Control: Encourage workers to provide feedback on incidents, hazards and the effectiveness of control measures.
 - Workers are often in the best position to observe incidents and hazards in their own work environment.
 - Workers should be supported to report incidents and hazards, and to have confidence that their reports will be followed up.
- 2.4.2 Control: Regularly observe work in progress. Note deviations from procedures, or risks that have not been effectively controlled.
- 2.4.3 Control: Record feedback and observations and share them with other parties.

- 2.4.4 Control: Collaborate with other parties to determine appropriate corrective actions, for example, improved implementation of controls, additional controls, or new controls.
- 2.4.5 Control: Implement corrective action(s), manage the change process, including all businesses affected, and continue to monitor the effectiveness of the controls.

3 Activity: Monitoring and training drivers

3.1 Hazard: Driver is Fatigued

- 3.1.1 Control: Compare a sample of records of driver work and rest hours with other data to verify their accuracy. For example, time sheets, GPS records.
- 3.1.2 Control: Respond to reports from other parties, and from drivers, about instances of drivers being fatigued.
- 3.1.3 Control: Monitor driver's fatigue levels and work and rest hours and adjust work schedules if required.

3.2 Hazard: Driver is distracted

- 3.2.1 Control: Reduce, the number of audio and visual devices in the cabin of each vehicle to the necessary minimum.
- 3.2.2 Control: Restrict the use of mobile phones during driving and install phone mounting equipment for use when drivers do need to receive calls while driving.
- 3.2.3 Control: Train drivers to stop at a safe place before making mobile phone calls.
- 3.2.4 Control: Install compartments, boxes or holders in vehicle cabins to restrain items that could move during travel.
- 3.2.5 Control: Train drivers to secure all loose items in the cabin, before starting to drive.
- 3.2.6 Control: Allocate time, at the end of shifts, for drivers to raise issues with supervisors or employers. Resolve issues, as far as possible, before the driver's next shift.

3.3 Hazard: Unsafe driving behaviour or driving conditions

Telematics systems require a commitment from the business to provide the resources necessary for data to be monitored, analysed and acted on. Where fatigue monitoring is conducted through telematics, it is essential to always have someone available to receive alerts from the system and to act on those alerts.

- 3.3.1 Control: Install telematics systems.
 - Telematics systems record and transmit vehicle data, including speed and use of accelerator and brakes and in some cases, activation of EBS and ABS systems.
 - Training drivers about how the systems work and how they will be used by supervisors can improve acceptance and reduce concerns about surveillance.
- 3.3.2 Control: Regularly monitor telematics data and correlate information to identify:

- locations that are potentially hazardous, such as sharp, off-camber or poorly signposted bends, concealed entrances, changes of speed limit.
- route characteristics, average travel times, engine time and maintenance issues.
- driver inattention or lack of proficiency.

3.3.3 Control: Use the data obtained by telematics systems to provide feedback to drivers and improve skills.

- Some businesses have successfully implemented incentive programs for drivers who demonstrate high levels of efficiency and safety in the driving task.

3.3.4 Control: Assess whether changes in scheduling, choice of route, maintenance or other procedures need to be implemented.

3.4 Hazard: Driver is struck by falling log during loading or while applying load restraints

3.4.1 Control: Train drivers to remain at a designated safe location (which may be in the cab of the vehicle), during loading.

3.4.2 Control: Train drivers to assess loads before applying lashings, and to ask loader operators to re-adjust loads if necessary

3.5 Hazard: Stopping to check loads at the side of the road

The use of auto-tensioners substantially reduces the need for drivers to inspect lashings, however there are still reasons why drivers will need to descend from the vehicle while travelling on a public road.

3.5.1 Control: Train drivers about a safe procedure for exiting and dismounting from the vehicle.

3.5.2 Control: Equip drivers with helmets and high-vis jackets and require them to always wear boots.

3.5.3 Control: Identify the safest places for stopping.

3.5.4 Control: Ensure drivers follow training for safe entry and exit from the vehicle.

3.6 Hazard: Debris and detritus fall onto road

Debris falling from logging trucks can be a hazard on roads, particularly for cyclists and motorcyclists.

3.6.1 Control: Train drivers to remove loose material from trailers before leaving the coupe, or before entering the road network.

4 Activity: Allocating tasks to workers

4.1 Hazard: Worker is insufficiently trained for role

Inadequately trained workers pose serious potential risks to themselves and to other workers and members of the public. See: [Regulatory Advice - Managing the risks of undertrained workers](#). Refer to Appendix B for a summary of training recommendations from this code.

4.1.1 Control: Assess the tasks and operating environment and identify training requirements.

4.1.2 Control: Collaborate with CoR parties to deliver consistent training to all workers.

4.1.3 Control: Train workers to ensure that they understand and can implement relevant controls to ensure that heavy vehicles and their loads do not create a safety risk on the road.

4.1.4 Control: Provide regular refresher training to maintain worker's competence.

4.1.5 Control: When tasks or the operating environment change, ensure that workers are trained in the changed conditions before deployment.

4.1.6 Control: Regularly assess the effectiveness of training and revise training requirements as necessary to ensure safety is effectively managed.

4.2 Hazard: Driver is not familiar with allocated route

4.2.1 Control: Provide drivers with a route map that identifies the main hazards on the route and provides details of the route. E.g., location of steep roads, applicable radio frequency for each part of the route etc.

4.2.2 Control: Allocate a second driver and vehicle to accompany the driver when travelling on the route for the first time.

4.3 Hazard: Worker is unfit to work

There are many reasons a worker may be unfit for work including general physical and mental health, use of prescribed medication or illicit substances, state of mind, distraction due to events outside work and fatigue.

Fatigue and impaired judgement or reaction times are well known hazards for heavy vehicle drivers however impairment of other workers may also be a hazard that increases other risks and may prevent risk controls being implemented effectively.

For guidance relating to fitness to work, refer to:

- [Safe Work Australia](#)

4.3.1 Control: Require workers to undergo medical and other assessments, suitable for the role they will perform, before commencing employment.

4.3.2 Control: Include employment conditions requiring regular or triggered re-assessments.

4.3.3 Control: Train workers to identify when they are unfit to work, and to identify indicators that another person is unfit to work.

4.3.4 Control: Implement procedures for workers to self-report when they are unfit to work.

4.3.5 Control: Implement procedures for workers to assess the fitness of co-workers, especially in the case of workers performing hazardous or safety critical tasks.

4.3.6 Control: Support a no-blame approach when workers identify themselves as unfit for work.

4.3.7 Control: Provide information and support to workers to manage causes of unfitness.

4.4 Hazard: Driver is unfit to drive

4.4.1 Control: Require drivers to be assessed for fitness to drive, using Austroads guidelines, before commencing employment.

4.4.2 Control: Include employment contract obligations for drivers to undergo regular random or triggered re-assessments.

For guidance relating to Fitness to drive, refer to

- NHVR guidance about [Fitness to Drive](#)
- [Safe Work Australia](#)

4.5 Hazard: Driver is fatigued

Although log haulage drivers travel shorter distances than drivers in other sectors, there are some features of log haulage that may increase the risk of driver fatigue.

Forest roads provide limited opportunities for drivers to stop and there may be limited access to rest facilities at mills, landings and unloading premises; logging vehicles are rarely fitted with sleeper cabins; drivers who start work before dawn may be more likely to be affected by fatigue; and drivers may be performing other tiring tasks as well as driving.

Work and rest hours are regulated under the HVNL, but complying with these requirements alone may not effectively manage the risk of driver's becoming fatigued.

Employers can train drivers about fatigue and its management and ensure that driver's fatigue is assessed throughout the period when they are driving.

Employers and other parties involved in scheduling can ensure drivers have sufficient opportunity to rest. All parties can work to identify and address the causes of delay through the supply chain.

Parties in the CoR who interact with drivers can have systems in place to assess and monitor driver fatigue and to support drivers to assess, report and manage their own fatigue.

For guidance relating to fatigue, refer to

- NHVR guidance about [Fatigue Management](#)
- [Regulatory Advice – Fitness to drive: Fatigue | NHVR](#)
- [Master Code of Practice](#)
- Austroads' [Assessing Fitness to Drive](#) guidelines
- [Safe Work Australia](#)

- 4.5.1 Control: Schedule driver's work hours to allow sufficient time to rest during and between shifts.
- 4.5.2 Control: Avoid scheduling driving between midnight and dawn.
- 4.5.3 Control: Implement extra fatigue risk management controls for drivers who drive between midnight and dawn.
- 4.5.4 Control: Work with other CoR parties and drivers to identify and address causes of delay.
- 4.5.5 Control: Adjust schedules, where necessary, to ensure drivers have adequate rest.
- 4.5.6 Control: Train drivers, and workers involved in scheduling, about the causes, indications and effects of fatigue.
- 4.5.7 Control: Encourage drivers to identify and report when they are fatigued. Empower drivers to stop driving when fatigued. Have contingency plans for replacing fatigued drivers.
- 4.5.8 Control: Identify suitable rest locations on haulage routes and provide this information to drivers.
- 4.5.9 Control: Maintain accurate records of driver work and rest hours.

- 4.5.10 Control: Install fatigue and distraction detection devices and train drivers and supervisors to use them.

- 4.5.11 Control: Develop and implement a procedure to assess a heavy vehicle driver's fatigue levels.

The procedure should be adapted to the specific circumstances in which the business and employees operate, and consider the following principles:

- Numerous factors affect fatigue, including the nature of the work and the work environment, shift start times and duration, and the work performed by the driver over previous days. The driver's age and overall health will also impact the risk of fatigue. For example, undiagnosed sleep apnoea is a recognised risk for professional and casual drivers alike. Other health conditions may also alter a person's sleep requirements.
- Self-assessment of fatigue levels is a basic element of fatigue management. It begins before the worker starts work and should continue throughout the shift. It is also part of a worker's own duty to keep themselves and others safe. Self-assessment is most effective when workers are trained about the causes, indicators and consequences of fatigue, and where there are procedures in place that support them to stop driving when they identify that they are at risk of being impaired by fatigue. A properly trained worker may have the earliest opportunity to detect that they are at risk of fatigue.
- Fatigue risk management can also be improved by using objective fatigue assessment methods to support self-assessments. These include second-person assessments and the use of fatigue risk evaluation tools. Objective fatigue assessments reduce the risk that bias, or fatigue impairment, affects the assessment outcome.
- Assessments by a second person are preferred because that person is better able to identify physical signs of fatigue such as slow blinking, unsteadiness or lack of balance, or inattention to conversation/details. Where there is no other person present, a second-person assessment could be conducted via video call or phone call, though this may reduce the opportunity to observe non-verbal cues. An in-person, second-person assessment could also be conducted at the next sensible opportunity.
- A fatigue risk evaluation tool asks for information about factors which cause fatigue and uses this as the basis of an objective assessment. There are a variety of tools available, e.g., online tools, smart phone applications, or paper-based tools that include calculations. There are some freely available software applications that perform this function. You should verify for yourself which tools are suitable, or whether a similar tool should be adapted for your operations.
- Also consider that a person's fatigue level changes over the course of a shift and should be re-assessed from time to time using objective fatigue assessment measures. Appropriate times to re-assess may include:
 - before the driver commences or recommences driving
 - when there are indications of fatigue

- at the time at which a fatigue risk evaluation tool predicts there will be an increased level of fatigue related risk.

4.6 Hazard: Working alone

At times drivers go to coupes where they load logs onto a vehicle, then drive it, without any other person present. This is more likely to occur at night or in the early hours of the morning.

Working alone, lack of communications and distance from medical and emergency services increase the risk of harm in the event of an accident.

Refer to Safe Work Australia's [Managing the Work Environment and Facilities Model Code of Practice](#) for further information on managing the risks associated with isolated or remote work.

- 4.6.1 Control: Plan operations to eliminate or minimise the need for workers to work alone.
- 4.6.2 Control: Implement emergency communication procedures so that workers who may experience problems on site are able to access support.
- 4.6.3 Control: Provide workers with duress alarms including fall detection when working alone, particularly in darkness or in isolated areas.
 - Train workers how to use alarms and how to respond when an alarm notification is received.
- 4.6.4 Control: Work with other parties to ensure that there is telecommunications coverage available in the area being worked, so that duress alarms can be effective. For example: Advocate for access to trunked radio systems such as the Public Safety Network.

5 Activity: Roothing and landings: design, construction and maintenance

Well-constructed and managed forest roadways and loading areas are critical for the safe transport of logs. This section identifies factors that should be considered in planning, building and maintaining haulage routes.

5.1 Hazard: Forest roads

- 5.1.1 Control: Design and construct road alignments so that curves and turns have sufficient radius and width for the types of vehicles that will use them.
- 5.1.2 Control: Ensure forest road design considers the potential use of the road and the prevailing environmental conditions in the area. For example, construct wider roadways with longer radius corners on roads used during night driving, or increase roadway crossfall in snow or high rainfall areas.
- 5.1.3 Control: Design and construct roads to minimise crossfall, crowning and gradient so far as possible without compromising surface drainage.
- 5.1.4 Control: Where roads are to be used by two-way traffic, design and construct them with sufficient width to enable safe passing or design and construct appropriate passing areas with signage indicating their location.
- 5.1.5 Control: Install signage and markers to prevent access to roads which should not be used.

- 5.1.6 Control: Install signage and markers to warn drivers of known hazards such as:

- Roads that require maintenance
- Sharp or narrow bends that require special attention
- Soft shoulders
- Steep descents
- Intersections

- 5.1.7 Control: Report concerns about road maintenance and access conditions to other parties in the CoR.

- 5.1.8 Control: Maintain roading in safe condition

- Trim branches that overhang the roadway or obscure vision on the inside of turns.
- Inspect and repair roading as required to ensure it is safe for use.

- 5.1.9 Control: Provide a system that any person can use to report near misses or hazards to do with road design or condition, including changes to road conditions due to weather etc.

- 5.1.10 Control: Take necessary actions to assess and control reported hazards as soon as possible.

5.2 Hazard: Traffic on forest roads

- 5.2.1 Control: Install signage and provide maps to inform truck drivers and other road users about safe use of coupe access roads and landing areas, including:

- Access requirements
- Site layout including road names, distances and waypoints
- Location of active landing area(s) and haul route(s)
- Location of active harvesting or spraying area(s)
- One-way roads, including direction of travel
- Radio channel and phone contacts for key site personnel
- Passing areas and waiting locations
- Speed limit(s)
- Known hazards. Refer to section 5.1.6.

- 5.2.2 Control: Provide information to members of the public using forestry roads where forestry management activities, harvesting or haulage may be occurring.

- 5.2.3 Control: Develop communication protocols for all road users to ensure that the position and travel direction is regularly communicated on the appropriate radio frequency. Where possible, install call-in signage at regular intervals to suit road conditions e.g., on approach to a pull-over point, narrow bridge or section of narrow road.

- 5.2.4 Control: Train workers to understand and use communication protocols and to understand any access controls or special considerations for safe use of site roads and loading areas.

5.3 Hazard: Mass isn't accurately measured during loading

- 5.3.1 Control: Construct loading areas to be flat and level with a firm surface to facilitate accurate use of vehicle on-board scales.
- 5.3.2 Control: Construct or identify an area in the vicinity where on-board mass can be accurately measured.

5.4 Hazard: Loads are poorly constructed because logs are not sorted prior to loading

Careful sorting of timber prior to loading enables efficient load construction and consolidation.

5.4.1 Control: Allocate space in loading areas, on firm level ground, where logs can be sorted and stacked prior to loading. Refer to section 6.1.1.

5.5 Hazard: Loading area congestion and queuing

5.5.1 Control: Construct or identify areas where vehicles can safely stop and wait when landings are in use.

5.6 Hazard: Loaders have limited view of loads when loading

5.6.1 Control: Assess the landing area and determine whether earthworks or other measures are required to enable loaders to have an adequate view of the load whilst loading.

5.6.2 Control: Construct loading areas to enable loading to take place from high ground.

5.7 Hazard: Lone workers cannot call for help

Isolation, lack of communications and distance from medical and emergency services increase the risk of harm in the event of an accident.

Refer to Safe Work Australia's [Managing the Work Environment and Facilities Model Code of Practice](#) for further information on managing the risks associated with isolated or remote work.

5.7.1 Control: Install telecommunications relays or boosters to enable workers to seek assistance if required, and to enable duress alarms to be effective. E.g. mobile phone/2-way radio relays, Wi-Fi equipment.

5.8 Hazard: Interacting with traffic on public roads

5.8.1 Control: Construct intersections where forest roads access the public road network so that there is good visibility in both directions on the public road and adequate distance for traffic to slow down for a logging vehicle entering or leaving the public road.

5.8.2 Control: Work with the road managers for public roads to maintain intersections in safe condition.

- Trim or remove branches that obscure vision.
- Report problems to road managers.

5.8.3 Control: Identify:

- Safe locations for stopping a truck to check loads or carry out other checks.
- Safe locations for stopping a truck so that a driver can rest.

Share information about those locations with other parties in the CoR.

5.8.4 Control: Use appropriate means to alert and advise members of the public of log haulage operations and safe conduct around heavy vehicles. For example:

- Use permanent signage in areas or regions where logging operations occur frequently.
- Place temporary signage near intersections where log trucks are entering or exiting public roads from forestry roads
- For signage on roads other than forest roads, work with the road manager to establish types and placement of signage required.
- Affix signage to trucks showing limitations of manoeuvrability and recommending minimum safe separation distances for other road users.

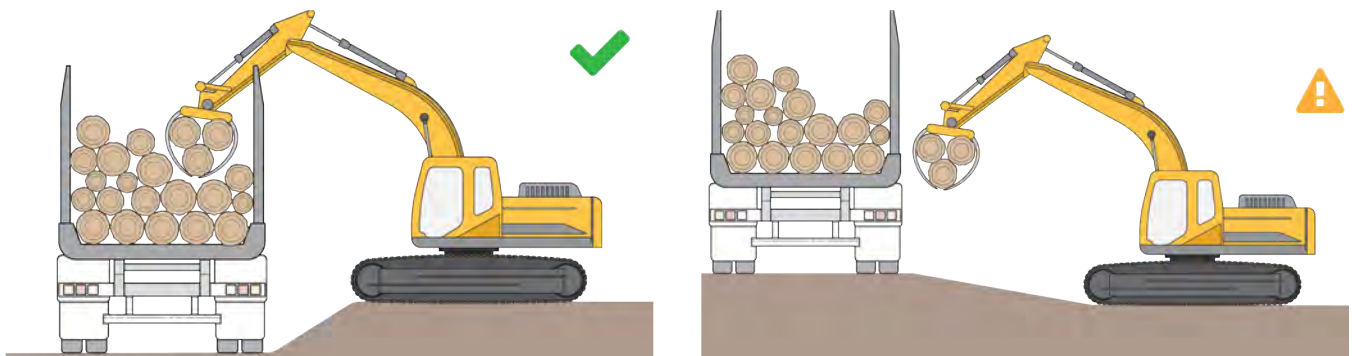


Figure 5.1. Loading from high ground allows a better view of the load.

6 Activity: Managing loading areas

6.1 Hazard: Loads are not well constructed

Careful sorting of logs prior to loading enables efficient load construction and consolidation.

6.1.1 Control: Ensure that timber is sorted and stacked prior to loading.

For example:

- Logs of the same length; Logs of the same diameter
- Straight logs suitable for building the walls of a bay of logs
- Two stacks for tapered logs, for efficiently alternating butt ends and narrow ends
- Logs with twist or sweep, splits, etc. that are not suitable for tie-down restraint.

6.1.2 Control: Require or train harvesters to sort and stack logs as they are brought to the landing.

6.2 Hazard: Rocks and debris are loaded onto trailers

6.2.1 Control: Require contractors to stack logs on bearers.

6.2.2 Control: Alert loader operators to the presence of rocks or detritus in stacks of logs to be loaded.

6.2.3 Control: Seek feedback from CoR parties about the presence of debris in loads.

6.2.4 Control: Monitor loads for the presence of debris and provide feedback to loader operators.

6.3 Hazard: Loaders have limited view of loads when loading

6.3.1 Control: Designate a location from which drivers can observe the load and communicate with loaders during loading.

6.3.2 Control: Install cameras to enable loader operators and drivers to inspect the top of the load during loading.

6.4 Hazard: Loading at night-time

6.4.1 Control: For night operations, install lighting to enable the load to be viewed during loading.

6.5 Hazard: Loading area congestion and queuing causes delay

6.5.1 Control: Communicate expected delays to drivers and CoR parties at the earliest opportunity.

6.5.2 Control: Require vehicles to wait in a designated safe location before driving into the loading area. For example, require drivers to identify themselves, and their vehicles, when they arrive at a designated point, and record their arrival in sequence.

6.5.3 Control: Implement a procedure to alert each driver shortly before it is their turn to move. For example: send a text message (if contact details are known); call on UHF radio.

6.5.4 Control: Monitor the average time required to load a vehicle, from the time it arrives at the coupe, until it departs, and share that information with other CoR parties.

6.5.5 Control: Adjust operations to minimise drivers' waiting time.

6.6 Hazard: Driver is fatigued or unfit to drive

A driver's level of fatigue and their fitness to drive are not constant. At the start of a shift, a driver may be assessed as fit to drive, but may subsequently become fatigued, or otherwise unfit to drive.

Workers at landings have an opportunity to observe drivers during their shifts, sometimes multiple times a day. When drivers are obviously unfit to drive, landing workers can respond according to an established procedure, supporting drivers, providing feedback to other parties, and intervening in extreme cases.

6.6.1 Control: Consult other CoR parties and establish procedures for responding to unfit or fatigued drivers at the landing.

6.6.2 Control: Train workers at landings to identify signs of fatigue or unfitness to drive.

6.6.3 Control: Train workers at landings to understand and follow the procedures when they believe a driver is fatigued or unfit to drive.

For example:

- Speak with the driver
- Direct them to a place where they can rest or park the vehicle
- Contact the driver's employer and other parties to report the signs of fatigue or unfitness
- Contact the driver's employer to arrange a replacement driver
- Refuse to load the vehicle.

6.7 Hazard: Lone workers cannot call for help

Isolation, lack of communications and distance from medical and emergency services increase the risk of harm in the event of an accident.

Refer to [Safe Work Australia's Managing the Work Environment and Facilities Model Code of Practice](#) for further information on managing the risks associated with isolated or remote work.

6.7.1 Control: Inform harvesters and transport operators about available telecommunication options at loading areas.

6.7.2 Control: Advocate for access to trunked radio systems, such as the Public Safety Network

6.8 Hazard: During loading or application of load restraints, a person is struck by falling log or by a lashing thrown by another person.

6.8.1 Control: Require drivers to remain in the cab of the vehicle, or at a designated safe location, during loading.

6.8.2 Control: Communicate clear expectations about conduct at coupes to all workers, contractors and employers.

7 Activity: Procuring vehicles and equipment

7.1 Hazard: Vehicle is not optimised to avoid collision

Modern electronic safety systems fitted to vehicles can substantially minimise the risk of collisions and can reduce the amount of harm or damage when a collision does occur. NHVR publications: [Heavy Vehicle Purchasing Guide](#) and [Regulatory Advice – Heavy vehicle safety technology and telematics](#) contain information on the function of these systems and advice on implementation of telematics monitoring programs and developing a safety culture in the business.

7.1.1 Control: Use, or specify the use of, vehicles fitted with appropriate safety systems such as ABS, RSC, ESC or EBS.

7.1.2 Control: Ensure drivers are consulted in decisions to implement new systems and are trained in their use.

- When drivers are not properly informed about these systems, they may not use them effectively, and in some cases may disable them.
- Unfamiliarity with warning signals can cause distraction and lead to drivers spending time looking away from the road searching for the source or meaning of a particular warning.

7.1.3 Control: Provide training, including refresher training at regular intervals to ensure drivers will be able to respond to a warning signal in a timely and effective manner.

7.1.4 Control: Consider system compatibility when purchasing vehicles. Ensure that prime movers and trailers can use the same systems. E.g., EBS on the truck and all trailers.

7.1.5 Control: Identify the combinations of vehicles in a fleet that will enable safety systems to function as intended. Train drivers and allocators to take safety system compatibility into account when pairing prime movers and trailers.

7.2 Hazard: Vehicle braking system is not optimised

Modern disc braking systems can be more effective than drum systems. They have better initial braking performance and disperse heat better during sustained or repeated braking application.

In some applications, drum brakes may be preferred because they are enclosed and provide additional protection from contamination with mud and grit when compared to disc brakes, although contamination can affect either kind of brakes.

Brakes with appropriately sized boosters are less likely to fail prematurely because of repeated overloading or overheating. Seek advice from a manufacturer or a mechanical engineer when specifying a new vehicle or combination.

EBS systems significantly reduce the likelihood of a loss-of-control incident due to braking.

7.2.1 Control: When purchasing or replacing fleet, specify appropriate brakes for both prime movers and trailers.

7.2.2 Control: Where appropriate specify the performance required of brake systems on particular axle groups.

7.2.3 Control: Select vehicles with similar braking systems when putting together combinations. A combination that includes disc brakes and drum brakes should be avoided.

7.3 Hazard: Inadequate vehicle stability

Because of the nature of the work and the road environment, log haulage has been associated with a high incidence of rollover. The frequency of those events has decreased with safety technologies such as ABS, RSC, ESC and EBS being incorporated in vehicle manufacture or retrofitted to older vehicles.

There are further controls relating to vehicle design and fittings that can reduce this risk. (Another control discussed in sections 10.1 and 12.3 is managing load height.)

7.3.1 Control: Use, or specify the use of, vehicles fitted with appropriate safety systems such as ABS, RSC, ESC or EBS.

7.3.2 Control: Use, or specify the use of, trailers which will lower the position of the load. For example:

- Stepped deck trailers that reduce the height of the load at the rear. Refer to figure 7.1
- Bolsters fitted as low as possible, while still allowing space for loading equipment.

7.3.3 Control: Use, or specify the use of, trailers fitted with smaller diameter wheels and tyres. E.g., 19.5" rather than 22.5" to lower centre of gravity and improve stability. Refer to figure 7.2.

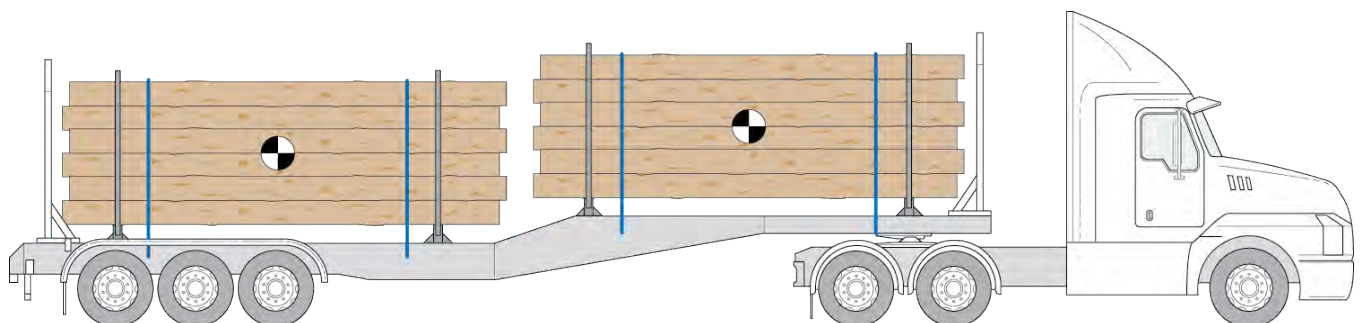


Figure 7.1. A step-deck trailer has a lower Centre of Gravity and is more stable

7.3.4 Control: Use, or specify the use of, suspension systems that are suitable for the nature of the load and haulage task.

- In general, stiffer suspensions are more stable than softer systems when heavily loaded.
- Innovative suspension components or systems may improve vehicle stability or traction. Consult a mechanical engineer or manufacturer.

7.3.5 Control: Use, or specify the use of, centralised tyre inflation (CTI) systems, and ensure drivers are trained to use them.

7.4 Hazard: Driver is not protected during rollover

During a rollover, the cabin of a vehicle and the occupants may be subjected to extreme forces, with a high risk of injury or death. There are different ways to reduce risks to cabin occupants:

7.4.1 Control: Use or specify the use of vehicles which comply with UN/ECE Regulation 29.

- This regulation specifies design and manufacturing criteria for vehicle cabins to maximise occupant protection. A vehicle that complies with this regulation offers the best standard of protection currently available for unmodified vehicles.

7.4.2 Control: Use or specify the use of a vehicle fitted with a Roll Over Protection System.

- A rollover protection system (ROPS) is specifically designed to prevent deformation of the cabin during a rollover event and should

improve protection for the driver and any cabin occupants. There is no Australian Standard for an ROPS for prime movers, but AS2294 (ROPS for earth moving machinery) and AS1636 (ROPS for tractors) may provide general guidance. If a ROPS is installed after market, the modification must be approved by an Approved Vehicle Examiner (AVE). VSB 6 J3 states the requirements for the installation of a ROPS.

7.4.3 Control: Use or specify the use of a vehicle fitted with a cab guard.

- Cab guards may improve occupant safety during a rollover event. Similar requirements for fitting a ROPS apply to cab guards.

7.5 Hazard: Load restraint equipment is inadequate

The force that tensioners apply to lashing is critical to ensure safe log haulage, but some, particularly some older models of air winch are not capable of applying sufficient tension and should be replaced or augmented to ensure adequate clamping force is applied to each load.

Even with the best performing tensioners, it is not guaranteed that all logs in a load will be restrained to the forward loading performance standard.

In the event of sudden deceleration, logs that escape restraint may break through the rear of a vehicle's cabin. **A cab guard may not provide adequate protection from logs that have become unrestrained.**



Figure 7.2. Step deck trailer with 19.5" wheels and low bolsters compared with flat deck with 22.5" wheels and high bolsters.

Secondary containment devices such as headboards and tailboards can provide some additional assurance that logs which become unrestrained will be retained on the trailer.

Refer to Section 13 for more information on load restraint.

7.5.1 Control: Fit or specify the fitment of lashing tensioners that will ensure that each bunk of logs has sufficient tension applied to meet the vertical loading performance standard. For a typical bunk of 15 tonnes mass, the total tension required is 3000kgf, or 0.2 times the weight of the load.

- The restraint of logs is a specialist task and not all tensioners or lashings will be suitable.

The only tensioners suitable for restraining loads of logs are ones specially made for that purpose by a small number of manufacturers.

- Air tensioners are generally preferred because they apply a consistent force as loads settle.
- Over centre binders (dogs) must not be used.
- Since tensioners apply forces to the trailer chassis, advice should be sought from the manufacturer or a mechanical engineer before fitting new winches or upgrading existing units.

7.5.2 Control: For each trailer, fit or specify the fitment of headboards and tailboards capable of withstanding the impact of logs that may spear from the packet due to a lack of clamping force. Refer to section 13.3, Appendix A.

7.5.3 Control: Fit or specify the fitment of bolsters that are readily adjustable to suit different lengths of log, or if the haulage task consists of known lengths of logs, specify bolster positions that ensure the logs are effectively contained. Refer to section 12.7.

7.5.4 Control: Fit or specify the fitment of stanchions that have sufficient strength to withstand the mass of logs in each bay and the forces applied during loading/unloading without bending.

- Round tubular stanchions are not recommended because they are more likely to bend under applied forces.

7.5.5 Control: Fit or specify fitment of grip plates onto bolsters and stanchions.

- Grip plates should be strong enough to prevent logs from sliding under the normal conditions of operation, including during emergency braking events.
- Grip plates on a stanchion, particularly in the top half, may significantly increase the forces applied to the stanchion during loading or transport and cause it to fail in service.
- Round section stanchions are not generally suitable for fitment of grip plates as they have insufficient strength and may rotate in the mounting bracket.
- Seek advice from the manufacturer or an engineer before fitting grip plates to existing bolsters or stanchions.

7.6 Hazard: Throwing lashings causes injury

Throwing lashings up over the top of a load of logs is an inherently hazardous activity. It may cause long-term soft tissue or spinal injuries to drivers.

Where chains are used, the risk of injury is greater.

7.6.1 Control: Procure equipment or fittings that launch lashings over a load, or that allow lashings to be picked up and passed over the top of a load.

7.6.2 Control: Assess load restraint requirements and use the lightest type of lashing that can effectively restrain the load.



Figure 7.3. Tensioners fitted to bolsters reduce forces on the trailer chassis

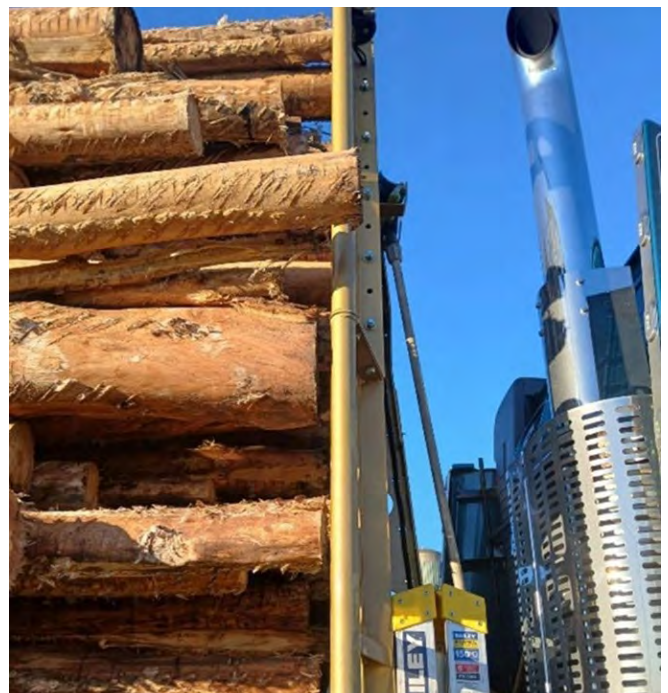


Figure 7.4. These logs slid during emergency braking and were stopped by the headboard (Refer to 7.5.2)



Figure 7.5. Without a headboard on the rear trailer, logs were not blocked (Refer to 7.5.2)

7.7 Working at night

- 7.7.1 Control: For night work, fit or specify the fitment of lighting plant to loading equipment, trucks and trailers. Plant should be capable of illuminating all work areas, including the full volume of the bay being loaded, and the areas designated for drivers to wait whilst vehicles are being loaded.
- 7.7.2 Control: For night work, provide workers with lighting equipment they can carry or fit to their person.

7.8 Hazard: Vehicle is overloaded

- 7.8.1 Control: Install or specify installation of on-board scales able to accurately measure masses on each trailer axle group and the truck's fifth wheel.
- Scales need to be calibrated regularly to ensure accurate data is available to the driver and loader.
- 7.8.2 Control: Ensure mass measurements are taken on flat, firm, level ground.
- Measurements taken on ground that does not meet these requirements may not be reliable.
- 7.8.3 Control: Share information about the mass of loads with other parties in the Chain of Responsibility.

8 Activity: Vehicle and equipment maintenance

Logging trucks and trailers operate in some of the most arduous conditions in trucking, and experience large forces on vehicle structures during loading and unloading. This increases the requirements for vehicle and equipment maintenance and requires more frequent inspection and maintenance than for vehicles operating in less demanding environments.

Equipment breakages and stress fractures can occur quite suddenly. Early identification of damage or defects can eliminate or minimise the associated risks. Drivers and workers who see vehicles close-up, such as loaders, unloaders and receiving staff, have an opportunity to observe vehicles regularly.

Drivers should be trained to identify and report issues. Other workers should be provided information and encouraged to report observations.

8.1 Hazard: Vehicle brakes are not optimally effective

The operating environment of logging vehicles accelerates wear on brakes and brake components, and the accumulation of dirt and debris not only contributes to the deterioration but also makes it more difficult to inspect brake systems.

Logging vehicles operate at close to maximum vehicle mass when loaded, and at relatively little mass when unloaded, but effective braking is essential at any mass.

- 8.1.1 Control: Increase the frequency of mechanical inspection and servicing compared to manufacturers' recommendations. Continue to adjust the frequency, based on inspection outcomes. E.g., if at a scheduled service, every vehicle required substantial maintenance, then the interval until the next service should be less.
- 8.1.2 Control: Train drivers to check for and report signs of brake system deterioration, either as part of a daily check, or during waiting time. Train them to recognise indicators such as:
- brake slack adjusters that are close to fully extended
 - signs of lock up on tyres, such as flat spots or uneven wear
 - substantial build-up of dirt or debris
 - signs of uneven heating such as blueing, ridges or surface cracking/checking on drums or discs
- 8.1.3 Control: Train drivers to check for and report corrosion of electrical connections for EBS systems.
- 8.1.4 Control: Train drivers to identify and report warning lights that indicate that ABS or EBS systems are not working.

Note: Controls 8.1.2 – 8.1.4 are not substitutes for an inspection and maintenance schedule with a qualified mechanic, but additional controls, to enable early identification.

8.2 Hazard: Stress or fatigue cracking in trailers

Logging operations place very high stresses on trailer chassis and suspension components or mounting points. Chassis are generally quite light weight and designed to be able to flex somewhat in use. Over time this can lead to stress or fatigue cracks, which reduce the strength of the trailer and may create a risk of breakage.

- 8.2.1 Control: Schedule regular maintenance inspections of trailer chassis and suspensions by qualified persons.
- 8.2.2 Control: Train drivers and workers such as loader operators, unloaders and receivers to observe and report signs of damage or deterioration to chassis and suspension systems. Train them to recognise and report indicators such as:
- flaking or discoloured paint or a line of rust – which can indicate excessive flexing before any visible crack develops.
 - signs of bending, such as a bend in a chassis flange, which may indicate significant overstressing of a component.

8.3 Hazard: Damaged or worn load restraint equipment

Load restraint can only be effective if the equipment used is in good condition and working properly.

- 8.3.1 Control: Regularly inspect load restraint equipment, including bolsters and their mounts, stanchions, headboards and tailboards, winches and their brackets and lashings.
- 8.3.2 Control: Repair or replace damaged equipment.
- 8.3.3 Control: Train drivers and workers such as loader operators, unloaders and receivers to observe and report signs of excessive wear, damage or deterioration in load restraint equipment.



Stanchions

- Do not use a stanchion if its upper third exceeds width limits.
- Damage to the upper third of a stanchion that will not affect performance: minor dents on inner surfaces, scratches, minor gouges or bent portions that remain within the vehicle width dimension requirement.
- Do not use a stanchion if its lower two thirds have: bent sections, cracking or dents larger than 10mm. Refer to Figure 8.1.
- Damage to the lower two thirds of a stanchion that will not affect performance: scratches, scuffing of surface, minor cuts that expose the steel surface but don't extend across the whole stanchion section.

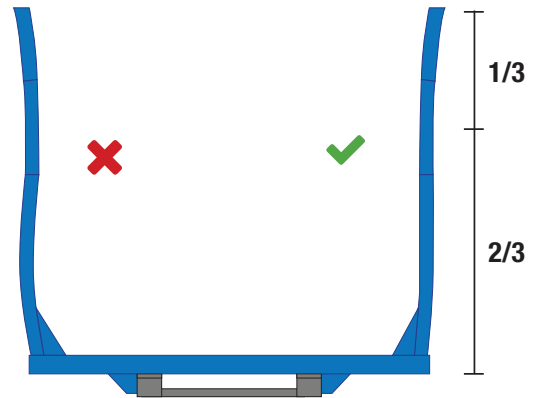


Figure 8.1. Stanchion damage key areas

Bolsters

- Do not use a bolster that has any cracks, gouges or bending without repair or specialist evaluation. Refer to Figure 8.2
- Damage to a bolster that will not affect performance: some small dents, scratches; no cracks, gouges or bending.

- 8.3.4 Control: Regularly service and check winches.
- 8.3.5 Control: Regularly check that the pressure of air supplied to winches is adequate for the performance required of the winch.
- 8.3.6 Control: Regularly test winch tension to ensure that the vertical loading performance standard is being met. Refer to Appendix A.

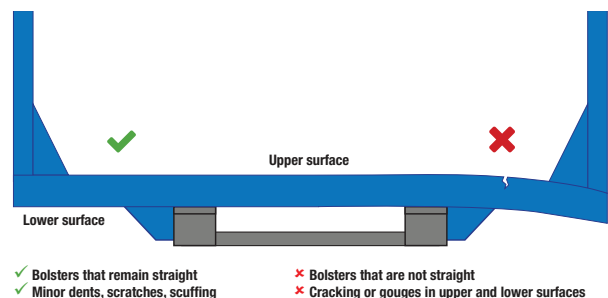


Figure 8.2. Bolster damage key areas

9 Activity: Allocating vehicles to routes

9.1 Hazard: Trucks operating on forest roads

A high proportion of rollover and loss of control incidents occur on forest roads.

9.1.1 Control: Assess roading and choose a haul route suitable for vehicle dimensions. Consider:

- Road width
- Radius of bends and turns
- Surface is firm and well drained with no dangerous rutting or potholing.
- Surface geometry is satisfactory: high crowns, S-bends, poor camber on bends, downhill bends do not cause a risk of instability or sliding off the roadway.

9.1.2 Control: Confirm that vehicles will be loaded so that they can safely use the chosen route

- Anticipated static rollover threshold (SRT) of loaded vehicles will be sufficient for the road surface geometry.

9.1.3 Control: Confirm that drivers understand the way loading affects vehicle stability and are trained to adjust their driving.

For example:

- Where to reduce speed
- Sections of the route requiring particular care. Refer to section 5.1, 5.2.

9.1.4 Control: Assign vehicle combinations that can safely use the chosen route. Refer to section 7.1.

9.2 Hazard: Hazards on public roads

9.2.1 Control: Refer to tools on the [NHVR](#) website such as the [Route Planner tool](#) and [National Network Map](#) to determine access conditions for each size and type of vehicle.

9.2.2 Control: Assess the proposed route for hazards such as:

- High traffic density
- Presence of vulnerable road users, e.g., townships, schools, shopping precincts
- Sharp, closing radius or off-camber bends
- Multiple bends in quick succession
- Steep descents
- T-junctions
- Local weather effects, such as fog or icing
- Level crossings

9.2.3 Control: Choose a route that minimises the presence of hazards to the extent that's reasonably practicable.

10 Activity: Specifying loading height

10.1 Hazard: High load reduces vehicle stability

The height of a vehicle's centre of gravity is a key factor affecting overall stability. Along with vehicle design and suspension roll stiffness, it determines a loaded vehicle's Static Rollover Threshold (SRT). (See Figure 10.1 and 10.2).

SRT is a measure of the sideways force required to roll a stationary vehicle. It can be calculated or measured by experiment and is expressed as a decimal fraction of the gravitational force (g) upon the vehicle. Refer to [S.R.T. - Calculator](#) ([ternz.co.nz](#)), [Payload Pilot](#) (Advantia) or another online tool.

Although moving vehicles are subject to complex dynamic forces, SRT is still a valuable indicator of stability and helps predict rollover risk. If the force applied to a vehicle - for example the cornering force during a turn - is greater than its SRT, then the vehicle will almost certainly roll over. This can happen very suddenly, before the driver is able to react, and is almost always unrecoverable. (Rollovers can also occur on wide turns or at low speeds, where there are uneven road surfaces, or due to driver error.)



A widely accepted minimum benchmark for SRT is 0.35g. (Note that the relationship between SRT and rollover risk is non-linear. Small decreases in SRT below 0.35g can disproportionately increase the rollover risk.) Improving SRT will reduce the risk of rollover in every circumstance.

A truck with a low height load will have a higher SRT (will be more stable) at the same mass than a similar truck with a higher load. (See Figure 10.1 and 10.2.)

As noted in section 7.3, the SRT of a vehicle can be improved by adjustments to deck height and suspension, but managing load height and density is a measure that can adapt to changes in rollover risk due to load density and operational conditions.

Timber density and load density

High density loads will generally have a centre of gravity within a safe range because mass limits will be reached before load height becomes a concern (“massing out”).

Load density is reduced for:

- Softwoods
- Logs that have dried out while awaiting collection
- Short logs that leave gaps between bays
- Non-uniform logs that result in air voids

The type and characteristics of timber may vary from day to day or over the course of a contract e.g., timber from different locations, timber affected by weather etc.

Operational Factors

Factors that affect the risk of rollover include:

- Road geometry such as high crowns, S-bends, poor camber on bends, downhill bends.
- Weather conditions, distance to travel.
- Driver experience and driving behaviour.
- Changed bolster height to accommodate unloading equipment

10.1.1 Control: For each vehicle and type of load, determine a load height that will result in an SRT of at least 0.35g

For example:

- Recommend a height for different kinds or lengths of timber
- Recommend a height based on the worst case, e.g., the lightest timber

10.1.2 Control: Re-assess safe load heights when factors change.

10.1.3 Control: Communicate recommended load heights to drivers, loaders and parties in the CoR.

10.1.4 Control: Mark stanchions with height indicators to assist drivers and loader operators monitor load heights.

10.1.5 Control: Train drivers to communicate with loader operators about log placement during the loading process.

10.1.6 Control: Empower drivers to refuse loads which exceed recommended load height.

10.1.7 Control: Encourage drivers to observe the stability of the truck in operation after each load, adjust subsequent loads as required, and provide feedback to other parties.

10.1.8 Control: Train drivers to drive more slowly with a higher load, particularly when cornering.

10.1.9 Control: If the recommended SRT is not feasible for the task, implement other controls to reduce the risk of rollover.

For example:

- Select a safer route
- Allocate a more experienced driver
- Direct the driver to drive at a lower speed
- Use a vehicle fitted with ABS, RSC, ESC or EBS

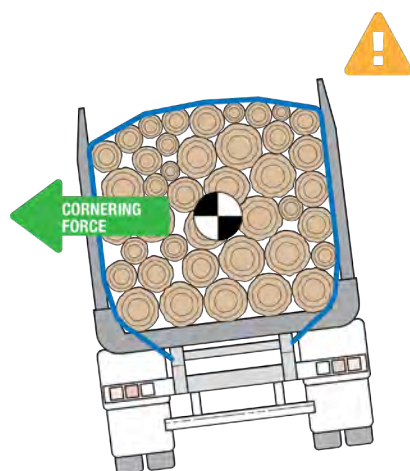


Figure 10.1. The cornering force acts through the centre of gravity. A lower centre of gravity is more stable.

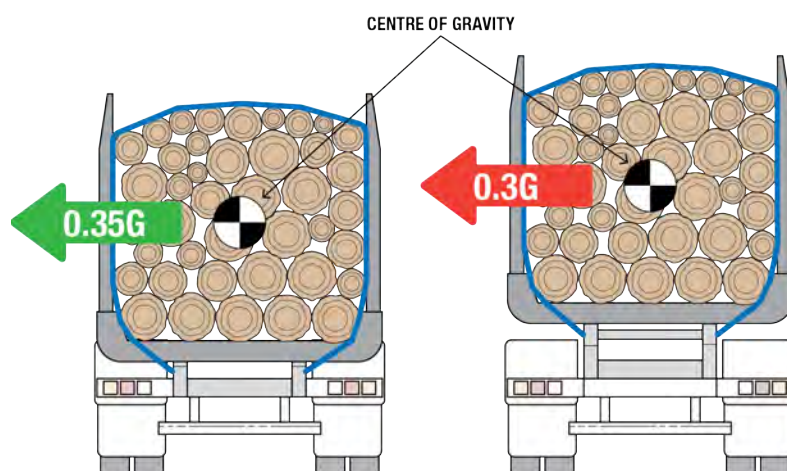


Figure 10.2. A high load has a lower SRT (is easier to roll) than a lower load

11 Activity: Managing Mass

11.1 Hazard: Vehicle is over mass

- 11.1.1 Control: Ensure mass measurements are taken on flat, firm, level ground.
- Measurements taken on ground that does not meet these requirements may not be reliable.
- 11.1.2 Control: Train drivers to go to the closest suitable location where mass can be accurately measured, and to return to the coupe for off-loading if necessary.
- 11.1.3 Control: Give priority to vehicles that return to the coupe for removing excess mass.
- 11.1.4 Control: Implement procedure for removing logs when vehicle is over mass.
- 11.1.5 Control: Train loader operators and drivers to underload when ground is too uneven to rely on truck scales.
- 11.1.6 Control: Share information about the mass of loads with other parties in the CoR.

12 Activity: Loading, load construction

Correct loading and load construction are essential for ensuring that loaded vehicles are stable and that loads are safely restrained and do not drop debris in transit.

To achieve best practice requires good landing design, appropriate equipment and training, planning and assessment, cooperation between loaders and drivers, and monitoring and improvement by all parties.

12.1 Hazard: Inadequate planning

The safe loading and transport of logs requires planning and assessment before any vehicle is loaded. Necessary considerations include the number, dimensions, mass and characteristics of the logs, the dimensions, payload and access conditions of vehicles, and the nature of the transport routes. Without planning, ad hoc decisions can result in poor loading practice.

Where log characteristics are unchanging – e.g. consistent plantation timber cut to a specified length – it may be possible to plan for many weeks or months. In other locations, it may be necessary to re-assess regularly.

- 12.1.1 Control: Plan each new haulage task, including contingency plans, prior to commencing operations.
- 12.1.2 Control: Regularly assess haulage and load conditions to determine whether plans need to be changed.

12.2 Hazard: Loading area does not allow loaders to have a clear view of the load

- 12.2.1 Control: Load from high ground where possible.
- 12.2.2 Control: Use loading machinery with elevating cabs.
- 12.2.3 Control: Communicate with driver during loading process.

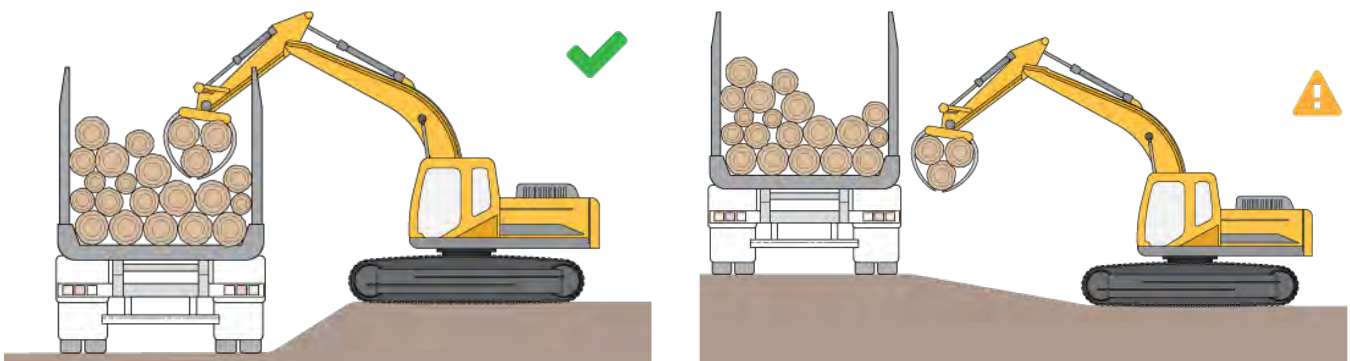


Figure 12.1. Load from high ground to ensure a good view of the load.

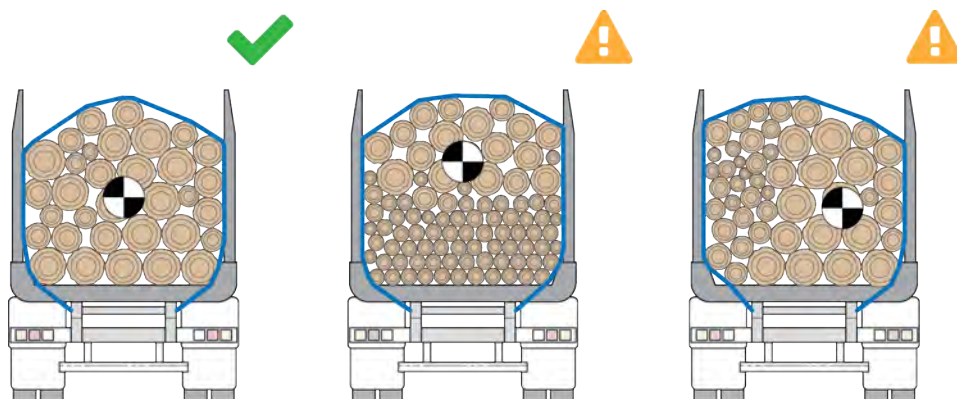


Figure 12.2. Even mass distribution is important for vehicle stability.

12.3 Hazard: High load reduces vehicle stability

- 12.3.1 Control: Train loader operators to follow driver instructions about load height.
- 12.3.2 Control: Develop and implement processes to ensure that vehicles are not loaded above the recommended safe load height.
- 12.3.3 Control: Work with other CoR parties to identify patterns of unsafe loading and take action to rectify the cause(s).

12.4 Hazard: Load mass is unsafely distributed

- 12.4.1 Control: Develop loading plans for each type of vehicle in use.
 - Mass and overall height of load for each bay.
 - Method of construction.
- 12.4.2 Control: Sort logs at landings so that loaders can readily select from logs with specific characteristics for each stage of loading.
- 12.4.3 Control: Train drivers and loaders to understand and implement loading plans to ensure best practice for load construction.
- 12.4.4 Control: Monitor loads and work with other parties to collect and analyse feedback on loads that may be poorly constructed. When incidents such as rollovers occur, investigate and analyse causes and use this information to improve processes.

12.5 Hazard: Logs are not uniform

The shape and dimension of logs in a load affect the clamping force that lashings can apply to the load and how that clamping force is distributed throughout the load. Logs with sweep or twist and logs of mixed diameter or length can substantially reduce clamping force.

It may be difficult to identify the number and position of such logs during the loading process and the resulting reduction in clamping force may be unpredictable and difficult to measure.

For logs with significant sweep or twist, tie-down alone may not be sufficient to restrain the load, unless combined with longitudinal blocking. Alternatively, such logs may be transported in a vehicle that fully contains the logs. Best practice is to load logs of like diameter and length.

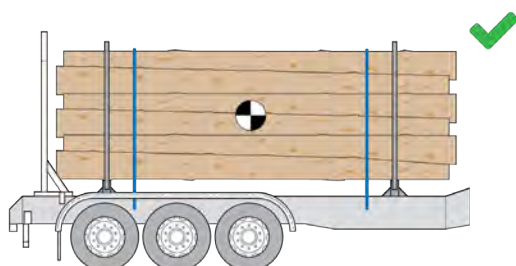


Figure 12.3. Alternating butt ends improves restraint

- 12.5.1 Control: Sort logs at landings so that loader operators can readily select logs with specific characteristics for each stage of loading and can separate non-uniform logs.
- 12.5.2 Control: Avoid loading non-uniform logs onto trailers that are not fitted with suitable headboards and tailboards.
- 12.5.3 Control: Train loader operators to place non-uniform logs into the load securely and without causing other logs to be unrestrained or to receive reduced clamping force.
- 12.5.4 Control: For logs which are significantly non-uniform, assign a vehicle with a fully enclosed body to carry them, e.g. a tipper or a walking floor.

Note: Assess the need for additional clamping force and apply additional lashings as required.

12.6 Hazard: Tapered logs

Butt ends can be significantly larger in diameter than the small end of a log. Loading heavily tapered logs needs careful attention to avoid uneven loads which can allow lashings to slide.

- 12.6.1 Control: Sort logs at landings so that loader operators can readily select from logs with specific characteristics for each stage of loading. Stack logs in a way that minimises handling at the time of loading. e.g., alternate the orientation of tapered logs.
- 12.6.2 Control: Load logs with butt ends placed at alternate ends of the bay, so that the top of the load remains approximately level.
 - Even where loads are well constructed and auto-tensioners are used, a heavily tapered log may still be prone to moving toward the butt end during transport.
- 12.6.3 Control: Train drivers to identify tapered logs and to check loads more frequently when such logs are carried.
- 12.6.4 Control: Adjust schedules to allow sufficient time for loading and transport, including sufficient time for constructing a safe load with tapered logs and time for stopping and checking the load during transport.

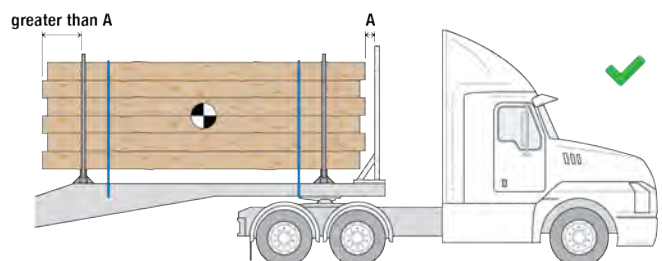


Figure 12.4. Horizontal stanchion containment with headboard

12.7 Hazard: Logs are not contained by stanchions

Stanchions provide effective horizontal containment when logs extend at least 300mm beyond stanchions at each end of the bay.

For logs to stay contained by stanchions, the distance that logs extend beyond the rear stanchion needs to be greater than the gap between a forward blocking surface, (e.g., a headboard) and the ends of the logs at the front of the bay. In that case, if logs do move forwards, they will be blocked before their ends are clear of the stanchion. (Refer to Figure 12.4.)

Logs touching the stanchions must be no higher than the tops of the stanchions. The top surface of logs used to crown the load must not be more than half a log diameter above the top of the stanchions. (Refer to Figure 12.5.)

- 12.7.1 Control: Allocate vehicles with stanchions at the appropriate distance apart, or re-position bolsters and stanchions to suit the log length.
- Increase the stanchion overhang distance for logs that are slippery
- 12.7.2 Control: Cut all logs to the same length, align their ends, pack them as tightly as possible so that there are no unnecessary gaps between logs and no logs are skewed across the load.
- 12.7.3 Control: If some shorter logs are included in a load of longer logs, pack them inside the load, with the longer logs under and above them, and on either side.
- 12.7.4 Control: Use another method to restrain shorter logs that cannot be contained inside the log packet.
- 12.7.5 Control: Train drivers and loader operators to understand how to construct loads so that short logs are safely contained.
- 12.7.6 Control: Train drivers and loader operators to communicate to assist with guiding the placement of logs on the vehicle.
- 12.7.7 Control: Monitor loads and work with other parties to collect and analyse feedback on load construction. When incidents such as load shift or load loss occur, investigate and analyse causes and use any learnings to inform process improvement.

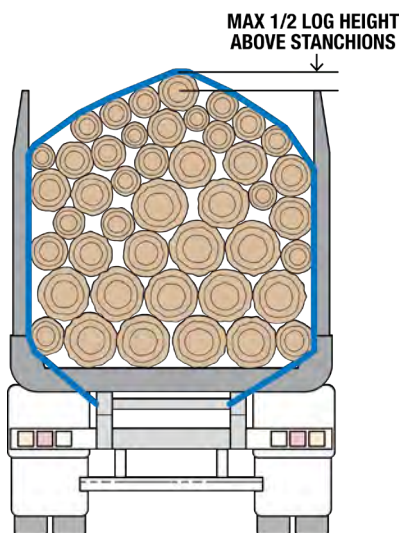


Figure 12.5. Vertical stanchion containment

12.8 Hazard: Load is not crowned

Crowning of the load improves the distribution of the clamping force applied by the lashing. Where loads have inadequate crowning, the clamping force is largely confined to the logs close to the sides of the load, while the logs closer to the centreline experience very little clamping force. Best practice is to achieve a crowning angle of 20-25°. Although a steeper angle may improve clamping, it can lead to logs shifting and create a hazardous situation. This angle is equivalent to a 400-450mm (approx.) height difference between the upper most log in contact with the stanchion and the log nearest the centreline of the bay for a 2.2m wide bay.

- 12.8.1 Control: Train loader operators and drivers to understand how and why to finish each bay of logs with a crown at the centreline.
- 12.8.2 Control: Monitor loads and work with other parties to collect and analyse feedback on load construction. When incidents such as load shift or load loss occur, investigate, analyse causes and use any learnings obtained to inform process improvement.

12.9 Hazard: Vehicle-mounted load restraint equipment is damaged

Bolsters, stanchions, winches, headboards, tailboards and mounting brackets are critical equipment that must be in good condition if a load is to be safely transported.

Poorly maintained winches may not be able to apply sufficient lashing tension.

Bent or cracked winch brackets may not be able to withstand forces applied by the winches.

Stanchions that are bent, or that have damaged brackets, may deflect during transport allowing logs to move.

- 12.9.1 Control: Check the condition of bolsters and stanchions before loading to determine whether a bay should be loaded.
- 12.9.2 Control: Check that bolster mountings are tight and not bent or deformed.
- 12.9.3 Control: Check winch brackets for cracking or bending.
- 12.9.4 Control: Check winches for proper operation.
- 12.9.5 Control: Check headboards and tailboards for cracks or bends that might reduce the capacity to prevent sliding logs from escaping
- 12.9.6 Control: Do not load bays with unserviceable equipment.
- Note:** Where a B-Double is used, an unladen lead trailer may cause the vehicle to become unstable under some conditions. Refer to NHVR publication [Regulatory advice - Managing the risk of a light or empty lead trailer in a laden B-double](#).
- 12.9.7 Control: Report damage and tag out unserviceable equipment for repair/replacement.

12.10 Hazard: Bolsters or stanchions fail due to loading methods

- 12.10.1 Control: Do not load large logs so that their weight is supported by the stanchion as it can create large lateral loads that may structurally damage the stanchions. See figure 12.7.
- 12.10.2 Control: Train drivers and loader operators to understand the effect of poor loading practice on stanchions and bolsters.
- 12.10.3 Control: Use care when placing logs onto a load.
- 12.10.4 Control: Do not drop a bundle of logs or individual large logs onto bolsters from a height or allow them to roll into the stanchions with force.
- 12.10.5 Control: Do not press down on the load with loading machinery, or force logs sideways against stanchions.
- 12.10.6 Control: Where logs are not well aligned, it may be necessary to carefully adjust the position of individual logs.
- 12.10.7 Control: Adjust schedules to allow sufficient time for loading and transport, including allowing time for loads to be rectified prior to vehicles leaving the landing.
- 12.10.8 Control: Train loader operators to understand how to adjust a load without damage to the bolsters or stanchions.



Figure 12.6. A well-constructed load with a suitable crown improves restraint effectiveness

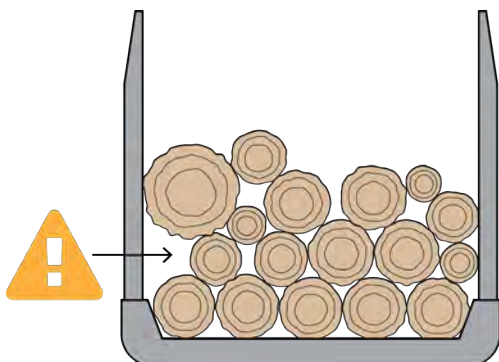


Figure 12.7. Large log supported by stanchion

13 Activity: Restraining the load

13.1 Hazard: Inadequate vertical clamping force is applied

All loads carried on a heavy vehicle must be loaded and restrained in a manner that complies with the Loading Requirements and Loading Performance Standards specified in Schedule 7 of the [Heavy Vehicle \(Mass, Dimension and Loading\) National Regulation](#).

Restraint in the sideways directions is largely provided by stanchions. Headboards and tailboards can provide secondary containment in the forwards and rearwards directions.

Vertical restraint serves two purposes. It prevents logs from “jumping” over the stanchions or other containment devices. More importantly, it improves restraint in the other directions too.

The effectiveness of lashings depends on the friction between the truck components and the logs and between the logs themselves, but the friction that prevents logs from sliding forwards or rearwards is significantly reduced if the surfaces are not in forceful contact. The vertical clamping force from lashings applies that contact force, tends to unitise the packet of logs, and improves restraint in all directions. How this force is applied is not critical: two winches fitted with 2:1 (double purchase) systems supplied with adequate air pressure may be able to meet this standard for a given bay of logs. Alternatively, 3 or 4 lower performance winches or winches running on a lower air pressure may also be able to meet the requirements.

The vertical Loading Performance Standard requires that a clamping force equivalent to 1/5 of the weight of the load (0.2g) is applied.

For example, a bunk of 15 000kg mass will require a total clamping force of 3000kgf.

Testing and engineering analysis has shown that this amount of lashing tension should provide most logs in a load with sufficient clamping force. However, there may still be some logs in any load that do not receive sufficient clamping. Headboards and tailboards provide some assurance that if these logs move in transport, they will not cause a safety hazard.

Refer to Appendix A for further information on lashing tension.

- 13.1.1 Control: Use trailers fitted with lashing tensioning systems that will provide sufficient clamping force to comply with the vertical loading performance standard.

- Test or procure testing of all lashing tensioners to determine the tension they can apply to the lashing under all loading conditions with the air pressure that is supplied to them. E.g., test with a load of low-density wood at maximum safe height for the vehicle, and with a load of high-density logs which create a lower load that requires additional spare lashing to be wound onto the spool. Measure the force applied on

both the tensioner side and off-side. Refer to Appendix A for further information on testing lashing tension.

- If testing is not feasible, estimate the clamping force that each lashing will apply using manufacturer data for the winch model, lashing type and air pressure supplied. Estimate the force that will be applied on the off-side noting that the expected range would be between 20% - 60% of the force on the tensioner side. Refer to Appendix A for further information on estimating lashing tension.
- Determine the total clamping force (tension) that each lashing applies to the load, by adding the tension force on each side.
- Sum the clamping force applied by each lashing to obtain the total force applied to each bay of logs.

13.1.2 Control: Install sufficient winches to provide total clamping force that is equivalent to at least 1/5 of the weight of the load.

- If alternative tensioning or clamping systems are used, they should be evaluated to determine their capacity to apply sufficient downward force on the load.

13.1.3 Control: Adjust lashing length so that there is limited excess lashing wound onto the spool of the tensioner. Excess lashing on the spool reduces the tension the winch can provide.

- Chains allow for lashing length to be adjusted easily with grab hooks.
- Webbing lashing can be adjusted by use of a chain on the offside to keep a constant number of lashing wraps on the winch drum with loads of different heights. Alternatively, where winches are designed with a slotted spindle or similar mechanism, excess lashing can be pulled through prior to tensioning, so that the minimum required amount is wound onto the spindle.

- UHMWPE rope can be purchased with several attachment loops spliced into it to allow adjustment of overall lashing length. Alternatively, as with webbing, chain can be used on the offside to adjust the length

13.2 Hazard: Air pressure for auto-tensioners is too low

Air-operated winches should be operated at the manufacturer's recommended air pressure.

Air-operated winches operated with reduced air pressure may not achieve the required lashing tension.

Pressures exceeding the manufacturers recommended air pressure may damage the winch and/or trailer. Check proposed tensioner configurations, including any force multiplying system (e.g. 2:1 pulley block/double purchase) with trailer and equipment supplier(s) to ensure the system will not damage the tensioner or its bracket, the trailer or the bolster system.

Lashing tensioning systems apply significant force to the logs and this may result in log breakage for some log types/sizes, particularly when loads are poorly constructed. Where log breakage is assessed as a potential outcome, an alternative means of restraint (such as multiple tensioners with reduced tension, different lashing type, blocking, a fully enclosed trailer) may be required to safely transport the load.

13.2.1 Control: Install auto-tensioners in compliance with the manufacturer's requirements to prevent damage to trailers or mounting brackets.

13.2.2 Control: Fit vehicles with air systems that supply the correct pressure required for the tensioning system.

- Refer to manufacturers for guidance on air pressure requirements.



Figure 13.1. Do you know how many lashings you need?

- 13.2.3 Control: Check the pressure of the air supply to auto-tensioners before leaving the landing.
- Install a pressure gauge for this purpose.
 - If the pressure is below the specified minimum, rectify or unload before leaving the landing.
- 13.2.4 Control: In some cases, with older vehicles particularly, pressure available at the trailer will be considerably lower than the truck manufacturer's rating. In these cases, fit additional tensioners so that adequate clamping force on the load is achieved.
- 13.2.5 Control: Do not install regulators in the auto-tensioner air supply line unless the manufacturer recommends a pressure lower than trailer tank pressure.
- 13.2.6 Control: Monitor logs for breakage/crushing during the tensioning process. If logs are damaged, they should be removed before continuing with restraining the load.
- 13.2.7 Control: Assess the need for a different method of restraint if logs are unable to withstand the tension being applied without breaking.
- Additional lashings at reduced tension.
 - Use of a truck with an enclosed body, such as a tipper or walking floor.

13.3 Hazard: Logs escape containment

The primary purpose of headboards and tailboards is to provide a secondary containment barrier for a case where one or a few logs may spear from the packet. If a full packet of logs or the logs in contact with the stanchions become unrestrained it is very likely that some logs will be lost, causing a serious risk of injury to other road users or damage to vehicles and road infrastructure. They should be strong enough to stop a sliding bay of logs without breaking.

Note: headboards and tailboards cannot be relied on to ensure that logs do not escape from the vehicle. Refer to Appendix A for further guidance on headboards and tailboards.

- 13.3.1 Control: Use trailers fitted with suitable headboards and tailboards to ensure that loads have adequate secondary containment.
- Jinkers and pole trailers may not have sufficient strength to enable tailboards to be fitted.
- 13.3.2 Control: Ensure that bolsters and stanchions are adjusted to suit the length of the logs. Refer to section 12.7.
- 13.3.3 Control: Train driver and loaders to understand the transport hazards and specific load restraint requirements associated with specific types of products. E.g., freshly harvested low-friction species such as E. Globulus or E. Nitens; heavily tapered logs; Logs with significant twist or sweep; very small diameter logs; short logs.
- 13.3.4 Control: Monitor loads and work with other parties to collect and analyse feedback on load construction. When incidents such as load shift or load loss occur, investigate, analyse causes and use any learnings obtained to inform process improvement.

13.4 Hazard: Throwing lashings

Throwing lashings up over the top of a load of logs is an inherently hazardous activity. It may cause long-term soft tissue or spinal injuries to drivers.

The risk of injury is greater when chains are used.

- 13.4.1 Control: Train drivers and loader operators how to use mechanical equipment that launches or passes lashings over a load.
- 13.4.2 Control: Train drivers and loader operators to use safer methods for passing chain lashings over a load. E.g., using a messenger rope attached to the chain, coiling a section of the lashing etc.
- 13.4.3 Control: Train drivers to throw lashings in ways that reduce the likelihood of long term muscular-skeletal or soft tissue injury.

14 Activity: Receiving and unloading loads of logs

Receivers of logs have a unique opportunity to observe and monitor drivers, vehicles and loads, to weigh loads, and to provide feedback to other parties.

Receivers may also influence the scheduling of deliveries, including how long trucks are queued waiting to be unloaded.

Receivers' operational requirements for unloading and processing can also influence other parties' decisions and actions. E.g., log species and length are factors in the procurement of vehicles and equipment, and in the practice of load construction. Refer to sections 7 and 10.

Note: The NHVR has published regulatory advice about [Managing the risks associated with non-compliant vehicles arriving at a premises](#).

14.1 Hazard: Delay

Delaying drivers extends their working hours and increases their risk of fatigue. Delay may also induce a driver to speed to meet a deadline or to improve productivity.

When delays occur, or are anticipated, communicating this with other parties enables them to make other arrangements such as choosing an alternative destination or product.

Informing drivers of the reasons for delay reduces their dissatisfaction and allows them to make good decisions to manage their fatigue, including taking a rest break while waiting, or arranging with their employer for a replacement driver.

- 14.1.1 Control: Plan layout, infrastructure, staffing and traffic movements to reduce waiting times for drivers.
- 14.1.2 Control: Review past data and confer with other parties to estimate future outputs. Work with other parties to determine acceptable waiting times.
- 14.1.3 Control: Measure and record the waiting time of each vehicle that delivers logs. Provide the information to other parties.
- 14.1.4 Control: Establish a method for alerting other parties of major delays - e.g., equipment failure,

staff shortage, power outage, lengthy queues – and send alerts and updates as soon as possible.

- 14.1.5 Control: Construct or identify an area where vehicles can wait before being unloaded.
- To reduce risks to drivers and other road users, the best practice is to locate waiting areas away from public roads.
 - So that drivers can leave their vehicles, safe pedestrian pathways should be identified and separated from traffic areas.
- 14.1.6 Control: At waiting areas, provide facilities such as bathrooms, and an air-conditioned lunchroom to facilitate drivers' rest and recuperation.
- 14.1.7 Control: Use a system to note the sequence in which vehicles arrive, and signal to them in turn when they should move into place for loading, without them having to move repeatedly and keep engines running.

For example:

- Require drivers to identify themselves, and their vehicles, when they arrive at a designated point, and record their arrival in sequence
- Use, radio, mobile phone, hand signals, etc. to indicate to a driver it is their turn.

14.2 Hazard: Driver is fatigued or unfit to drive

A driver's level of fatigue and their fitness to drive are not constant. A driver may be assessed as fit to drive at the start of their shift, but become fatigued, or otherwise unfit to drive later.

Workers at businesses that receive logs have an opportunity to observe drivers during their shifts, sometimes multiple times a day. When drivers are obviously unfit to drive, workers can respond according to an established procedure, supporting drivers, providing feedback to other parties, and intervening in extreme cases.

- 14.2.1 Control: Consult other CoR parties and establish procedures for responding to unfit or fatigued drivers at the landing.
- 14.2.2 Control: Train workers at receiving sites to identify signs of fatigue or unfitness to drive.
- 14.2.3 Control: Train workers at receiving sites to follow the procedure when they believe a driver is fatigued or unfit to drive.

For example:

- Speak with the driver
- Direct the driver to a place where they can rest or park the vehicle
- Contact the driver's employer and other parties, to report the signs of fatigue or unfitness
- Contact the driver's employer to arrange a replacement driver

14.3 Hazard: Loads are not safely constructed or restrained

- 14.3.1 Control: Train staff to identify vehicles, loads, and load restraint systems that are potentially unsafe.

For example:

- Uncrowned loads; excessively high loads; logs not aligned; logs not contained by stanchions.
- Logs that have moved forward or rearward; lashings under low tension; logs not clamped by lashings; insufficient lashings for the load.
- Damaged lashings, stanchions, bolsters, air tensioner brackets, headboards.
- Loads with poor mass distribution, such as larger diameter logs on top of smaller ones, or that have a higher apparent load density on one side of the bay than the other; loads with excess mass on one or more axle groups.

- 14.3.2 Control: Monitor arriving loads and record details, including photographs, of potentially unsafe loads.

- 14.3.3 Control: Provide immediate feedback to drivers and other parties when unsafe loads are observed.

- 14.3.4 Control: Identify patterns of poor loading practice – e.g., loads from a particular coupe, or transported by a particular operator – and discuss with the relevant party.

- 14.3.5 Control: Report persistent patterns of unsafe load construction or restraint to the NHVR.

- 14.3.6 Control: Provide facilities and develop procedures to safely manage the risks of unloading poorly constructed or restrained loads.

For example:

- De-twitching stations with supporting structures to protect the driver from logs that move during lashing removal.
- Lashing removal procedures. In some cases, a customised plan may need to be developed to address specific hazards identified when a load arrives.
- Machinery to support logs that are at risk of falling when lashings are removed.
- Exclusion zones and safe areas for drivers.

- 14.3.7 Control: Train workers to understand and implement procedures for safe working during unloading.

- 14.3.8 Control: Monitor effectiveness of procedures and revise or provide additional training if required. Refer to sections 2 and 3 for more information on monitoring and feedback.

14.4 Hazard: Loads exceed mass limits

Overloaded axles or axle groups cause damage to road pavement and may damage or cause deterioration of structures such as bridges and culverts.

Excessive overloading also affects the steering, stability and stopping distance of vehicle combinations. Repeated overloading places strain on brake and suspension systems and causes extra wear and damage to a range of vehicle components.

- 14.4.1 Control: Provide the necessary equipment, staff and training to accurately weigh loaded vehicles.
- 14.4.2 Control: Require transport operators to indicate the axle and mass limits that apply to any vehicle authorised to exceed general mass limits.
- 14.4.3 Control: Provide information about the mass of each load to the driver and operator and loader (where known) of each vehicle.
- 14.4.4 Control: Maintain records of each load, including details about the vehicle, transport company, and origin of the load.
- 14.4.5 Control: Identify patterns of overloading and communicate them with other parties, particularly loaders and consignors.
- 14.4.6 Control: Continue to monitor overloads and report them to other parties.
- 14.4.7 Control: Report persistent overloading to the NHVR.



APPENDIX A: LOAD RESTRAINT EQUIPMENT

The following information has been included as an Appendix due its technical nature.

These recommendations address the requirements of the Loading Performance Standards and have been assessed or calculated based on both experimental tests and analytical models.

Headboards and tailboards

Headboards and tailboards provide longitudinal (forward and rearward) blocking. They are a recommended control, even for loads expected to meet the loading performance standards through tie-down alone. They provide some assurance that logs will be contained, even if the applied lashings fail to prevent them from moving.

- If strong enough, they may allow heavier masses to be carried than would otherwise be able to be safely restrained - so long as vertical and lateral restraint is sufficient.
- They may permit safe carriage of loads that would otherwise fail to meet the loading performance standards; e.g.: low friction logs or loads with insufficient clamping.
- They are recommended where shorter logs are placed inside a packet of longer logs.
- Blocking systems fabricated in steel should comply with AS3990-1993, AS4100-1998 or an equivalent standard. Blocking systems fabricated in aluminium should comply with AS1664-1997 or an equivalent standard.
- Blocking systems should be constructed to maximise their capacity for dynamic loading (impact forces).
- They must be sufficiently strong to prevent penetration of the surface by any single log or several isolated logs spearing from the load.
- They must be sufficiently strong that a full bay of logs, moving under an acceleration equivalent to the relevant loading performance standard (0.8g in the forward direction, 0.5g towards the rear) would not cause them to break or to deflect in a way that enables logs to escape containment.

Blocking loads where logs have a large offset from the blocking structure.

As logs accelerate toward a headboard or tailboard they pick up speed, increasing the amount of energy with which they strike the blocking structure. As the distance they travel increases, so does the velocity and the resulting impact energy.

Where loads are constructed in such a way that there are logs which have a substantial offset from the relevant blocking surface, there is a risk that a standard headboard will not have sufficient strength to prevent penetration by a sliding log. If the whole bay is constructed with a large gap between the end of the logs and the relevant surface, a blocking structure may not be able to be relied on to contain the load. In such a case, additional clamping force from lashings may be required.

Tensioners

As discussed in Section 13, clamping provided by the lashing system MUST meet or exceed the vertical loading performance standard of 0.2g. This may be achieved using the appropriate number of manual or automatic tensioners, or a combination of both.

Lashing tension on both sides of the load contributes to the total clamping force. There is usually a significant difference between the tension on the side where the tensioner is mounted and the offside.

Previous testing by the NHVR and others has shown that it is reasonable to expect this tension difference to be at least 40%, and in some circumstances to be as high as 80%. If the tension measured on the tensioner side is 1000kgf, the tension on the offside might be as much as 600kgf or as little as 200kgf.

The main cause is friction between the lashing and the load.

There are several factors which affect how large the tension difference will be, including:

- The log species
- Whether bark is attached or not
- The freshness of the logs and the surface moisture condition
- The type of lashing. (This is generally not a large factor but becomes more significant when lashings are frayed or damaged or when logs have rough surfaces.)

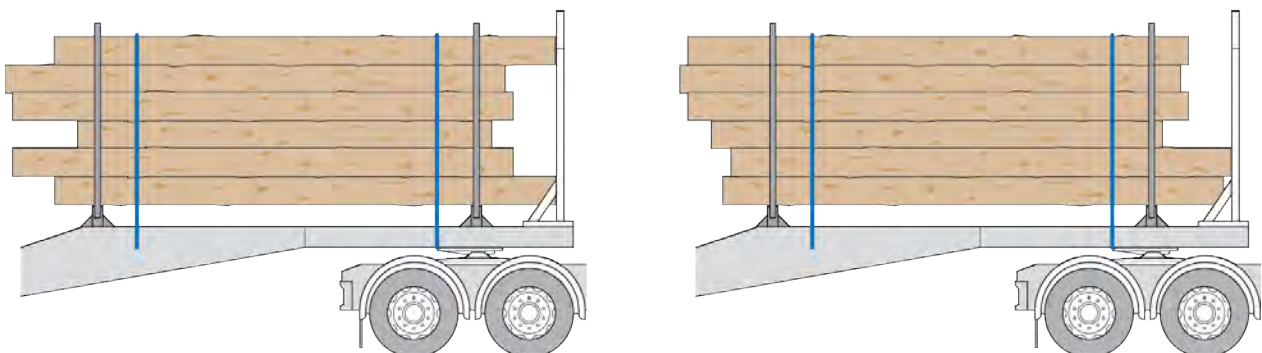


Figure A.1. Log configurations that may lead to damage to headboards or loss of stanchion containment

To reduce the tension difference, the winch and offside attachment point should be positioned so that the lashing is vertical, or as near to vertical as possible, where it is in contact with logs at the base of the load. (Note: a longer winch bracket will also apply greater forces to the trailer chassis. Seek advice from your trailer manufacturer or an engineer before fitting longer brackets or latch mounts to existing trailers).

Another factor that can reduce tension applied by the winch is extra loops of lashing wound on to the winch. This increases the effective diameter of the winch spindle and reduces the mechanical advantage available. Some winch models allow the excess lashing to be pulled through a slot or bar in the spindle, so that the minimum necessary lashing is wound on and the remainder can then be spooled and safely stored.

Testing lashing tension

To determine the total clamping force available to any particular load type, the tension applied on each side of the load must be known. The most accurate way to determine this is to test using load cells in line with the lashings on each side (Figure A.2, A3).

Method

- a) Load logs into bay, ensuring a crowning angle of 20° to 25°.
- b) Ensure load shape will result in the lashing contacting all logs on top of the load.
- c) Place lashings over the load and insert tension load cells on both the tensioner and off sides of the load.
 - Load cells must not be placed under the load (next to the chassis) - tension must be recorded from the vertical part of the lashing, beside the logs.
- d) Ensure load cells are free to move and do not catch on the logs when lashings are being tensioned.
- e) Repeat test several times, unloading and reloading between tests. Discard very high or very low values and use the average of the remaining results as representative of the tension difference to be expected for that type of load.

Estimating lashing tension

If no testing has been carried out for the particular truck and load type, an estimate of the tension provided by the winch could be made using manufacturer data for the winch model and lashing type and the air pressure supplied. Estimates of the likely tension supplied by the winch (T_{Ten}) and of the tension difference across the load could be used to estimate the tension on the off side (T_{off}). In that case it would be prudent to use an estimate of off-side tension that is close to the observed maximum difference discussed above (80%). This will ensure that an optimistic estimate does not lead to inadequate clamping force being applied.

Changes in tension during transport

Lashing tension also changes during transport as logs move within the packet and due to stretching of lashings, particularly webbing.

A distinct advantage of automatic tensioners is that they adjust to those changes as they occur. They also remove or reduce the need for drivers to stop and inspect lashings during the journey. This reduces drivers' exposure to the risk of leaving the vehicle on or near a road and reduces time for the journey.

Manual tensioners can nonetheless provide effective restraint if they are checked regularly throughout a journey. Extra time should be scheduled for vehicles with manual tensioners to complete the same journey, and drivers should be trained in safe procedures for exiting the vehicle and furnished with appropriate safety equipment.

Lashing Characteristics and Condition

Webbing is a relatively high-stretch material and may be expected to stretch by around 5% under the force applied in lashing a load of logs. It is also subject to "creep" under tension and will stretch over time.

While auto-tensioners should in theory be able to compensate for this stretch, this may not always be completely effective, which means that there may be some reduction in the clamping force while in transit.

Chain and Ultra-High Molecular Weight Polyethylene (UHMWPE) rope both have very low stretch. Some operators are of the view that chain will form a more reliable engagement with logs on the top of the load than other lashings and provide a higher level of security for those logs, however this has not been found to be the case in testing.

Lashings must be in serviceable condition, with no substantial wear or damage that would reduce their capacity to provide clamping force.

The Load Restraint Guide recommends that lashings with damage that extends across 10% or more of the lashing cross-sectional area should not be used.

For webbing lashings this would include wear, fraying or tears.

For chains it includes wear, bending of links or fittings and damage or stretching which reduces the diameter of any part of the chain.

UHMWPE rope is very hard to assess for wear, since the load-bearing fibres are contained within a sheath and so cannot be easily inspected. It is recommended that a replacement schedule is developed for UHMWPE rope where it is used as a lashing material. Ideally this schedule would be based on evidence developed through testing. E.g., after retiring a lashing, it can be tested to determine its tensile strength. A database of such results would provide a basis for determining how long a piece of the product could be used with high confidence that it is safe for the task. UHMWPE rope can also be prone to fraying at splices, so these should be examined

Lashing Capacity vs Tensioning Force

Lashings are typically marked with the lashing capacity (LC) specified by the manufacturer. It's important to understand what this value indicates. It is equal to half the breaking force of the lashing – in good condition and including its fittings - when it's used to provide direct (tensile) restraint.

For lashings used in tie-down or clamping restraint, the important factor is not the LC, but the tensioning force applied by the tensioner. For example, a chain with a 2700kgf LC may only be applying 300kgf of force when used with one tensioner, but with another tensioner, and the correct configuration, it may be able to apply sufficient clamping force to effectively restrain a much greater mass than 2700kg.

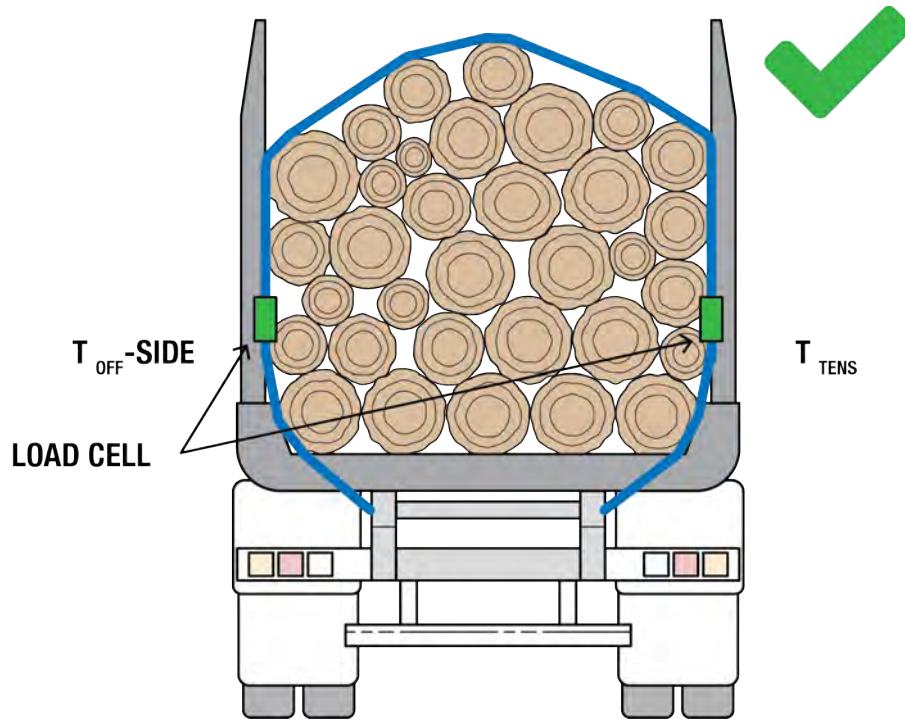


Figure A.2. Load Cell Placement



Figure A.3. A length of UHMWPE rope with eye splices at different lengths was used to position this load cell correctly. (Refer Testing lashing tension)

APPENDIX B: TRAINING

Index of training references within the code.

Section	Recommended Training	Who
2.1, 2.2	Training required to understand and implement procedures	All workers
3.2.3	Stop at a safe place before making mobile phone calls	Drivers
3.2.5	Secure all loose items in the cabin, before starting to drive	Drivers
3.3.1	Use of telematics systems	Drivers
3.4.1	Remain at a designated safer location (which may be the cab of the vehicle) during loading	Drivers
3.4.2	Assess loads before applying lashings, and ask loader operator to re-adjust load if necessary	Drivers
3.5.1	Safe procedure for exiting and dismounting from the vehicle	Drivers
3.6.1	Remove loose material from trailers before leaving the coupe, or before entering the road network	Drivers
4.1	Recommendations about training in general	Executives, Managers, supervisors
4.3.3	Identify indicators of unfitness for work, in self and others	All workers
4.5.6	Causes, indications and effects of fatigue	Drivers, schedulers
4.5.10	Use of fatigue and distraction technologies	Drivers
4.5.11	Self-assess fatigue	Drivers
4.6.3	Use of duress alarms and how to respond when an alarm notification is received	All workers
5.2.4	Understand and use communication protocols	All workers
5.2.4	Understand any access controls or special considerations for safe use of site roads and loading areas	All workers
6.1.2	Sort and stack logs at landings	Harvesters, forwarder operators
6.6.2	Identify signs of fatigue or unfitness to drive	Workers at landings
6.6.3	Understand and follow procedures when a driver is believed to be fatigued or unfit to drive	Workers at landings
7.1.2	How ABS, RSC, ESC and EBS function and how to drive with them	Drivers
7.1.3	Familiarisation with warning signals and required responses	Drivers
7.1.5	Understanding of how to ensure vehicles in combinations have compatible safety systems	Drivers, allocators
7.3.5	Use of Centralised Tyre Inflation systems.	Drivers
8.1.2	Check for and report signs of brake system deterioration, either as part of a daily check, or during waiting time	Drivers
8.1.3	Check for and report corrosion of electrical connections for EBS systems are not working	Drivers
8.1.4	Identify and report warning lights that indicate that ABS or EBS systems	Drivers
8.2.2	Observe and report signs of damage or deterioration to chassis and suspension systems	All workers who have contact with the vehicle
8.3.3	Observe and report signs of excessive wear, damage or deterioration in load restraint equipment	All workers who have contact with the vehicle

9.1	Understand the route to be used and to schedule operations with due regard to known hazards	Drivers, supervisors, allocators
9.1.3	Understand the way that loading affects vehicle stability and adjust driving accordingly	Drivers
9.1.3	Adjust driving to ensure safe operation as required <ul style="list-style-type: none"> ▪ Where to reduce speed ▪ Sections of the route requiring particular care ▪ Where engine brake usage is prohibited 	Drivers
10.1.3	Understand the safe load height for each vehicle in use	Drivers, loader operators
10.1.5	Communicate about load construction during loading process	Drivers, loader operators
10.1.8	Drive more slowly with a high load	Drivers
11.1.2	Go to a level area to verify mass after loading	Drivers
11.1.3	Give priority to drivers returning to the coupe to unload extra mass	Loader operators
11.1.5	Underload when ground is too uneven to rely on truck scales	Drivers, loader operators
12.3.1	Follow driver's instructions about load height	Loader operators
12.4.3	Understand and implement loading plans	Loader operators, drivers
12.5.3	Place non-uniform logs into the load securely and without causing other logs to be unrestrained	Loader operators, drivers
12.6.3	Identify tapered logs and check loads more frequently when such logs are carried	Drivers
12.7.5	Construct loads so that short logs are safely contained	Loader operators, drivers
12.7.6	Communicate to assist with guiding the placement of logs on the vehicle	Loader operators, drivers
12.8.1	Understand how and why to finish each bay of logs with a crown at the centreline	Loaders, drivers
12.10.2	Understand the effect of poor loading practice on stanchions and bolsters	Loader operators, drivers
12.10.8	Understand how to adjust a load without damage to the bolsters or stanchions	Loader operators
13.3.3	Understand the transport hazards and specific load restraint requirements associated with specific types of products	Loader operators, drivers
13.4.1	How to use mechanical equipment that launches or passes lashings over a load	Loader operators, drivers
13.4.2	Use safe methods for passing chain lashings over a load	Loader operators, drivers
13.4.3	Throw lashings in ways that reduce the likelihood of long term musculoskeletal or soft tissue injury	Drivers
14.2.2	Identify signs of fatigue or unfitness to drive	Unloaders
14.2.3	Understand and follow the procedure when they believe a driver is fatigued or unfit to drive	Unloaders
14.3.1	How to identify vehicles, loads, and load restraint systems that are potentially unsafe	Unloaders
14.3.7	Understand and implement procedures for safe working during unloading	Unloaders, drivers
14.4.1	How to accurately weigh a loaded vehicle	Unloaders

GLOSSARY

HVNL Definitions

ATM (aggregate trailer mass) (HVNL s5), of a heavy trailer, means the total maximum mass of the trailer, as stated by the manufacturer together with its load and the mass imposed on the towing vehicle by the trailer when the towing vehicle and trailer are on a horizontal surface.

Business practices (HVNL s5), of a person, means the person's practices in running a business associated with the use of a heavy vehicle on a road, including:

- the operating policies and procedures of the business; and
- the human resource and contract management arrangements of the business; and
- the arrangements for preventing or minimising public risks associated with the person's practices.

Consign and consignor (HVNL s5)–

A person consigns goods, and is a consignor of goods, for road transport using a heavy vehicle, if–

- (a) the person has consented to being, and is, named or otherwise identified as a consignor of the goods in the transport documentation relating to the road transport of the goods; or
- (b) the person engages an operator of the vehicle, either directly or indirectly or through an agent or other intermediary, to transport the goods by road; or
- (c) if paragraphs (a) and (b) do not apply–the person has possession of, or control over, the goods immediately before the goods are transported by road.

Consignee, of goods (HVNL s5)–

- (a) means a person who–
 - (i) has consented to being, and is, named or otherwise identified as the intended consignee of the goods in the transport documentation relating to the road transport of the goods; or
 - (ii) actually receives the goods after completion of their road transport; but
- (b) does not include a person who merely unloads the goods.

Dimension requirement (HVNL s5) means:

- a prescribed dimension requirement (under HVNL [s 101](#)); or
- a requirement as to a dimension limit relating to a heavy vehicle under a condition to which a mass or dimension authority is subject (where the dimension limit is more restrictive than the relevant prescribed dimension requirement); or
- a requirement as to a dimension limit under a PBS vehicle approval; or
- a requirement as to a dimension limit indicated by an official traffic sign; or
- a requirement as to a dimension limit for a component vehicle as prescribed by a heavy vehicle standard.

Due diligence (HVNL s 26D) includes taking reasonable steps–

- (a) to acquire, and keep up to date, knowledge about the safe conduct of transport activities; and

(b) to gain an understanding of–

- (i) the nature of the legal entity's transport activities; and
 - (ii) the hazards and risks, including the public risk, associated with those activities; and
- (c) to ensure the legal entity has, and uses, appropriate resources to eliminate or minimise those hazards and risks; and
 - (d) to ensure the legal entity has, and implements, processes–
 - (i) to eliminate or minimise those hazards and risks; and
 - (ii) for receiving, considering, and responding in a timely way to, information about those hazards and risks and any incidents; and
 - (iii) for complying with the legal entity's safety duties; and
 - (e) to verify the resources and processes mentioned in paragraphs (c) and (d) are being provided, used and implemented.

Employee (HVNL s5) means an individual who is employed by someone else.

Employer (HVNL s5) means a person who employs someone else.

Executive (HVNL s26D), of a legal entity, means:

- for a corporation – an executive officer of the corporation; or
- for an unincorporated partnership – a partner in the partnership; or
- for an unincorporated body – a management member of the body.

Executive officer, (HVNL s5) of a corporation, means:

- a director of the corporation; or
- any person, by whatever name called and whether or not the person is a director of the corporation, who is concerned or takes part in the management of the corporation.

GCM (gross combination mass) (HVNL s5), of a motor vehicle, means the total maximum loaded mass of the motor vehicle and any vehicles it may lawfully tow at any given time–

- (a) if the registration authority has specified the total maximum loaded mass of the motor vehicle and any vehicles it may lawfully tow at any given time - specified by the registration authority; or
- (b) otherwise - stated by the motor vehicle's manufacturer.

GVM (gross vehicle mass) (HVNL s5), of a vehicle, means the maximum loaded mass of the vehicle:

- if the registration authority has specified the vehicle's maximum loaded mass - specified by the registration authority; or
- otherwise - stated by the vehicle's manufacturer.

Heavy Vehicle (HVNL s6) means a vehicle with a GVM or ATM of more than 4.5t, or a combination that includes a vehicle with a GVM or ATM of more than 4.5t.

Load, when used as a verb, and loader (HVNL s5)–

A person loads goods in a heavy vehicle, and is a loader of goods in a heavy vehicle, if the person is a person who—

(a) loads the vehicle, or any container that is in or part of the vehicle, with the goods for road transport; or

(b) loads the vehicle with a freight container, whether or not it contains goods, for road transport.

Loading manager (HVNL s5), for goods in a heavy vehicle, means:

(a) a person who manages, or is responsible for the operation of, regular loading or unloading premises for heavy vehicles where the goods are—

(i) loaded onto the heavy vehicle; or

(ii) unloaded from the heavy vehicle; or

(b) a person who has been assigned by a person mentioned in paragraph (a) as responsible for supervising, managing or controlling, directly or indirectly, activities carried out by a loader or unloader of goods at regular loading or unloading premises for heavy vehicles.

Loading requirements and loading performance standards (HVNL s110 and s115), are the requirements and standards prescribed in Schedule 7 of the Heavy Vehicle (Mass, Dimension and Loading) National Regulation, about securing a load on a heavy vehicle or a component of a heavy vehicle. The loading requirements and loading performance standards include requirements and standards about the restraint or positioning of a load or any part of it on a vehicle or trailer.

Operate and operator (HVNL s5) means:

A person operates a vehicle or combination, and is an operator of the vehicle or combination, if the person is responsible for controlling or directing the use of—

(a) for a vehicle (including a vehicle in a combination)— the vehicle; or

(b) for a combination — the towing vehicle in the combination.

Pack and packer (HVNL s5)—

A person packs goods, and is a packer of goods, if the person—

(a) puts the goods in packaging, even if that packaging is already on a vehicle; or

Example for the purposes of paragraph (a)—

A person who uses a hose to fill the tank of a tank vehicle with petrol packs the petrol for transport.

(b) assembles the goods as packaged goods in an outer packaging, even if that packaging is already on a vehicle; or

(c) supervises an activity mentioned in paragraph (a) or (b); or

(d) manages or controls an activity mentioned in paragraph (a), (b) or (c).

Party in the chain of responsibility(HVNL s5), for a heavy vehicle, means each of the following persons:

(a) if the vehicle's driver is an employed driver – an employer of the driver

(b) if the vehicle's driver is a self-employed driver – a prime contractor for the driver

(c) an operator of the vehicle

(d) a scheduler for the vehicle

(e) a consignor of any goods in the vehicle

(f) a consignee of any goods in the vehicle

(g) a packer of any goods in the vehicle

(h) a loading manager for any goods in the vehicle

(i) a loader of any goods in the vehicle

(j) an unloader of any goods in the vehicle.

Prime Contractor (HVNL s5) of the driver of a heavy vehicle, means a person who engages the driver to drive the vehicle under a contract for services. (Explanation: the term applies where a self-employed driver enters an agreement with another individual or business. That individual or business is the prime contractor.)

Public place (HVNL s5) means a place or part of a place:

(a) that the public is entitled to use, is open to members of the public or is used by the public, whether or not on payment of money; or

(b) the occupier of which allows members of the public to enter, whether or not on payment of money.

Public risk (HVNL s5) means:

(a) a safety risk; or

(b) a risk of damage to road infrastructure.

Public safety (HVNL s5) means the safety of persons or property, including the safety of:

(a) the drivers of, and passengers and other persons in, vehicles and combinations; and

(b) persons or property in or in the vicinity of, or likely to be in or in the vicinity of, road infrastructure and public places; and vehicles and combinations and any loads in them.

Reasonably practicable (HVNL s5), in relation to a duty, means that which is, or was at a particular time, reasonably able to be done in relation to the duty, weighing up all relevant matters, including—

(a) the likelihood of a safety risk, or damage to road infrastructure, happening; and

(b) the harm that could result from the risk or damage; and

(c) what the person knows, or ought reasonably to know, about the risk or damage; and

(d) what the person knows, or ought reasonably to know, about the ways of—

(i) removing or minimising the risk; or

(ii) preventing or minimising the damage; and

(e) the availability and suitability of those ways; and

(f) the cost associated with the available ways, including whether the cost is grossly disproportionate to the likelihood of the risk or damage.

Regular loading or unloading premises (HVNL s5) for heavy vehicles, means premises at or from which an average of at least 5 heavy vehicles are loaded or unloaded on each day the premises are operated for loading or unloading heavy vehicles.

Road (HVNL s8) is an area that is open to or used by the public and is developed for, or has as 1 of its uses, the driving or riding of motor vehicles. Examples of areas that are roads – bridges, cattle grids, culverts, ferries, fords, railway crossings, tunnels or viaducts

Road infrastructure (HVNL s5) includes:

- (a) a road, including its surface or pavement; and
- (b) anything under or supporting a road or its surface or pavement; and
- (c) any bridge, tunnel, causeway, road-ferry, ford or other work or structure forming part of a road system or supporting a road; and
- (d) any bridge or other work or structure located above, in or on a road; and
- (e) any traffic control devices, railway equipment, electricity equipment, emergency telephone systems or any other facilities (whether of the same or a different kind) in, on, over, under or connected with anything mentioned in paragraphs (a) to (d).

Safety duties (HVNL s5) is a prescribed list of eighteen HVNL duty and offence provisions in relation to which executives have a duty to exercise due diligence, and for which authorised officers have extra investigative powers. The most important duty in this category is the primary duty (s26C). For the full list, see s5 HVNL.

Safety risk (HVNL s5) means a risk:

- (a) to public safety; or
- (b) of harm to the environment.

Scheduler (HVNL s5) for a heavy vehicle, means: a person who—

- (a) schedules the transport of any goods or passengers by the vehicle; or
- (b) schedules the work times and rest times of the vehicle's driver.

Transport activities (HVNL s5) means activities, including business practices and making decisions, associated with the use of a heavy vehicle on a road, including, for example—

- (a) contracting, directing, or employing a person:
 - (i) to drive the vehicle; or
 - (ii) to carry out another activity associated with the use of the vehicle (such as maintaining or repairing the vehicle); or
- (b) consigning goods for transport using the vehicle; or
- (c) scheduling the transport of goods or passengers using the vehicle; or
- (d) packing goods for transport using the vehicle; or
- (e) managing the loading of goods onto or unloading of goods from the vehicle; or
- (f) loading goods onto or unloading goods from the vehicle; or

(g) receiving goods unloaded from the vehicle.

Unload and unloader (HVNL s5)—

A person unloads goods in a heavy vehicle, and is an unloader of goods in a heavy vehicle, if the person is a person who—

- (a) unloads from the vehicle, or any container that is in or part of the vehicle, goods that have been transported by road; or
- (b) unloads from the vehicle a freight container, whether or not it contains goods, that has been transported by road.

Terms used in this Code

Chain of responsibility is the principle that recognises that heavy vehicle safety depends upon the whole supply chain. The term 'party in the chain of responsibility' is also defined under the HVNL as each person performing any one of ten functions, in relation to a heavy vehicle. Any person or business that performs one of those functions has a primary duty to ensure, so far as reasonably practicable, the safety of their transport activities. See HVNL s5, s26C, s26F, s26G, s26H.

Code of Practice is a document which provides information about hazards, risks and controls and which helps parties in the chain of responsibility to identify, analyse, evaluate, and mitigate risks to public safety associated with their transport activities.

Control measures are actions, resources, procedures, training etc. to eliminate or minimise risk.

CoR means Chain of Responsibility.

Forest road, for the purpose of this code, means any temporary or permanent roading or landing on land designated as a forestry area which may be accessed by members of the public.

Hazard is anything with the potential to cause harm or loss. This could be an activity or behaviour, a physical object, a situation, or a management practice.

Loading performance standards, Schedule 7 of the [Heavy Vehicle \(Mass, Dimension & Loading\) National Regulation](#) prescribes the legal standards for loading and restraining loads on heavy vehicles.

Load Restraint Guide provides guidance about designing and implementing a load restraint system that will meet the **loading performance standards** (see above). The Load Restraint Guide is published on the NHVR website.

Master Code of Practice is a general code of practice for parties in the chain of responsibility for heavy vehicles.

NHVR stands for National Heavy Vehicle Regulator. The NHVR is Australia's independent regulator for all vehicles over 4.5 tonnes gross vehicle mass.

Non-uniform log means a log which has substantial taper or is not straight and therefore requires additional care when loading.

Public road, for the purpose of this code, means any road under the ownership of a government which is generally available for use by members of the public.

RICP stands for Registered Industry Code of Practice; an RICP has an evidentiary status under s632A of the HVNL. A court may have regard to the contents of a registered code of practice when determining whether a party in

the CoR has done what was reasonably practicable to ensure safety. Specifically, the contents of a code can be used as evidence of what a party knew, or ought to have known, about hazards, risks, risk assessments and controls in relation to the subject matter of the code.

Risk for the purpose of this Code, is a harm that may arise from a hazard.

Safety management means the coordinated activities to direct and control risks associated with an organisation's activities. The safety management process consists of four key steps, including identifying hazards; assessing risks; controlling risks; and monitoring and reviewing controls.

CODE ADMINISTRATION

This Code will be maintained by the NHVR in accordance with the conditions of registration in [Section 706\(2\)](#) of the HVNL, and the [Guidelines for Preparing and Registering Industry Codes of Practice](#).

As Sponsor of this Code of Practice, the Australian Forest Contractors Association (AFCA) will support the maintenance of this code and contribute to its review.

Providing Feedback

Feedback is invited on this Registered Industry Code of Practice from any stakeholder with an interest in the log haulage industry.

Feedback should be submitted to codes@nhvr.gov.au

All feedback received will be considered by the NHVR as part of the on-going code management process.

Further Information

If you require further information about the process for developing Codes of Practice, or about how to provide feedback, please see the NHVR website at www.nhvr.gov.au/safety-accreditation-compliance/industry-codes-of-practice or email codes@nhvr.gov.au

Contact details

National Heavy Vehicle Regulator

codes@nhvr.gov.au

AFCA (Australian Forest Contractors Association)

Chief Executive Officer

PO Box 49

Dalton NSW 2581

E office@afca.asn.au

W <https://afca.asn.au>

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NATIONAL HEAVY VEHICLE REGULATOR

www.nhvr.gov.au

E info@nhvr.gov.au

P 13 NHVR (13 64 87)

PO Box 492, Fortitude Valley QLD 4006

