Best Practice Guidelines for Transport

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This Best Practice Guideline is to be used as a guide to log transport. It does not supersede legislation in any jurisdiction or the recommendations of equipment manufacturers.

FITEC believes that the information in the guideline is accurate and reliable; however, FITEC notes that conditions vary greatly from one geographical area to another; that a greater variety of equipment and techniques are currently in use; and other (or additional) measures may be appropriate in a given situation.

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Transport basics

Transport modes

There are several modes used to transport wood and wood products. The most common of these are:

- Road
- Rail
- Water Air.

These modes may be used singly or in combination. For example, a train may transport wood products to and from the port, and ships transport the products between ports.

Road transport

Road transport by truck is the most common means of moving logs or wood products. Most log trucks are purpose-built, comprising a truck and trailer unit fitted with bolsters within which the logs are secured.

Wood chips, and harvesting and processing residues are typically transported in hard-sided freight vans, although some units (log/chip liners) can haul both logs and fibre products.

Timber is usually transported on flat-deck truck and trailer units. Some of these trucks are fitted with folddown bolsters (log/timber liners), and this allows logs to be transported on return journeys (back-loading).

Log truck configurations

The most common configuration is the shorts truck and trailer. Double-bay trailers are becoming the preferred trailer set-up. These trailers can legally carry two packets of logs up to 4.1 m in length, or one packet of random length logs. Trucks registered as 22 metre units can legally carry logs up to 5m in length as 2 packet loads.

Over recent years the trend towards the production and transport of short logs has increased significantly. Today there is relatively minimal use of convertible and fixed longs units.

Bailey Bridge units offer good flexibility in the type of logs they can carry but are severely disadvantaged by the Land Transport Rule: Vehicle Dimensions and Mass 2002, and are not as manoeuverable as other combinations.

The B-Train unit represents only about 2% of the log transport fleet. It is an ideal highway truck but performs badly if required to operate in the off-highway situation



Shorts truck (6 x 4) and trailer (4-axle)



Shorts truck and trailer

Shorts truck and trailers may be any of the following combinations:

- 6 x 4 truck with 3-axle trailer
- 8 x 4 truck with 3-axle trailer
- 6 x 4 truck with 4-axle trailer
- 8 x 4 truck with 4-axle trailer

Longs truck and trailer

Longs truck and trailers may be any of the following combinations:

- 6 x 4 truck with 2-axle longs trailer
- 8 x 4 truck with 2-axle longs trailer
- 6 x 4 truck with 3-axle longs trailer
- 8 x 4 truck with 3-axle longs trailer
- 6 x 4 truck with 4-axle longs trailer
- 8 x 4 truck with 4-axle longs trailer

Semi-trailer (Bailey Bridge)

The type of semi-trailer (articulated vehicle) used for transporting logs is known as the Bailey Bridge. It may be used for transporting either long or short logs.

B-train

B-train configurations are used to transport short logs.

Self-loading rigs

Self-loading rigs are fitted with a loading crane, which is used to load or unload the rig. Self-loaders are typically used where part loads are being uplifted from old landings or the harvesting operation does not have a loader capable of loading trucks.

Self-loading rigs require outriggers and stabilisers. These stabilise the unit while it is loading, and they must be used unless the stability of the empty truck safely exceeds the maximum tipping movement the crane can apply.

A safe and adequate means of getting on to and off the loading crane workstation has to be provided.

Another requirement is a means to prevent a free fall of the boom in the event of a malfunction, such as deadman valves fitted to the hydraulic system.

Each set of controls for the operation of the selfloading unit is to be of the deadman operation type.

Self-loading cranes can be permanently fixed to the chassis of the truck or removable, depending on the application.

Off-highway rigs

Off-highway rigs tend to be much larger and heavier than those transporting logs on the highway. This is because they are not governed by the same weight and dimension laws as trucks driven on public roads. They must still operate within the manufacturer's rating for the truck and trailer(s).

It is common for forestry companies to rate their roads and advise operators of the maximum axle weight limit permissible. Extra care therefore should be taken when operating an off-highway rig to ensure the axle weight limits are not exceeded.

Full Stem rigs

Full stem rigs are designed to transport stems prior to any processing. Although these rigs are not permitted to operate on public roads, they must still operate within the manufacturer's rating for the truck and trailer(s).











Full stem rigs











Most operate at up to 35 to 40 m in length, with up to 15m overhang past the rear bolster.

There are two types of full stem rig.

- Purpose built Off-highway trucks (*left, upper*) which are used on fully constructed arterial, secondary, and spur roads. Because of the load overhang swept path, it is preferable that these rigs operate in a one-way roading system so that they do not conflict with other traffic. Through correct road design, these units can operate on 2 lane roads such as arterial and secondary, interacting with on coming traffic.
- Forwarder-type stem trucks (*left*) are purpose built to operate on lower standard roads. Forwarders by design operate at low speed and over short haul distances. These vehicles are not designed to operate on arterial or secondary roads. The roads may be of a steeper grade and/or have less gravel than other roads but generally purpose built stem trucks are hard on roads. Typically, these roads are used where only small volumes of timber are transported.

Log/timber liner

Log/timber liners are used to maximise loaded kilometres.

They haul logs on one journey and timber on the return journey, and are an ideal unit for hauling product over long distances (\geq 150 km).

Log/chip liner

These are similar to log/timber liners, but they transport sawmill fibre on the return journey. Their percentage loaded running is normally 100%.

Chip liner

Chip liners are designed to transport bulk products, namely sawmill fibre. These units have fixed sides or are curtain sided. All loads should be covered by a tarpaulin or netting.

Rail transport

Rail is commonly used to shift large volumes of logs at any one time. For example, rail transport is often used between log yards and ports. It can also be effectively used between log yards and the yards of customers who have rail sidings entering their site.

Trucks move logs from forest operations to rail loading points, and road and rail can complement each other — especially over long distances. However, the use of rail is limited to areas currently served by rail lines.

Water transport

Barges have been used in several regions to transport logs, either from islands or over sensitive marine areas.

Machinery used for the assembly, loading, and unloading of rafts and barges is to comply with the Health and Safety in Employment Act (Pressure Equipment, Cranes and Passenger Ropeways Regulations 1999).

Only persons fully trained and instructed on the dangers are to carry out barging work.

Only tug boats of suitable power and able to fully control the barge or raft shall be used in this operation.

Aerial transport

Helicopters are sometimes used to extract trees from the felling site. This method of transporting logs in New Zealand is the least used of all methods. The safe use of helicopters in forestry operations is described in **Best Practice Guidelines for Working** with Helicopters, and is subject to the Approved Code of Practice of Helicopter Logging.

Truck compliance

The following rules apply:

- All motor vehicles, logging trucks and trailers that travel on public roads are subject to the Transport Act 1962 and shall carry a current certificate of fitness (COF).
- A competent person shall inspect vehicles that are not subject to the Transport Act 1962 (e.g., off highway vehicles) every 6 months and a record to this effect signed by the competent person is to be displayed in the vehicle. Stem trucks will be subject to a certificate of fitness as issued under the Land Transport Act 1998.
- Inspection and maintenance records shall be kept to ensure maintenance is performed properly.
- All vehicles must carry relevant and current documentation. This may include:
 - Certificate of Fitness
 - ☐ 22 metre permit

- C Road User Charge's loading certificate
- C Load anchorage, drawbar/draw beam, and brake code compliance.
- Vehicles shall be kept up to an acceptable safe operating standard at all times; in most cases this will be COF standard.
- Vehicles must only be used to cart the product in the form they were designed for.
- Vehicles must not be loaded above the manufacturer's recommended gross vehicle mass (GVM) or used in combination with other vehicles above the manufacturer's recommended gross combination mass (GCM).
- Individual vehicle components (such as axles, tyres, couplings, and chassis) must not be loaded above the manufacturer's recommendations.
- The dimensions of a heavy vehicle must comply with those set out in the Heavy Motor Vehicle Regulations 1974. The allowed dimensions are as follows.





	Heavy Vehicle Dimensions
Maximum width	2.5 m
Maximum height	2 and 3-axle trailers 3.5 m 4-axle trailers 3.8 m other combinations 4.25 m
Maximum front overhang	3 m from the front edge of driver's seat when in the rearmost position
Minimum ground clearance	100 mm
Maximum rear overhang	The lesser of 3.2 m or 60% of wheelbase (for rigid trucks and full trailers) or 50% (for articulated vehicles). No more than 1 m past the rearmost part of the truck/trailer.
Total length	17 m (articulated trucks) 20 m (truck and trailer) 20 m (A and B train) 22 m Log trucks (see page 9)

• Any vehicle that becomes unsafe and/or sustains structural damage either by wear and tear or accident is to be shut down until such time as it is repaired to the manufacturer's recommendations or standards.

Over-dimension trucks

(Note: these include full-stem trucks)

- Units shall not be operated at a weight exceeding the manufacturer's rated gross vehicle mass or gross combination mass.
- Units shall not be loaded in a manner exceeding the manufacturer's component rating.
- Units with excessive overhang shall display flashing lights and operate under a specific hazard control procedure to ensure that other road users are warned of the hazards associated with such operations.
- Units shall have any excessive rear overhang identified with warning signs.
- All load-securing equipment shall comply with the requirements of the Approved Code of Practice for Safety and Health in Forestry Operations.

Offences against regulation 18 (1) Of Heavy Motor Vehicle Regulations 1974 (1 March 1999):

Brief Description of Offence	Regulation to which Offence Relates	Infringement Fee (\$)
Unlawful use of Class C road	5 (5)	370
Failure to comply with conditions of permit to exceed weight limits	7 (5)	370
Operation of vehicle with excessive tyre pressure	8 (1)	150
Failure to comply with conditions of permit to exceed minimum tyre pressur	e 8 (3)	150
Failure to comply with provisions concerning prohibition on certain heavy tr	affic 10	370
Failure to comply with provisions concerning protection of bridges	11	470
Use, etc., of devices to alter axle weights	13	370
Failure to mark tare weight	14	150
Unlawful erection of signs; interference with prescribed signs, etc.	16	150
Failure to comply with vehicle standards, etc.	16	370
Failure to comply with requirements of traffic officer, obstruction, etc.	17	370

Load regulations

There are a range of regulations relating to load weights, positioning, and height which the truck driver must comply with.

Maximum vehicle weights

The maximum weight of a vehicle (truck plus load) will be affected by the axle configuration of the truck and trailer.

The maximum weight of a vehicle on any two or more axles (that together do not form a single tandem or triaxle set) is a function of the distance between the first and last axle. Maximum vehicle weights for a range of lengths are shown on the next pages.



Maximum permissible vehicle weights

Length (m)	Maximum Weight (kg)	Length (m)	Maximum Weight (kg)
1.8 to less than 2.5	15 500	8.2 to less than 8.8	31 000
2.5 to less than 3.0	17 500	8.8 to less than 9.4	32 000
3.0 to less than 3.3	19 000	9.4 to less than 10.0	33 000
3.3 to less than 3.6	20 000	10.0 to less than 10.8	34 000
3.6 to less than 4.0	21 000	10.8 to less than 11.6	35 000
4.0 to less than 4.4	22 000	11.6 to less than 12.4	36 000
4.4 to less than 4.7	23 000	12.4 to less than 13.2	37 000
4.7 to less than 5.1	24 000	13.2 to less than 13.5	38 000
5.1 to less than 5.4	25 000	13.5 to less than 14.4	39 000
5.4 to less than 5.8	26 000	14.4 to less than 14.8	40 000
5.8 to less than 6.4	27 000	14.8 to less than 15.2	41 000
6.4 to less than 7.0	28 000	15.2 to less than 15.6	42 000
7.0 to less than 7.6	29 000	15.6 to less than 16.0	43 000
7.6 to less than 8.2	30 000	16.0 or more	44 000

Vehicles exceeding 39 000 kg are subject to pre-conditions determined by the Director of the LTSA.

Height limits for log loads

The outside logs of a truck or trailer load shall not be loaded above the top of the stanchion or the stanchion extension pins.

Logs loaded in the middle of the load shall not have more than 1/3 of the diameter of the logs above the top of the stanchions or the extension pins where fitted.

The top of the load shall be evenly crowned so that the load-securing device will contact as many logs as possible.





Specific load limits for log trailers

Maximum load heights are set according to the number of axles on the trailer.

The measurement is taken from the ground to the top of the log that is resting against the stanchion.

Trailer type	Maximum load height (m)
Two- and three-axle	3.5
Four-axle	3.8

Overhang on trailers

Logs shall be loaded so that the lower and outside logs overhang the bolster and stanchion edges by 300 mm. Exception:

The minimum overhang may be reduced to 150 mm provided:

- · Logs are less than 4.6 m long and of uniform length
- There is a fixed chassis or frame between the bolsters
- A belly chain is used.

Logs that are shorter than the distance between the stanchions shall be nestled between the outer logs.

A short log may be placed on top of the load provided the truck driver uses a belly chain to secure the log end not supported by a stanchion



22 Metre log trucks

From 20th June 2002, new regulations were introduced allowing for the maximum overall length of the loaded truck and trailer to be extended from 20 metres to 22 metres, subject to specific conditions. The provisions effectively lower the centre of gravity of the load, making the loaded truck more stable on the road.

(Note: Summary only, for more information refer to Rule 41001 and exemption notice)



DIMENSION LIMITS (only applies when trailer laden with 2 or more packets of logs)

- Overall length must not exceed 22.0 metres
- Trailer length must not exceed 13.5 metres
- Trailer wheelbase must be at least 4.9 metres
- Inter-vehicle spacing (including the load but excluding the drawbar and front dolly assembly) must be at least 1/2 load width, usually 1.1 metres
- Front overhang when measured across the full width of the load must not exceed 2.0 metres
- Rear overhang if registered before 1st July 2002 must be less than the smaller of 65% of the trailer wheelbase or 4.0 metres

• The maximum load height of any part of the load on the trailer must be less than 3.2 metres

Note: If bolster side arms are higher than 3.2m they must have a clearly identifiable painted strip that extends from 3.1m to 3.2m above the ground to show the maximum allowable load height 3.2 metres.

OPERATING CONDITIONS

- Must not enter an intersection or railway crossing without adequate clearance to complete crossing before train or other vehicle arrives.
- Must pull over clear of moving traffic in fog, heavy rain, hail or other factors that restrict visibility to less than 500 metres.
- Where available must use routes designated for use by over dimension vehicles.
- Must display a LTSC spec. 0800 LOGTRUCK sign
- Must pull over to allow other traffic to pass when safe to do so.
- Operator responsible for any property and roadside furniture damage due to over dimension load.

DAY TIME

- · Headlights on low beam
- Fluorescent yellow green flags or hazard panels each side of the rear of the load displayed only when greater than 20 metres.

DARKNESS (lights visible from 200m)

- Revolving amber light on cab roof
- Red or amber lights at each side at rear of load. These can be trailer lamps if positioned at rear of load e.g. by telescopic pole system (lights must be at least 50cm²)
- Side marker lights approx. 3 metres apart. (Amber front facing, red or amber rear facing)



Roundwood loading

Roundwood needs to be stacked evenly.

The top of the load needs to be slightly rounded so that the binder chains make contact with as much of the load as possible.



Truck safety

Cab guards

Trucks will be fitted with an industry-standard cab protection frame between the cab and forward end of the load.

This frame will be fastened so that it protects the cab and driver during loading and unloading, and in the event of a sudden movement of the load.

The cab guard shall provide limited protection in the event of a vehicle roll over.

Cab guards for full-stem trucks may require upgrading to withstand the forces imposed by the heavier loads.

Load security

Load securing devices are designed to prevent movement of the load during sudden deceleration, such as during emergency braking.

On log trucks, belly chains and throw-over chains are used to secure logs within the bolsters to:

- Reduce the risk of the logs sliding forward and hitting or sliding over the cab
- Reduce the risk of logs sliding off the back of the load
- Reduce the risk of logs jumping over the stanchions or extension pins
- Help retain the load on the vehicle in the event of a vehicle rollover.



The following rules apply to load security:

- There shall be a minimum of two sets of bolsters and stanchions to contain each load or section of a load.
- Steel wire rope and chain used to secure a load shall have a combined rated strength at least equal to half the weight of the load they contain or a minimum breaking strain of 6.4 tonnes.

Where this is not practical, a belly strop/chain or load-restraining equipment of equal strength shall make up the balance. This load restraint may be attached from chassis to chassis.

- Debarked logs, fresh eucalypt logs, and other hard-to-restrain logs shall have a tensioned belly chain fitted over each section of the load in addition to the other restraints required by law.
- When transporting sawdust, woodchips, and waste, the load should be carried and secured so that the load is contained within the vehicle. Loose bulk loads shall be tarped/netted as appropriate whenever there is risk of load shedding due to wind action or movement.
- Where sawn timber (loose or packeted) is being carried, securing devices shall comply with the requirements set out in the Code for Timber Stacking, Packaging and Transportation, which is available from the offices of the Department of Labour.

Static rollover threshold (SRT)

A vehicle static roll threshold is a measure of the likelihood of that vehicle rolling over sideways.

Vehicles with a low SRT are more likely to roll over when going around sharp bends and in sudden emergency manoeuvres.

Class TD trailers (trailers with a gross mass exceeding 10 tonnes) must have a static roll threshold (SRT) when laden of at least 0.35g (where g is the acceleration due to gravity). SRT measures the stability of the vehicle.

Class TD trailers with a body height or load height above ground of 2.8 metres or more are also required to be certified that they have an SRT of at least 0.35g. (Refer to factsheet 13e, *Static roll thresholds*).

Information on calculating SRT's can be found at the LTSA website www.ltsa.govt.nz

Seat belts

If seatbelts are fitted to your truck they must be used.







Log Transport Safety Accord

This accord is between the New Zealand Forest Owners Association (NZFOA), Road Transport Forum New Zealand (RTFNZ), Log Transport Safety Council (LTSC) and New Zealand Farm Forestry Association (NZFFA).

Objective

The objective of this Accord is to improve public safety by reducing the frequency rate of road accidents involving log trucks on public roads.

Commitment

We, the above organisations, are committed to working towards reducing the frequancy rate of accidents that involve logging trucks on public roads. We shall encourage the members of our respective organisations to abide by the principals of this Accord and agreed initiatives for its implementation.

Implementation

To give effect to this Accord, the parties agree to encourage their members to implement the following:

Compliance with Reglations and Code of Practice

That all logs are loaded and transported in compliance with relevant regulations and industry codes of practice e.g. the OSH Approved Code of Practice for Safety and Health in Forest Operations, and the LTSA Truck Loading Code.

Rate setting

That rate negotiations between forest owners and their transport providers take into consideration recommended safety criteria.

0800 Public reporting scheme

That all parties participate in and actively support the objectives of the 0800 public reporting scheme.

Transport Operator Safety Rating System

That parties fully support the Transport Operator Safety Rating System as a means of encouraging and rewarding best practice safety behaviour amongst operators.

Speeds

That parties acknowledge that speed constitutes a major accident risk. Drivers shall travel at speeds that allow considerable safety margin for the conditions. Drivers will adher to recommendations in respect to corner speeds as agreed between the parties.

Delays

That parties acknowledge that delays at loading, unloading and checkpoints can contribute to driver and transport operator frustration. The parties shall endeavour to minimise such delays.

Load weights

That forest owners and operators oppose the exceeding of legal load limits. The two parties agree to develop improved systems to identify and to impose disincentives to this practice.

Driver training and qualifications

That all log truck drivers either hold the National Certificate in Commercial Road Transport, or be working towards this qualification.

Industry issues

In addition to encouraging their members to implement the above measures designed to improve logging truck safety, the signatory organisations agree to work together on the following:

Truck and trailer design and manufacture

The parties acknowledge the part truck and trailer manufacturing standards and dimensions play in log transport safety and support the LTSC in reviewing and revising these standards to improve safety. The parties will work to implement any agreed revised truck and trailer manufacturing standards as quickly as practicable.

Loading/unloading equipment

The parties acknowledge the need to review loading and unloading equipment and procedures to match developments in best practice truck and trailer design.

Roading infrastructure

The parties will work to together to identify roading infrastructure priorities and work with central and local government to achieve roading standards that can accommodate expanded log truck traffic and improve public safety. Particular emphasis shall be placed on regions where harvest volumes are rapidly expanding.

Accident statistics

All parties will support and contribute to the efficient and accurate recording and dissemination of accident statistics and analysis of causes under the stweardship of the LTSC.

Education and awareness

The parties acknowledge the important role of the other road users in maintaining the safe transport of logs. They will support education of both truck drivers and the public (particularly where the public interacts with the industry) that improve the awareness of such factors as loading, overtaking safely, and the distance required to slow or stop a loaded truck.

Training and supervision

Transportation of stem, logs and other wood products is a highly visible aspect of the forest industry. Interaction with public road users also increases the need to ensure transportation operations are safe and efficient.

Training and supervision are very important factors in ensuring high performance of the transport sector.

The Approved Code of Practice for Safety and Health in Forest Operations requires that when <u>any</u> worker begins operating transport equipment, the employer must place them under the close (constant and one-on-one) supervision of a competent person. That person must continue to supervise the worker until they are sure the worker can operate safely and is not likely to harm themselves or anyone else.

Extra attention must be given to the training and supervision of new or inexperienced operators as most serious injuries occur to operators with less than 6 months' experience.

All operators must be under a documented training programme and should be aiming to pass the relevant NZQA unit standards that apply to transportation.

Workers involved in transportation need to be fit, active, alert, properly trained or supervised and appropriately equipped.

Knowledge of hazards

As part of the supervision and training programme, operators need to be shown the hazards they will face on the job, and the controls to avoid being harmed by those hazards.

Before entering new areas operators must be involved in identifying any significant hazards specific to the transport equipment at the work sites , and understand the way those hazards will be controlled. There must be documented evidence on site listing the hazards and controls and showing that all operators have been run through those hazards and controls.

The two main hazard categories are **Health hazards** and **Operational hazards**.

Health hazards

Transport operators often work long hours, which can contribute to cumulative fatigue and stress.

To maintain peak performance and prevent accidents, transport operators must take special care of their bodies including their physical fitness, diet, water intake, personal hygiene, sleep, and also how they treat their bodies away from work.

A Liro study of log truck incidents showed that more incidents occurred in the first 2 hours of the shift than during any other 2-hour period.

Health hazards

Hazard	Control
Stress (indicated by the following: inability to sleep, nervousness, headaches, low energy levels, feeling exhausted, getting sick easily and recovering slowly, poor judgment, easily upset)	 Get enough sleep (go to bed earlier). Eat a healthy balanced diet. Drink less caffeine and high sugar drinks. Try to exercise regularly. Allow time-out for yourself. Try to plan as much of the day as possible. Practise relaxation techniques. Make sure you talk to workmates or family—don't bottle things up. Be prepared to wait—have a book or magazine to read.
Lack of rest/sleep	 Build short frequent rest breaks into your work routine. Take at least two evenly spaced 30-minute rest breaks during the working day. Refer to page 29 for details on driving hours.
Poor nutrition	 Start each day with a high-carbohydrate breakfast like porridge, cereal, toast, bananas, pasta, or potatoes. Eat high-protein foods like lean meat, chicken, eggs, milk and cheese at night. Eat at the start of a break and rest to allow digestion.
Drugs	 Avoid all non-prescription drugs as they seriously affect both your mental and physical ability to work. Inform the boss if you are on any medication that may affect your work. Stay home if necessary. Before receiving any medication, tell your doctor what you do for a living. If you are on long-term medication for a serious health complaint, inform the boss or crew of your condition in case you are involved in an emergency at work.
Early over-exertion/sprains and strains	 Start each day with a 10 to 15-minute warm-up and then a few stretches. Start the day slowly until muscles are warmed up properly. Do some stretches at the end of the day. Take particular care when starting back at work after the holidays.

Health hazards (cont)	
Hazard	Control
Hypothermia/chills	Polypropylene clothing (thermal underwear) is excellent for cold, wet weather.
	Bring spare dry clothing even on fine days. The weather can turn bad very quickly.
Lack of hygiene/infection	 Clean and dress any cuts or scratches received on the job as soon as possible and keep them covered.
	 Make sure the first aid kit is kept fully stocked.
	Carry water and soap on the job to wash hands before smokos.
	Wear clean clothes against the skin every day.
Occupational overuse syndrome	Use correct techniques.
(OOS)	Have regular medical examinations.
	Use pre-work warm up and stretching techniques throughout the day.
Dehydration/heat exhaustion	Regularly drink fluids.
	Drink before you feel thirsty.
	 Do not drink fluids like soft drinks and cordials that have more than 8% carbohydrate content.
	 Drink plenty of water at night to recharge the body.
	• Drink a couple of glasses of water before leaving for work.

Operational hazards

Operational hazards relate to the equipment being used and the work environment.

The hazard list below is not an exhaustive list, but includes some that you could encounter during your working day. You must take time to recognise operational hazards in your own operation each day.

New hazards identified should be reported for inclusion on hazard identification lists.

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Hazard	Control
Ineffective personal protective equipment (PPE)	 Do not perform any operation if PPE is ineffective. Replace any worn, damaged, or expired PPE. Routinely check the condition of your PPE.
Other road users	 Turn lights on when travelling. Keep speed down (particularly on corners). Pull over to let traffic pass you ONLY where there is adequate pull-off area. Keep left on blind corners. Drive to the road conditions. Be aware of slips, washouts, trees, or undergrowth encroaching on the road. Report any hazards seen. Watch out for other road users who are not as experienced as you in these conditions. Drive defensively. Be aware of other road users not knowing the right hand rule. Call up location on the 2 way radio.
Loading/unloading operations	 The truck driver and the loader operator should agree on a safe place for the driver to stand. Remain in view of the loader driver or stacker operator at all times. Remain in the cab if appropriate. The truck driver should remain a safe distance from log stacks. Driver should not be chaining up while loading is in progress.
Truck/trailer instability	 Do not exceed legal load heights. Communicate with and instruct the loader operator. Remember, as a driver you are responsible for the safe loading of your truck. Ensure the load is even and crowned. Drive to the road conditions - excessive speed is the major contributor to rollovers.
Dirty windscreens and mirrors Spilt fuel at pump site	 Keep windscreens and mirrors clean at all times to ensure good visibility. Isolate spillage and notify appropriate authorities.

Operational hazards (cont...) Hazard Control Fog, dust, heavy rain Check for alternative route. Take due care and operate to the conditions. Keep as far to the left as safely possible. Extend vehicle following distances. Slippery roads (mud, rain or ice) Drive to the conditions. Drive smoothly. Reduce speed. Extend following distances. Ice on vehicle Avoid hosing down late at night if likely to freeze. Exercise caution. Falls from truck Always climb down from the truck - do not jump. Climb down on to firm ground where possible. Apply the 3 points of contact rule. Slippery or processed logs Avoid loading or unloading on slopes. Use belly chains when necessary. Stand further away from the landing process Skid debris and slash (especially Stay within well-lit areas. ٠ in low-light conditions) ٠ Stand in cleared, designated areas. Unloading/loading of trailer Be aware of hands in relation to moving parts. Always stand on the opposite side of the drawbar to loader. Truck driver to be in clear view of loader driver. Wait untilk the loader driver signals. Wear gloves. Don't rush. Standing or folding bolsters or Chain storage, extension pin removal, stanchion-folding stanchions operation is not to commence until truck and trailer are unloaded. Be aware of hands and fingers in relation to moving parts. Wear gloves. Stanchions should be lowered while trailer is on the ground.

Operational hazards (cont ...)

Hazard	Control
Standing or folding bolsters or stanchions (cont)	After standing the stanchion/bolster, ensure that the locking device is in place.
	Watch for stanchions that may fall back down if the trailer or truck are on sloping ground
Being hit by twitch handle	 Use a safety "Cheater bar" to tighten.
	 Ensure footing is firm, your body positioned to the side of the twitch handle.
	Take care when removing handle.
	Stand to one side when releasing.
Working alone	 Ensure you have the means of getting help in an emergency (such as RT or mobile phone).
	 Arrange for regular contact with someone who can provide help in an emergency.
	Ensure that person knows where you are and your intended route.
Working at night	Wear a hi-vis garment with reflective strips.
	 Ensure there is adequate lighting to complete any tasks outside the truck.
	Ensure all lights on your vehicle are working and in good order.
	 Ensure you stand in a safe position with adequate light when your truck is being loaded or unloaded.
Throw over chains	Do not start securing the load until loading is complete.
	Before throwing chains, make certain the other side of the truck is clear of people or vehicles.
	• Beware of strain injuries when throwing the chain over the load.



Driver wearing personal protective equipment

Personal protective equipment

The minimum safety requirements for transport operators are:

- Safety boots. Compliant with AS/NZS 2010
- Hi-vis clothing (must have at least 150 cm² of reflective material back and front if working during the hours of darkness)
- Hi-vis helmet when outside of a protected cab. Compliant with AS/NZS 1801:1997
- Gloves when setting up truck/trailer or changing tyres.
- Safety glasses compliant with AS/NZS 1337:1992
- Personal protective equipment will be worn at all times while on the job and outside the cab of the truck.

Truck driver requirements

Training

All drivers must have the correct licence for the machine they are operating. Also, they must be trained or under training for the task they are performing.

Drivers should hold the NZQA Unit Standard 17769 (General Requirements) and a First Aid Certificate (NZQA Units 6401 and 6402) before commencing employment as a driver in a forest.

It is important that drivers keep a copy of all training records.

All logging truck drivers should be working towards the National Logging Truck Driver Certificate. Ideally, this should be completed within 2–3 years of starting in the forest Industry. If you are unsure of how to commence this training, contact your employer.

It is recommended that all drivers who operate heavy vehicles in an off-highway situation should hold the NZQA Unit Standard 1738 (Drive Heavy Vehicle in Off-road Environment).

Logbooks

Drivers subject to driving hours must record their driving, on-duty, and rest hours in an approved style of logbook. The logbook provides a record of a driver's work activity and enables enforcement officers to check compliance with the driving hours requirements. A driver must produce the logbook to any enforcement officer for inspection, when requested.

An enforcement officer is entitled to remove pages from your logbook, and most logbooks contain a special duplicate or triplicate copy for this purpose.

As a general guide, each logbook page should clearly and legibly show the following information:

- All periods spent:
 - $\ensuremath{\square}$ driving; and
 - $\ensuremath{\square}$ working or on-duty; and
 - $\ensuremath{\mathbb{C}}$ rest periods (being periods of not less than half an hour); and
 - $\ensuremath{\square}$ off-duty.

• The relevant starting and finishing dates, times, and (except in the case of off-duty periods) places of the periods referred to above, and the distance recorder reading, if one is required to be fitted under the Road User Charges Act 1977; and the registration number of each vehicle driven.

You may use any style of logbook, provided the Director of Land Transport Safety has approved it for use. This should be stated on the front cover of the logbook.

You must keep your logbook up to date for each period you are driving. In addition, you must:

- Always carry your current day's log page and the preceding 10 days' log pages, for inspection by an enforcement officer
- Maintain your logbook for at least 10 days after your last day spent driving
- Keep your logbook for at least 12 months from the date of the logbook's last entry.

If you are an employed driver, you are also required to give a copy of your logbook to your employer (who must retain it for at least 12 months). You must give your employer their copy as soon as practicable, but no later than 10 days after the date of the last entry in the logbook.

If you are a driver and are convicted of any of the following offences, you can be fined up to \$2,000 and, unless the Court finds special reasons relating to the offence for not doing so, be disqualified from driving for at least 1 month.

- Not having a logbook
- Having an incomplete logbook (logbook omissions)
- Having false entries in your logbook
- · Having a logbook with unclear or illegible entries
- Maintaining more than one logbook at the same time.

If you employ a driver who commits any of the above offences, and you are deemed responsible for the offending, on conviction you may be fined up to \$10,000.

Driver Hours

A driver must:

- Not drive for any continuous period exceeding 5¹/₂ hours
- After a continuous period of 5¹/₂ hours driving, have at least a ¹/₂-hour rest before undertaking any further driving
- Not exceed 11 hours driving in any 24-hour period
- Not exceed 14 hours on-duty in any 24-hour period
- Have a minimum continuous off-duty period of at least 9 hours in any 24-hour period.

In addition, a driver must have a minimum continuous off-duty period of at least 24 hours after having totalled:

- 66 hours driving, or
- 70 hours on-duty.

The accumulated total has to be counted from the last minimum 24-hour off-duty period.



What do driving, on-duty, rest, and off-duty mean?

Driving means time spent driving a vehicle that is subject to driving hours.

On-duty includes driving and any time spent in paid employment (of any sort). Loading or unloading a vehicle, waiting for the loading or unloading of a vehicle, maintenance, cleaning (other than unpaid cleaning that occurs during any off-duty period of not less than 24 hours), or other activities relating to a vehicle are on-duty activities.

On-duty also includes any other activity (whether or not it relates to a vehicle of any kind) relating to the provision of transport services for passengers or goods.

Rest and off-duty are ant periods where you are not driving or on-duty.



Professional driving hints

Professional heavy vehicle drivers have certain responsibilities that are important to their employment and the way they are perceived by the public at large. They are:

- Know the vehicle you drive
- Know, and apply the road traffic laws
- Maintain your vehicle to a high operating standard and a high level of appearance
- Apply the highest possible standards of safety in all operations
- Remember, as a professional driver, you must think of other road users.

Six steps to be a successful professional driver:

- (1) Always put safety first
- (2) Accept full responsibility for the safety of yourself, your vehicle, and all others.
- (3) Regularly revise your safety training and drive defensively.
- (4) Apply your training and the rules of safety to each and every move you make with a heavy vehicle
- (5) Allow for the probability of less safety awareness on the part of other road users and any hazard they may represent
- (6) Act with professional courtesy and always promote safety to others.

Whenever you, as a professional driver, identify a potential hazard you should prepare yourself to be in the best position to deal with the hazard. For example, if you notice that a road has been recently graded you should prepare yourself to come across a grader. Likewise if you come across a tree-felling sign you should be prepared to be stopped while felling is in progress.

Rural roads

When driving on rural roads drivers should :

- · Be aware of routes and timing of school buses.
- Be aware of stock movements (both controlled and uncontrolled).
- Be prepared to meet other rural road users (eg: farm vehicles and road mantenance crews).

Railway crossings

When you come up to a level crossing you should:

- Always check a railway line is clear before crossing
- Never start to cross if the lights are flashing, bells are ringing or the barrier arms are lowered
- Never cross a railway crossing unless there is space on the other side of the crossing for your vehicle
- Never overtake a vehicle that has stopped for a train
- Never try to race the train over the crossing.



Approaching a railway crossing

Vision requirements

Good vision is the most important faculty a driver requires, as it buys time and space, which gives room to either slow, turn, or stop. Most people have a 200° range of vision, but the following phenomena begin to occur as your speed increases above 40 km per hour:

- You lose sight of objects on both your left and your right hand side
- You may have trouble identifying objects
- Closer objects become more blurred or dim.
- You tend to focus on a distant point and its immediate surroundings
- Colour differentiation becomes increasingly more difficult when vehicles are in motion

Reaction time

This is the interval between recognising a dangerous situation and applying the brakes. We know the average reaction time is three quarters of a second, but this reaction time is also affected by other factors:

- People over 50 react about 15% slower than people in their 30s.
- Reactions of the over 50s are about 53% as dependable as for those in their 30s.
- Driving while physically or mentally tired, or under the influence of drugs or alcohol, reduces the dependability of reaction.
- The faster a vehicle is moving, the further it will travel during reaction time.

Inertia and friction

When you brake you are using the friction between the brake shoe and drum, and the tyre and road, to resist inertia and stop the forward motion. Any of the following factors can cause loss of friction, or in other words, make you unable to stop effectively:

- Poorly adjusted braking system
- Water or oil on the brake linings
- Incorrect use of the braking system.
- Road surface material (type)

- Poorly maintained braking system
- Wet, slippery, or icy road surface
- Poor tyre condition
- The weight and distribution of a load

General rules for braking

- Apply steady pressure at the beginning of a stop. Ease off the brake pressure as the vehicle slows.
- Release brake pressure just before the vehicle completely stops.
- Re-apply to hold the vehicle when stopped.

Balanced braking

In truck/trailer combinations the technique of balanced braking should be applied with the foot brake as opposed to hand control of the trailer brakes. Wear will take place evenly and reduce the risk of a jackknife situation (this only applies where hand controls are fitted).

Any identification of loss of air pressure should be acted on immediately. Stop the vehicle in the safest place possible and correct the fault, or have the fault corrected, before proceeding.

If the brakes should fail on a level road, reduce speed if possible by downshifting to use engine compression or auxiliary brakes to assist in slowing the vehicle. The emergency braking system will automatically apply as the pressure drops to a pre-determined level. In this situation, violent braking can take place (especially on an unladen vehicle) and you will need to keep the vehicle on line and under control to the best of your ability.

Cadence braking

In slippery conditions, the cadence braking technique can give better control when full use of the steering is required. The brakes are hit hard and held only for a split second, then released and reactivated again about every half second or so. By doing this, the weight transfer is kept on the front tyres, allowing better road holding.

Where hydraulic retarders are used, drivers must anticipate their operation as there is a delay in the activation of the retardation effect and the vehicle can travel a significant distance before this takes place.

Auxiliary braking

Where any auxiliary braking is used, drivers must be aware that the drive wheels may lock up and cause a jack-knife to occur.

Downhill Braking

The following three steps represent good downhill braking practice.

(1) Prepare

- Know your route, especially where steep downhill sections are located.
- Check the condition of your brakes prior to the trip.
- (2) Control
 - Reach control speed before starting downhill (this should be one to two gears lower than used driving uphill on the same grade). The engine RPM should be just below the governed maximum.
- (3) Use snub braking techniques.

Snub Braking

The best way to brake downhill is using snub braking. This means applying all your service brakes, intermittently, in a way that will reduce the speed of a fully loaded vehicle by 8 to 10 km in 3 seconds during each application. You have got to get the application pressure high enough to get all your brakes working.

The continuous application of the brakes (i.e., dragging) is likely to result in uneven drum and lining temperatures and problems such as brakes "fading" before you get to the bottom of the hill.

Steady, low-pressure application of the brakes may not cause all the brakes on the vehicle to apply and may result in some brakes doing more work than others. The application of pressure must be high enough to ensure that all brake chambers apply and that all linings make solid contact with the drums — about 20 psi or higher.

Centrifugal force

The safety of heavy vehicles is affected by speed to a much greater extent than it is for cars. Speed affects the propensity to rollover or jack-knife, and affects stopping distance and the ability to react in time. As a measure of the affect of speed on safety, a truck with a SRT of 0.35g travelling through a 45km/h sign posted curve at the advisory speed should be safe. However if it travels around the same curve at 50km/h it has a very high risk of rolling over. It is therefore extremely important that drivers do not travel around curves above the advisory speed.

Safeguard driving

The principles of safeguard driving can be summarised as follows:

- S Stay alert in all driving conditions
- A Act in time when danger appears
- F Fatigue is a killer, even to professionals
- E Expect the worst in every situation
- **G** Giving way is better than being taken away
- **U** Unusual weather, road, and traffic conditions place stress on all drivers
- A Avenues of escape must be maintained
- **R** Reduce the chance of accidents by applying the rules
- D Drugs and alcohol have no place on the road

Truck maintenance

Pre-start check

It is a good idea to use a check sheet

- Engine oil recommended level
- · Visible oil leaks on engine
- Seats/seatbelts adjusted
- RT / CB / phone
- Batteries secure/function
- · Fifth wheel/ring feeder
- Tyres/damage/pressure/condition
- · Load security/chains, restraints
- Fuel tanks/damage/leaks
- Tyres/pressure/tread
- · Load security/king pin locked in

Start-up procedure

- Gauges working
- · Wipers/washers
- · Clutch free travel/adjust if required
- Braking system
- Brake lights/tail lights

- **D** Dominate by skill, not by size
- **R** Roads conditions + speed caution = injury or death
- I Indicate, evaluate, don't hesitate
- V Victorious on the race track, can be vanquished on a highway
- I Inspection of your vehicle is important
- **N** No engine braking in built-up areas
- **G** Good physical and mental condition allows you to drive safely in all situations.

- Coolant recommended level
- · Visible coolant leaks
- Mirrors clean/set
- Windscreen clean
- Body panels dents/scratches
- Air tanks/drain/leaks
- Wheels/nuts/condition
- Steering play
- · Visible suspension parts
- Hubometer fitted
- Draw bar
- Horn working
- Air conditioning/heater
- Driving lights/headlights
- Landing legs/function (up and down)
- · Indicators/hazard

Daily inspection

Walk around inspection

- Drawbar/hitch/chains etc
- Engine coolant
- Engine oil leaks
- Trans/diff leaks
- Bolsters
- Loose bolts/damage
- Chassis

- Tyres
- Engine oil level
- Coolant leaks
- Air cleaner/indicators
- Air leaks/drain tank
- Hub oil leaks
- Chains, strops, twitches

Weekly inspections

Check fluid levels	General checks	
Transmission oil	Clean/check batteries	Grease
Diff oils	Fire extinguisher	Tool box/shovel
Power steering oil	Brake linings	Hose down
	Chassis	Wrap-around strops

Monthly

A competent person nominated by the employer should inspect the following on a monthly basis to ensure that all such equipment is maintained in a safe condition:

Belly chains or strops

- Fire extinguisher
- Servicing requirementsStanchion chains or strops and safety plates,

including the fastening of each

• First Aid kit.

Defective rigging or fittings shall be repaired or replaced before the vehicle continues operating.

Truck transport procedures

Unloading a log trailer

- The loader operator will direct the truck driver where to position the truck.
- Remove the trailer tie downs; this can be done just prior to moving on to the loading area.
- The loader driver will position the loader ready to receive the lifting chain, and be stationary before placing the lifting chain on the forks or grapple hook.
- Establish an effective means of communication with the loader operator.
- The truck driver will move in and attach lifting chains when the loader is stationary.
- Once the trailer is lifted off the truck, the loader should hold the trailer about 30 cm off the ground.
- The truck driver can then safely swing the drawbar around so that the trailer can be connected to the truck.
- The truck driver stands on the opposite side of the drawbar from the loader while the trailer is being hooked up. The truck driver must ensure he/she is in plain view of the loader operator at all times. Trailers and drawbars should be designed in such a manner that the drawbar can be hitched and released without the driver having to move under the trailer to do it.
- After hook up has been completed, the truck driver should place the truck/trailer in position for loading.
- Set up the bolsters, and install extension pins if fitted, before loading commences.
- · Ensure locking devices are in place for fold-down bolsters.

Ensure you are wearing the correct safety equipment at all times when outside the cab.

Loading a log trailer

By loader

- The truck driver will direct the loader driver in all aspects of trailer loading. Where practicable the driver will always be in the recommended safe area (see diagram). It is recommended the driver be at least 6 metres forward of the cab guard.
- Uncouple the drawbar, trailer hoses, and electrical connections.
- Remove extension pins, fold down bolsters (if required), and remove any loose bark, etc., from chassis rails and bolster beds.



Lifting the trailer off the truck



Setting up bolsters and fitting pins



Recommended Safe Area



Clean debris from the truck



Removing extension pins



Raising the trailer

- Communicate with the loader operator regarding the location of the lifting hook.
- Place the lifting chain on the grapple or lifting hook once the loader is in position and stationary.
- Have the loader operator hold the trailer no higher than 30 cm above the ground if you are required to swing the turntable around.
- Have the loader driver lift the trailer to allow the log truck driver to reverse the truck under the trailer.
- Have the loader operator place the trailer on the truck, ensuring the trailer is placed on the trailer mounts.
- Uncouple the trailer-lifting chain.
- Tie the trailer down before leaving the loading point.
- Clean any loose debris from the truck before leaving for destination.
- Ensure you are in view of the loader operator at all times
- Ensure you retain your fingers. Make sure the loader is stationary before attaching lifting chains.

Loading by gantry

- Place the trailer in the correct place for loading
- Lower bolsters, remove extension pins, and remove loose bark, etc., from chassis rails and bolster beds.
- Disconnect drawbar, trailer hoses, and electrical connections.
- Lower gantry to attach the lifting chain.
- Lift trailer no higher than 30 cm above the ground if you are required to swing turntable around.
- Lift the trailer only as high as necessary to load the trailer on to truck safely.
- Reverse truck under the raised trailer.
- Lower the trailer and uncouple the lifting chain once trailer is placed safely on truck.
- Ensure that the gantry hook is raised again to be • clear of trucks and trailers wishing to use the gantry.
- Tie trailer down before leaving loading point.
- Clean any loose debris from the truck before leaving for destination.
- Unloading a trailer using a gantry is the reverse • of the loading using a gantry instruction.

Loading stems or logs

The truck driver is responsible for the legal loading of the truck trailer. He/she will therefore direct the loader operator during loading.

- The truck driver will always be in the recommended safe zone (forward of the cab guard, or a designated point in the yard or in the cab).
- A satisfactory system of communication will be established between the loader driver and truck driver.
- The truck driver will not move into the loading zone while loading is in operation, if the loader driver sees a person in the loading zone, loading operations must cease.

Securing the load

- Load securing of the truck or trailer cannot commence while loading is in operation.
- If necessary, move your truck to a safe position before securing the load.
- Before throwing chain/strop over the load, ensure no person or vehicle is standing/parked too close on the opposite side of the vehicle.
- If clear, throw chain/strop over load.
- Use of the skipping rope technique is generally the preferred method for throwing chains over loads.
- Pull chain/strop hand tight, ensuring you have no twists in the chain/strop. The throw-over chain/ strop should be as close as possible to the stanchion arm, as well as ensuring the chain/strop is touching as many of the logs on top of the load as practicable.
- Connect tensioning device on to the throw-over chain/strop and to the load anchorage point on the truck/trailer. If using a twitch ensure you are not standing directly over the twitch when tensioning the load; stand to either side.
- You may have to tension the load down more than once to achieve maximum tension on the load.
- Operators are encouraged to use an approved safety extension pipe (e.g., a safety Cheater bar) on the twitch whilst tensioning the load.
- If a belly chain is required, then follow the above, but ensure the strop is in the centre of the load before tensioning.



Lowering the trailer on to the truck



Watch out for the logs spilling during loading



Throwing the chain over the load using the skipping rope method



Using a cheater bar on the twitch handle

- After leaving the loading point, stop your vehicle and inspect the load security and retention or restraining devices. This should be done not more than 30 minutes after loading, and before moving on to a public road.
- Remove any loose bark or dirt from the chassis before leaving the loading site and again before entering the highway.

Unloading stems or logs

You should follow the same rules that apply when you are loading

- When entering a mill site, log yard, or weighbridge area, you shall comply with all road signs and speed limits.
- You should position your truck/trailer where the loader operator directs.
- Load-securing chains and/or strops shall not be removed until the truck is within the unloading area and immediately before unloading, or within any designated unchaining areas.
- Unloading shall not commence until the driver signals the load is ready to be removed.
- During the unloading phase the driver will remain in the cab of the truck, unless specific site rules differ. In that case the driver is to remain in a site designated safe area.
- You should ensure that all load-securing chains and/or strops are in the correct position before leaving the unloading area. Also, ensure that extension pins are properly secured.
- Remove any loose bark or dirt from the chassis before leaving the unloading area.

Glossary of terms

ABS (anti-lock braking system)	ABS brakes are designed to prevent wheel lock by automatically pumping at a rate of up to 18 times per second whenever a sensor detects the start of wheel lock.	
Articulated vehicle	(semi trailer) The trailer is attached to the truck so that the back wheels of the truck fit underneath and support the front end of the trailer.	
Bailey bridge	Type of semi trailer used to transport short logs.	
Bolster	The frame member that is mounted on the bolster bed and which supports the log load.	
Cheater bar	A safety extension device for use on the twitch when tensioning the load. It differs from a pipe extension because it locks on to the end of the twitch and cannot fly loose.	
Belly chain	The wire rope or chain that is placed around the load at any position(s) in a complete circle and is attached to it and tensioned using a "load binder".	
Extension pin	The uppermost section of the stanchion upright. It is good practice to remove the pins during a return trip to comply with vehicle height regulations and to keep the pins from falling out. The pins are usually then stored in a carrier on the rear of the cab.	
Fibre	Fibre can be sawmill chip, shavings, or saw dust.	
High-visibility (hi-vis)	Clothing and equipment that is easily spotted and seen from a great distance. Common hi-vis colours include fluorescent yellow, pink, and orange, though it has been found that yellow is the most easily spotted of the fluorescent colours.	
Load binder	A tensioning device consisting of two hooks used to tension a chain around a load.	
Off-highway rig	Truck designed to operate on private roads.	
Semi-trailer	see Articulated vehicle	
Self-loading rig	A truck fitted with a loader.	
Shall	Means you have an obligation to adhere to the rule.	
Should	Means that it is strongly recommended that you adhere to the rule.	
Side arms	see Stanchion	

Glossary of terms (cont...)

Stanchion	The upright(s) attached to the bolster or bunk ends, which constrain the load within the width limits of the vehicle. Also called "side arms". There are three types:	
	Fixed:	The stanchion is attached to the bolster or bunk ends in a fixed permanent position (usually welded) and cannot move relative to the bolster or bunk ends.
	Drop:	The stanchion is pinned to the bolster or bunk end and can be swung down to release the load. It is held in place by a "wrap-around strop".
	Drop-in:	The stanchion is held in position by two pins. To facilitate piggyback loading of the trailer, one pin may be removed and the stanchion swung inwards, rotating around the other hinge pin.
Throw over strop/chain	Wire rope or chain that passes across the top of the load, through guides, and is attached to the bolster or bunk end on both sides.	