Background

When loading and unloading rigid and articulated trucks, including trailers, road transport operators need to ensure the tasks related to the restraint and containment of loads are done safely. This includes the safe handling of side-gates, side-curtains and application of restraint lashings and tensioning devices (tensioners).

Every year there are about 100 serious injuries associated with restraining and containing loads. Injuries are mainly caused by:

• handling side-gates on trucks
• opening and closing side-curtains on trucks
• placing lashings and corner protectors over loads
• using tensioning devices with chains and webbing.

Road transport operators need to:

• address hazards associated with these tasks as well as any hazards to public safety
• assess the risk associated with each hazard identified
• consider the likelihood of the hazard causing harm to a person, and the level of harm
• work out the available controls (including their costs) to eliminate the risks or reduce so far as reasonably practicable.

Note: This Guidance Note does not provide advice on keeping loads attached to or contained within vehicles during transit. This advice can be found in the Load Restraint Guide 2004 (LRG), published by the National Transport Commission and administered by VicRoads.

The LRG includes performance standards referenced in Regulation 248 of the Victorian Road Safety (Vehicles) Regulations 2009.

If you need further advice, consider engaging a competent load restraint professional.

Handling side-gates on trucks

Lifting and carrying gates on trucks requires repetitive force and puts workers at risk of musculoskeletal injuries to the back, shoulders, arms and hands.

Workers are also at risk of gates hitting or trapping them, causing injuries to the head, back, shoulders and hands.

Recommendations

It is recommended you use the first listed control where possible and the fourth control as your last option.

To eliminate or reduce the risk of injuries while handling gates on trucks and trailers:

1. Consider whether or not you need to use gates to contain the load.

There may be a more effective method (see point 2). Ensure you still meet the LRG performance standards.

Note: Gates alone do not ‘restrain’ loads unless they have been professionally designed and assessed. There are circumstances when gates can effectively ‘contain’ loads.

If containing dangerous goods, the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG7) requires dangerous goods to be carried on vehicles with rigid sides, fitted with gates or in approved segregation bins.

2. Use an alternative load restraint but only if suitable for your load.

These include:

• vehicles with sturdy walls. For example a folding side or sliding panel vehicle. See images 1 and 2 on the following page
• vehicles custom-designed for loads. For example some pallet loads may suit a vehicle with combination internal side and middle expanding walls, combined with an inward sloping floor and load-rated curtain
• curtains that are load-rated on a curtain-sided vehicle (eg tautliner). Manufacturer instructions for load type, weight and placement must be followed. Load-rated curtains are designed and assessed to keep certain loads restrained
• chains or webbing capable of securing the load (ensure you still meet the LRG performance standards).
3. Use gates that are fixed to the vehicle and do not need to be removed during loading and unloading. Such as:

- swinging gates that are hinged to the floor or roof posts, and lock into the vehicle coaming rail
- sliding gates. See image 3 below
- hanging gates. These hang from a flexible material such as webbing, wire rope or chain. Use a hanging system that prevents the gates from falling completely if any single part fails.

After lifting hanging gates from pin pockets, lower (rather than drop) the gates to prevent damage to the track and flexible material. See image 4 below.

Most of these gates can be retrofitted to the truck. Tracks and rollers for sliding or hanging gates should be regularly cleaned, maintained and repaired as necessary. A record – such as a defective vehicle report – and history of maintenance will help you know how often they need cleaning.
4. Use gates that can be removed from the truck.

If workers manually handle gates, they should remove and place gates from a solid platform that is a similar height to the truck tray (e.g., a finger dock). This means workers will be handling gates in a safe working zone between the shoulders and knees. If the gates are very tall and heavy, two workers should move them from the platform.

If the gates are removed and placed from ground level, two workers should move them unless the gates are short and very light.

The gate weight, height and handling frequency will need to be assessed (see Table 1).

When two people are needed to remove gates, operators should arrange with the delivery site a second person to help the driver.

When removing gates, loads jamming against the gates put workers at risk of musculoskeletal injuries. If this is a common problem, operators and workers should identify the best way to eliminate or reduce the need for high force.

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**Table 1: Number of workers recommended to handle side-gates when working from the ground**

Calculation is based on:
- two lifts per minute, for an hour in a single day
- the trailer base being 1200mm from the ground
- the National Institute for Occupational Safety and Health Lifting Equation.

<table>
<thead>
<tr>
<th>Height of gate</th>
<th>Weight of gate</th>
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<tbody>
<tr>
<td>3m (10foot)</td>
<td>15kg or over</td>
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<tr>
<td></td>
<td>14kg</td>
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<tr>
<td></td>
<td>13kg</td>
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<tr>
<td></td>
<td>12kg</td>
</tr>
<tr>
<td></td>
<td>10kg</td>
</tr>
<tr>
<td>1.8m (6foot)</td>
<td></td>
</tr>
<tr>
<td>1.5m (5foot)</td>
<td></td>
</tr>
<tr>
<td>1.2m (4foot)</td>
<td></td>
</tr>
<tr>
<td>0.9m (3foot)</td>
<td></td>
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</tbody>
</table>
Guidance Note  Safe handling when securing loads on trucks

Opening and closing side-curtains on trucks

Side-curtains on trucks can be difficult to handle and put workers at risk of:

- musculoskeletal injuries, particularly to the shoulders, back and hands, from the repetitive force of pulling curtains and using curtain buckles
- fractures, contusions and lacerations from trapped fingers in curtain buckles
- broken bones, fractures and loss of consciousness from side-curtains and end poles striking workers in windy conditions or falling loads when curtains are opened.

Recommendations for curtain design

If the curtains are load-rated, manufacturer instructions for load characteristics and placement in transit must be followed.

The risk of injuries can be eliminated or reduced by:

- using automatic curtains that are self-opening and closing
- if using manual curtains, using curtains with a track and rollers that have a plate with double bearings. These will slide better because they are less likely to twist when the curtain is pulled in different directions during opening/closing (see image 5 below)
- using curtains with a securing system that does not involve buckles. This reduces the risk of pinched fingers and repetitive strain to the hands and arms.

Recommendations for using curtains

The risk of injuries can be eliminated or reduced by:

- checking if the load is resting against the curtains before opening them. Check for deformity or pressure marks in the curtain, particularly at the top. Stand clear at the rear when releasing the curtain tensioner
- using safe procedures for manually handling curtains, such as:
  - checking for tripping hazards before opening/closing curtains
  - grabbing two buckle straps, one in each hand, keeping hands close to the body and below shoulder height, and walking back slowly so the curtain moves smoothly
  - being aware of the buckle locations to reduce the risk of buckles becoming tangled and limiting the curtain movement
- ensuring the curtain track and rollers are regularly maintained and following manufacturer instructions for lubrication. Keep the track clean by using air, water or vacuum to remove dust. Be aware of increased curtain resistance. This usually means the track or rollers need maintenance.

If the curtains or track needs repairing but the truck must be used in the short-term:

- clean the track and use dry lube to help rollers move along the roof track. This is generally a temporary solution because it will not help the rollers roll as they should
- pull the curtains in sections – when opening, pull back a section of the curtains near the rear of the truck. Move forward and pull another section then repeat until the curtains are fully open.

Recommendations for windy conditions

In windy conditions, the risk of injury while using curtains can be eliminated or reduced by:

- identifying whether loading/unloading happens in areas with high wind. If so, load/unload the vehicle in a less windy area
- if it is not possible to load/unload the vehicle in a less windy area, open the curtain by undoing most – but not all – curtain buckles before releasing the curtain ratchet. This will lessen curtains billowing as soon as the ratchet is released. Keep two or three buckles attached along the length of the curtain and only unbuckle these as the curtain is pulled back slowly
- when the open curtain is bunched at the rear of the trailer, secure it to the trailer to prevent the wind from catching it (eg clip a section of the curtains with a buckle to the rear of the trailer or pass a rope through the buckle).
Placing lashings and corner protectors over loads

Throwing or placing chains, webbing and other lashings over loads and through restricted spaces, puts workers at risk of:

- musculoskeletal injuries, particularly to the back, shoulders and arms
- fractures and concussions from chains thrown over loads and striking workers
- electric shock from chains and webbing thrown over loads and hitting electrical wires
- falls from height while placing chains, webbing and corner protectors on high loads.

Recommendations

The risk of injuries can be eliminated or reduced by:

- not throwing lashing over loads anywhere near overhead powerlines
- keeping pedestrians away from vehicles when restraining loads (eg using barriers)
- using a system to apply and remove lashing and corner protectors while standing on the ground. This could involve:
  - using a purpose-built lightweight extension pole, especially one that grips the lashing or corner protector
  - using a system designed for a curtain-sider that retracts the webbing straps to the roof of the trailer when not in use, eliminating the need for workers to climb onto the truck to position and pull straps over the load (see image 6 below)
- working from a platform ladder or elevating work platform
- when using chains – using a lead rope to throw and drag the chain over the load. This can reduce the risk of shoulder strain from throwing the chain and can cause less damage than a chain if it hits a worker.

Using tensioning devices with chains and webbing

Chains and webbing with tensioning devices (tensioners) are commonly used to restrain loads. Tensioners include webbing hand ratchets, under-vehicle webbing winches, chain dogs and other chain tensioners.

Using tensioners to tighten and release chains and webbing puts workers at risk of:

- musculoskeletal injuries (particularly to the back, shoulders and hands) from the repetitive force required to tighten chain tensioners, webbing winches and webbing hand ratchets
- pinched fingers from tensioners
- falls from overbalancing
- fractures, contusions and lacerations from being struck by extension bar handles used with over-centre lever style tensioners (dogs) – these can rebound and fly off the dog.

Recommendations

The following recommendations depend on the type of load being carried (you must meet the LRG performance standards so loads do not come away from the truck during transit or shift causing vehicle instability).

Manufacturer instructions should be followed while using tensioners.

It is recommended you use the first listed control where possible and the third control as your last choice.

To eliminate or reduce the risk of injuries while using chains and webbing with tensioners:

1. **Minimise the use of chains and webbing by using:**

   - systems to reduce or eliminate the need for chains and webbing. For instance use a coil containment system, pin, pegs, posts, headboards or goose-neck on a drop-deck trailer to help block the load. See image 7 on page 7
   - a truck that is custom-designed for loads. For example some pallet loads may suit a truck with combination internal side and middle expanding walls, combined with an inward-sloping floor and load-rated curtain.

2. **Consider webbing straps as an alternative to chains.**

   Webbing, if suitable for restraining the load, is lighter than chain. Webbing tensioners are also lighter to handle and will not need handling if they are fixed to the trailer.

   If you use webbing, two 2500kg lashing capacity straps can often replace one regular (8mm) chain with a 4000kg lashing capacity. You will need to assess your load and should not mix webbing and chain.
It is important to remember webbing is slightly elastic and may stretch in transit. It can also be damaged by sharp edges on loads.

If you use a hand ratchet with webbing:
- use a pull-down webbing ratchet. This reduces the risk of shoulder injuries because it will not need to be repeatedly pushed up. The strap length should allow the ratchet to be between waist and shoulder height. This makes it easier to pull the ratchet handle (see images 8 and 9 on page 7).

If you use a winch with webbing:
- use a winch that does not require the removable handle to be reinserted with every turn. This reduces the risk of the handle coming off, causing workers to suddenly lurch. The handle should fit snugly on the socket or in the winch cap holes.

An example is a geared winch. This will generally not require the handle to be repeatedly reinserted. A geared winch also requires less force and encourages better posture because workers do not need to repeatedly bend low when positioning or tensioning the handle. The more teeth a geared winch has, the less force is needed to achieve high tension (see images 10a and 10b on page 7).

3. Use chains with non-rebounding tensioners.

If using chain lashings, consider an alternative to an over-centre lever style load binder (a dog).

You should not use an extension bar to increase chain tension (see image 13 on page 7). Many workers find they cannot get satisfactory chain tension when using a dog. As a result, an extension bar is often used to increase chain tension. Using an extension bar is dangerous during tightening and releasing because it can rebound quickly and may even fly into the air. This applies to generic, manufactured extension bars, pipe handles and any other makeshift extension bar.

Instead of using a dog, consider using a turnbuckle tensioner (see image 11 on page 7) or another type of non-rebounding tensioner (see images 12a to 12d on page 7). Turnbuckles have no kickback and can achieve very high tensions without using extension bars. Ratchet and sliding lever turnbuckles are available.

If you are able to tighten a dog without an extension bar, use a recoil-less (pivoting) dog. These dogs do not store energy in the handle when under tension. This reduces the risk of hitting workers when the handle is released.

An extension bar should not be used to tighten or release a dog unless all other chain tensioners are assessed by the operator as unsuitable for each load and adequate tension cannot be achieved by the dog alone.

When using tensioners, workers should also:
- use gloves with all chain tensioners to reduce the risk of pinched hands
- position chain tensioners below shoulder height or use a stable standing aid when applying or releasing tensioners
- regularly inspect and maintain tensioners to ensure effectiveness and safety. A record – such as a defective vehicle report – and history of maintenance will help you know how often they need inspecting.
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Image 7: Removable posts in a truck help block the load.

Image 10a: This is a type of geared winch on the market. Geared winches generally do not require the handle to be repeatedly reinserted.

Image 10b: This is another type of geared winch on the market.

Image 8: A pull-down hand ratchet reduces the risk of shoulder injury (note the extended top plate).

Image 9: A ratchet cap/hat winch does not require the handle to be reinserted with every turn (note the black casing or ‘cap’).

Image 11: Two types of ratchet turnbuckle chain tensioners. Turnbuckles have no kickback when released.

Image 12a-d: These are four chain tensioners on the market. Like the turnbuckle, they all eliminate the risk of kickback through a long handle.

Image 12c: A type of chain tensioner.

Image 12d: A type of chain tensioner.

Image 13: An extension bar should not be used to tension chains.

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Image 12d: A type of chain tensioner.

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Further Information

WorkSafe Advisory Service
Toll-free 1800 136 089
Email info@worksafe.vic.gov.au
worksafe.vic.gov.au

WorkSafe Victoria
• Delivering large gas cylinders – A guide to manual handling
• A guide to handling large, bulky or awkward items
• Prevention of falls in the transport of steel
• Forklift safety – Reducing the risks

Australian Standard
• Australian/New Zealand Standard 4380 – 2001: Motor vehicles – Cargo restraint systems – Transport webbing and components
• Australian/New Zealand Standard 4344 – 2001: Motor vehicles – Cargo restraint systems – Transport chain and components

Australian Code
• Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG7) – Section 8.1.3

Other
• vicroads.vic.gov.au
• National Transport Commission – Load restraint guide (Second edition, 2004) including the performance standards (Section F.1)
• Australian Road Transport Suppliers Association – Design of Vehicle Body Systems for Load Restraint Compliance
• Transport Safety Group – Buying a Safer Heavy Trailer

Note: This guidance material has been prepared using the best information available to the Victorian WorkCover Authority, and should be used for general use only. Any information about legislative obligations or responsibilities included in this material is only applicable to the circumstances described in the material. You should always check the legislation referred to in this material and make your own judgement about what action you may need to take to ensure you have complied with the law. Accordingly, the Victorian WorkCover Authority cannot be held responsible and extends no warranties as to the suitability of the information for your specific circumstances; or actions taken by third parties as a result of information contained in the guidance material.