

Coates

Equipped for anything

Load Restraint Guide 2023 Edition



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Introduction

About this guide

The Coates Load Restraint Guide (2023 Edition) outlines the restraint methods required to achieve the performance standards listed in Schedule 7 of the Heavy Vehicle (Mass, Dimension and Loading) National Regulation 2021.

Certification of this document has been provided by:

RPEQ, CPEng 3121238 and RPEQ 21522 in documents ELRC340, ELRG009, ELRG665, ELRG668, ELRG531, ELRG564, ELRG 556, E00864-LRC1, E00864-LRC2, E00864-LRC3, E00864-LRC4, E00864-LRC5, E00864-LRC6, E00864-LRC7 and ELRC356.

Compliance can only be achieved when all aspects of this document are adhered to in full. Alternative load restraint systems may be used provided they are supported by testing or engineering advice that demonstrates compliance to Schedule 7 of the Heavy Vehicle (Mass, Dimension and Loading) National Regulation 2021.



Who is responsible for load restraint?

Under the Heavy Vehicle National Law (HVNL), anyone across the supply chain who conducts, controls or influences transport-related activities is responsible for complying with load restraint laws. In the event of a HVNL breach, each party in the Chain of Responsibility can be charged with the offence.

So, if you're driving, packing, loading or unloading heavy vehicles, overseeing or employing people to perform any of these tasks, it's important that you know your legal requirements and understand the basic principles of safe load restraint.

Legal requirements for load restraint

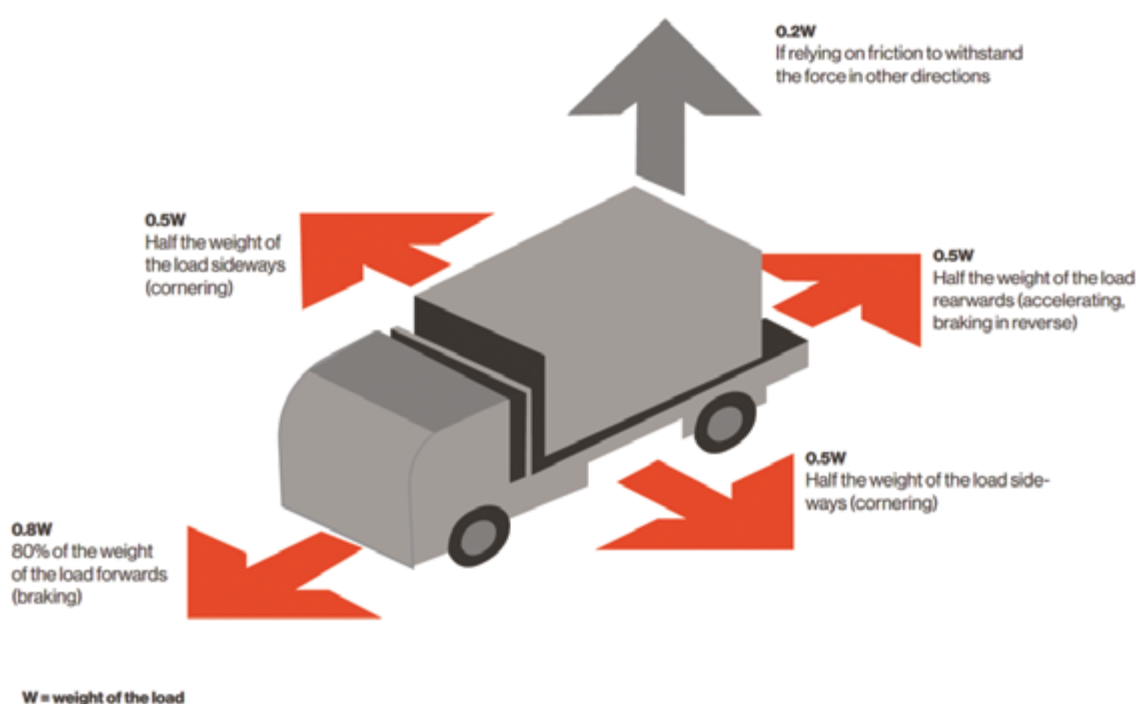
Some basic legal requirements apply to heavy vehicle load restraint in Australia. The Heavy Vehicle (Mass, Dimension and Loading) National Regulation, or MDL regulation, is one of four sets of regulations that underpin HVNL.

According to this regulation, all loads must be:

- placed in a stable and safe way
- secured in a way that prevents items falling or being dislodged
- appropriately restrained and meet the loading performance standards set out by Schedule 7 of the MDL regulation.

Loading performance standards

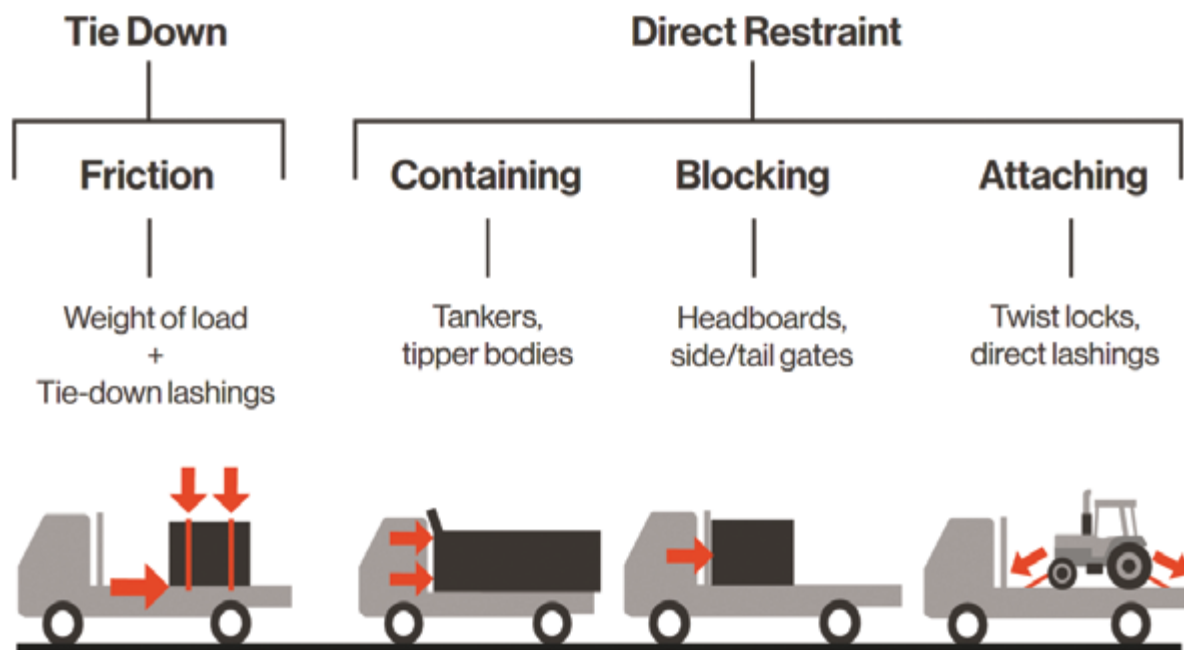
The loading performance standards set out the minimum amount of force a restraint system must be able to withstand in each direction. For heavy vehicles, these forces are:



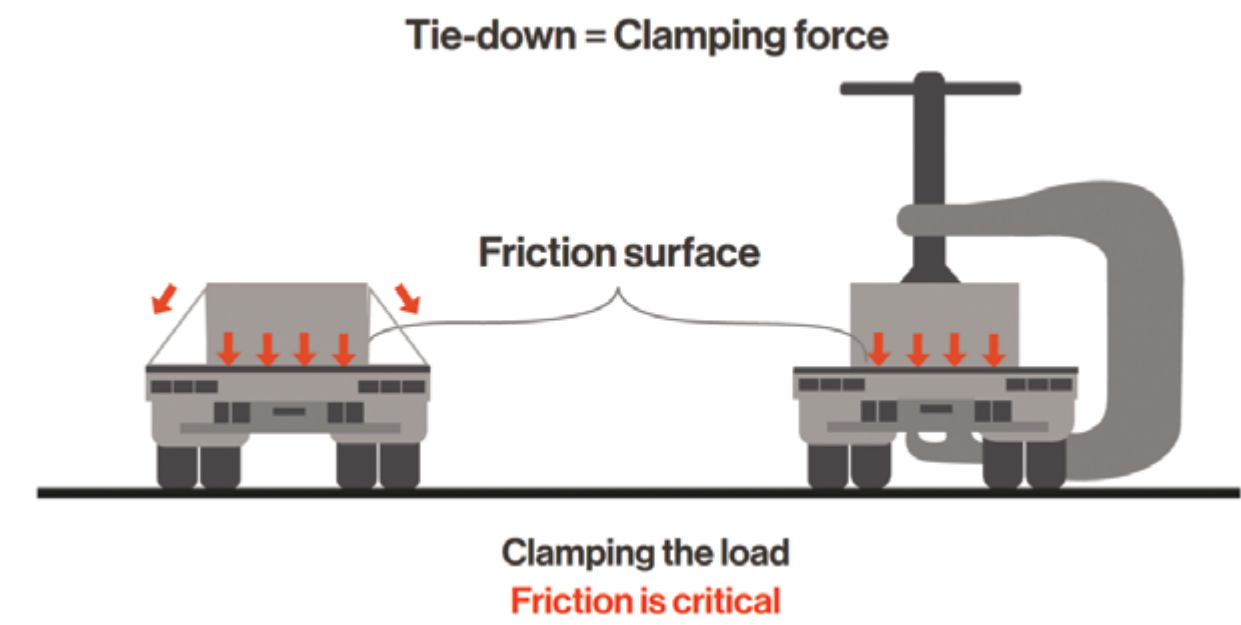
If a load is restrained to meet these loading performance standards, it will not fall off or affect the stability of the vehicle under expected driving conditions. This includes emergency braking and minor collisions.

[Load Restraint Guide for Heavy Vehicles 2018, National Transport Commission]

Types of load restraint



[Load Restraint Guide for Heavy Vehicles 2018, National Transport Commission]



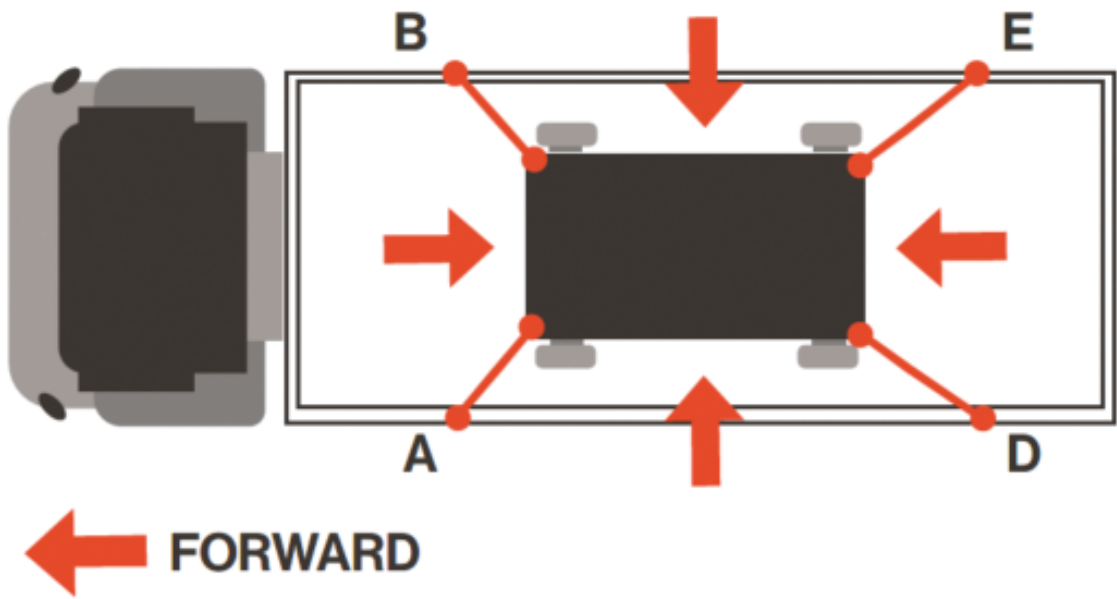
Typical friction levels	
Load	Friction
Wet or greasy steel on steel	Very low
Smooth steel on smooth steel	Low
Smooth steel on rusty steel	Low
Smooth steel on timber	Medium
Smooth steel on conveyor belt	Medium
Rusty steel on rusty steel	Medium to high
Rusty steel on timber	High
Smooth steel on rubber load mat	High

*Coated steel products can reduce friction

Examples of average pre-tension			
Lashing	Size	Tensioner	Pre-tension kilogram-force (kg.f)
Webbing	35mm	Hand ratchet	250kg.f
	50mm	Truck winch	300kg.f
	50mm	Hand ratchet (push up)	300kg.f
	50mm	Hand ratchet (pull down)	600kg.f
Chain	7mm & above	Turnbuckle	750kg.f

[Load Restraint Guide for Heavy Vehicles 2018, National Transport Commission]

Direct restraint



[Load Restraint Guide for Heavy Vehicles 2018, National Transport Commission]

Typical lashing capacity- Chain			
Chain type	With claw hooks or 'winged' grab hooks	With grab hooks or edge contact	Looped chain
6mm transport chain	2.3t	1.7t	3.4t
7.3mm transport chain	3.0t	2.3t	4.6t
8mm transport chain	4.0t	3.0t	6.0t
10mm transport chain	6.0t	4.5t	9.0t
13mm transport chain	9.0t	6.7t	13.4t
13mm Grade 'T' chain	10.0t	7.5t	15.0t
16mm Grade 'T' chain	16.0t	12.0t	24.0t

Direct load restraint of mobile plant

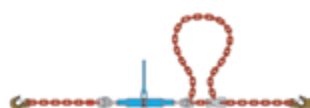


Applies to:

- Mobile plant including earthmoving, access and compaction equipment
- Trailer-mounted equipment

Load restraint equipment requirements:

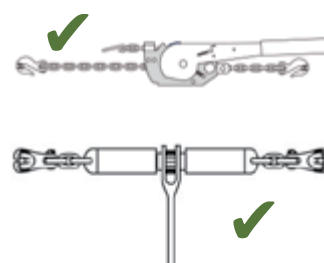
- 8mm, 10mm & 13mm transport chain, conforming to AS/NZ4344 tensioned to a minimum pre-tension of 750kg.f averaged across the load.
- 50mm webbing, conforming to AS/NZS4380 tensioned to a minimum pre-tension of 300kg.f averaged across the load.
- Equipment must be in good working order. Inspect the lashings for wear.
- All fittings and lashing points on vehicles and equipment must be in good condition. Use manufacturer's lashing points where provided.
- Chains with excessively damaged, worn or bent links must not be used.
- Over center lever load binders (dogs) are a high risk and must not be used.
- Ausbinders, Turnbuckle ratchet, Web-Dog binders or similar are a suitable alternative to dogs, provided a minimum pre-tension of 750kg.f can be achieved.
- Webbing straps torn more than 10% of their width must be discarded.
- Braking system cannot be used as part of a load restraint system.



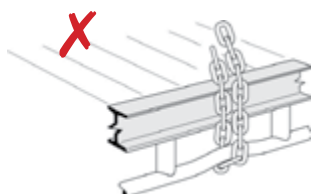
All fittings at least the same rating as the chain



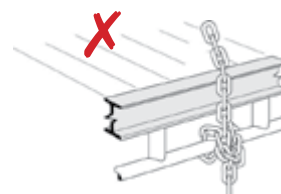
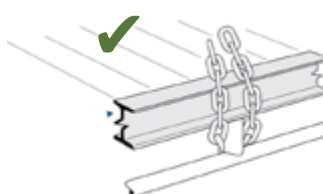
Chains with elongated, worn or bent links must not be used for restraint



No over-center lever load binders (Dogs)



(NTC, 2004)



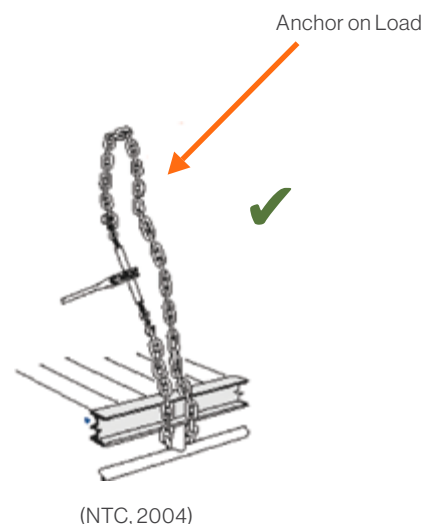
[Load Restraint Guide 2004, National Transport Commission]

Section A: Earthmoving equipment

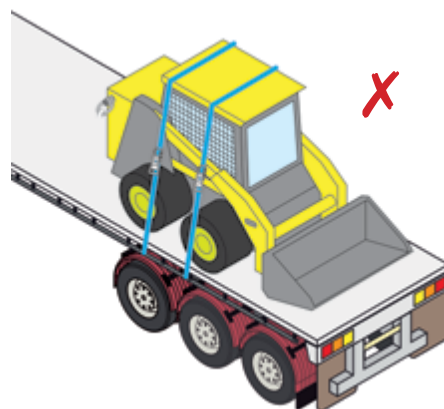
- Covers Skid Steer Loaders & Mini Excavators

Key load requirements:

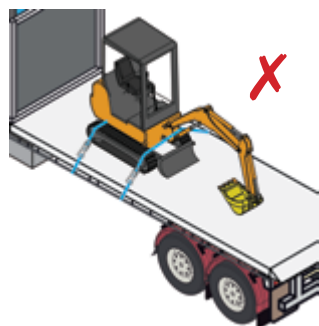
- Do not mix lashing types i.e., chain and webbing on the same item for restraint. (Note: webbing straps can be used to restrain equipment accessories e.g., buckets and baskets).
- A minimum of four lashings will be required, two angled forwards and two backwards.
- All lashings to be similar geometry.
- Apply any brakes provided.
- Beware of shock forces generated through bouncing. Aim for restraint angles of approximately 25° or less.
- Chains must be minimum Grade 70 transport chains compliant to AS4344 in a continuous loop between the anchor point and tie-down point on the trailer where specified.
- Over-centre lever load binders (dogs) are a high risk and are not permitted for use on Coates sites.
- Webbing straps cannot be used for direct restraint on mobile equipment.
- Chains must be used for mobile plant restraint.
- All on board equipment must be secured (e.g., booms and buckets).
- All hydraulic and mechanical equipment must be isolated and pressure released to prevent inadvertent movement in transit.



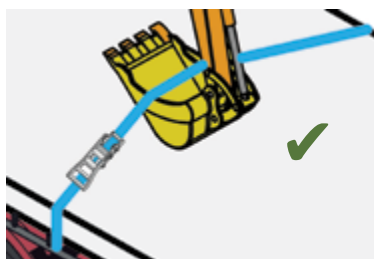
Continuous loop chains used to maximise lashing capacity.



Tie Downs over or through the cab are noncompliant on wheeled items and are not permitted.



Tie Downs over tracks or through the cab are noncompliant and are not permitted.



Boom must be locked out and lashed

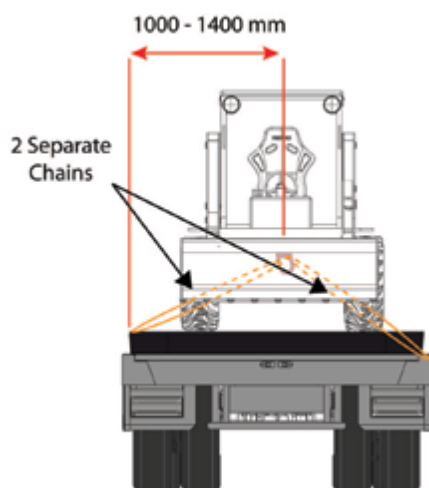


Bow shackles rated to 4 x lashing capacity of chain. Maximum of 2 chains.

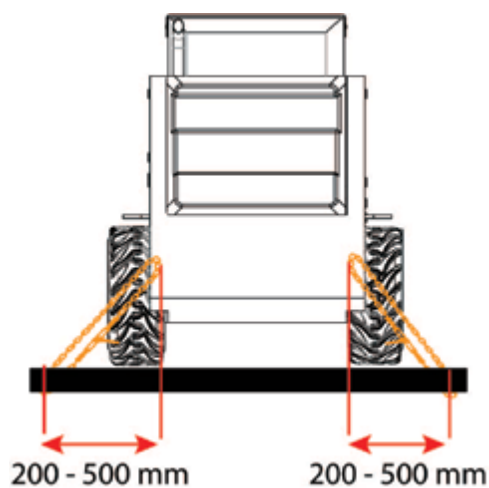
Refer to Appendix 5 for a worked example on how to use the Matrix to identify the required restraint solutions for each asset

A.1. Wheeled equipment less than 4.5t

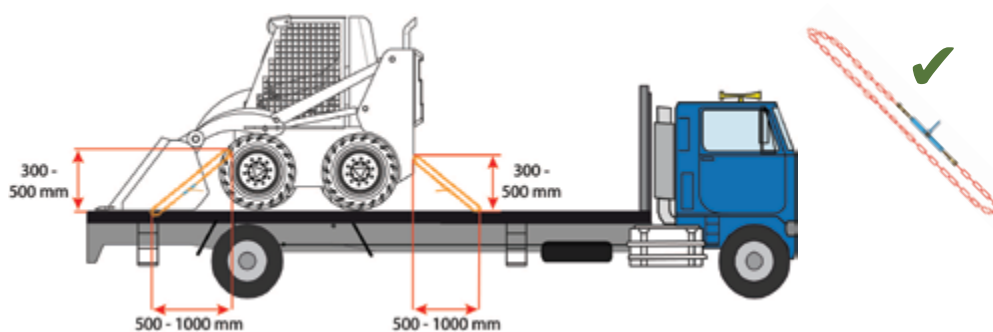
Unblocked - ensure angles of chains are within parameters shown in images



Single Anchor Point

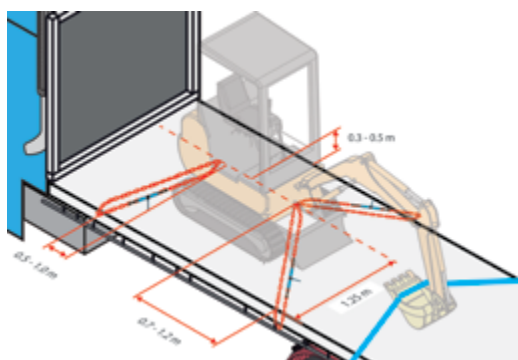


Dual Anchor Points

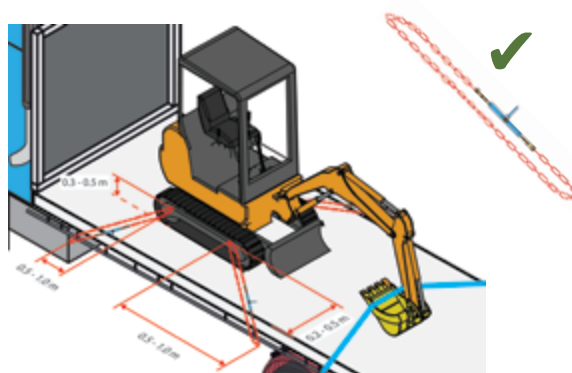


A.2. Tracked equipment less than 6t

Unblocked - ensure angles of chains are within parameters shown in images



Preferred Option



Non Preferred Option

Section A.1 & A.2 – Earthmoving equipment load restraint matrix

A.1.1. Wheeled equipment less than 4.5t [Earthmoving]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	8mm chain single	8mm chain looped	10mm chain single	10mm chain looped
BOBCAT	Skid Steer Loader (Medium)	3059	1575	1956	2150	4	4	4	4
BOBCAT	Skid Steer Loader	3309	1575	1938	2568	4	4	4	4
CAT	Skid Steer Loader (Medium)	3233	1524	1950	2589	4	4	4	4
BOBCAT	Skid Steer Loader (Large)	3309	1575	1938	2635	4	4	4	4
CAT	Skid Steer Loader (Medium)	3233	1676	1950	2646	4	4	4	4

A.1.2. Wheeled Equipment less than 4.5t [Forklifts/Telehandlers]

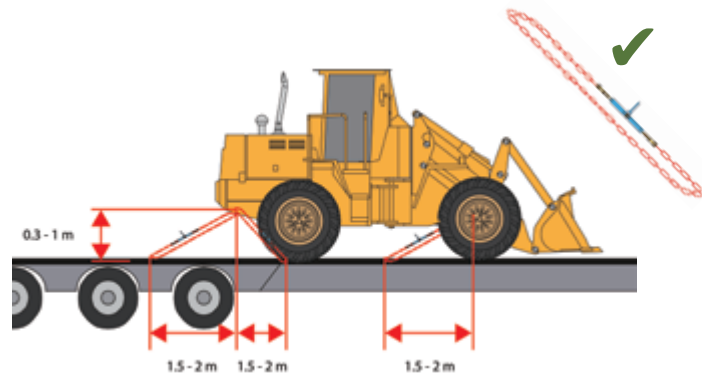
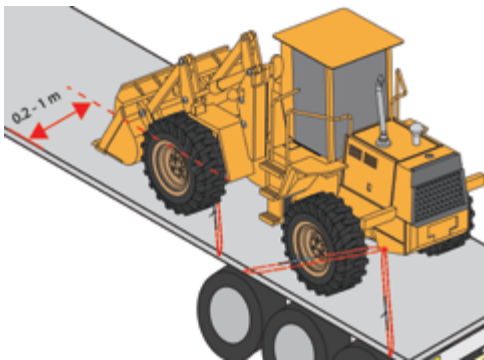
Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	8mm chain single	8mm chain looped	10mm chain single	10mm chain looped
CLARK	Forklift 2.5t Container Diesel	3630	1210	2135	4000	4	4	4	4
CLARK	Forklift 2.5t Container LPG	3650	1210	2135	4000	4	4	4	4
CLARK	Forklift 2.5t Dual Fuel	3630	1225	2165	4088	4	4	4	4
MANITOU	Forktruck Rt Container 2.5t 4wd	2950	1450	1990	4340		4	4	4

A.2.1. Tracked Equipment less than 6t [Earthmoving]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	Drawbar basket buckets secured	8mm chain single	8mm chain looped	10mm chain single	10mm chain looped
BOBCAT	0.8t - Mini Excavator	2913	700	2155	760	Yes	4	4	4	4
BOBCAT	0.8t - Mini Excavator	2913	700	2155	760	Yes	4	4	4	4
BOBCAT	1.5t - Mini Excavator	3872	980	2246	1599	Yes	4	4	4	4
BOBCAT	1.5t - Mini Excavator	3872	980	2246	1599	Yes	4	4	4	4
BOBCAT	1.5t - Mini Excavator	3872	980	2246	1599	Yes	4	4	4	4
BOBCAT	1.5t - Mini Excavator	3872	980	2246	1599	Yes	4	4	4	4
CAT	1.8t - Mini Excavator	3695	1340	2190	1680	Yes	4	4	4	4
BOBCAT	1.5t - Mini Excavator	4170	1398	2391	3273	Yes		4	4	4
BOBCAT	3.5t - Excavator	4170	1398	2391	3273	Yes		4	4	4
BOBCAT	3.5t - Excavator	4889	1540	2391	3433	Yes		4	4	4
BOBCAT	5t - Mini Excavator	5238	1930	2541	4788	Yes		4	4	4
CAT	5t - Mini Excavator	5330	1980	2550	5320	Yes		4		

A.3. Wheeled equipment 4.5t - 17.5t & tracked equipment 6.0t - 17.5t

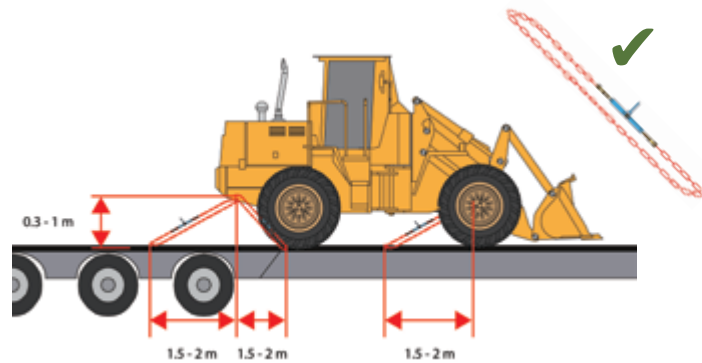
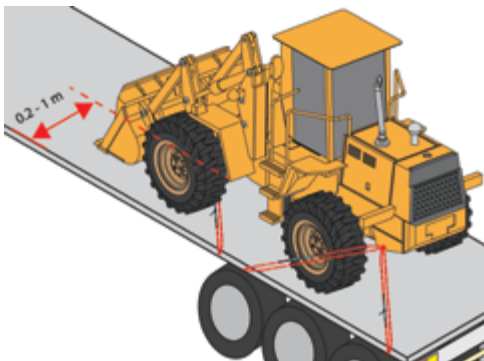
Unblocked - ensure angles of chains are within parameters shown in images



- Actual anchor point locations may vary for different machines.
- 2 pairs of looped chains for forwards forces and 1 pair of looped chains for rearwards with the above geometry ranges.

Wheeled & tracked equipment 17.5t - 26t

Unblocked - ensure angles of chains are within parameters shown in images



- Actual anchor point locations may vary for different machines.
- 2 pairs of looped chains for forwards forces and 1 pair of looped chains for rearward forces with the above geometry ranges.
- Anything over 35t, refer to transport manager.

Section A.3 – Earthmoving equipment load restraint matrix

A.3.1. Wheeled equipment 4.5t – 17.5t & tracked equipment 6t – 17.5t [Earthmoving]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	Drawbar basket buckets secured	8mm chain looped	10mm chain single	10mm chain looped	13mm chain single	13mm chain looped
CAT	Wheel Loader (1 M3 Bucket Capacity) 4x4	5595	2060	2650	6465		6	6	4	4	4
CAT	8t - Mini Excavator	6070	2200	2630	7210	Yes	4	4	4	4	4
CAT	Backhoe 4x4 (60 - 63Kw)	5756	2258	3470	7570	Yes	6	6	4	6	4
CAT	Integrated Tool Carrier 8.5t	6474	2401	3100	8450		4	6	4	4	4
CAT	Wheel Loader (1.5 - 2.5 Bucket Capacity)	7168	2550	3227	11340		6	6	4	4	4
CAT	11t - Excavator	6920	2490	2770	11980	Yes	6	6	4	6	4
CAT	Integrated Tool Carrier 12t	7435	2549	3268	12134		6	6	4	4	4
CAT	Wheel Loader (2.1 - 5.0 Bucket Capacity) 930g - ITC	7390	2550	3288	13029		6	6	4	4	4
CAT	12t - Excavator	7570	2490	2760	13140	Yes	6	6	4	6	4
CAT	Wheel Loader (1.8 - 2.8 Bucket Capacity)	7331	2706	3300	13452		6	6	4	4	4
CAT	Grader Articulated 70 - 110kW (12ft Blade)	10012	2440	3090	14200		6	6	4		4
CAT	Grader Articulated 115 - 160kW (14ft Blade)	10097	2464	3103	14677		6	6	4		4

A.3.2. Wheeled equipment 4.5t – 17.5t & tracked equipment 6t – 17.5t [Watercart]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	8mm chain single	10mm chain single	10mm chain looped	13mm chain single	13mm chain looped
AGM	Water Cart 11200L	9570	2370	3720	11560	6	6	4	4	4

A.3.3. Wheeled equipment 4.5t – 17.5t & tracked equipment 6t – 17.5t [Forklifts – Telehandlers]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	Drawbar basket buckets secured	8mm chain looped	10mm chain single	10mm chain looped	13mm chain single	13mm chain looped
CLARK	Forklift 3.0t Container Diesel	3738	1237	2165	4644		4	4	4		
MANITOU	Telehandler 2.3t (4.9M)	4200	1800	1980	5020	Yes	6		4	4	4
GENIE	Telehandler 2.5t (5.75M)	4940	1800	1920	5120	Yes	4	4	4	4	4
CAT	Telehandler 2.5t (5.5M)	5000	1900	2130	5746	Yes	6	6	4	4	4
GENIE	Telehandler 3.0t (6.8M)	5910	2000	2050	6000	Yes	4	4	4	4	4
JLG	Telehandler 2.6t (5.8M)	4400	2040	2200	6300	Yes	4	4	4	4	4
CLARK	Forklift 4t Container Diesel	4160	1550	2170	6880		4	4	4		
CLARK	Forklift 4.5t Diesel	4200	1550	2338	6943		4	4	4		
MANITOU	Telehandler 3.0t (10M)	4990	2260	2300	7470	Yes	6		4	4	4
MANITOU	Forktruck Rough Terrain 5t 2wd	3760	2040	2860	7495		6		4	4	4
JLG	Telehandler 3.0t (6.8M)	4920	2300	2350	7500	Yes	4	4	4	4	4
CLARK	Forklift 5t Diesel	4240	2260	2338	7583		4	4	4		
MANITOU	Telehandler 3.3t (9.6M)	4960	1800	2300	7845	Yes	6		4	4	4
JLG	Telehandler 3.5t (9.0M)	5620	2380	2450	8600	Yes	4	4	4	4	4
MANITOU	Telehandler 4.5t (8.0M)	5220	2420	2580	8645	Yes	6		4	4	4
JLG	Telehandler 4.0t (9.0M)	5620	2380	2450	9200	Yes	6		4	4	4
GENIE	Telehandler 3 - 4t (13M - 14M Reach)	6750	2330	2490	9900	Yes		4	4	4	4
MANITOU	Telehandler 4.0t (14.0M)	6130	2380	2450	10800	Yes	6		4	4	4
JLG	Telehandler 3.5t (13M)	5620	2380	2450	11000	Yes	6		4	4	4
MANITOU	Telehandler 4.0t (13.0M)	5960	2430	5590	11180	Yes	6		4	4	4
JLG	Telehandler 4.0t (13.0M)	5620	2380	2450	11800	Yes	4	4	4	4	4
GENIE	Telehandler 4.0t (16.7M)	7510	2330	2630	12680	Yes	6	6	4	4	4
JLG	Telehandler 4.0t (16.7M)	6090	2400	2500	12980	Yes	6		4	4	4

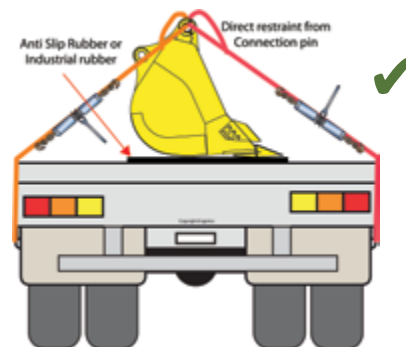
A.3.4. Wheeled & tracked equipment 17.5t - 35.5t [Earthmoving]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	Drawbar basket buckets secured	10mm chain looped	13mm chain single	13mm chain looped
CAT	Wheel Loader (2.5 - 3.5 Bucket Capacity) 950	7988	2927	3452	18338		6	6	4
CAT	20t - Excavator	9440	2800	3010	20350	Yes			4
CAT	22t - Excavator	10000	2990	3120	22820	Yes			4
CAT	25t - Excavator	10340	2990	3260	26900	Yes			6
CAT	30t - Excavator	10420	2990	3190	26900	Yes			6
CAT	30t - Excavator	11140	3440	3350	35100	Yes			6
CAT	30t - Excavator	11150	3290	3340	35500	Yes			6

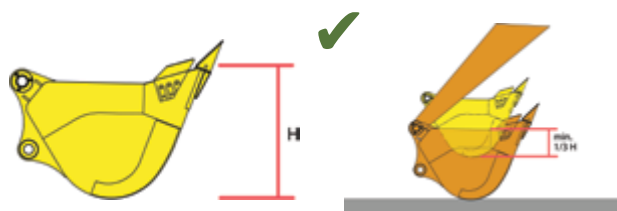
A.4. Bucket restraint - max 1000kg per bucket

Unblocked - ensure chains are correctly applied as shown in images

- No low friction (steel on steel).
- Place buckets on anti-slip or industrial rubber matting to increase friction.
- Restrain buckets using two separate chains attached to the bucket connection pin.

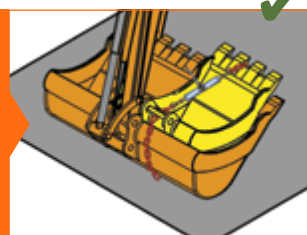


Unblocked - 2 x 8mm Chain

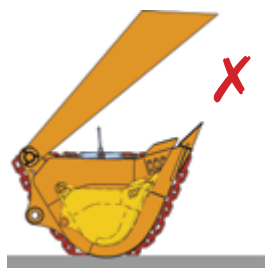


Nested bucket must be contained by lower bucket to at least 1/3 of its height.

For every bucket other than 900GP - 20T excavator bucket use a single chain



Restrain each individual nested bucket with an 8mm belly chain tensioned to min. 750kg.f to prevent movement,

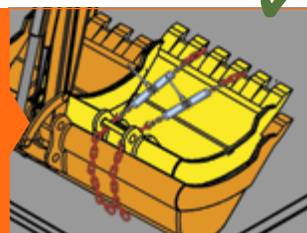


Belly chains must contact the nested bucket

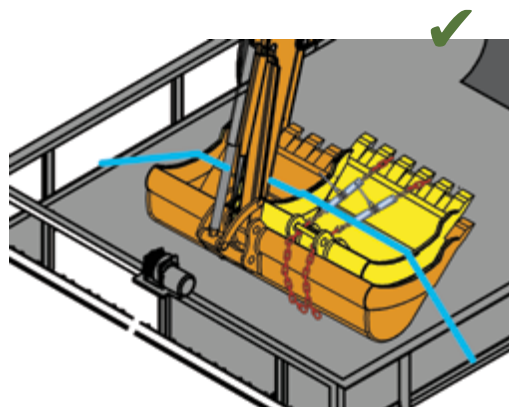


Buckets contained by less than 1/3 of their height in the lower bucket may rotate out.

Use two chains for each 900GP - 20T excavator bucket



- All buckets, nested or not, must be lashed down.

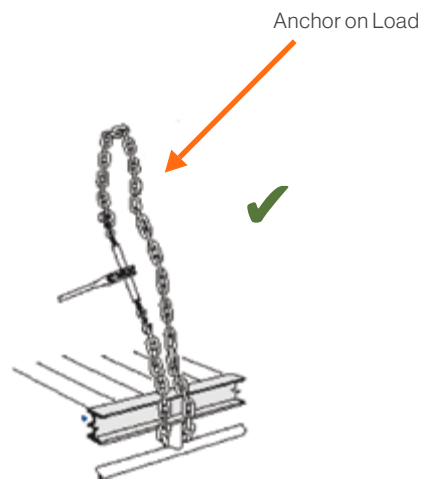


Boom and bucket must be restrained

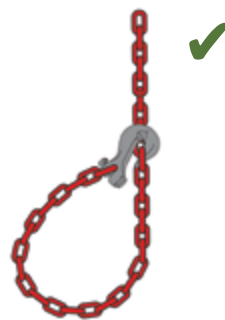
Section B: Access equipment

Key load requirements:

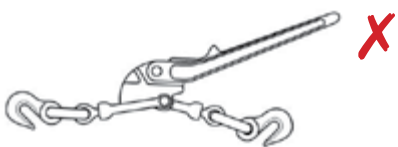
- Do not mix lashing types i.e. chain and webbing on the same item for restraint. (Note: webbing straps can be used to restrain equipment accessories e.g. baskets).
- All lashings to be similar geometry.
- Apply any brakes provided.
- Chains must be Grade 70 transport chains.
- 50mm webbing, conforming to AS/NZS4380 tensioned to a minimum pre-tension of 300kg.f averaged across the load.
- Over-centre lever load binders (dogs) are a high risk and are not permitted for use on Coates sites.
- Slew lock pins must be engaged where fitted.



Continuous loop chains used to maximise lashing capacity.



Single loop chains permitted on some smaller machines where specified e.g. Scissor lifts to 7.5t.



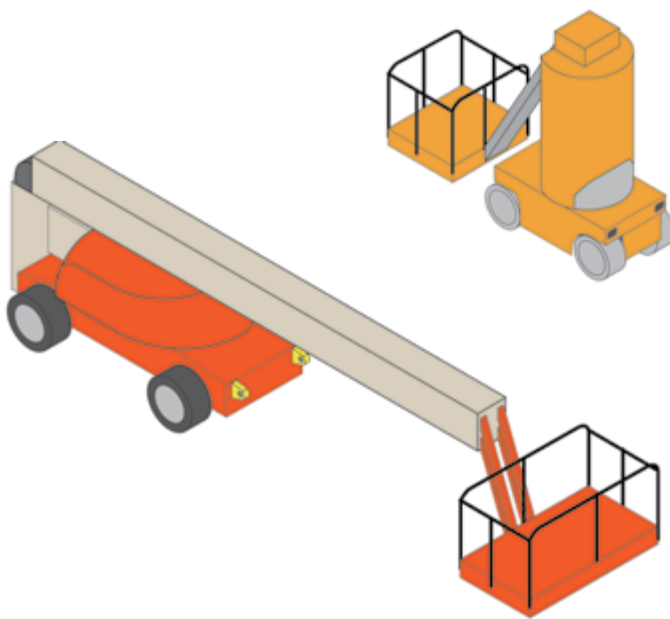
Do not use Over Center Level Load Binders

Scissor Lifts



Scissor lifts up to 7.55t

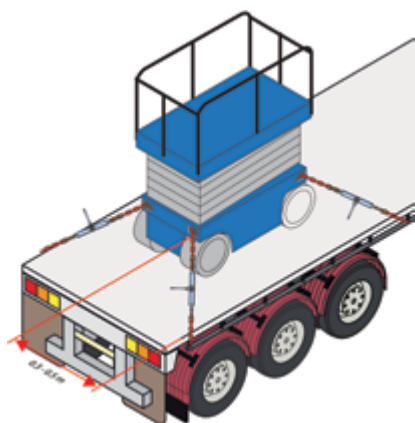
Light and Heavy Booms



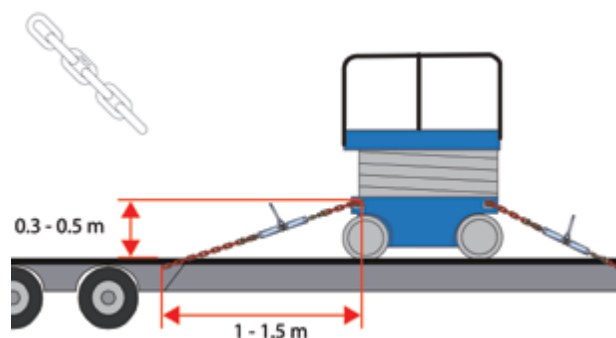
Booms ranging between 0.37 - 22t

B.1. Light Scissor Lifts less than 3.5t

Unblocked - ensure angles of chains are within parameters shown in images

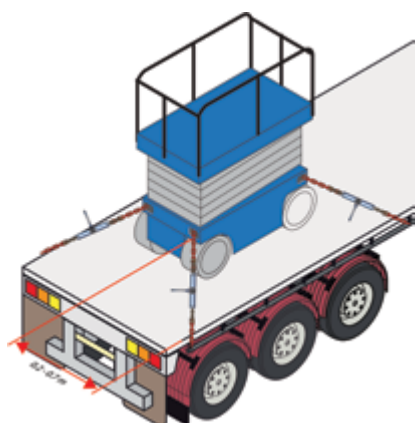


(Gr 70 - AS4344)
Chain to be used

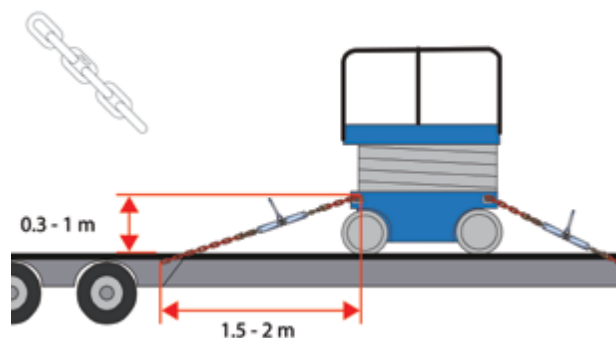


B.2. Heavy Scissor Lifts 3.5t - 7.55t

Unblocked - ensure angles of chains are within parameters shown in images



(Gr 70 - AS4344)
Chain to be used



- Actual anchor point locations may vary for different machines.
- Attach four separate chains two for forwards forces and two for rearwards forces within the above geometry ranges.
- All hydraulic and mechanical equipment must be isolated and pressure released to prevent inadvertent movement in transit.

Section B.1 & B.2 – Access equipment load restraint matrix

B.1. Light Scissor Lifts less than 3.5t [Access]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	Drawbar basket buckets secured	8mm chain single	8mm chain looped	10mm chain single	10mm chain looped	13mm chain single	13mm chain looped
JLG	Telescopic Work Platform 12ft (3.7M)	1360	760	1660	790	Yes	4	4	4	4		
GENIE	Scissor Lift 15ft (4.6M) - Electric	1820	810	2020	1269		4	4				
GENIE	Scissor Lift 19ft (5.7M) - Electric	1820	760	1990	1476		4	4				
GENIE	Scissor Lift 19ft (5.7M) - Electric	1820	810	2110	1483		4	4				
JLG	Scissor Lift 19ft (5.7M) - Electric	1870	760	1980	1565		4	4	4	4		
HAULOTTE	Scissor Lift 19ft (5.7M) - Electric	1880	760	2000	1610		4	4	4			
JLG	Scissor Lift 20ft (6.1M) - Electric	2540	1170	2000	1820		4	4	4	4		
GENIE	Scissor Lift 20ft (6.1M) - Electric	2440	810	2130	1830		4	4				
GENIE	Scissor Lift 20ft (6.1M) - Electric	2440	1170	2140	1945		4	4				
GENIE	Scissor Lift 26ft (7.9M) - Electric	2440	810	2260	1959		4	4				
JLG	Scissor Lift 20ft (6.1M) - Electric	2300	760	2200	2020		4	4	4	4		
JLG	Vertical Mast 20ft	1900	990	1990	2050	Yes	4	4	4	4		
GENIE	Scissor Lift 26ft (7.9M) - Electric	2440	1170	2260	2412		4	4				
HAULOTTE	Vertical Mast 26ft	2670	990	1990	2470	Yes	4	4	4	4		
JLG	Scissor Lift 26ft (7.9M) - Electric	2500	1170	2330	2600		4	4	4	4		
HAULOTTE	Vertical Mast 26ft	2650	990	1990	2760	Yes	4	4	4	4		
JLG	Scissor Lift 32ft (9.7M) - Electric	2500	1170	2330	2765		4	4	4	4		
GENIE	Scissor Lift 32ft (9.7M) - Electric	2440	1170	2410	2781		4	4				
JLG	Vertical Mast 26ft	2890	990	1990	3300	Yes	4	4	4	4		
HAULOTTE	Scissor Lift 27ft (8.2M) - Diesel	2650	1800	2370	3400		4	4	4	4	4	4

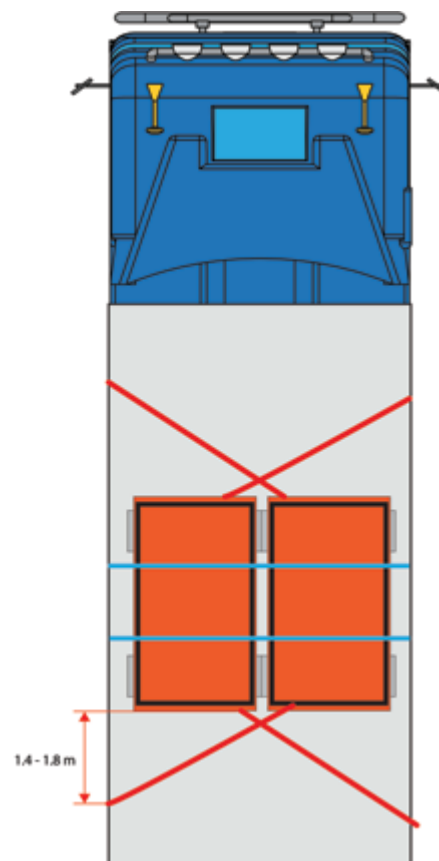
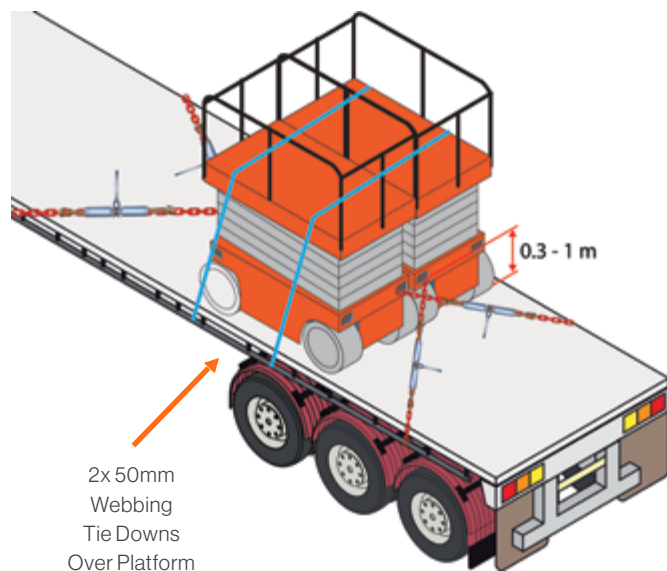
B.2. Heavy Scissor Lifts 3.5t – 7.55t [Access]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	8mm chain single	8mm chain looped	10mm chain single	10mm chain looped	13mm chain single	13mm chain looped
GENIE	Scissor Lift 26ft (7.9M) - Diesel	2670	1730	2300	3535		4	4	4	4	4
GENIE	Scissor Lift 26ft (7.9M) - Electric Wide Deck	2670	1730	2300	3535		4	4	4	4	4
JLG	Scissor Lift 26ft (7.9M) - Diesel	2670	1750	2370	3750			4	4	4	4
HAULOTTE	Scissor Lift 33ft (10.0M) - Diesel	2650	1800	2540	3900		4	4	4		
JLG	Scissor Lift 39ft (11.9M) - Electric	2770	1800	2790	3930		4	4	4		
GENIE	Scissor Lift 32ft (9.7M) - Diesel	2670	1730	2500	4175		4	4	4		
JLG	Scissor Lift 40ft (12.2M) - Electric	3100	1750	2810	4860		4	4	4	4	4
JLG	Scissor Lift 40ft (12.2M) - Bi Energy	3100	1750	2810	5520		4	4	4	4	4
GENIE	Scissor Lift 33ft (10.0M) - Diesel	4900	2130	2700	6224	6	4	4	4	4	4
JLG	Scissor Lift 33ft (10.0M) - Diesel	3860	2330	1990	6430			4	4	4	4
GENIE	Scissor Lift 43ft (13.0M) - Diesel	4900	2300	2900	6728	6	4	4	4	4	4
JLG	Scissor Lift 43ft (13.0M) - Diesel	3860	2330	2250	6940		4	4	4	4	4

B.3. Light Scissor Lifts loaded two abreast (2.6t or less)

Unblocked - ensure angles of chains are within parameters shown in images

2.6t each or less

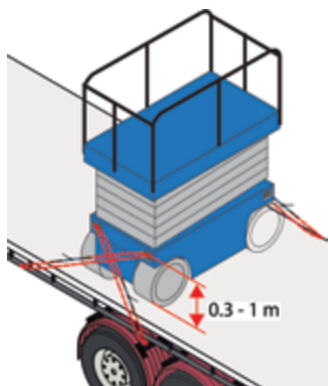


- Actual anchor point locations may vary for different machines.
- Attach four 8mm chains within the above geometry ranges to each pair of lifts.
- Attach two 50mm webbing straps over the platform as per above, ensure placement is on floor grating and not handrails.
- All hydraulic and mechanical equipment must be isolated, and pressure released to prevent inadvertent movement in transit.
- Only suitable for loading/unloading activities using a forklift or crane.

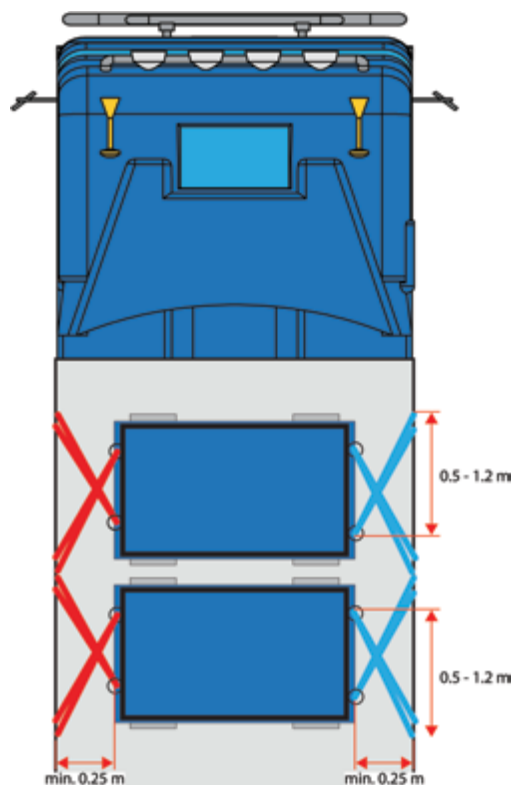
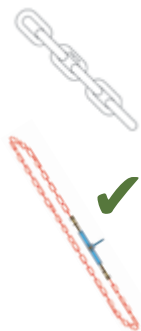
B.4. Light Scissor Lifts loaded laterally

1.55t each or less

Unblocked - ensure angles of chains are within parameters shown in images

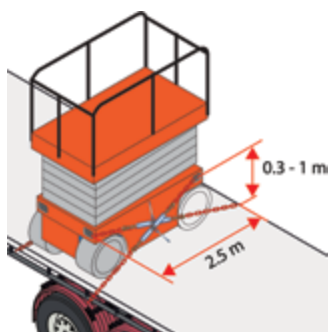


(Gr 70 - AS4344)
Chain to be used

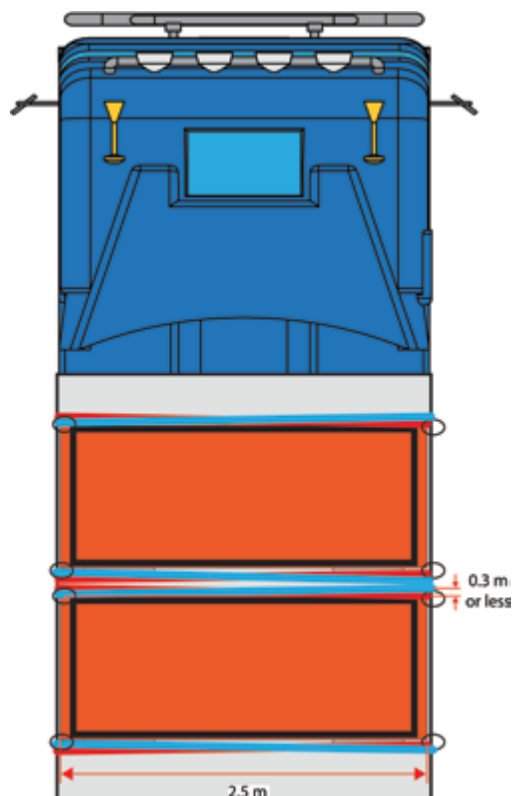


2.6t each or less

Unblocked - ensure angles of chains are within parameters shown in images



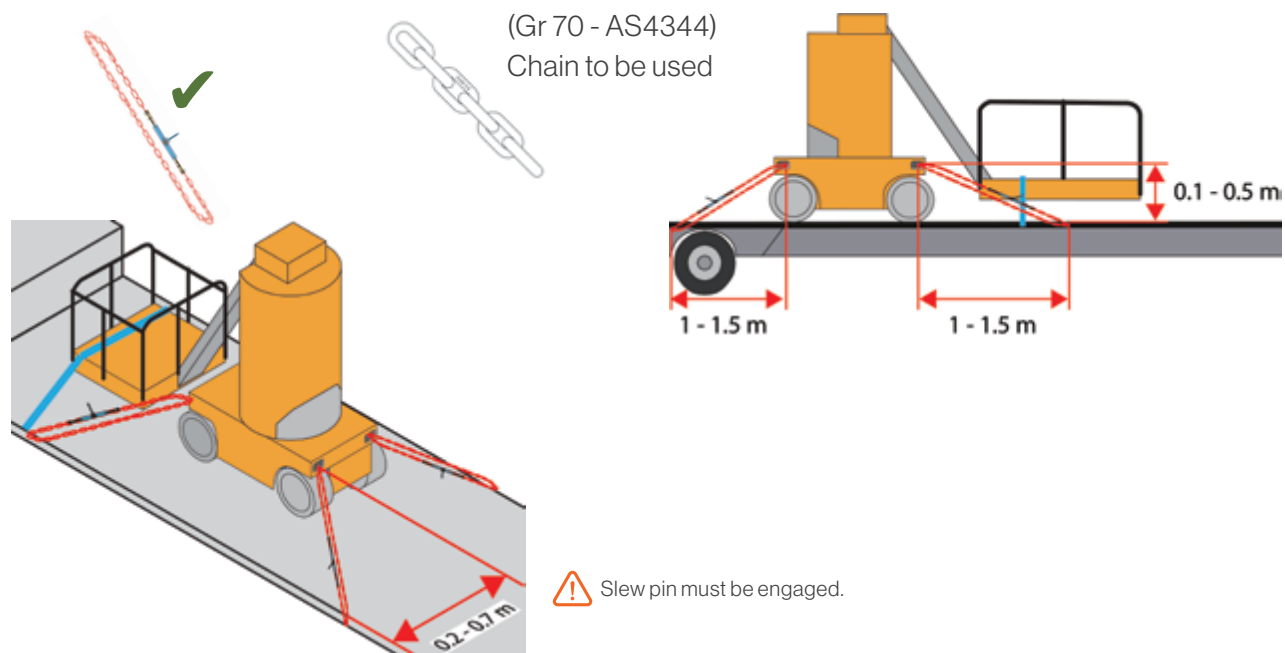
(Gr 70 - AS4344)
Chain to be used



- Actual anchor point locations may vary for different machines.
- Attach the applicable number of chains within the above geometry ranges to each scissor lift.
- All hydraulic and mechanical equipment must be isolated, and pressure released to prevent inadvertent movement in transit.

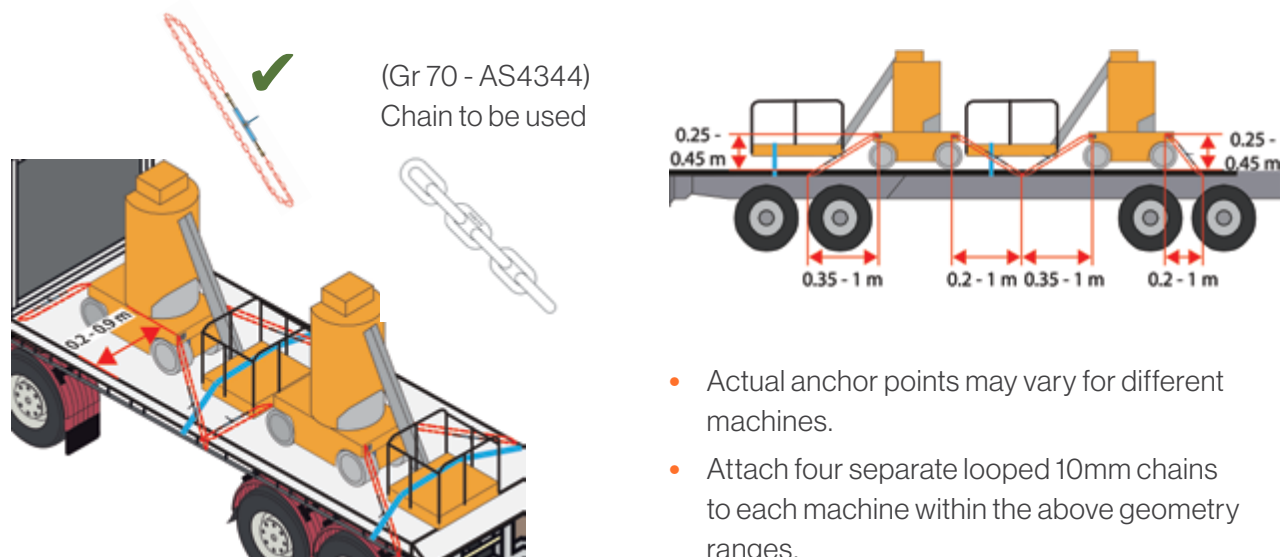
B.5. Light Boom Lifts less than 11t

Unblocked - ensure angles of chains are within parameters shown in images



B.5. Two Light Boom Lifts on short deck up to 7t

Unblocked - ensure angles of chains are within parameters shown in images



- Actual anchor points may vary for different machines.
- Attach four separate looped 10mm chains to each machine within the above geometry ranges.
- Slew pin must be engaged.

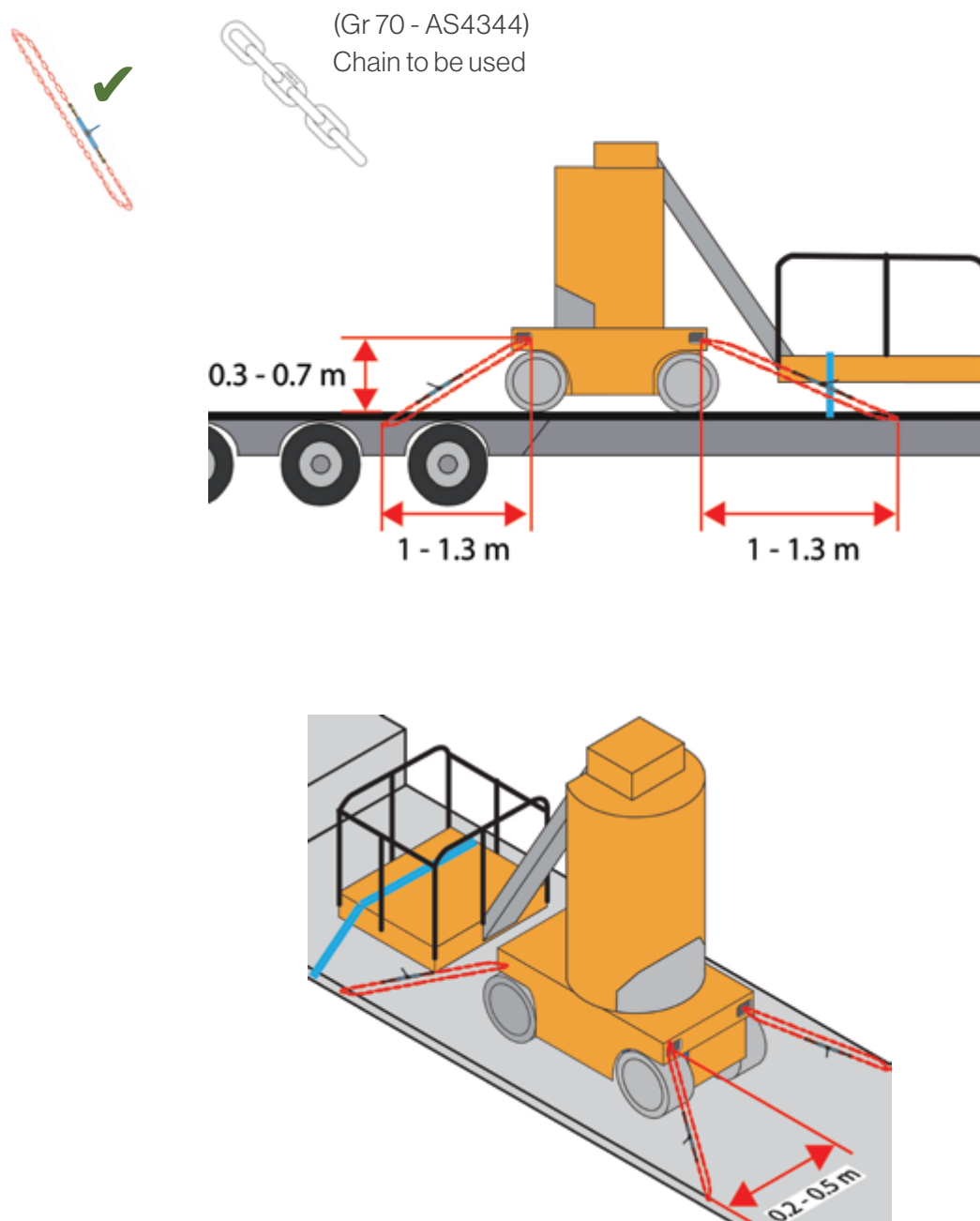
Section B.5 – Access equipment load restraint matrix

B.5. Light Boom Lifts less than 11t [Access]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	50mm webbing straps	Drawbar basket buckets secured	50mm wheel straps	8mm chain single	8mm chain looped	10mm chain single	10mm chain looped	13mm chain single	13mm chain looped
NIFTY	Trailer Mounted Boom 10.2m Diesel/ Electric	4500	1500	1900	1420	4	Yes	2	4	4	4	4		
NIFTY	Trailer Mounted Boom 15m	5550	1600	2000	1725		Yes		4	4	4	4		
GENIE	Knuckle Boom 34ft (10.4M) - Diesel	5700	1800	2000	4740		Yes			4	4	4	4	4
GENIE	Knuckle Boom 34-35ft- Electric- Narrow	5700	1500	2000	5171		Yes			4	4	4	4	4
GENIE	Straight Boom Lift 40ft (12.2M) - Diesel	7390	2300	2490	5284		Yes		6	4	4	4	4	4
JLG	Knuckle Boom 40ft (12.2M) - Electric	5280	1500	2010	5350		Yes			4	6	4	4	4
HAULOTTE	Knuckle Boom 34ft (10.4M) - Diesel	5640	1800	2150	5640		Yes			4	4	4	4	4
HAULOTTE	Knuckle Boom 34-35ft- Electric- Narrow	5430	1340	1990	6000		Yes			4	4	4	4	4
JLG	Knuckle Boom 45ft (13.7M) - Diesel	6710	1750	2010	6290		Yes			6	6	4	4	4
GENIE	Knuckle Boom 45ft (13.7M) - Electric	5400	1800	2000	6305		Yes			4	4	4	4	4
GENIE	Knuckle Boom 30ft (9.1M) - Electric - Narrow	5100	1200	2000	6428		Yes			4	4	4	4	4
GENIE	Knuckle Boom 45ft (13.7M) - Diesel	5500	2100	2200	6532		Yes			4	4	4	4	4
GENIE	Straight Boom Lift 45-46ft - Diesel	8500	2300	2490	6709		Yes		6	4	4	4	4	4
JLG	Knuckle Boom 30ft (9.1M) - Electric - Narrow	5590	1220	2010	6880		Yes			6	6	4	4	4
JLG	Straight Boom Lift 60ft (18.3M) - Electric	9910	2440	2570	7382		Yes			6	4	4	4	4
JLG	Knuckle Boom 45ft (13.7M) - Diesel	6710	1980	2240	7430		Yes			6	6	4	4	4
JLG	Straight Boom Lift 60ft (18.3M) - Bi Energy	9910	2440	2570	7527		Yes			6	4	4	4	4
JLG	Knuckle Boom 40ft (12.2M) - Electric	6710	1500	1970	7760		Yes			6	6	4	4	4
JLG	Straight Boom Lift 45-46ft - Diesel	8840	2290	2390	7926		Yes			6	4	4	4	4
HAULOTTE	Knuckle Boom 51ft (15.5M) - Diesel	7600	2300	2200	8100		Yes			4	4	4	4	4
GENIE	Straight Boom Lift 60ft (18.3M) - Diesel	8500	2490	2720	9385		Yes			4	6	4	4	4
GENIE	Straight Boom Lift 65-66ft - Diesel	9500	2490	2720	10102		Yes			4	6	4	4	4
GENIE	Straight Boom Lift 65-66ft - Diesel	9500	2490	2720	10202		Yes			4	6	4	4	4
GENIE	Knuckle Boom 60ft (18.3M) - Diesel	8200	2500	2700	10215		Yes			4		4		4

B.6. Medium Boom Lifts (11.1t - 16.5t)

Unblocked - ensure angles of chains are within parameters shown in images



- Actual anchor points may vary for different machines.
- Attach the applicable number of looped chains to each machine within the above geometry ranges.
- Slew pin must be engaged.

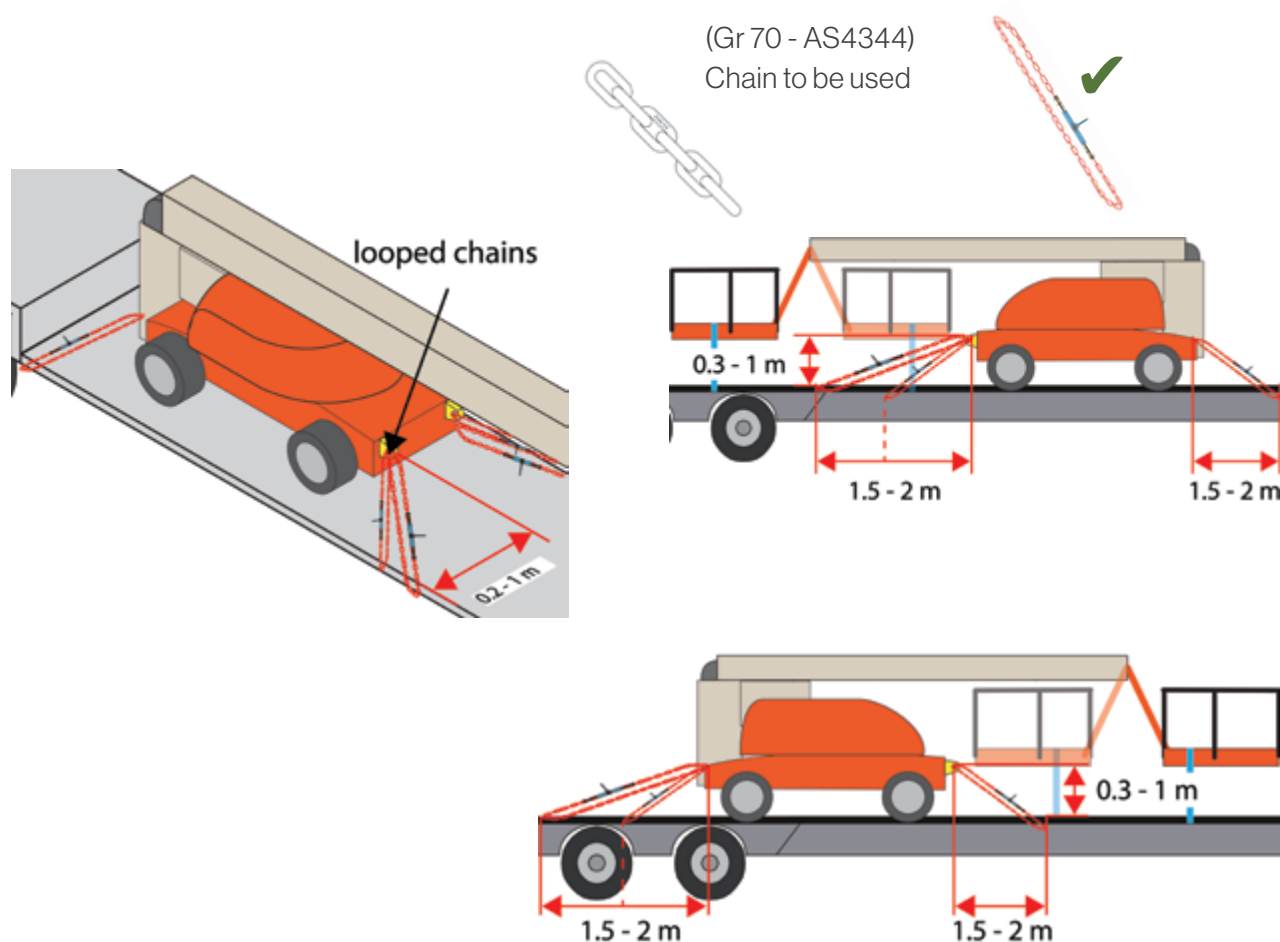
Section B.6 – Access equipment load restraint matrix

B.6. Medium Boom Lifts 11t - 16.4t [Access]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	Drawbar basket buckets secured	10mm chain single	10mm chain looped	13mm chain single	13mm chain looped
JLG	Straight Boom Lift 60ft (18.3M) - Diesel	9450	2430	2500	11880	Yes		4		4
JLG	Knuckle Boom 60ft (18.3M) - Diesel	8830	2440	2560	11900	Yes	6	4		4
JLG	Straight Boom Lift 65-66ft - Diesel	10210	2430	2560	13500	Yes		4		4
JLG	Knuckle Boom 80ft (24.4M)	11130	2440	3000	15220	Yes		4		4
GENIE	Straight Boom Lift 85ft (25.9M)	12400	2440	2790	16284	Yes	6	6	6	4

B.7. Heavy Boom Lifts (16.5t - 22t)

Unblocked - ensure angles of chains are within parameters shown in images



- Actual anchor point locations may vary for different machines.
- Attach applicable chains for forwards and rearwards forces within the above geometry ranges.
- All hydraulic and mechanical equipment must be isolated, and pressure released to prevent inadvertent movement in transit.
- Apply a minimum of 1 x 50mm webbing strap over boom basket to prevent any movement in transport.
- Slew pin must be engaged.
- Webbing strap must be secured over the basket.

Section B.7 – Access equipment load restraint matrix

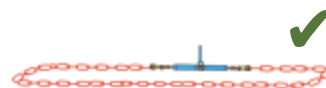
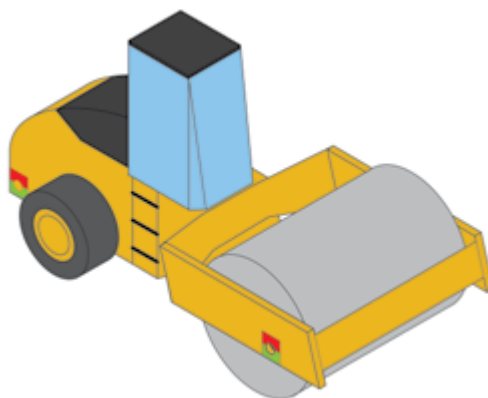
B.7. Heavy Boom Lifts 16.5t - 22t [Access]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	Drawbar basket buckets secured	10mm chain looped	13mm chain single	13mm chain looped
GENIE	Knuckle Boom 80ft (24.4M)	9100	2500	3000	17010	Yes	4		4
JLG	Straight Boom Lift 86ft (26.2M)	12190	2490	3050	17130	Yes	6		4
JLG	Knuckle Boom 125ft (38.1M)	11460	2490	3050	20080	Yes	6		4
GENIE	Straight Boom Lift 125ft (38.4)	14200	2600	3100	20248	Yes	6	6	4
JLG	Straight Boom Lift 135ft (41.1M)	11860	2490	3050	20300	Yes	6		4
GENIE	Knuckle Boom 135ft (41.5M)	12900	2500	3100	20366	Yes	6		4

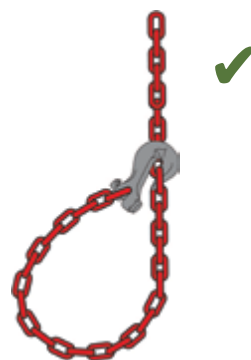
Section C: Compaction equipment

Key load requirements:

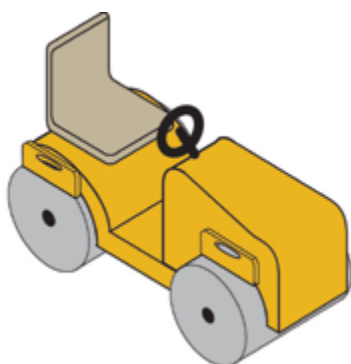
- All lashings must be directly connected to the component or looped back.
- Four chain lashings minimum will be required, two angled forwards and two backwards.
- All lashings to be similar geometry.
- Apply any brakes provided.
- Chains must be Grade 70 transport chains.
- Overcentre lever load binders (dogs) are a high risk and are not permitted for use on Coates sites.
- Articulation locking pins must be engaged where fitted.



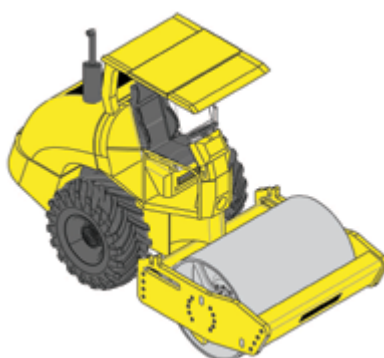
Continuous loop chain



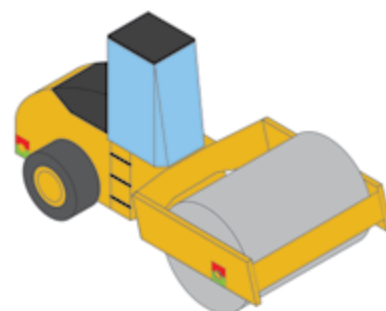
Permitted on up to 3.5t compaction equipment.



Small Drum Roller up to 3.5t



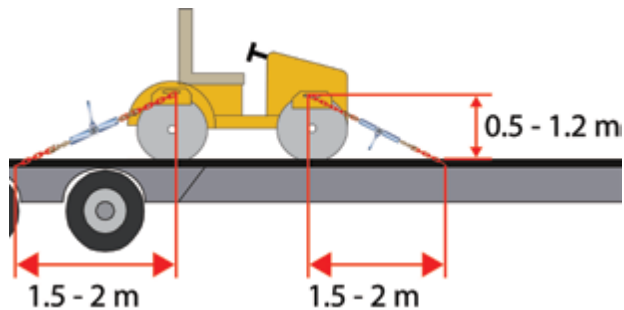
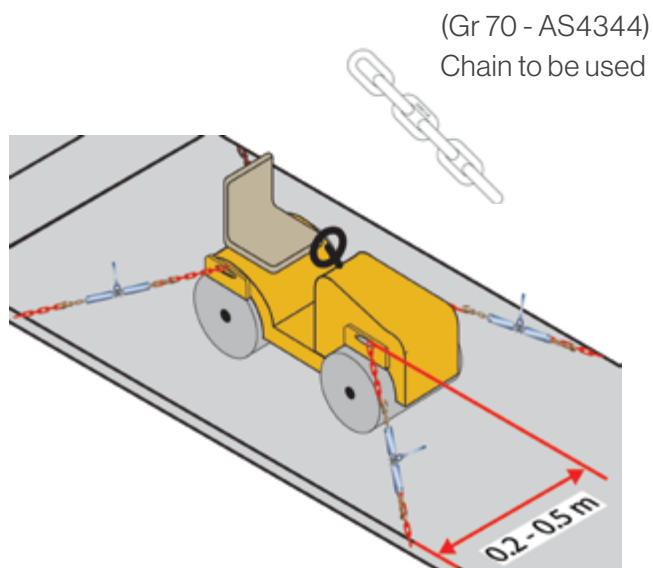
Medium Drum Roller
3.5t - 8.5t
8.5t - 13.5t



Large Drum Roller
13.5t - 22t

C.1. Light equipment less than 3.5t

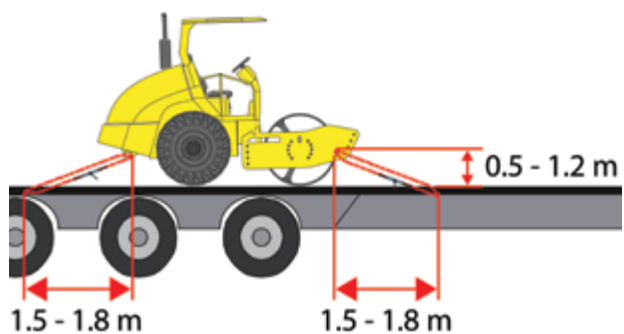
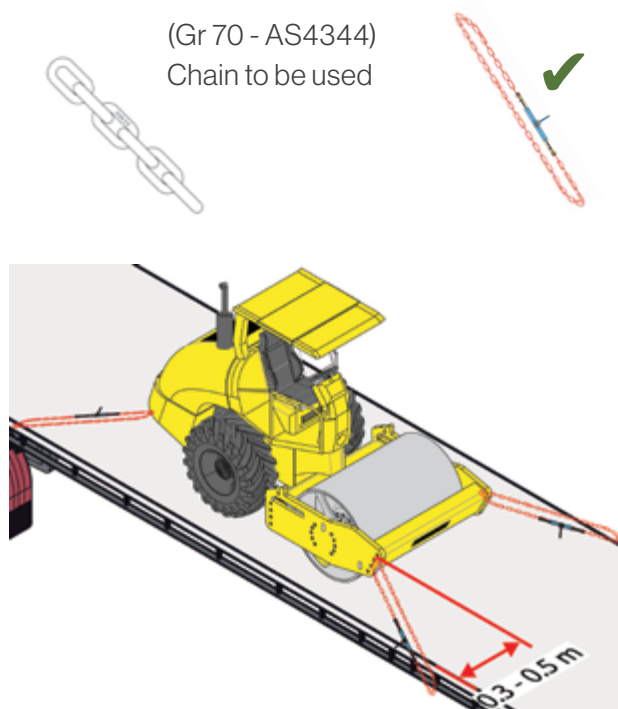
Unblocked - ensure angles of chains are within parameters shown in images



- Actual anchor points may vary for different machines.
- Attach the applicable number of chains to each machine within the above geometry ranges.

C.2. Medium equipment (3.6t- 11t)

Unblocked - ensure angles of chains are within parameters shown in images



- Actual anchor points may vary for different machines.
- Attach the applicable number of chains to each machine within the above geometry ranges.

Section C.1 & C.2 – Compaction equipment load restraint matrix

C.1. Light equipment less than 3t [Compaction]

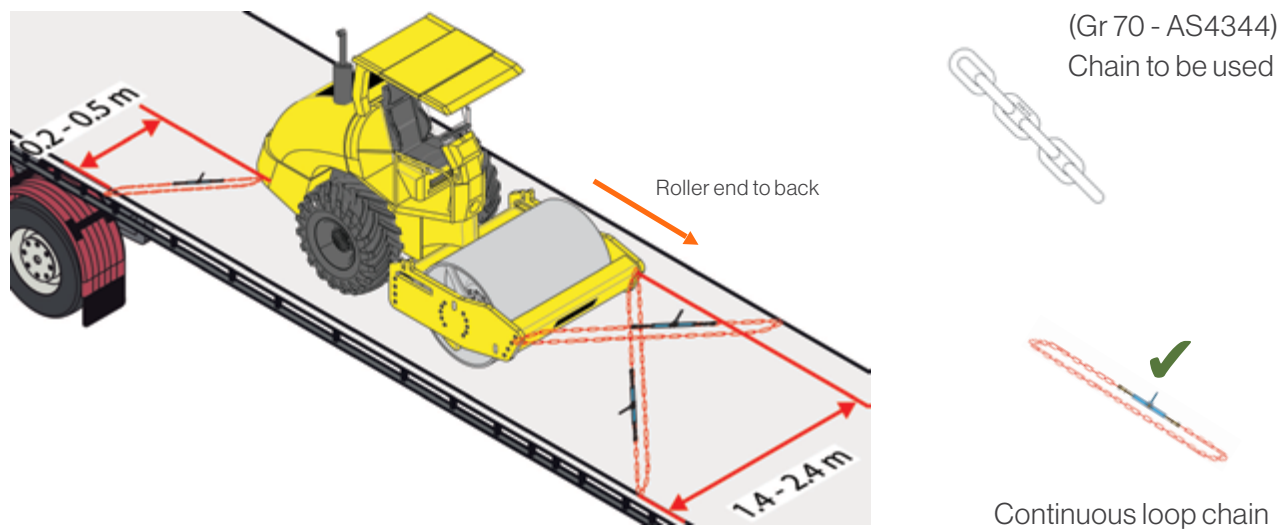
Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	8mm chain single	8mm chain looped	10mm chain single	10mm chain looped
DYNAPAC	Roller Smooth 2 - 3t - Double Drum	2450	1180	2640	2350	4	4	4	4

C.2. Medium Equipment 3.6t - 11t [Compaction]

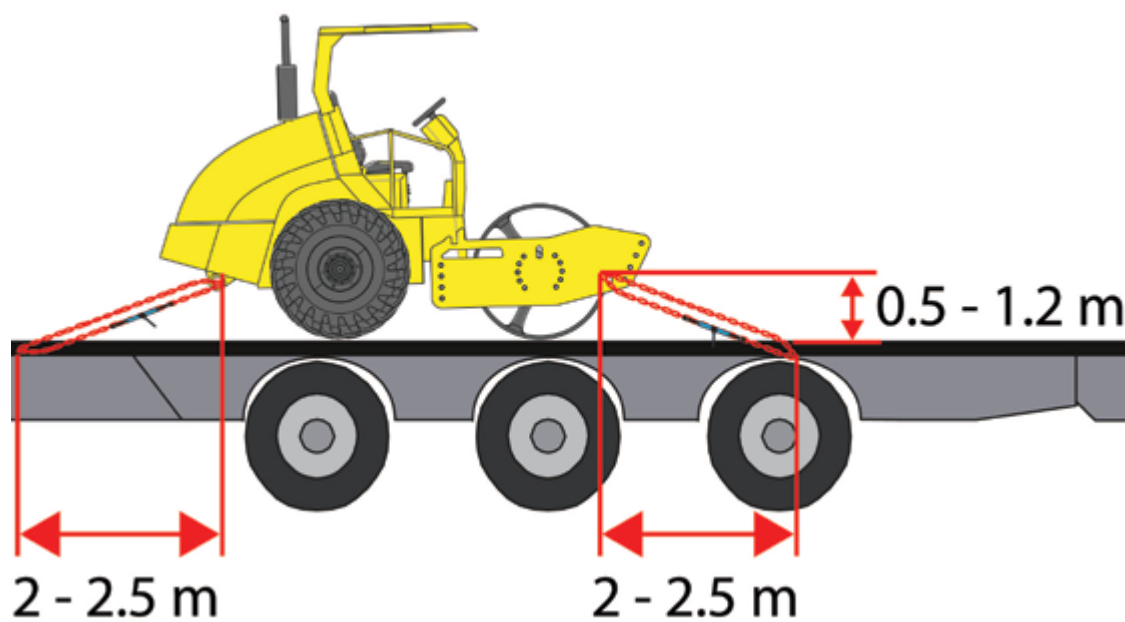
Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	8mm chain single	8mm chain looped	10mm chain single	10mm chain looped	13mm chain single	13mm chain looped
DYNAPAC	Roller Smooth 4 - 5.7t - Double Drum	2725	1450	2750	3900		4	4	4		
DYNAPAC	Roller Multi - Tyre Pneumatic 4.3 - 12.5t	3580	1760	3200	4300	6	4	4	4		
DYNAPAC	Roller Padfoot 4.5t	3580	1486	2370	4500	6	4	4	4		
CAT	Roller Multi - Tyre Pneumatic 5T - 15T	5000	2100	3000	5300		4	4	4		
DYNAPAC	Roller Padfoot 5t - C/W Blade	4236	1550	2519	5500	6	4	4	4		
CAT	Roller Padfoot 6 - 8t - Single Drum	4960	2100	2930	6880	6	4	4	4		
DYNAPAC	Roller Smooth 6 - 8t - Single Drum	4776	1852	2835	7600		4	4	4		
DYNAPAC	Roller Smooth 7 - 8t - Double Drum	4300	1575	2920	7700		4	4	4		
DYNAPAC	Roller Padfoot 8t	4871	1852	2877	8000		4	4	4		
DYNAPAC	Roller Padfoot 6 - 8t - Single Drum	4871	1852	2877	8000	6	4	4	4		
CAT	Roller Smooth 10 - 12t - Single Drum	5510	2290	3060	10485		4	4	4	4	4

C.3. Medium equipment (11.1t - 13.4t)

Unblocked - ensure angles of chains are within parameters shown in images



- Actual anchor points may vary for different machines.
- Attach the applicable number of chains to each machine within the above geometry ranges.



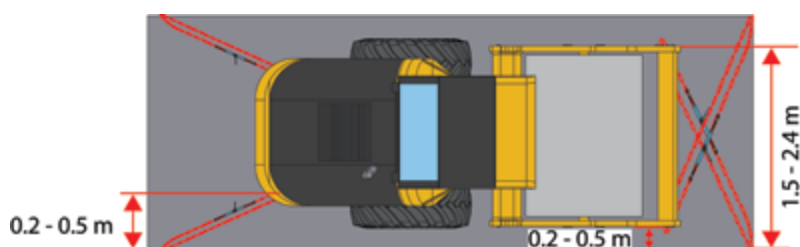
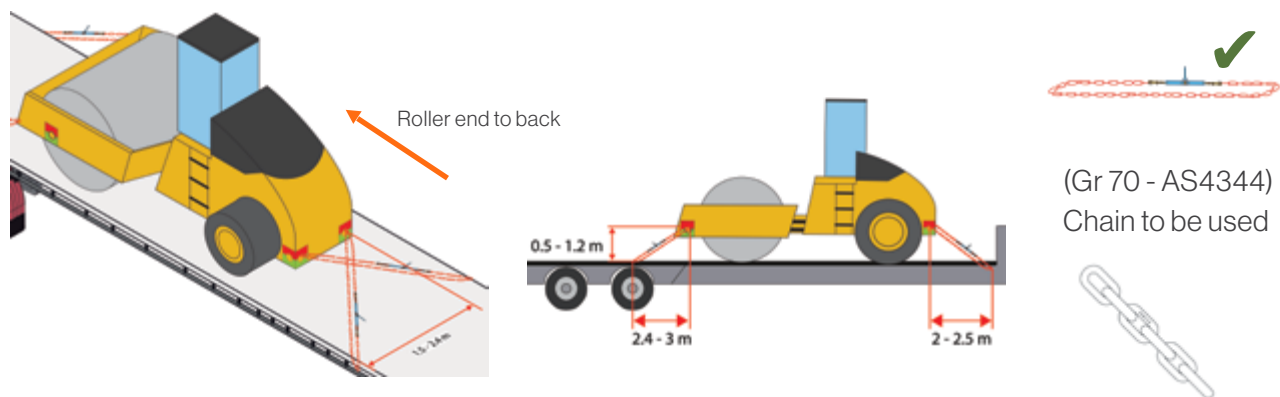
Section C.3 – Compaction equipment load restraint matrix

C.3. Medium equipment 11.1t – 13.4t [Compaction]

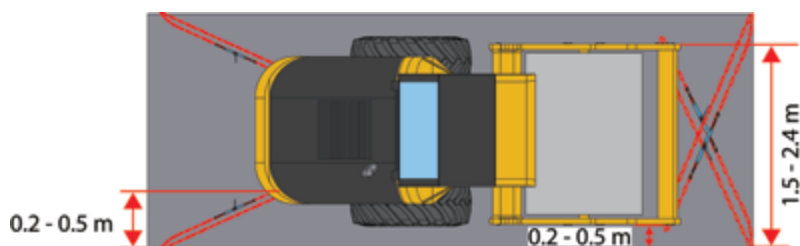
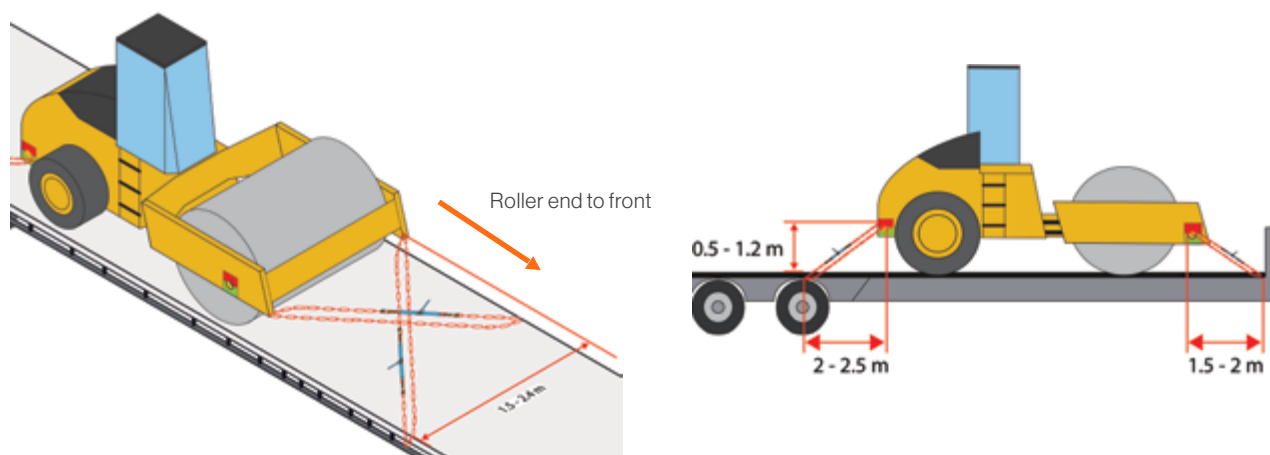
Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	10mm chain looped	13mm chain single	13mm chain looped
CAT	Roller Smooth 10 - 12t - Single Drum	6300	2500	3070	11450	4	4	4
DYNAPAC	Roller Padfoot 10 - 12t - Single Drum	5758	2324	2996	12200	4	4	4
CAT	Roller Smooth 10 - 12t - Single Drum	5510	2360	3070	12360	4	4	4
DYNAPAC	Roller Multi - Tyre Pneumatic 4.3 - 12.5t	3580	1760	2990	12500	4	4	4
DYNAPAC	Roller Padfoot 10 - 12t - Single Drum	5550	2384	2990	12600	4		4
DYNAPAC	Roller Padfoot 13.1t	5550	2384	2990	12600	4		4
DYNAPAC	Roller Padfoot 13.1t	5758	2384	2996	13200	4		4
DYNAPAC	Roller Smooth 13t - Single Drum	5758	2384	2980	13300	4		4

C.4. Heavy equipment (13.5t - 22t)

Unblocked - ensure angles of chains are within parameters shown in images



- Actual anchor points may vary for different machines.
- Attach the applicable number of chains to each machine within the above geometry ranges.



- Actual anchor points may vary for different machines.
- Attach the applicable number of chains to each machine within the above geometry ranges.

Section C.4 – Compaction equipment load restraint matrix

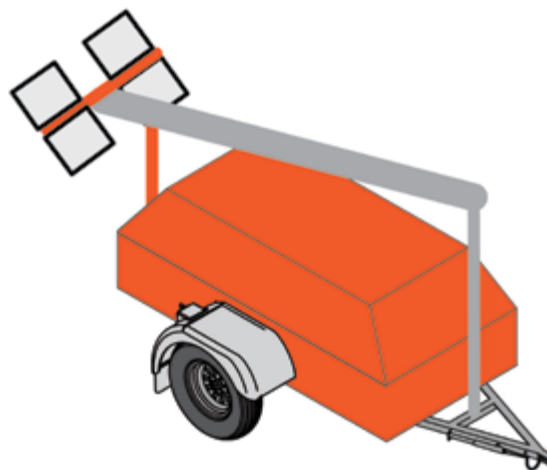
C.4. Heavy equipment 13.5t – 22t [Compaction]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	8mm chain looped	10mm chain single	10mm chain looped	13mm chain single	13mm chain looped
HAMM	Roller Padfoot 14t	5705	2250	2990	14240				6	4
CAT	Roller Multi - Tyre Pneumatic 5T - 15T	5000	2100	3000	15000	6	6	4	4	4
DYNAPAC	Roller Padfoot 15t	6000	2350	2990	15900					4
DYNAPAC	Roller Padfoot 17t - Single Drum	6000	2350	2990	15900					4
DYNAPAC	Roller Padfoot 18t	6000	2400	3000	18700					4
DYNAPAC	Roller Smooth 18t - Single Drum	6000	2400	2972	18700					4
DYNAPAC	Roller Smooth 19t - Single Drum	6000	2400	2972	18700					4
HAMM	Roller Padfoot 20t - Single Drum	6210	2390	2980	19800				6	4
DYNAPAC	Roller Padfoot 20t - Single Drum	6180	2400	3000	20750					4
DYNAPAC	Roller Smooth 20t - Single Drum	6180	2400	2972	20750					4
CAT	Roller Multi - Tyre Pneumatic 20t	5300	2000	3000	21000				6	4
CAT	Roller Multi - Tyre Pneumatic 20t	5350	2160	3000	24000				6	4

Section D: Small Trailers

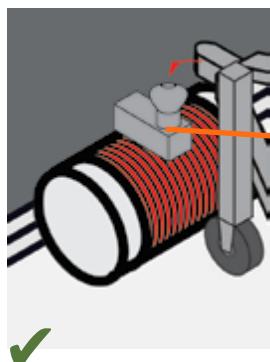
Key load requirements:

- No slippery surfaces.
- Do not mix lashing types i.e. chain and webbing.
- All lashings must be directly connected to the component or looped back.
- Four lashings minimum will be required, two angled forwards and two backwards.
- All lashings to be similar geometry.
- Apply any brakes provided.
- Beware of shock forces generated through bouncing.
- 50mm webbing, conforming to AS/NZS4380 tensioned to a minimum pre-tension of 300kg.f.
- Over-centre lever load binders (dogs) are a high risk and are not permitted for use on Coates sites.
- All on board equipment must be secured (e.g. draw bars and booms).

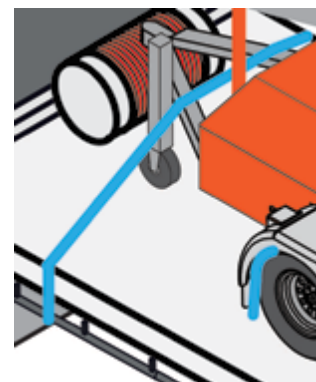
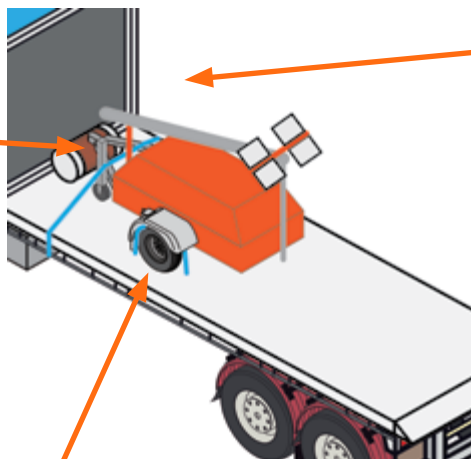


D.1. Light Trailer restraint along deck (up to 1850kg)

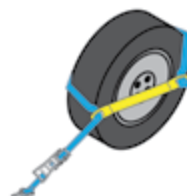
Wheel restraints:



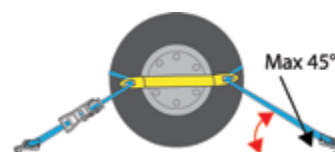
Draw bar must be connected to headboard tow ball when using wheel restraints



Lashing over draw bar



Purpose built wheel lashings



Section D.1 – Small Trailers load restraint matrix

D.1.1. Light Trailer restraint along deck up to 1850kg

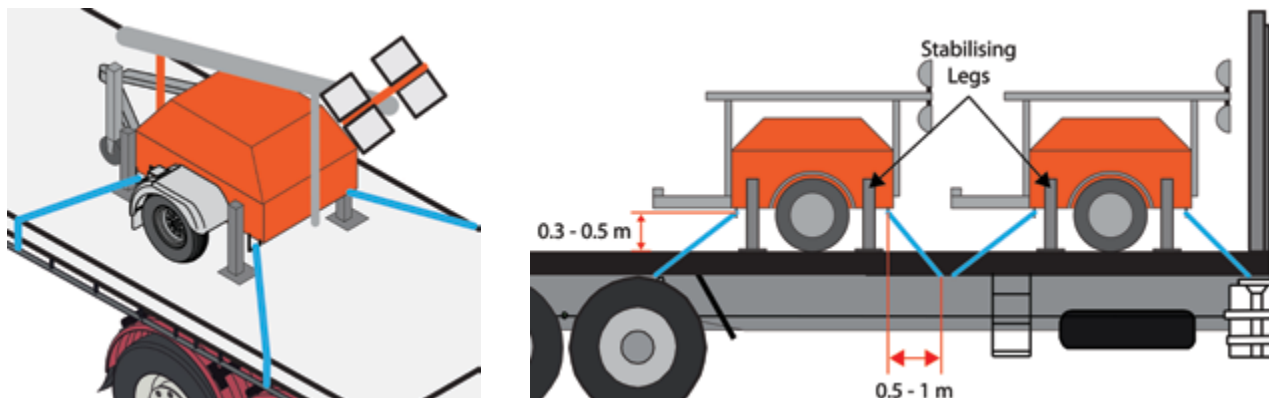
Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	50mm webbing straps	Drawbar basket buckets secured	50mm wheel straps	8mm chain single	8mm chain looped	10mm chain single
A1 ROADLINES	Arrow Board 2.4Mx1.2M (Diesel)	3200	1600	2650	630	4	Yes	2	4	4	4
A1 ROADLINES	Traffic Lights (Diesel)	3450	1670	1970	920	4	Yes	2	4	4	4
A1 ROADLINES	Traffic Lights (Petrol)	3450	1670	1970	920	4	Yes	2	4	4	4
A1 ROADLINES	Traffic Lights (Solar)	4700	1700	1600	1200	4	Yes	2	4	4	4
A1 ROADLINES	Traffic Lights (Solar)	4700	1700	1600	1200	4	Yes	2	4	4	4
A1 ROADLINES	Traffic Lights (Solar)	4700	1700	1600	1200	4	Yes	2	4	4	4
JLG	Lighting Tower 6000W Hydraulic	2500	1750	2400	1700	4	Yes	2	4	4	4
A1 ROADLINES	Variable Message Board Senior	3835	2000	2819	1820		Yes		4	4	4

D.1.2. Light Trailer restraint along deck up to 1850kg [toilets]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	50mm webbing straps	Drawbar basket buckets secured	50mm wheel straps	8mm chain single	8mm chain looped	10mm chain single	10mm chain looped
MERLIN	Toilet Portable - With Trailer	2400	1400	2800	267	4	Yes	2	4	4	4	4

4 x 50mm Webbing combination along deck

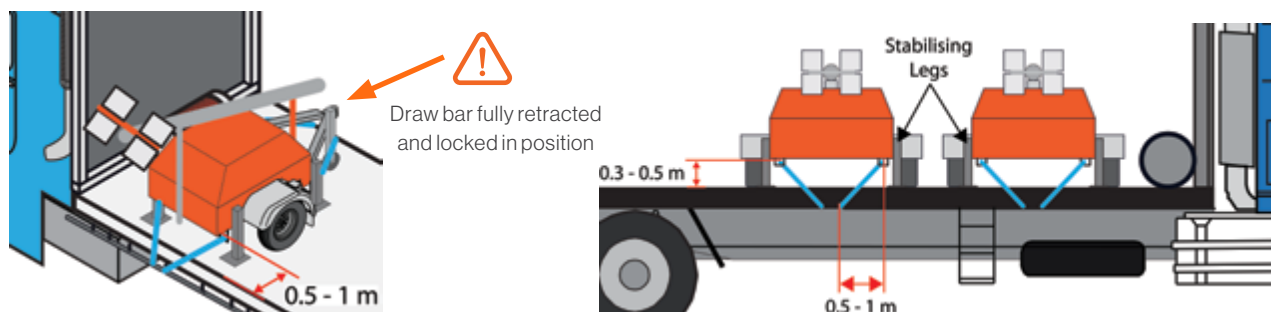
Direct restraint



- Stabilising legs are to be rested on deck surface.
- Ensure all locking pins are secure.
- Do not use jockey wheels as a stabilising leg.
- Actual anchor point locations may vary for different lighting towers.
- Attach a minimum of 2 x looped 50mm webbing straps for forward restraint and 2 x looped 50mm webbing straps for rearward restraint within the above geometry ranges.

D.2. Light Trailer restraint across deck (up to 1200kg)

4 x 50mm Webbing combination



- Stabilising legs are to be rested on deck surface.
- Ensure all locking pins are secure.
- Extending draw bars must be fully retracted and locked so that they do not exceed legal width of 2.5m and cannot extend in transit.
- Actual anchor point locations may vary for different lighting towers.
- Attach a minimum of 2 x looped 50mm webbing straps for forward restraint and 2 x looped 50mm webbing straps for rearward restraint within the above geometry ranges.

Section D.2 – Small Trailers load restraint matrix

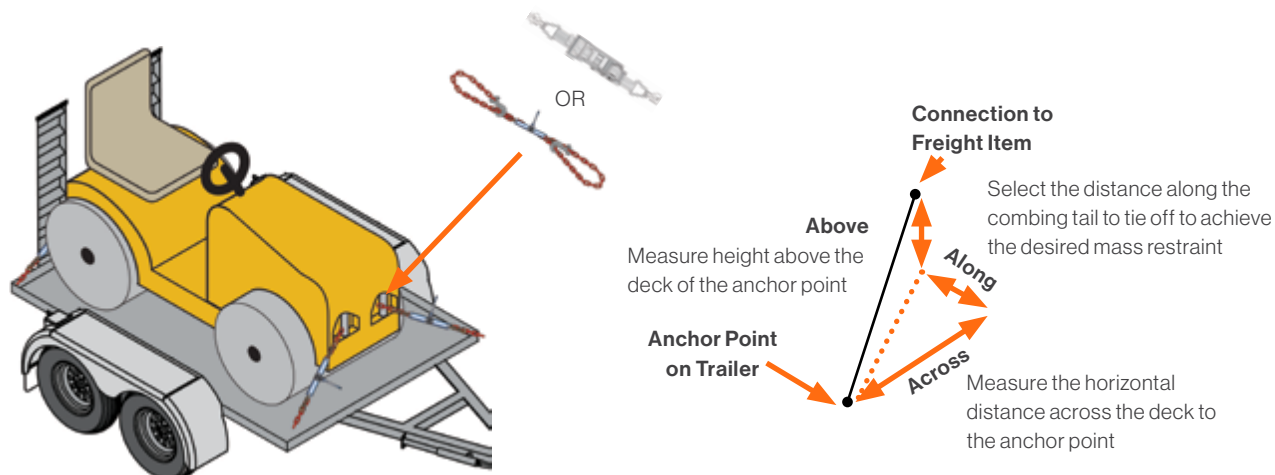
D.2. Light Trailer restraint across deck up to 1200kg

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	50mm webbing straps	Drawbar basket buckets secured	50mm wheel straps	8mm chain single	8mm chain looped	10mm chain single
A1 ROADLINES	Arrow Board 2.4Mx1.2M (Diesel)	3200	1600	2650	630	4	Yes	2	4	4	4
A1 ROADLINES	Traffic Lights (Diesel)	3450	1670	1970	920	4	Yes	2	4	4	4
A1 ROADLINES	Traffic Lights (Petrol)	3450	1670	1970	920	4	Yes	2	4	4	4
A1 ROADLINES	Traffic Lights (Solar)	4700	1700	1600	1200	4	Yes	2	4	4	4
A1 ROADLINES	Traffic Lights (Solar)	4700	1700	1600	1200	4	Yes	2	4	4	4
A1 ROADLINES	Traffic Lights (Solar)	4700	1700	1600	1200	4	Yes	2	4	4	4

D.3. Inside Trailer

All items inside trailer to be restrained as per the below table

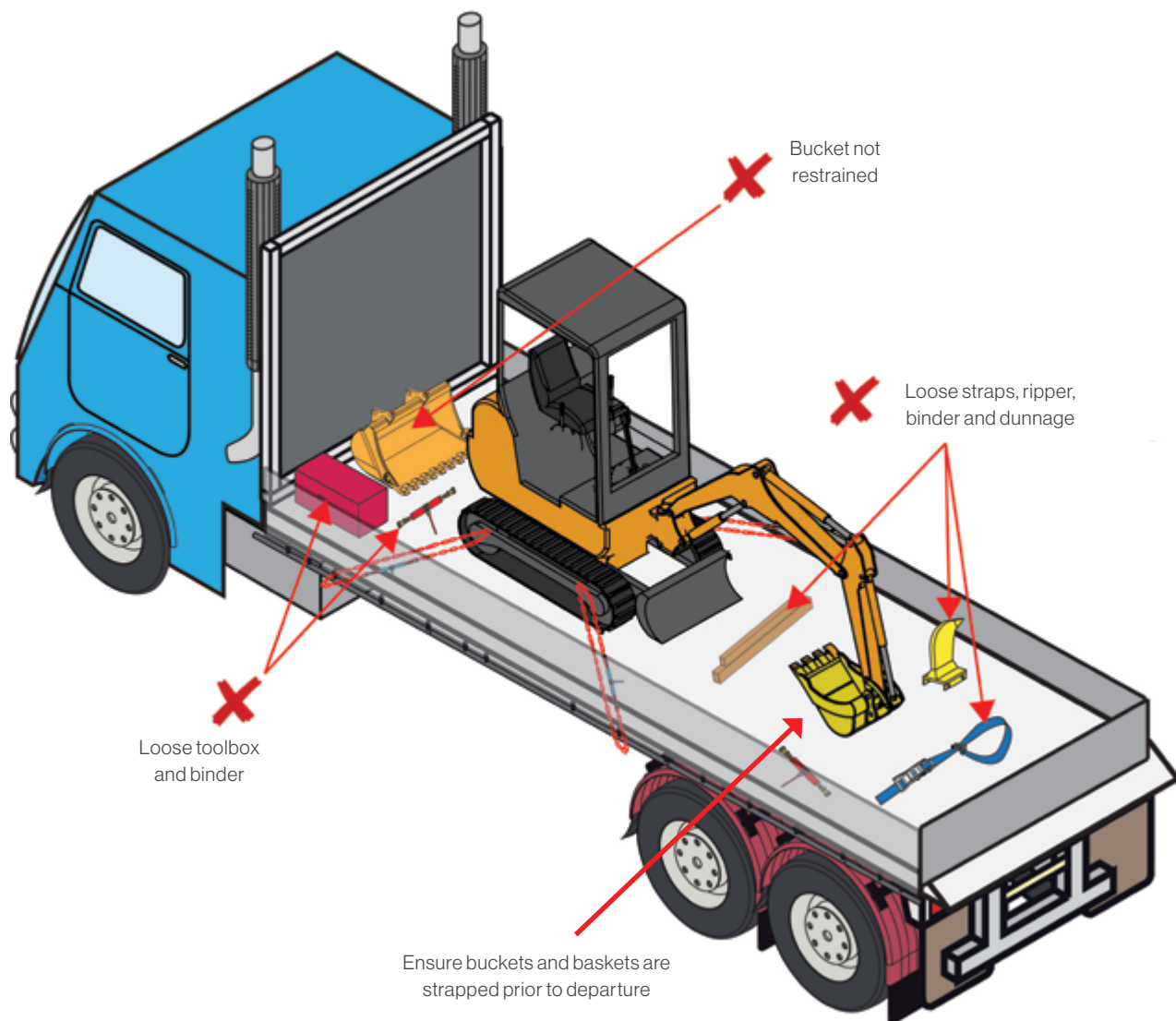
- 8mm & 10mm transport chain, conforming to AS/NZ4344 tensioned to a minimum pre-tension of 750kg.f.
- 50mm webbing strap, conforming to AS/NZS4380 tensioned to a minimum pre-tension of 300kg.f.
- Equipment must be in good working order. Inspect the chains for wear.
- Do not mix chain and webbing on same restrained item.



Engineered maximum permissible restrained mass					
Direct restraint table (maximum weight for 4 lashings)				Restrained mass (kg)	
Height of anchor point above deck (m)	0.3-0.99m	Anchor point across deck (m)	Location along combing rail for lashing (m)	Mass per 4 x 50mm webbing	Mass per 4 x 8mm chain
		0 to 0.49	0.5 to 0.99	1200 kg	3000 kg
Height of anchor point above deck (m)	0.3-0.99m	0.5 to 0.99	1 to 1.5	800 kg	2200 kg
			0.5 to 0.99	2000 kg	2500 kg
		1 to 1.5	1 to 1.5	3600 kg	4300 kg
			0.5 to 0.99	1600 kg	2000 kg
		1 to 1.5	1 to 1.5	3000 kg	3600 kg
			0.5 to 0.99	1400 kg	1700 kg
Height of anchor point above deck (m)	1-2m	0 to 0.49	1 to 1.5	2500 kg	3200 kg
		0.5 to 0.99	0.5 to 0.99	1300 kg	1600 kg
			1 to 1.5	1200 kg	3000 kg
		1 to 1.5	0.5 to 0.99	2500 kg	1400 kg
			1 to 1.5	2300 kg	2700 kg
		1 to 1.5	1 to 1.5	2300 kg	2700 kg

Section E: Pre-departure checks

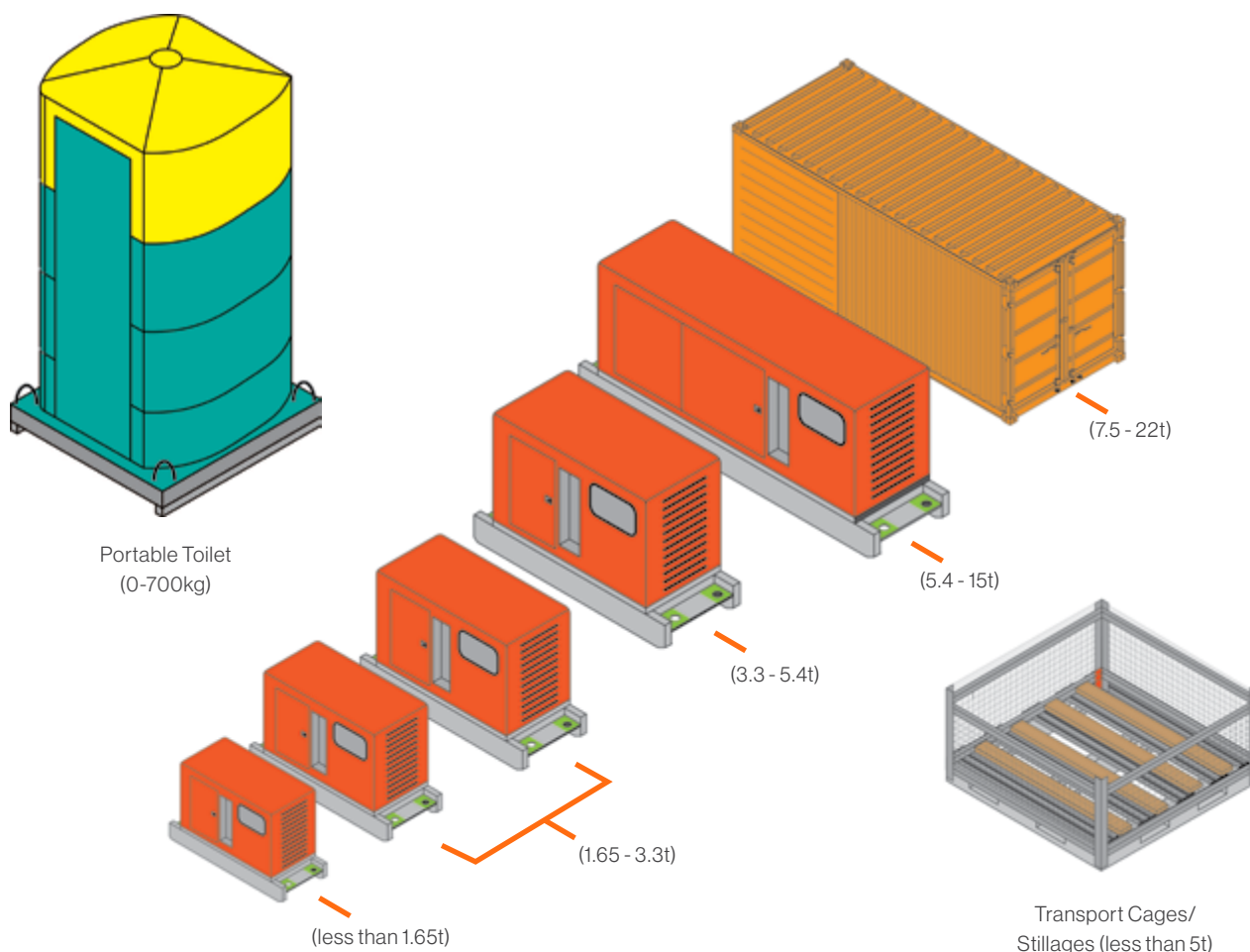
- Check the correct size and quantity of chains have been applied as shown in the relevant section of this document.
- Check there are no loose items left on the deck that are unsecured e.g. buckets, toolboxes, dunnage, binders or debris. These items must be separately restrained or stowed.



Load restraint: Skid-based equipment, Portable Toilets and Transport Cages

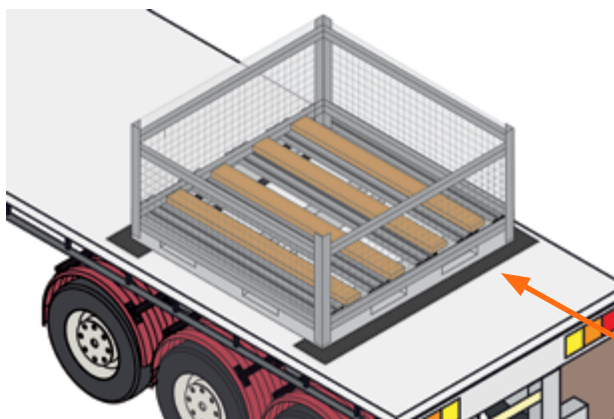
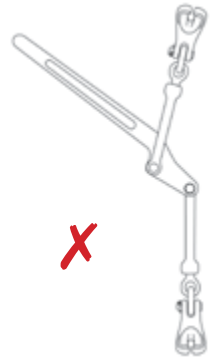
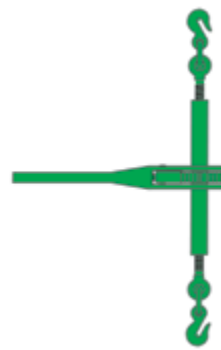
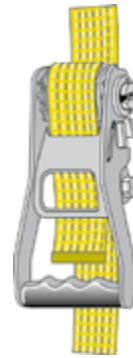
Applies to:

- Coates' range of skid-mounted equipment up to 22t
- Lightweight transport stillages/cages 0t - 5t
- Small portable toilets up to 700kg

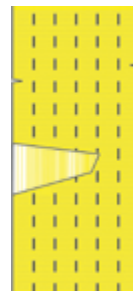


Load restraint equipment requirements:

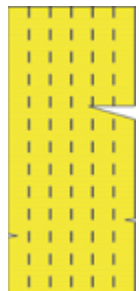
- Some low friction restraint options are provided for skid-mounted equipment. It is good practice to place items on industrial rubber when not using a tilt tray.
- Truck deck should be free of any contaminants that may reduce friction (e.g. mud, gravel or oil).
- Transport chain conforming to AS/NZ4344 tensioned to a minimum pre-tension of 750kg.f averaged across the load.
- 50mm webbing conforming to AS/NZS4380 tensioned to a minimum pre-tension of 300kg.f averaged across the load.
- Equipment must be in good working order. Inspect lashings for wear.
- All fittings must be in good condition and are required to have the same rated capacity, or greater, as the lashings being used.
- Ausbinders, Turnbuckle ratchet, Web-Dog binders or similar are a suitable alternative to dogs, provided a minimum pre-tension of 750kg.f can be achieved.
- Slippery surfaces (e.g. steel to steel) must be avoided wherever possible.
- Chains with excessively damaged, worn or bent links must not be used.
- Over center lever load binders (dogs) are a high risk and are not permitted for use on Coates sites.
- Webbing straps with stretched or damaged fibres more than 10% of the strap width must be discarded and not be used.
- Castors wheels that are free to rotate are not permitted.



Use rubber matting to increase friction



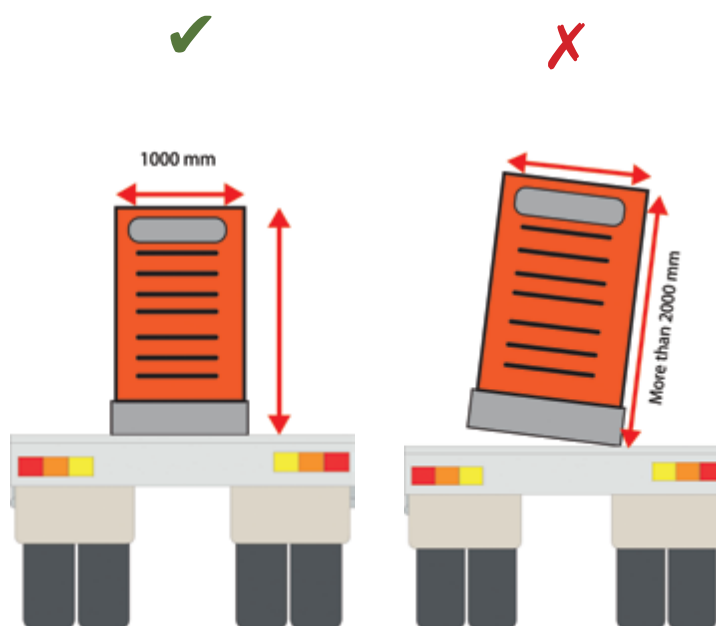
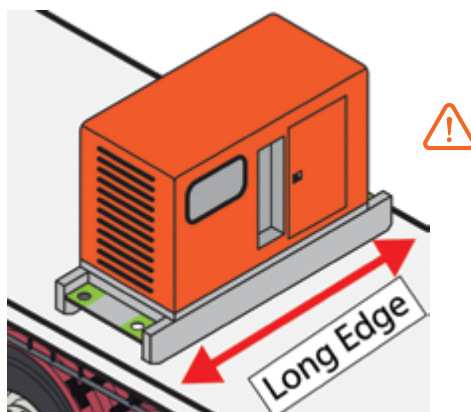
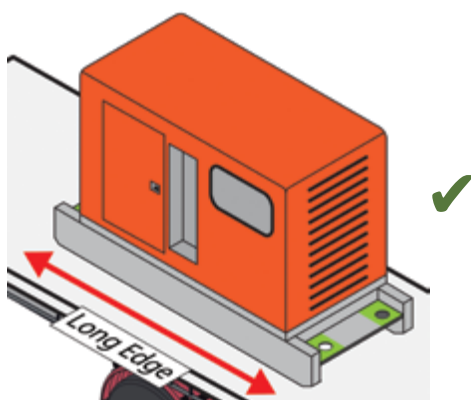
Stretched webbing



More than 10% wear

Section F: Skid-based equipment

- This restraint system has been evaluated with low friction; in this instance, loading directly steel to steel has been determined as suitable with the below restraint systems.
- All chains other than those through the tyne pockets must be looped.
- Ensure that the generators are loaded centrally on the deck.
- Chains must be placed within the dimensional ranges specified in this guideline. If anchor points are not within these ranges, a separate assessment would be required to conform to, Schedule 7 of the Heavy Vehicle (Mass, Dimension and Loading) National Regulation.
- All skid-based equipment shall be placed such that the long dimension (length) is longitudinal to the truck unless specified in this guideline.
- All skid-based equipment shall have a maximum height to base ratio of 2:1. Where the height exceeds this ratio, a separate assessment for sideways toppling is required.
- There is a risk of toppling if the base is less than half the height.
- Two abreast units must have tyne pockets aligned.
- Two abreast configurations must be the same unit.

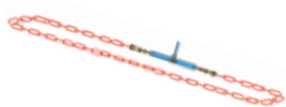


Note: When restraining with direct restraint low down on the frame only, the maximum stability ratio at 0.5g sideways is 2:1

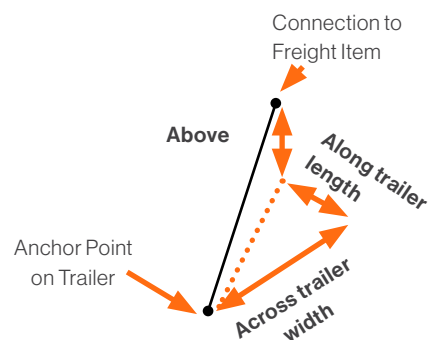
F.1. Skid-based equipment weight range up to 3.3t



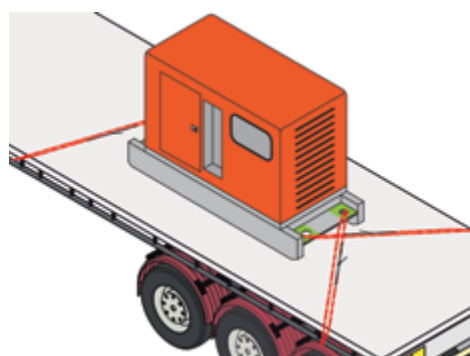
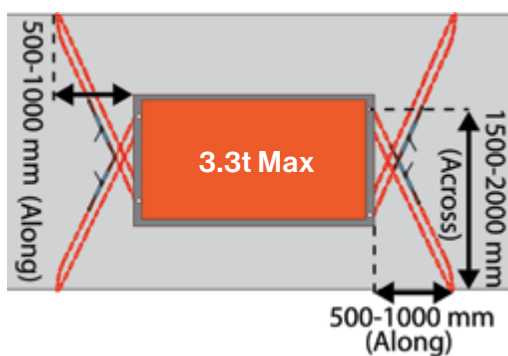
Grade 70 Transport Chains
to AS4344



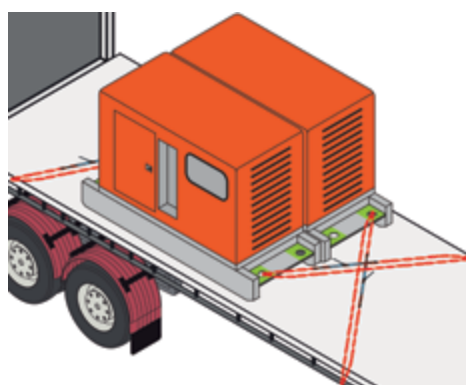
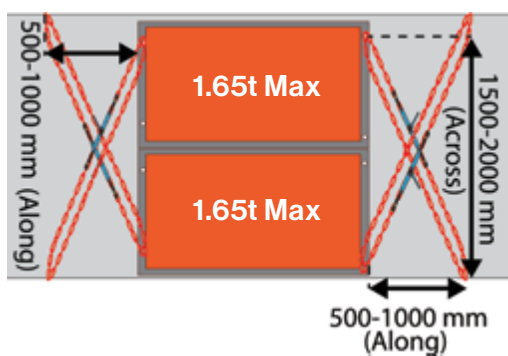
Looped Chain



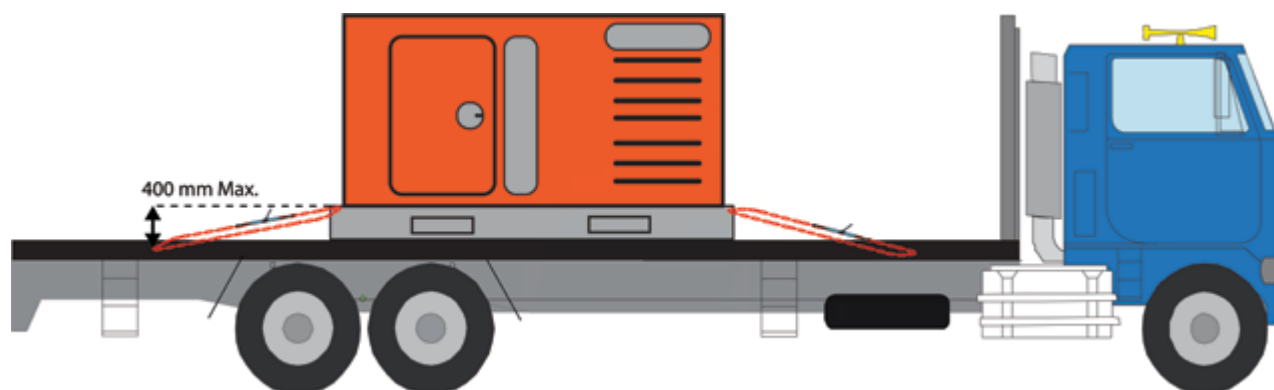
Top View - Single File



Top View - Two Abreast



Must be the
same unit



Section F.1: Skid-based equipment load restraint matrix

F.1.1. Skid-based equipment less than 3.3t [Generators - Air]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	50mm webbing straps	Drawbar basket buckets secured	50mm wheel straps	8mm chain single	8mm chain looped	10mm chain single	10mm chain looped	13mm chain single	13mm chain looped
ATLAS COPCO	Generator - 15kVA (Diesel)	1860	811	957	793				4	4	4	4	4	4
ATLAS COPCO	Generator - 18kVA (Diesel)	1860	811	957	793				4	4	4	4	4	4
ATLAS COPCO	Generator - 20kVA (Diesel)	1860	811	957	793				4	4	4	4	4	4
COMPAIR	Compressor 180CFM (Diesel)	2900	1390	1300	895	4	Yes	2	4	4	4			
ATLAS COPCO	Compressor 130CFM (Diesel)	2827	1410	1258	915	4	Yes	2	4	4	4			
ATLAS COPCO	Compressor 130CFM (Diesel)	2827	1410	1258	915	4	Yes	2	4	4	4			
ATLAS COPCO	Compressor 175CFM (Diesel)	2970	1410	1258	925	4	Yes	2	4	4	4			
ATLAS COPCO	Generator - 25kVA (Diesel)	2080	951	1157	942				4	4	4	4	4	4
ATLAS COPCO	Generator - 35kVA (Diesel)	2080	951	1157	1017				4	4	4	4	4	4
COMPAIR	Compressor 130CFM (Diesel)	3545	1250	1550	1050	4	Yes	2	4	4	4			
COMPAIR	Compressor 175CFM (Diesel)	3545	1250	1550	1050	4	Yes	2	4	4	4			
COMPAIR	Compressor 275CFM (Diesel)	3770	1580	1415	1100	4	Yes	2	4	4	4			
COMPAIR	Compressor 250 - 260CFM (Diesel)	3495	1430	1405	1236	4	Yes	2	4	4	4			
ATLAS COPCO	Generator - 70kVA (Diesel)	2562	1031	1307	1662					4	4	4	4	4
ATLAS COPCO	Generator - 80kVA (Diesel)	2562	1031	1307	1662					4	4	4	4	4
COMPAIR	Compressor 390 - 400CFM (Diesel)	4275	1670	1602	1930		Yes		4	4	4			
COMPAIR	Compressor 400CFM (Diesel)	4544	1820	1765	2050		Yes		4	4	4			
ATLAS COPCO	Generator - 45kVA (Diesel)	2450	1100	1770	2086					4	4	4	4	4
CUMMINS	Generator - 36kVA (Diesel)	2980	1370	1690	2310					4	4	4	4	4
CUMMINS	Generator - 50kVA (Diesel)	2850	1300	1600	2410					4	4	4	4	4
ATLAS COPCO	Generator - 125kVA (Diesel)	3112	1131	1507	2424					4	4	4	4	4
ALLIGHT	Generator - 150kVA (Diesel)	3558	1130	1943	2601				4		4	4	4	4
CUMMINS	Generator - 56kVA (Diesel)	3420	1450	1750	2750					4	4	4	4	4
CUMMINS	Generator - 56kVA (Diesel)	3420	1450	1750	2750					4	4	4	4	4
ATLAS COPCO	Generator - 100kVA (Diesel)	2940	1100	1780	2756				4		4	4	4	4
CUMMINS	Generator - 75kVA (Diesel)	3420	1450	1750	2850					4	4	4	4	4
CUMMINS	Generator - 75kVA (Diesel)	3420	1450	1750	2850					4	4	4	4	4
CUMMINS	Generator - 100kVA (Diesel)	3420	1450	1750	2950				4		4	4	4	4

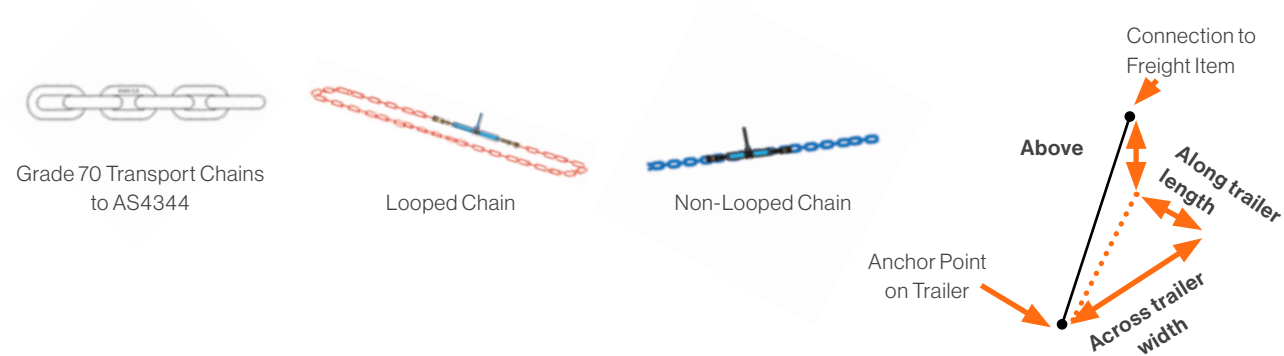
F.1.2. Skid-based equipment less than 3.3t [Welder]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	8mm chain single	8mm chain looped	10mm chain single	10mm chain looped
LINCOLN	Welder 575A Vantage	2100	1040	1480	980	4	4	4	4

F.1.3. Skid-based equipment less than 3.3t [Pumps]

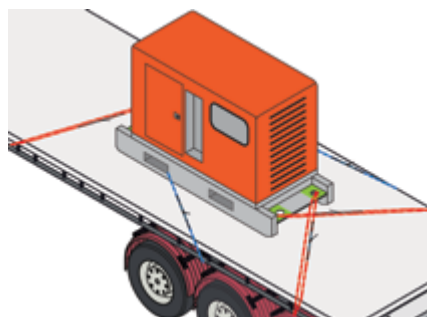
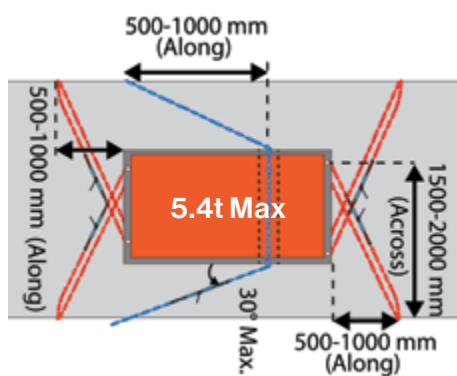
Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	50mm webbing straps	Drawbar basket buckets secured	50mm wheel straps	8mm chain single	8mm chain looped	10mm chain single	10mm chain looped	13mm chain single	13mm chain looped
SYKES	Pump 75mm Diesel	1960	900	1300	840				4	4	4	4	4	4
SYKES	Pump 100mm Diesel	1960	900	1300	850				4	4	4	4	4	4
SYKES	Pump 100mm Diesel	1960	900	1300	950				4	4	4	4	4	4
SYKES	Pump 150mm Diesel	1960	900	1300	1100				4	4	4	4	4	4
SYKES	Pump 150mm Diesel Trailer Mounted	2250	1100	1375	1325	4	Yes	2	4	4	4	4	4	4
SYKES	Pump High Head 80mm	2340	1250	1900	1540				4	4	4	4	4	4
SYKES	Pump Large 150mm Cp/CD/Vp150	2340	1250	1900	1640				4	4	4	4	4	4
SYKES	Pump 150mm Diesel	2340	1250	1900	1640				4	4	4	4	4	4
SYKES	Pump 150mm Wellpoint	2340	1250	1900	1640				4	4	4	4	4	4
SYKES	Pump 100mm Silenced HH-HL80	2850	1100	1900	2200					4	4	4	4	4
SYKES	Pump 100mm Silenced	2850	1100	1900	2200					4	4	4	4	4
SYKES	Pump 150mm Diesel Silenced	2850	1100	1900	2200					4	4	4	4	4
SYKES	Pump 150mm Diesel Silenced	2850	1100	1900	2200					4	4	4	4	4
SYKES	Pump 200mm Diesel	2600	1520	2270	2370					4	4	4	4	4
SYKES	Pump 200mm Diesel	2600	1520	2270	2370					4	4	4	4	4
SYKES	Pump 100mm Diesel	2850	1100	1900	2400					4	4	4	4	4
SYKES	Pump 150mm Diesel Silenced	2850	1100	1900	2500					4	4	4	4	4
SYKES	Pump 150mm Diesel	2850	1100	1900	2500					4	4	4	4	4
SYKES	Pump High Head 100mm - HH100	3000	1250	1870	2920					4	4	4	4	4
SYKES	Pump High Head 100mm - HH100	3500	1520	2250	2920					4	4	4	4	4
SYKES	Pump High Head 150mm - HH125	3500	1520	2250	2920					4	4	4	4	4
SYKES	Pump 200mm Silenced	3800	1550	1815	2950					4	4	4	4	4
SYKES	Pump High Head 80mm - xh80	4000	1550	1700	3000					4	4	4	4	4
SYKES	Pump Extra High Head 100mm	4500	1820	2150	3150					4	4	4	4	4
SYKES	Pump 150mm (6inch)	4500	1820	2150	3150					4	4	4	4	4

F.2. Skid-based equipment 3.3 - 5.4t

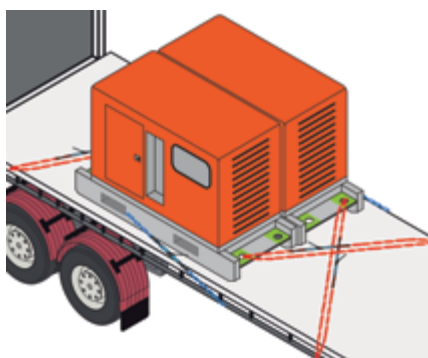
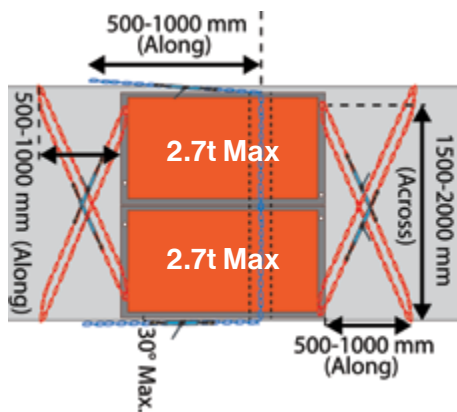


- An additional forwards-acting non-looped 8mm direct chain through the tyre pocket is required. Angled less than 30 degrees.

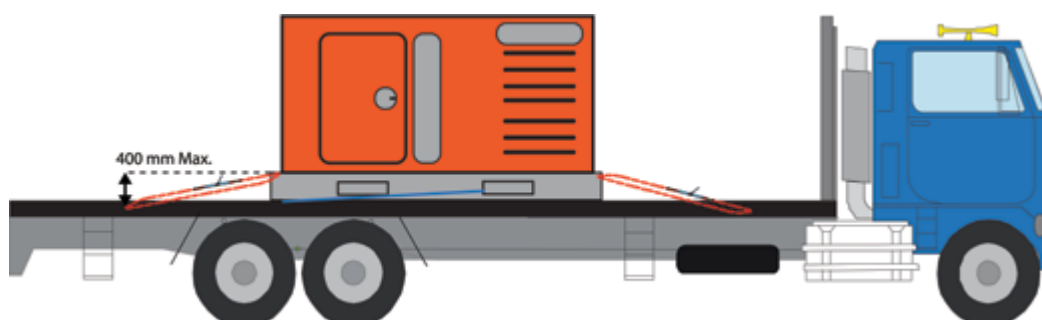
Top View - Single File



Top View - Two Abreast



Must be the same unit



Section F.2: Skid-based equipment load restraint matrix

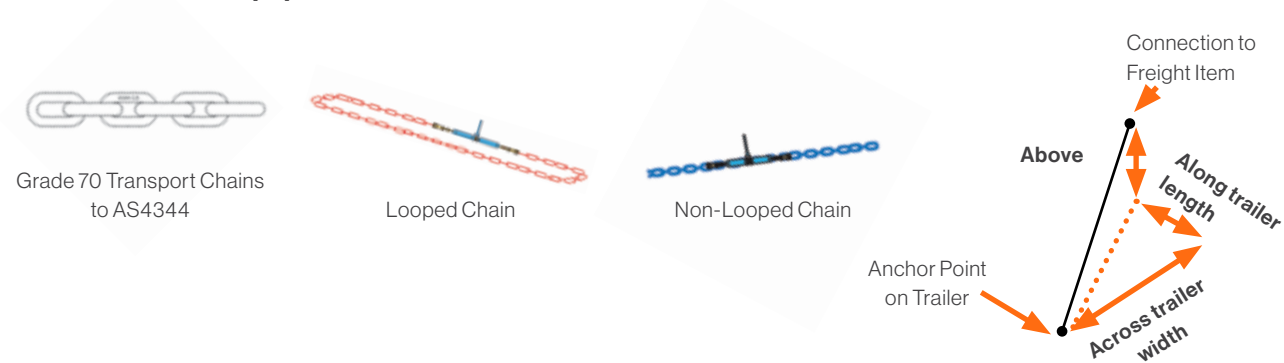
F.2.1. Skid-based equipment 3.3t – 5.4t [Generators – Air]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	8mm chain single	8mm chain looped	10mm chain single	10mm chain looped	13mm chain single	13mm chain looped	Comments
ATLAS COPCO	Generator - 100kVA (Diesel)	3380	1180	1930	3349		4		4	4	4	Min. 1 x 8mm chain through tyne pocket
CUMMINS	Generator - 100kVA (Diesel)	3600	1140	1900	3500		4		4	4	4	Min. 1 x 8mm chain through tyne pocket
ATLAS COPCO	Generator - 150kVA (Diesel)	3470	1440	2330	4050		4		4	4	4	Min. 1 x 8mm chain through tyne pocket
ATLAS COPCO	Generator - 200kVA (Diesel)	3470	1440	2330	4150		4		4	4	4	Min. 1 x 8mm chain through tyne pocket
ATLAS COPCO	Generator - 300kVA (Diesel)	3955	1431	2128	4240		4		4	4	4	Min. 1 x 8mm chain through tyne pocket
CUMMINS	Generator - 150kVA (Diesel)	4040	1660	2025	4250		4		4	4	4	Min. 1 x 8mm chain through tyne pocket
COMPAIR	Compressor 900CFM (Diesel)	5740	1865	2210	4886	6	4	4	4	4	4	
COMPAIR	Compressor 1000CFM (Diesel)	5740	1865	2210	5016	6	4		4	4	4	
CUMMINS	Generator - 180kVA (Diesel)	4200	1600	2080	5200		4		4	4	4	Min. 1 x 8mm chain through tyne pocket

F.2.2. Skid-based equipment 3.3t – 5.4t [Pumps]

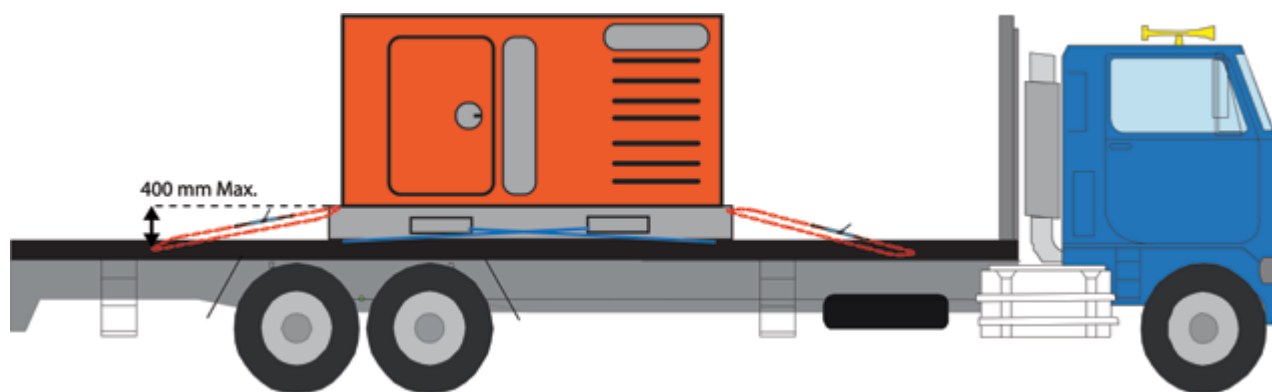
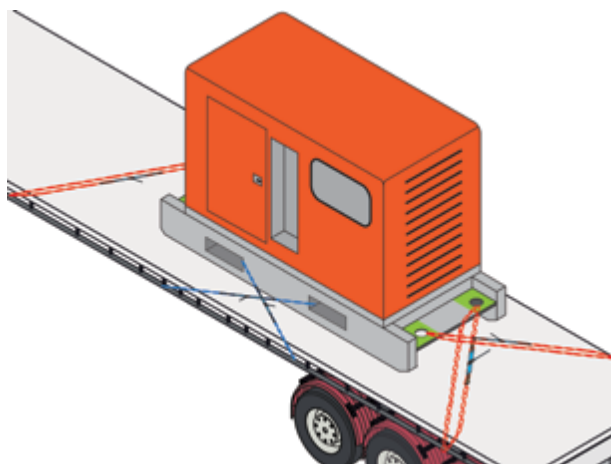
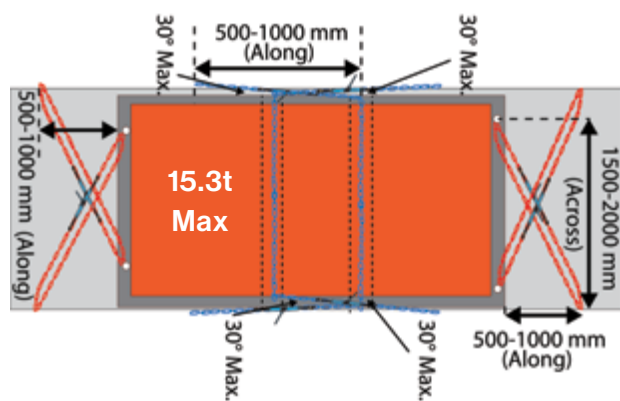
Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	8mm chain looped	10mm chain single	10mm chain looped	13mm chain single	13mm chain looped	Comments
SYKES	Pump High Head 150mm	4500	1620	2400	3700	4	4	4	4	4	Min. 1 x 8mm chain through tyne pocket
SYKES	Pump Extra High Head 150mm	5000	1820	2200	3950	4	4	4	4	4	Min. 1 x 8mm chain through tyne pocket
SYKES	Pump Extra High Head 150mm	5000	1820	2200	3950	4	4	4	4	4	Min. 1 x 8mm chain through tyne pocket

F.3. Skid-based equipment 5.5t - 15.3t



- 2 x additional non-looped 8mm blocking chains through the tyne pockets are required. Angled less than 30 degrees.

Top View - Single File



Forwards and rearwards chains (max 300) through tyne pockets

Section F.3: Skid-based equipment load restraint matrix

F.3.1. Skid-based equipment 5.5t – 15.3t [Generators – Air]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	10mm chain looped	13mm chain single	13mm chain looped	Comments
ATLAS COPCO	Generator - 230kVA (Diesel)	4020	1390	2310	5475	4		4	Min.1 x 8mm chain through tyne pocket
CUMMINS	Generator - 200kVA (Diesel)	4200	1600	2080	5500	4	4	4	Min. 2 x 10mm chains through tyne pockets
ATLAS COPCO	Generator - 320kVA (Diesel)	4020	1390	2310	5612	4		4	Min. 1 x 8mm chain through tyne pocket
ATLAS COPCO	Generator - 450kVA (Diesel)	4800	1550	2300	6252	4		4	Min. 1 x 8mm chain through tyne pocket
CUMMINS	Generator - 313kVA (Diesel)	4700	1870	2400	7600	4		4	Min. 2 x 10mm chains through tyne pockets
CUMMINS	Generator - 250kVA (Diesel)	5040	1900	2380	8200	4		4	Min. 2 x 10mm chains through tyne pockets
CUMMINS	Generator - 300kVA (Diesel)	5400	2050	2650	8800	4		4	Min. 2 x 10mm chains through tyne pockets
CUMMINS	Generator - 270kVA (Diesel)	5200	1850	2650	8900	4		4	Min.2 x 10mm chains through tyne pockets
CUMMINS	Generator - 350kVA (Diesel)	5400	2050	2650	9200	4		4	Min. 2 x 10mm chains through tyne pockets
CUMMINS	Generator - 500kVA (Diesel)	5500	1800	2500	9740	4		4	Min. 2 x 10mm Chains through Tyne pockets
CUMMINS	Generator - 500kVA (Diesel)	5700	2200	2600	10300	4		4	Mini.2 x 10mm chains through tyne pockets

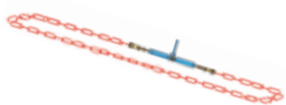
F.3.2. Skid-based equipment 5.5t – 15.3t [Pumps]

Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	10mm chain looped	13mm chain single	13mm chain looped	Comments
SYKES	Pump High Flow 300mm Diesel - Cp300	5100	2200	2500	6300	4	4	4	Min. 2 x 10mm chains through tyne pockets
SYKES	Pump High Head 200mm	4900	2000	3150	7600	4	4	4	Min. 2 x 10mm chains through tyne pockets

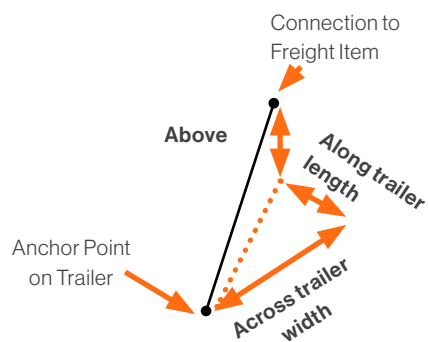
F.3.3. Skid-based equipment up to 2t (loaded sideways at rear of truck)



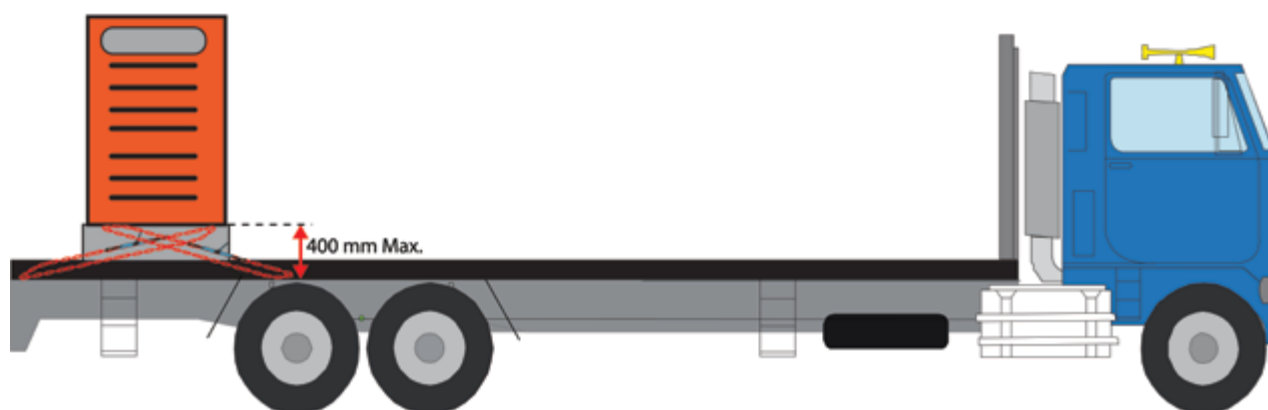
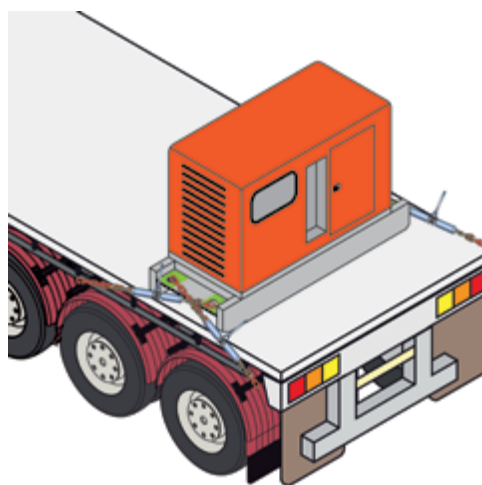
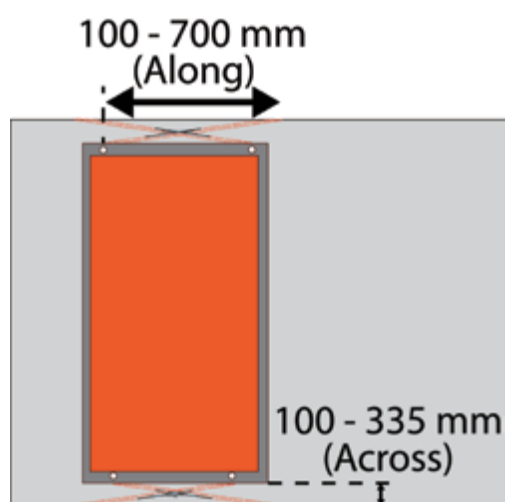
Grade 70 Transport Chains
to AS4344



Looped Chain

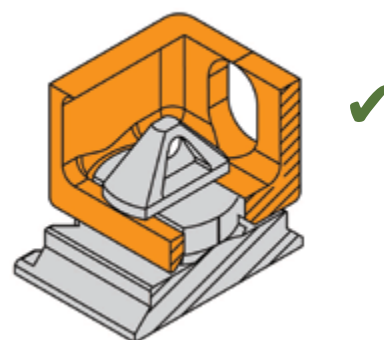
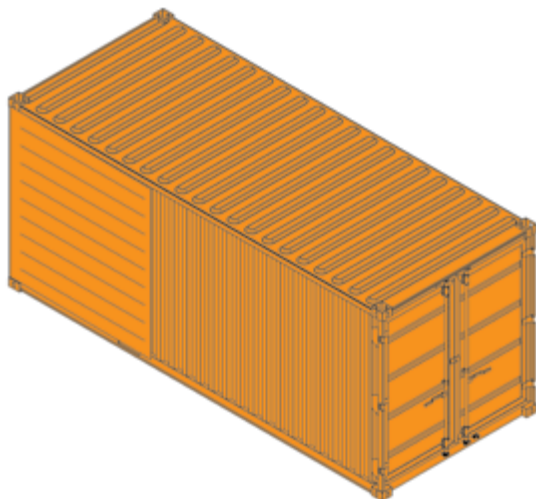


Top View - Single File

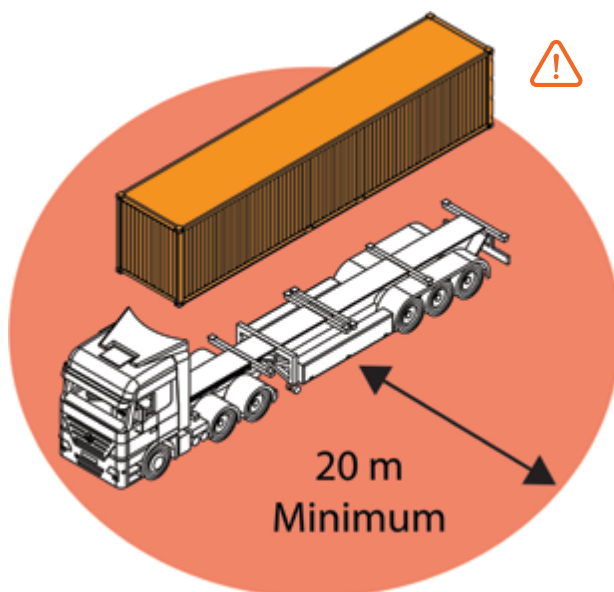


F.4. Containerised generator sets less than 22t

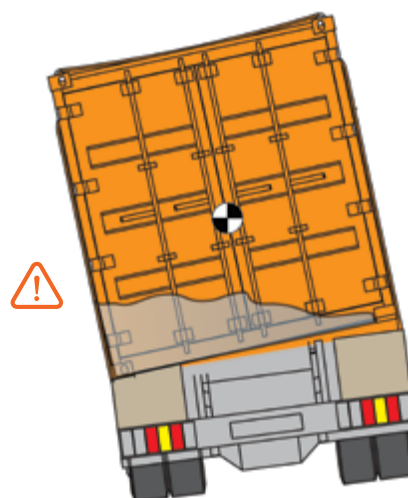
- Ensure that container pins are aligned and that all four are properly engaged.
- Do not enter the loading exclusion zone until the container has been placed on the vehicle.
- No partially filled fuel tanks. Liquid sloshing can destabilise the vehicle.
- Completely empty or completely full tanks are acceptable.



Ensure all four container twist locks are properly engaged.



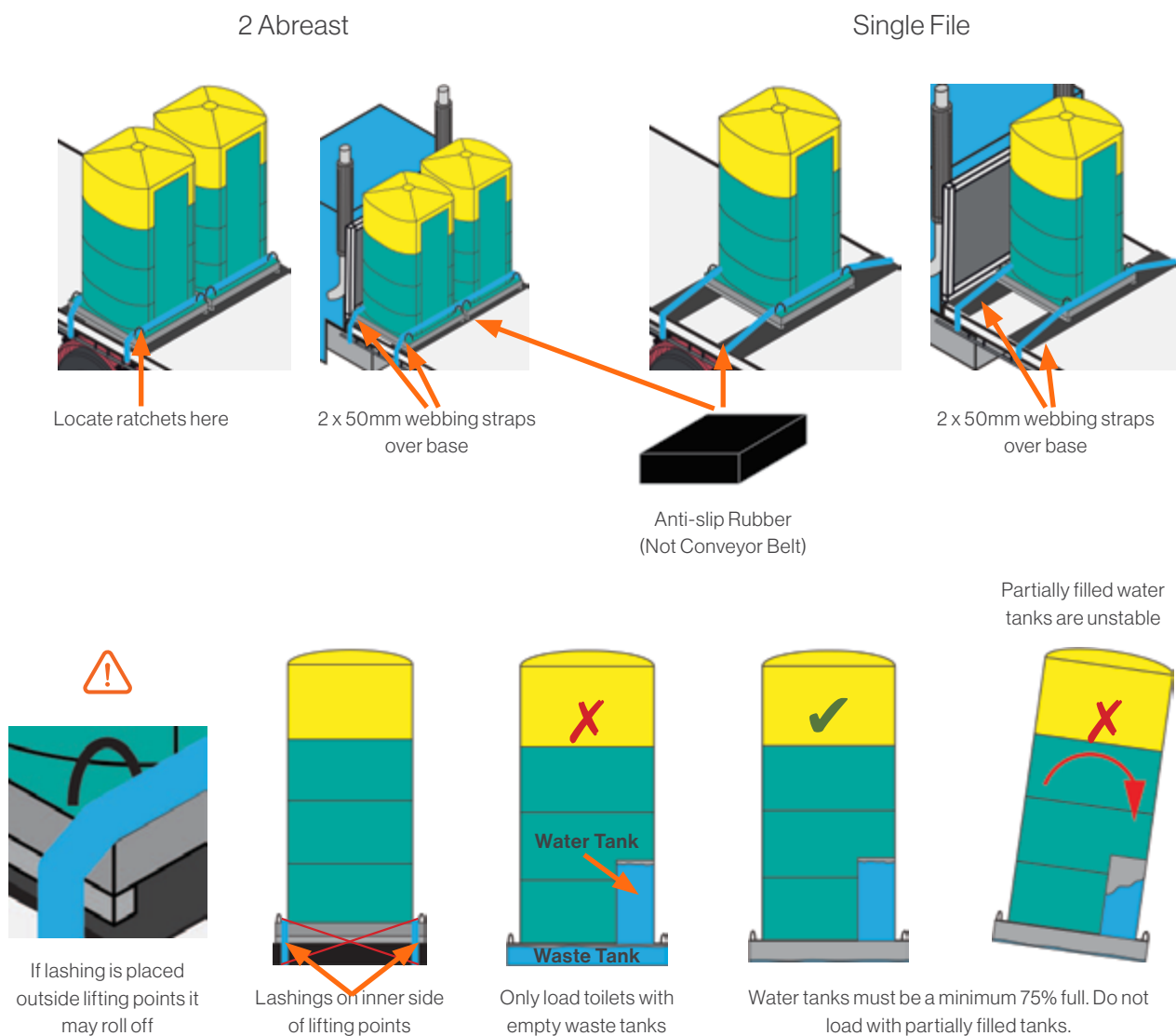
Do not enter the loading exclusion zone until the container is resting on the trailer and it is safe to enter the exclusion zone.



Partially filled fuel tanks elevate the vehicle rollover risk.

Section G: Tie-down - General loads

G.1.1. Lashing Configurations Portable Toilets



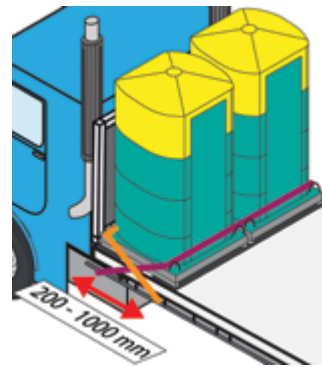
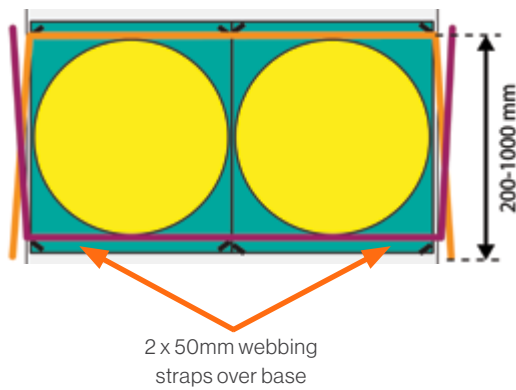
- Do not place 50mm tie down webbings outside lifting points as the lashing may come off and lose tension.
- Do not load with full waste tanks or partially filled water tanks.
- Load on anti-slip rubber to achieve static friction coefficient of 0.4.
- Do not load on timber dunnage.
- Do not locate ratchets on the edge of the toilet base.

G.1.1. Lashing Configurations Portable Toilets – load restraint matrix

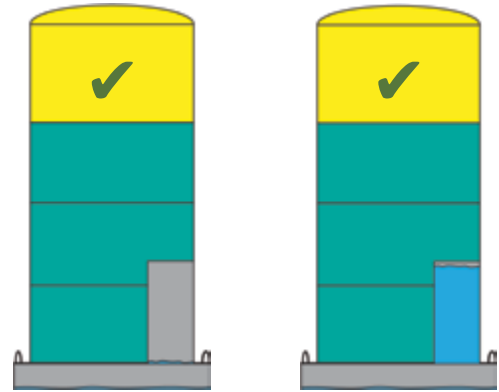
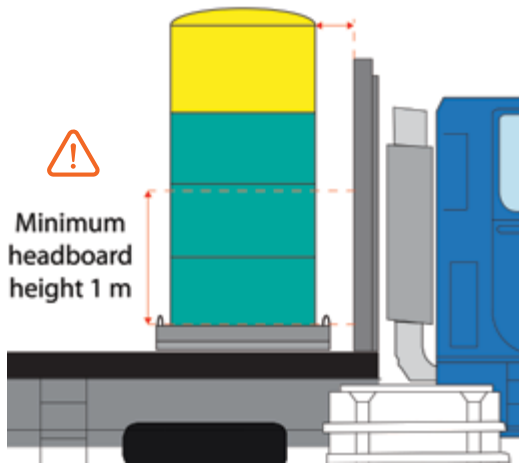
Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	50mm webbing straps	Transport rubber
MERLIN	Toilet Portable - Fresh Water Flush	1220	1200	2220	117	2	Yes

G.1.2. Lashing Configurations Portable Toilets – 2 abreast and blocked

2 abreast and blocked - 2 x 50mm webbing straps



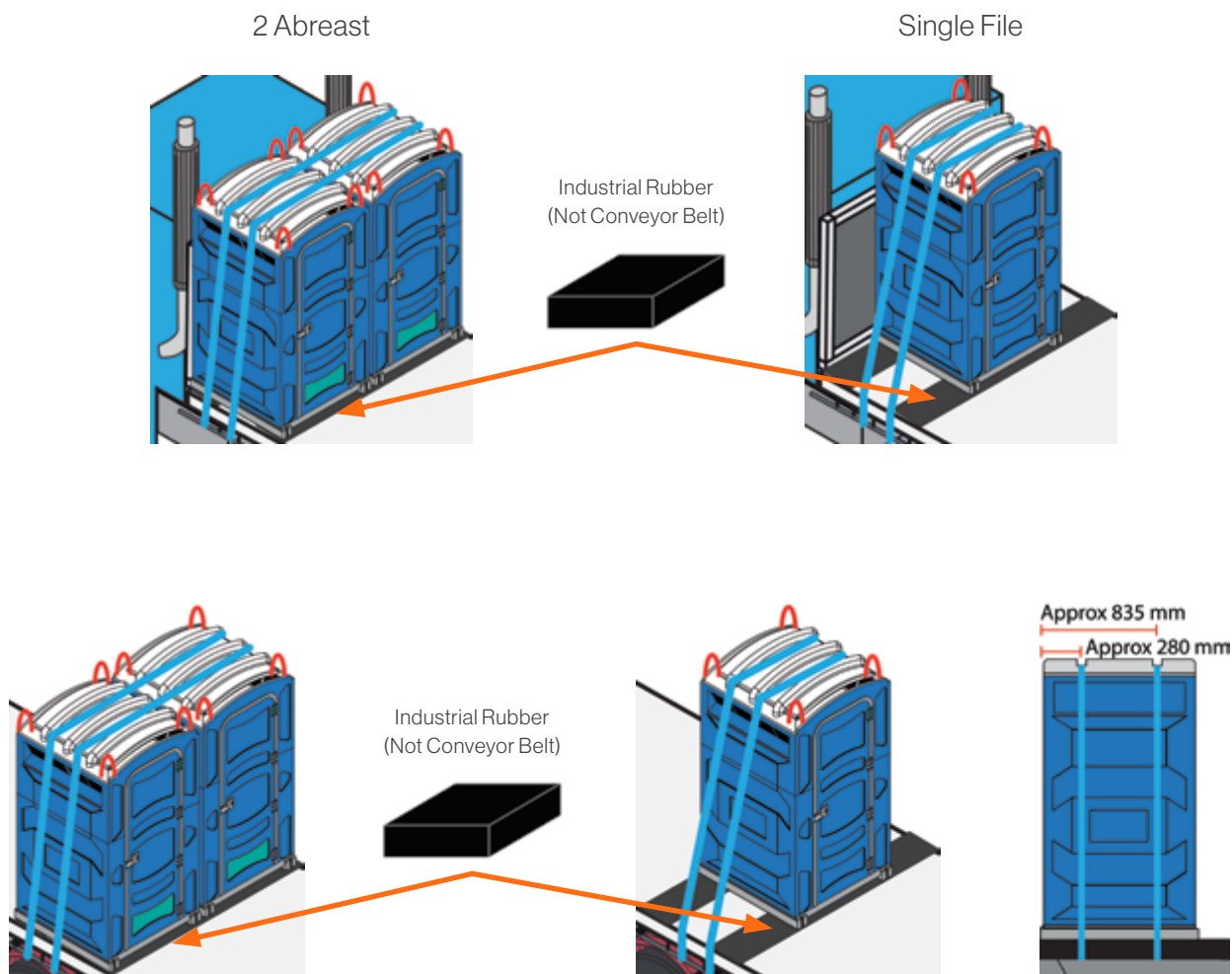
Maximum total gap between blocking surface is 200mm



Water tanks must be a minimum of 75% full or be empty

- Headboard must be minimum height of 1m.
- Engineered headboard should be able to provide blocking restraint equivalent to 30% of the payload.
- Total accumulative gap along the length of the load is 200mm.
- Do not place 50mm tie down webbings outside lifting points as the lashing may come off and lose tension.
- Do not load with full waste tanks or partially filled water tanks.
- Do not load on timber dunnage.
- Load on anti-slip rubber to achieve static friction coefficient of 0.4.

G.1.3 Lashing configurations: Portable Toilets with internal frames



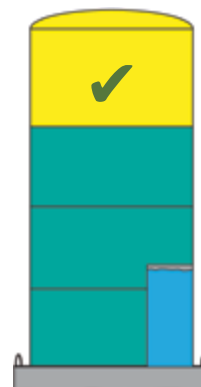
- 2 x 50mm standard ratchets must be applied over portalooks at all times.
- Do not load with full waste tanks or partially filled water tanks.
- Load on industrial rubber or similar to achieve static friction coefficient of 0.4.
- Do not load on timber dunnage.
- Portable toilets without internal frames cannot be restrained with this method.



Do not lash through lugs on top of toilet



Lugs on top of toilet indicate internal frame



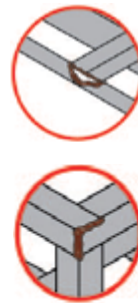
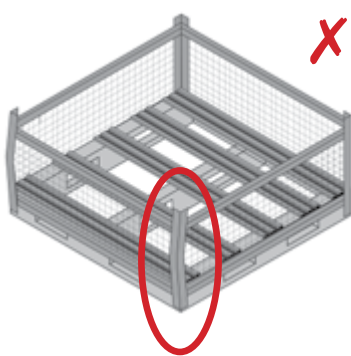
Water tanks must be a minimum of 75% full

G.2. Stillage loading considerations

Prior to loading with freight, visually inspect and check that the cage or stillage is suitable for the freight task. The cage must be in good condition and not have excessive rust/corrosion. The cage must not have a buckled or deformed frame structure.

- Steel cages must have a rated working load limit (WLL) or safe working load (SWL) if they contain loads greater than 500kg.
- Single packaging straps are not adequate to restrain loose items from bouncing out. A plywood or similar lid is preferred.
- Do not fill cages higher than the sides of the containing walls.
- Do not use damaged or buckled cages.
- Use plywood, foam or timber to block loose items inside the cage.
- Plywood or anti-slip rubber must be placed between the stillage and the deck of the truck.

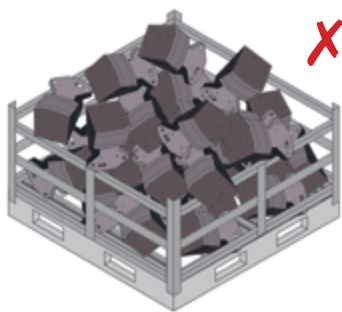
Condition assessment:



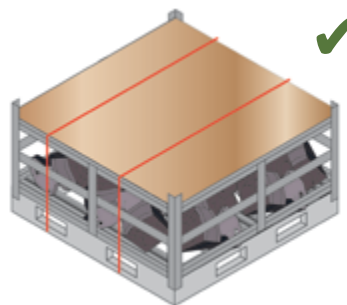
Flaking rust is not acceptable.
Some surface rust is allowable.

Check frame for damage. Buckled frames are not acceptable.

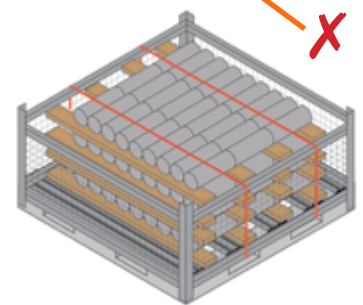
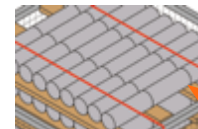
Condition assessment:



Don't stack loose items higher than side walls.



Use lid to prevent loose items bouncing out.



Loose items can bounce out.
Use lid.

G.3. Tie-down tables stillages (standard ratchets)

- Use the following tables for standard push-up ratchets with a minimum pre-tension of 300kg.f averaged across the load.
- Do not load any items with steel-on-steel contact surface.
- If wooden dunnage is used, ensure that it is placed on its long edge.

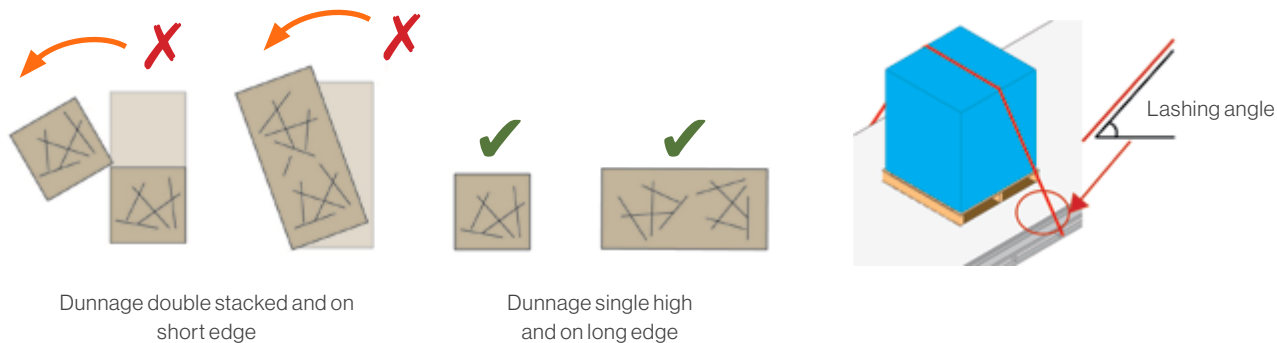
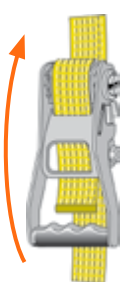
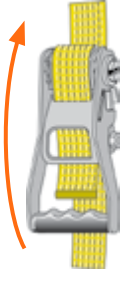


Table 1. Tie-down 50mm webbing restraint - load placed on wooden dunnage

Payload (kg)	Number of lashings required blocked (tie-down angle)			Number of lashings required unblocked (tie-down angle)		
	(80-90°)	(60-79°)	(30-59°)	(80-90°)	(60-79°)	(30-59°)
0-1000	2	2	2	2	2	4
1001-1500	2	2	2	3	3	5
1501-2000	2	2	2	4	4	7
2001-2500	2	2	3	5	5	9
2501-5000	3	3	5	9	10	Not practical

Table 2. Tie-down 50mm webbing restraint - load placed on anti-slip rubber

Payload (kg)	Number of lashings required blocked (tie-down angle)			Number of lashings required unblocked (tie-down angle)		
	(80-90°)	(60-79°)	(30-59°)	(80-90°)	(60-79°)	(30-59°)
0-1000	2	2	2	2	2	2
1001-1500	2	2	2	2	2	2
1501-2000	2	2	2	2	2	3
2001-2500	2	2	2	2	2	3
2501-5000	2	2	4	3	4	6

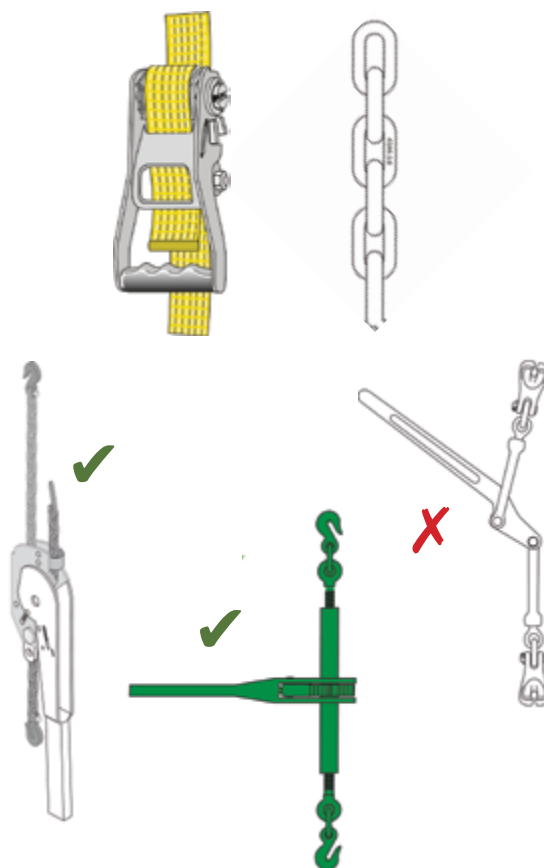
Load restraint: Loose Scaffold Planks, Barriers and PVC/Plastic Pipes

Applies to the following items transported on behalf of Coates:

- Loose scaffold planks
- BG800 crash barriers
- Water-filled cash barriers
- Concrete barriers
- PVC/plastic dewatering pipes

Load restraint equipment requirements:

- Some low friction restraint options are provided for equipment loaded on steel racking.
- 8mm or larger transport chain, conforming to AS/NZ4344 tensioned to a minimum pre-tension of 750kg.f averaged across the load.
- 50mm webbing, conforming to AS/NZS4380 tensioned to a minimum pre-tension of 300kg.f averaged across the load (unless otherwise specified).
- Equipment must be in good working order. Inspect lashings for wear.
- All fittings must be in good condition and are required to have the same rated capacity, or greater, as the lashings being used.
- Ausbinders, turnbuckle ratchet, Web Dog binders or similar are a suitable alternative to dogs provided a minimum pre-tension of 750kg.f can be achieved.
- Chains with excessively damaged, worn or bent links must not be used.
- Webbing straps with stretched or damaged fibres for more than 10% of the strap must be discarded.
- Over center lever load binders (dogs) are a high risk and are not to be used on Coates sites.
- Slippery surfaces (eg steel to steel) must be avoided wherever possible.



Chains with elongated, worn or bent links must not be used for restraint.



All fittings at least the same rating as the chain



Stretched webbing



More than 10% wear

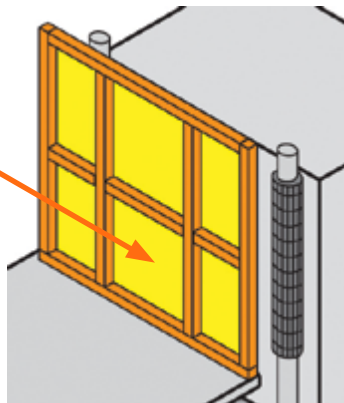
Blocking requirements:

Engineered Headboard:

Typical Engineered Headboard 4 x large section uprights.

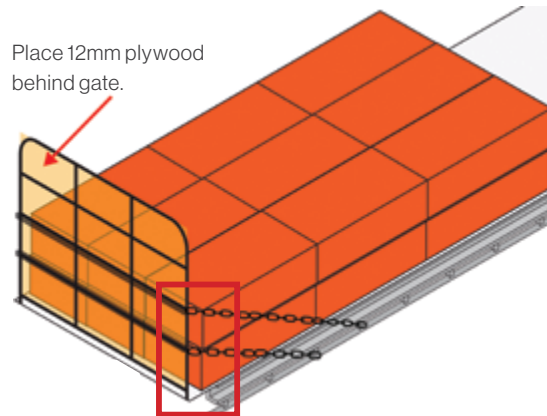


Engineered Headboards can be used to provide blocking restraint.

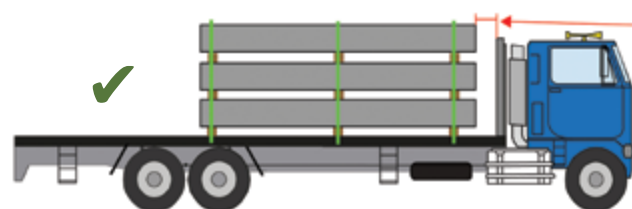
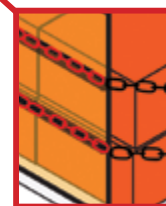


Reinforced Pipe Gate:

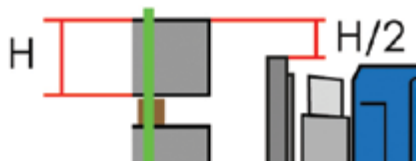
Place 12mm plywood behind gate.



Reinforce pipe gates by placing two chains through RHS sections welded to the pipe gate.



Max 200 mm gap to blocking surface for blocked loads



Top layer must not extend more than half its height above the headboard to be considered blocked.



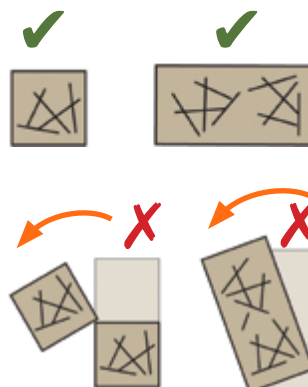
Pipe gates not suitable for restraint of heavy steel items.



Maximum trade rack capacity evaluated at 150kg unless certified otherwise

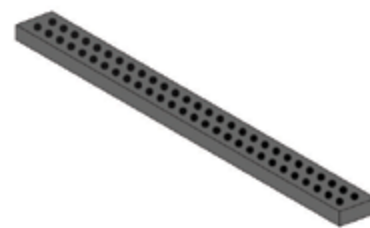
Dunnage requirements: applies to all sections

- Use square timber dunnage in good condition. Minimum 100x100mm.
- Hardwood dunnage only.
- No softwood dunnage.
- Rectangular dunnage must be placed on long edge.

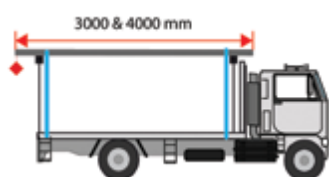


Section H: Loose Scaffolding Planks

- Maximum nine planks in any stack.
- Minimum 2 x 50mm webbing straps for restraint of scaffolding planks.
- All scaffolding planks shall be placed centrally on the deck.
- If not on a H-frame racks, planks must be placed on timber dunnage.
- Use square timber dunnage in good condition. Minimum 75x75mm.
- All scaffolding planks shall be placed centrally on the H frame.
- All scaffolding planks will be 3, 4, 5 or 6m long and weigh 5, 8, 12 and 15kg respectively.



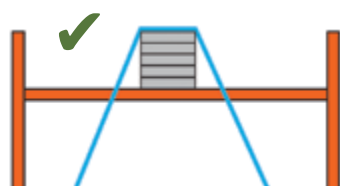
Load configuration: H-frame



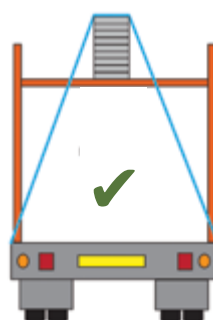
Minimum of Two (2) lashings are required for restraint.



Do not position scaffold planks on an angle



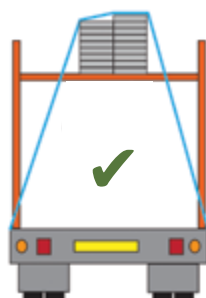
Ensure placed centrally on the H-frame for equal lashing angle



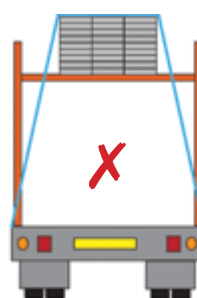
Maximum 9 planks high



Ensure lashings are attached to the truck deck



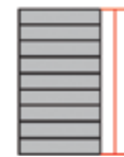
Maximum 50mm height difference between columns



Do not load 3 columns of planks

Table 1. Tie-down with webbing restraint on H-frame - standard pretension

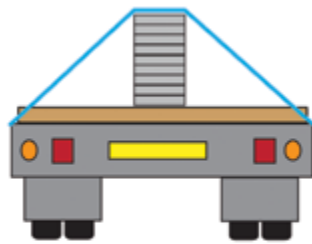
Max. allowable number of planks for 2 lashings	6m & 5m	4m	3m
35mm ratchet	6	10	18
50mm ratchet/Winch	12	18	18



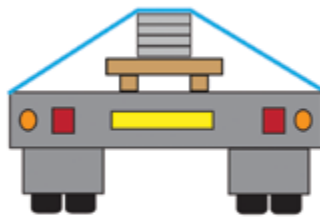
Max 9 planks
high per
column

*Do not use with uneven height gaps

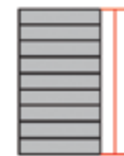
Load configuration: Dunnage



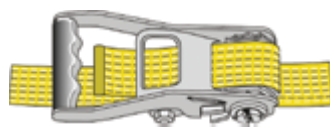
Stack only one
column of planks
on dunnage



When stacking less than
4 planks, add extra layer
of dunnage

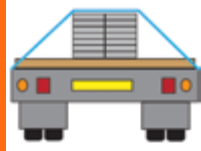


Max 9 planks
high per
column



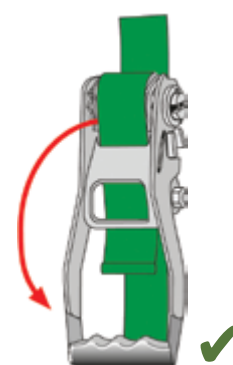
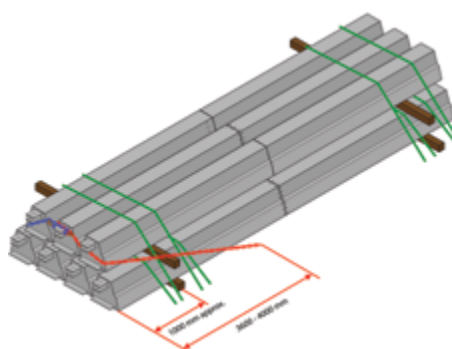
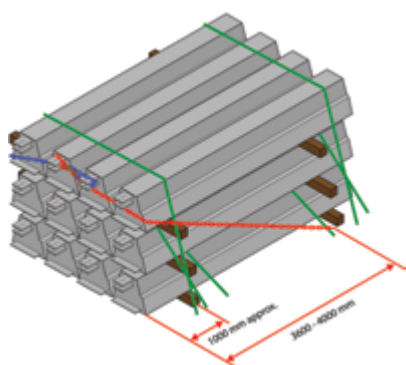
Use only 50mm
webbing strap

**Table 2. Tie-down with webbing restraint on dunnage - standard 50mm ratchet/winch**

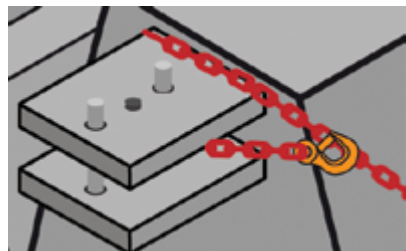
	1-4 planks	1-4 planks	5-9 planks	5-9 planks
				
Length	Number of lashings required			
3m	2	2	2	2
4m	2	2	2	3
5m	2	3	3	4
6m	2	4	3	5

Section I: BG800 Crash Barriers

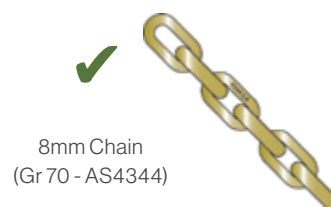
- Ensure that barriers have timber dunnage under each layer. Dunnage must be one piece.
- Use square hardwood timber dunnage in good condition. Minimum 100x100mm.
- Maximum load on trailer is 12 x 12m barriers.
- Minimum 8mm transport chain.
- Use 50mm high pre-tension webbing straps with ratchets capable of achieving a 600kg.f pretension averaged across the load.
- Barrier to be loaded with the male connector facing to the front.
- For loading configurations with more than two barriers on the top layer, the top layer must have two blocking chains attached to the male connector of the barrier as shown below.



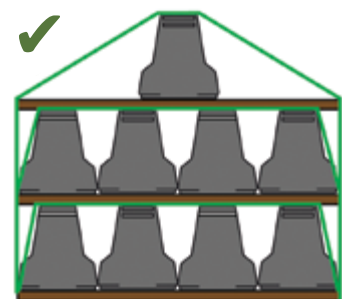
Use only high pre-tension webbing straps



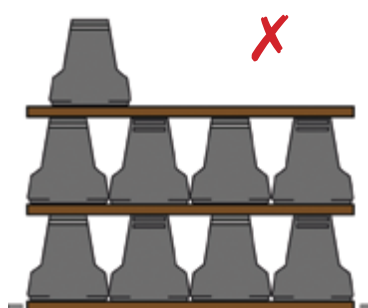
Loop chain through male connector and secure hook to chain



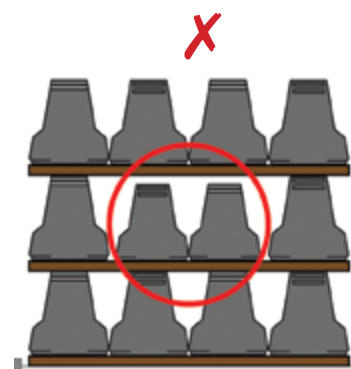
8mm Chain
(Gr 70 - AS4344)



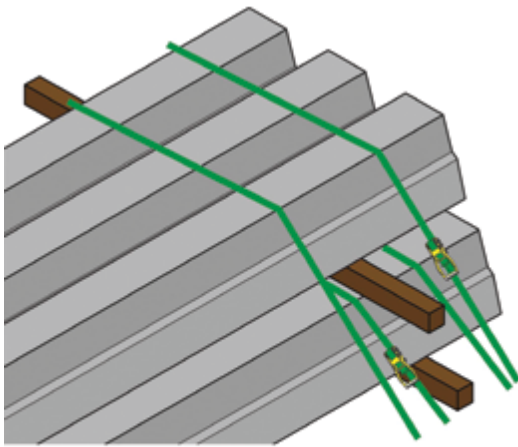
When stacking a single barrier on the top layer ensure the barrier is placed centrally on stack



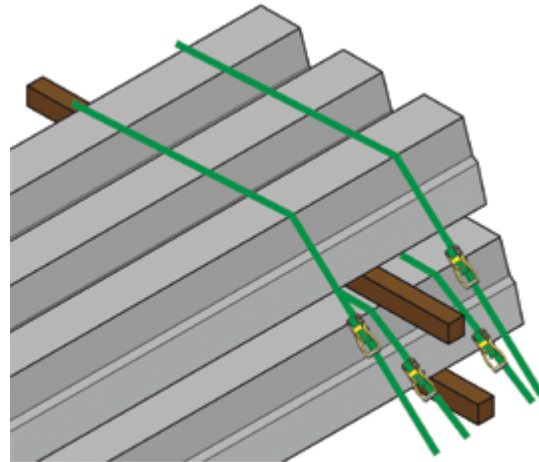
Dunnage must be in contact with all barriers on the layer below



- Alternate tensioning side for every second tie-down lashing.
- Dunnage must be located with both pieces either inside or outside of barrier feet.
- Do not place one piece of dunnage on the inside and one on the outside of barrier feet.
- Do not leave gaps between the dunnage and the barrier feet.



Tensioning side
alternating for every
second lashing



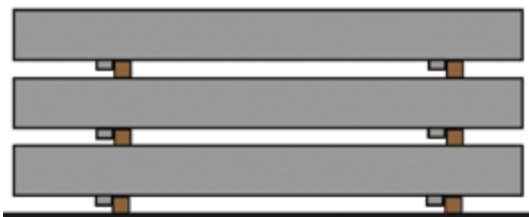
Tensioning all on the
same side



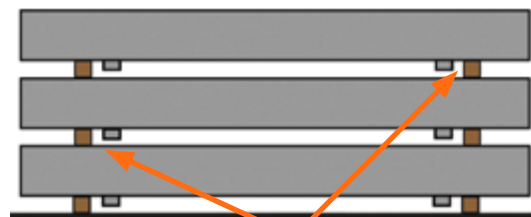
Both pieces of dunnage
located inside the
barrier feet



Both pieces of dunnage
located outside the
barrier feet



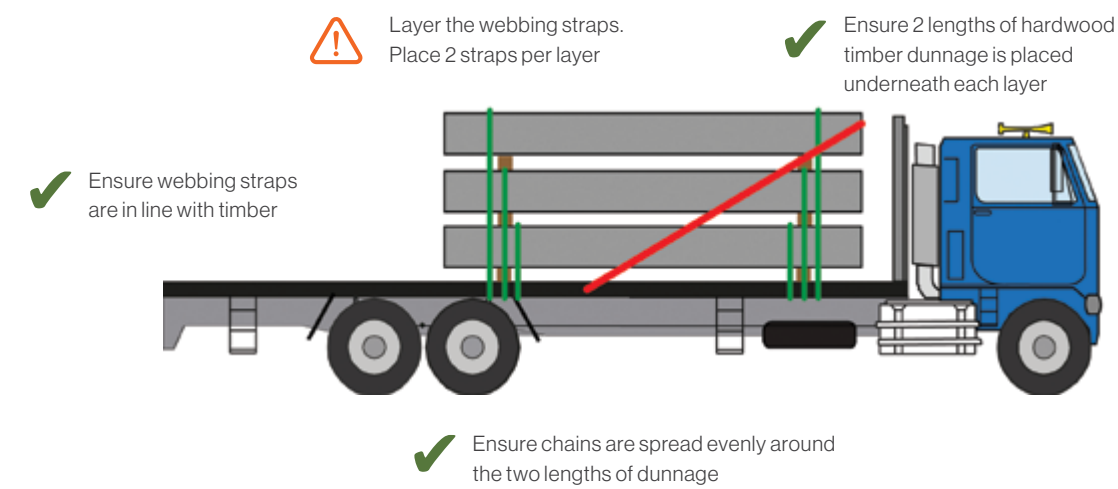
One dunnage inside of
barrier feet and one
outside of barrier feet



Gaps between dunnage
and barrier feet



Restraint with high pre-tension webbing straps and blocking chains:



Restraint with high pre-tension webbing straps and blocking chains:

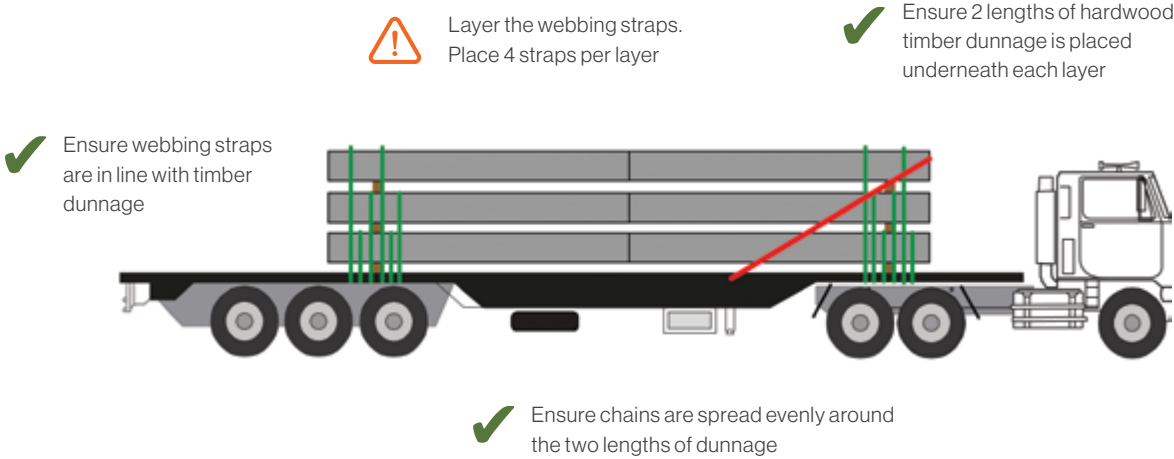
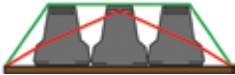
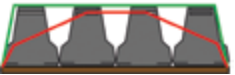
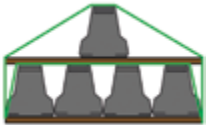
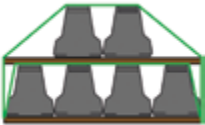
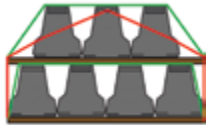
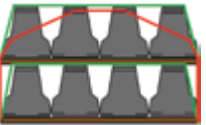
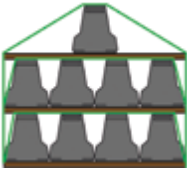
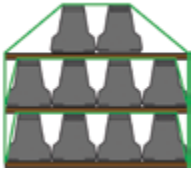
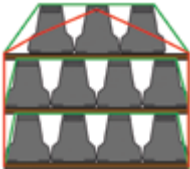
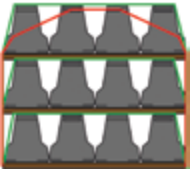


Table 4. Load configurations of 12m BG800 barriers using tie-down straps

Required restraint		12m barriers (max. 1300kg)	
Loading configuration			
			
Blocking chains	0	2	
Tie-down straps	4		
Loading configuration			
			
Blocking chains	0	2	
Tie-down straps	4 per layer (8 in total)		
Loading configuration			
			
Blocking chains	0	2	
Tie-down straps	4 per layer (12 in total)		

Restraint with chains:



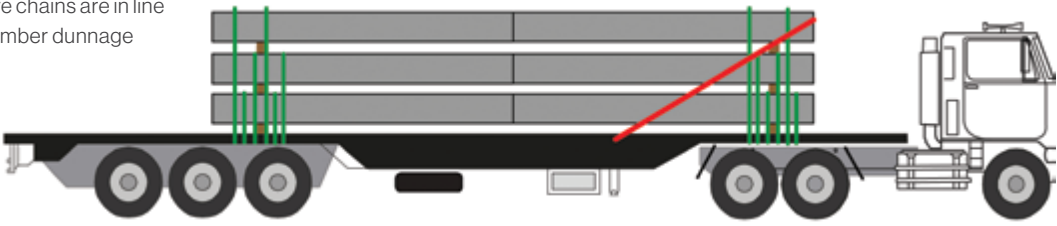
Layer the chains.
Place 3 chains per layer



Ensure 2 lengths of 100mm x 100mm
hardwood timber dunnage is placed
underneath each layer



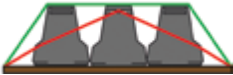
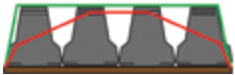
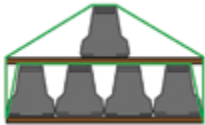
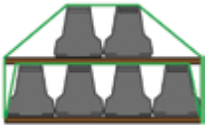
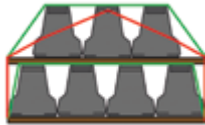
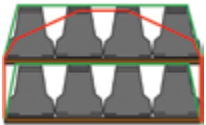
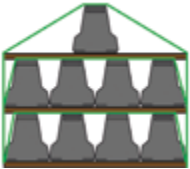
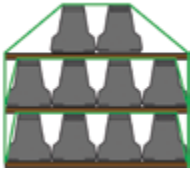
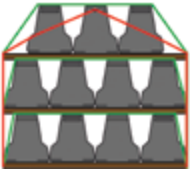
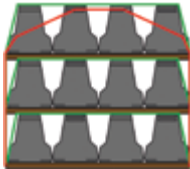
Ensure chains are in line
with timber dunnage





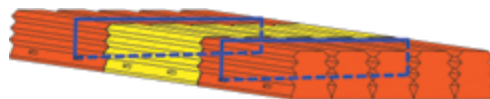
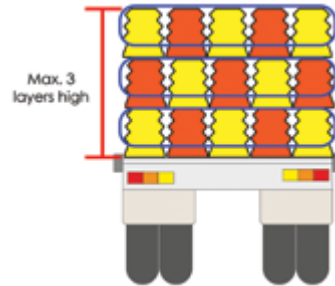
Ensure chains are spread evenly around
the two lengths of dunnage

Table 5. Load configurations of 12m BG800 barriers using chains

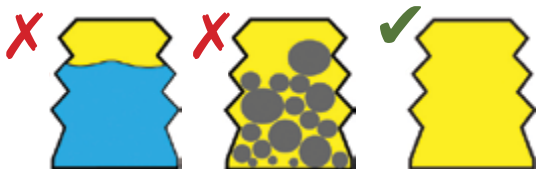
Required restraint		12m barriers (max. 1300kg)	
Loading configuration			
			
Blocking chains	0		2
Tie-down straps	3		
Loading configuration			
			
Blocking chains	0		2
Tie-down straps	3 per layer (6 in total)		
Loading configuration			
			
Blocking chains	0		2
Tie-down straps	3 per layer (9 in total)		

Section J: Water-filled Barriers

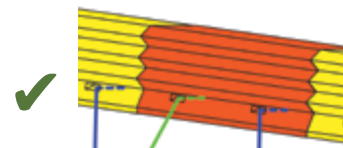
- Barriers must be empty for transport.
- Ensure barriers are interlocked.
- Maximum 3 layers of barriers/slugs high for semi-trailers and 2 for tilt trays.
- 50mm webbing straps with a minimum pretension of 300kg.f averaged across the load to be used.
- Do not allow tie-down lashings to twist more than 0.5 turns.
- Barriers to be loaded as a slug of 3 wherever possible.
- Maximum of 4 slugs in a layer for Triton barrier and 5 slugs in a layer for ArmorZone Barriers.
- Ensure lashings are placed over each layer of barriers.
- Unitise each layer of barriers with suitable packaging strapping prior to loading.



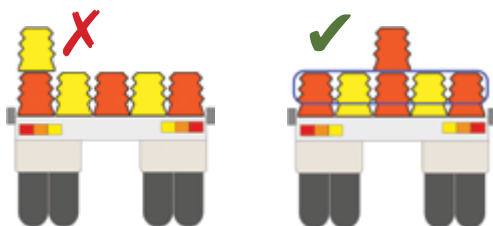
Unitise each layer of barriers with suitable packaging strapping prior to loading



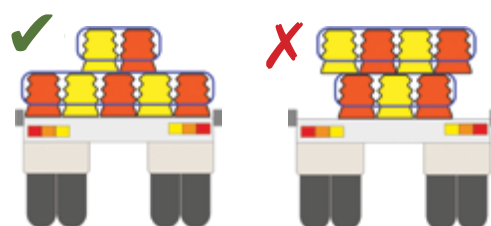
Ensure barriers are empty



Pass webbing straps through holes in barriers

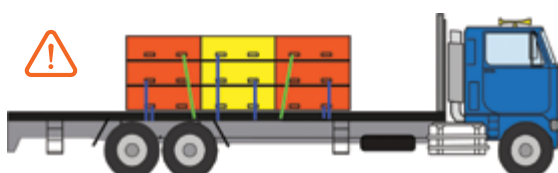


Stack barriers centrally

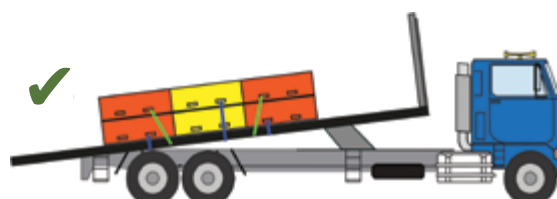


Always load narrow on wide

Do not load wide on narrow



More lashings required if not blocked



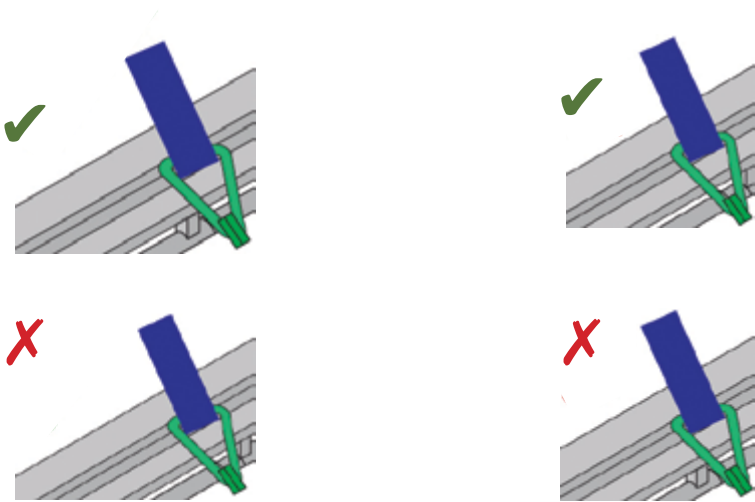
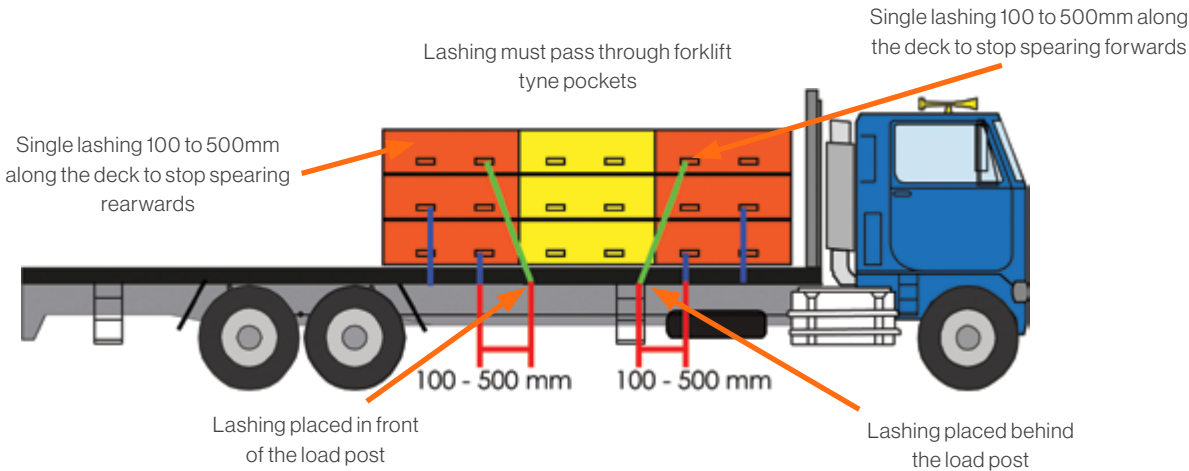
Maximum of 2 layers 3 high for tilt trays

Table 6. Tie-down 50mm webbing restraint - standard pretension

ArmorZone and Triton barriers		
Number of lashings		
Layers	Unblocked	Blocked
1		
2	2 on first layer, 3 on second layer (5 in total)	2 on first layer, 2 on second layer (4 in total)
3	2 on first layer, 3 on second layer and 3 on third layer (8 in total)	2 on first layer, 2 on second layer and 2 on third layer (6 in total)

*Add 2 lashings to the total when barriers are new or still have film layer on them.

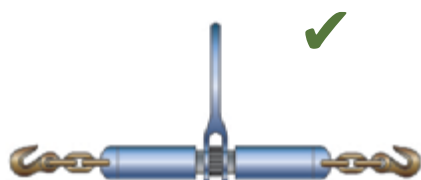
Lashing configuration to prevent spearing:



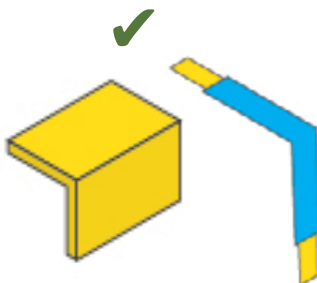
Section K: Concrete Barriers

Load restraint equipment:

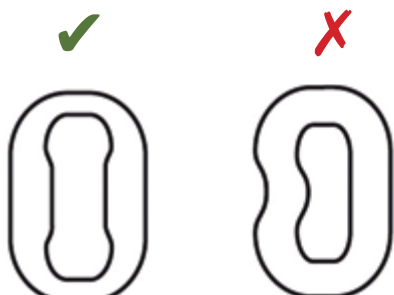
- Minimum 50 mm webbing lashing to AS/NZS 4380. Larger sizes may be used provided they are to AS/NZS 4380.
- Webbing lashing tensioned by a load binder capable of achieving a minimum 300 kg force pretension averaged across the load conforming to AS/NZS 4380.
- Webbing straps torn more than 10% of their width must be discarded.
- Minimum 8 mm transport chain to AS/NZS 4344. Larger sizes may be used provided they are to AS/NZS 4344.
- Chain tensioned by load binder capable of achieving a minimum 750 kg force pretension averaged across the load conforming to AS/NZS 4344.
- Use corner protection and wear sleeves on each corner to prevent damage to barriers and webbing straps.
- Hardwood timber dunnage 100 mm x 100 mm.
- Timber must be in good condition - Free of splits or knots that may weaken the dunnage and risk breaking during transport.
- Use anti-slip load matting with minimum static coefficient of friction of 0.6 and sufficient bearing capacity.
- Headboards must be rated capable of withstanding 30% of the load weight.
- All equipment must be in good working order.



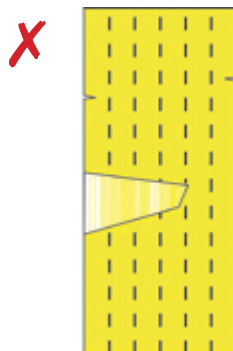
Turnbuckle style or maxbinder tensioners for chain



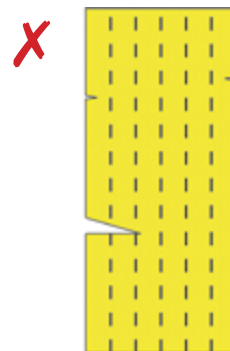
Corner Protection and wear sleeves to prevent damage



Inspect chain for defects



Stretched webbing



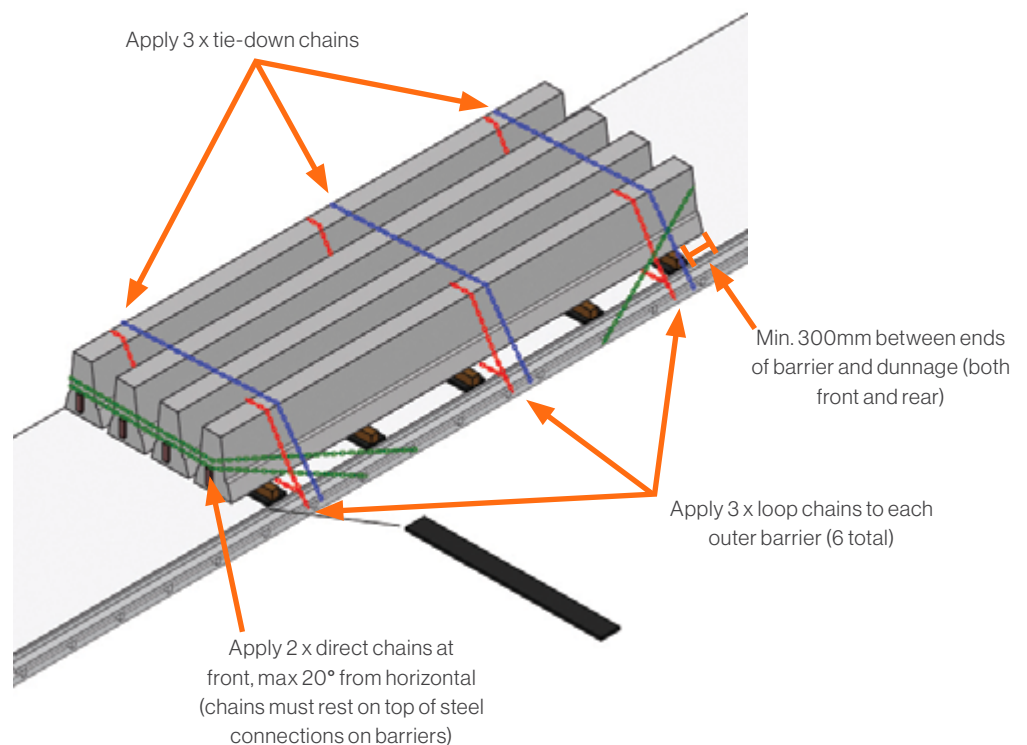
More than 10% wear

Applies to:

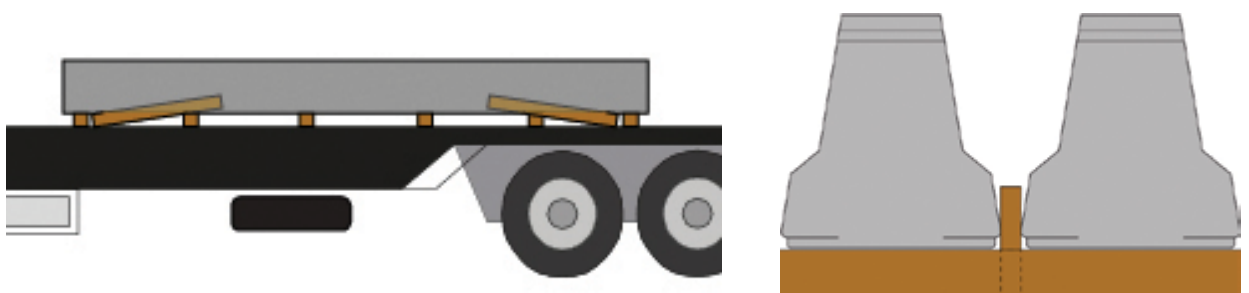
- 4 x 6m 4.5t Concrete Barriers

Loading and configuration:

- Place anti-slip matting along the deck between the timber dunnage and the trailer deck.
- Place timber dunnage on top of the anti-slip matting and under the concrete barriers.
- Ensure dunnage and matting is positioned = or < 300mm from end of concrete barriers.
- Place angled timber dunnage at each end between outer barriers to prevent chain damage between barriers - timber must be longer than gap between dunnage.
- Apply three tie down chains over the top.
- Apply three loop chains to each outer barrier. Combined total of six looped chains.
- Apply two direct chains at front of load.
- Apply one direct chain at the rear of load.



Place angled timber dunnage at each end between outer barriers to prevent chain damage between barriers - timber must be longer than gap between dunnage

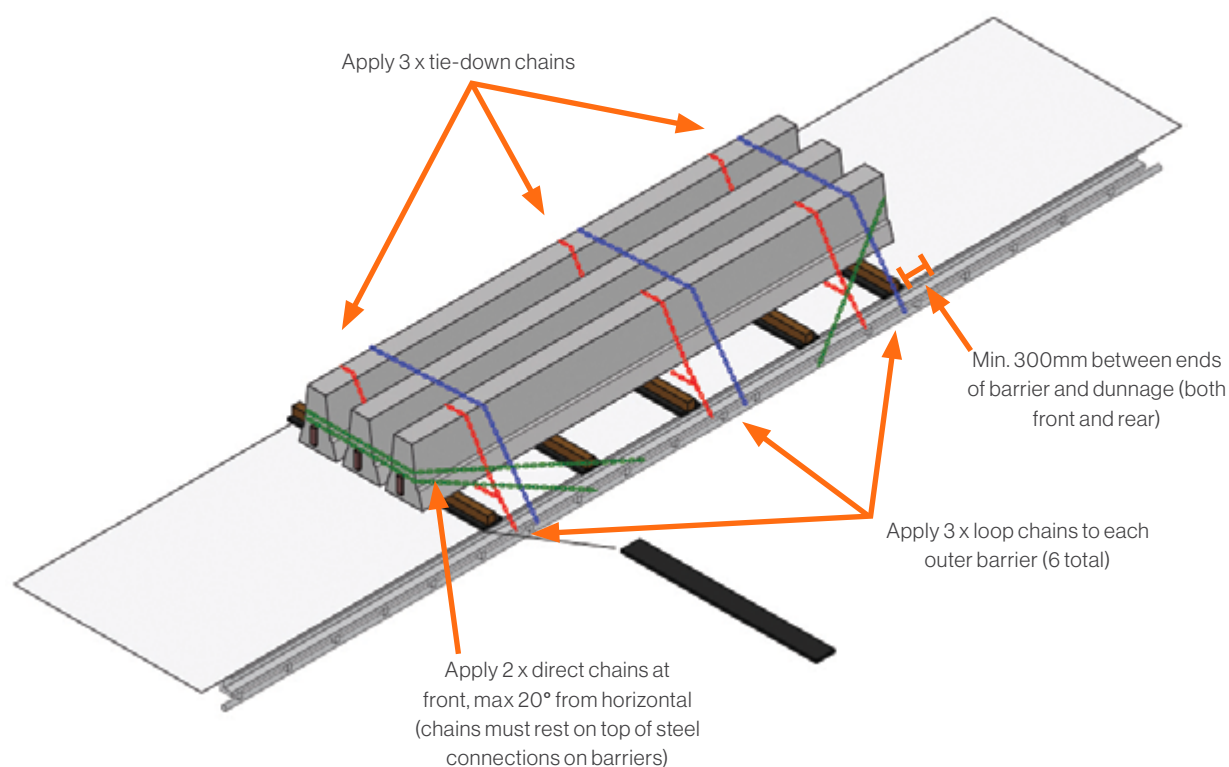


Applies to:

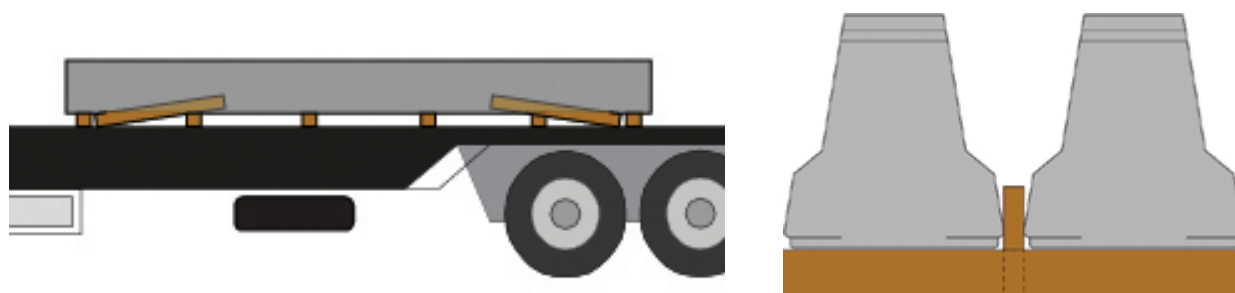
- 3 x 6m 4.5t Concrete Barriers

Loading and configuration:

- Place anti-slip matting along the deck between the timber dunnage and the trailer deck.
- Place timber dunnage on top of the anti-slip matting and under the concrete barriers.
- Ensure dunnage and matting is positioned = or < 300mm from end of concrete barriers.
- Place angled timber dunnage at each end between outer barriers to prevent chain damage between barriers - timber must be longer than gap between dunnage.
- Apply three tie down chains over the top.
- Apply three loop chains to each outer barrier. Combined total of six looped chains.
- Apply two direct chains at front of load.
- Apply one direct chain at the rear of load.



Place angled timber dunnage at each end between outer barriers to prevent chain damage between barriers - timber must be longer than gap between dunnage

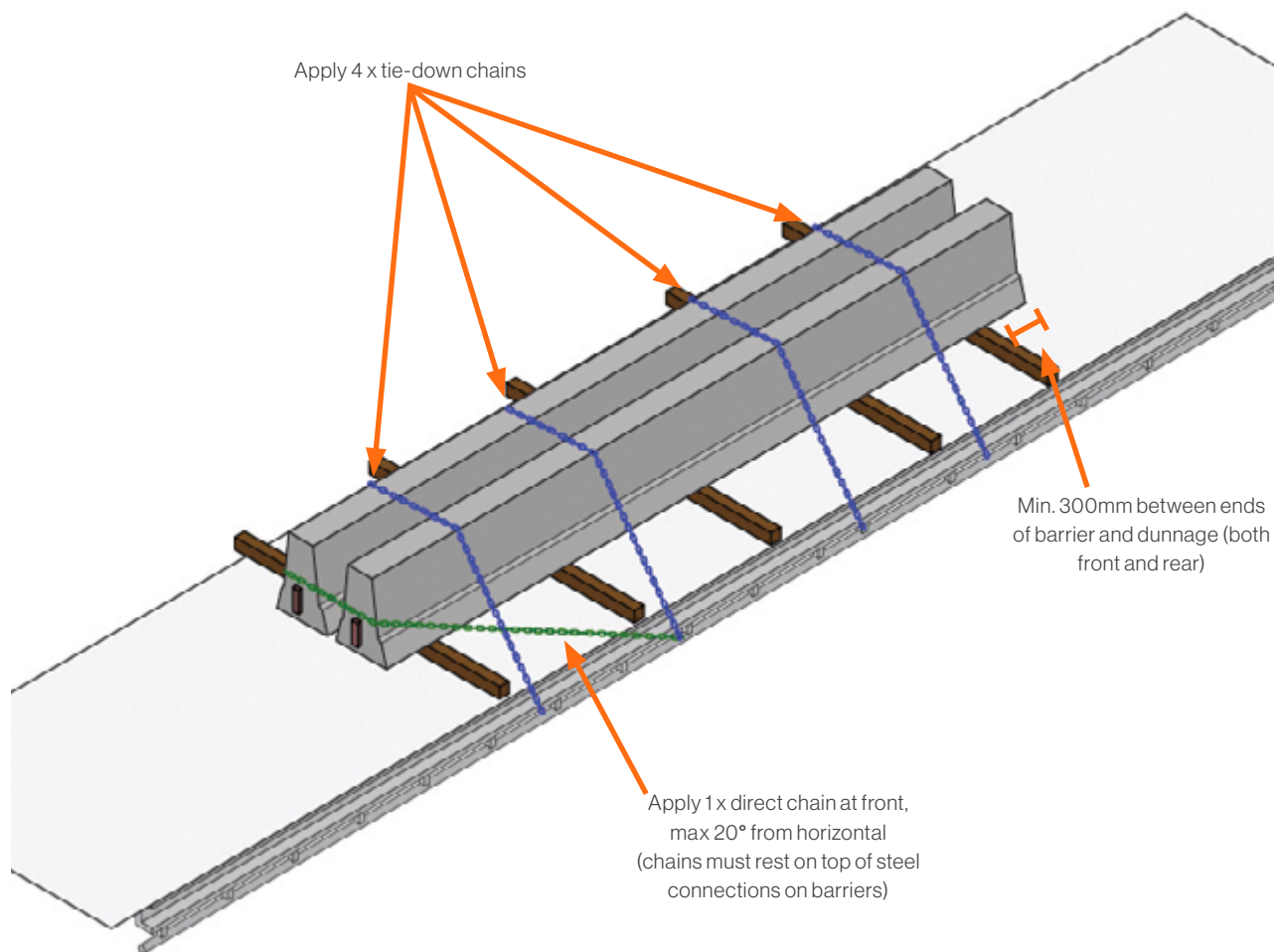


Applies to:

- 2 x 6m 4.5t Concrete Barriers

Loading and configuration:

- Place timber dunnage on top of the anti-slip matting and under the concrete barriers.
- Ensure dunnage and matting is positioned = or < 300mm from end of concrete barriers.
- Apply four tie down chains over the top.
- Apply one direct chain at front of the concrete barriers.

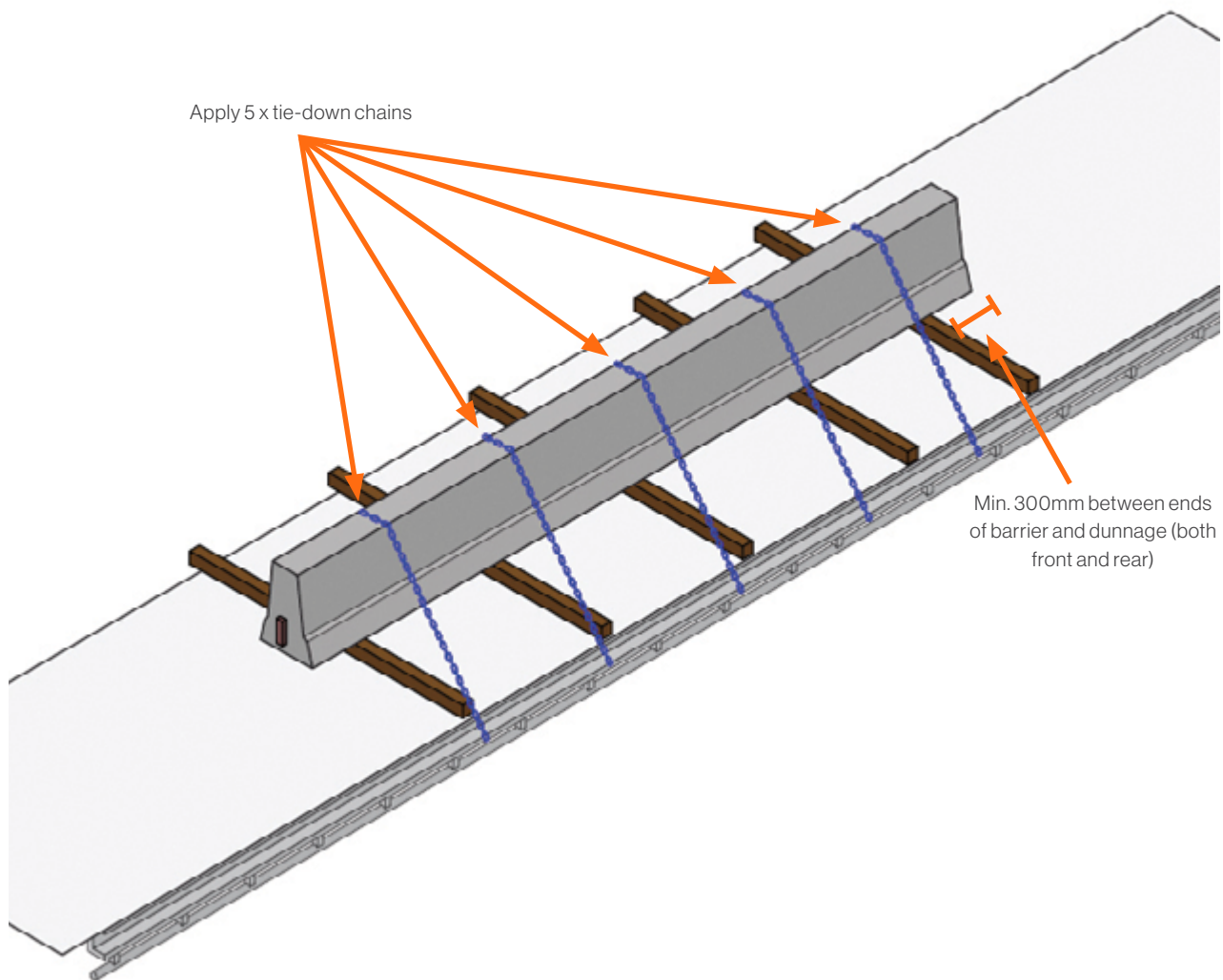


Applies to:

- 1 x 6m 4.5t Concrete Barriers

Loading and configuration:

- Place timber dunnage on top of the anti-slip matting and under the concrete barriers.
- Ensure dunnage and matting is positioned = or < 300mm from end of concrete barriers.
- Apply five tie down chains over the top.

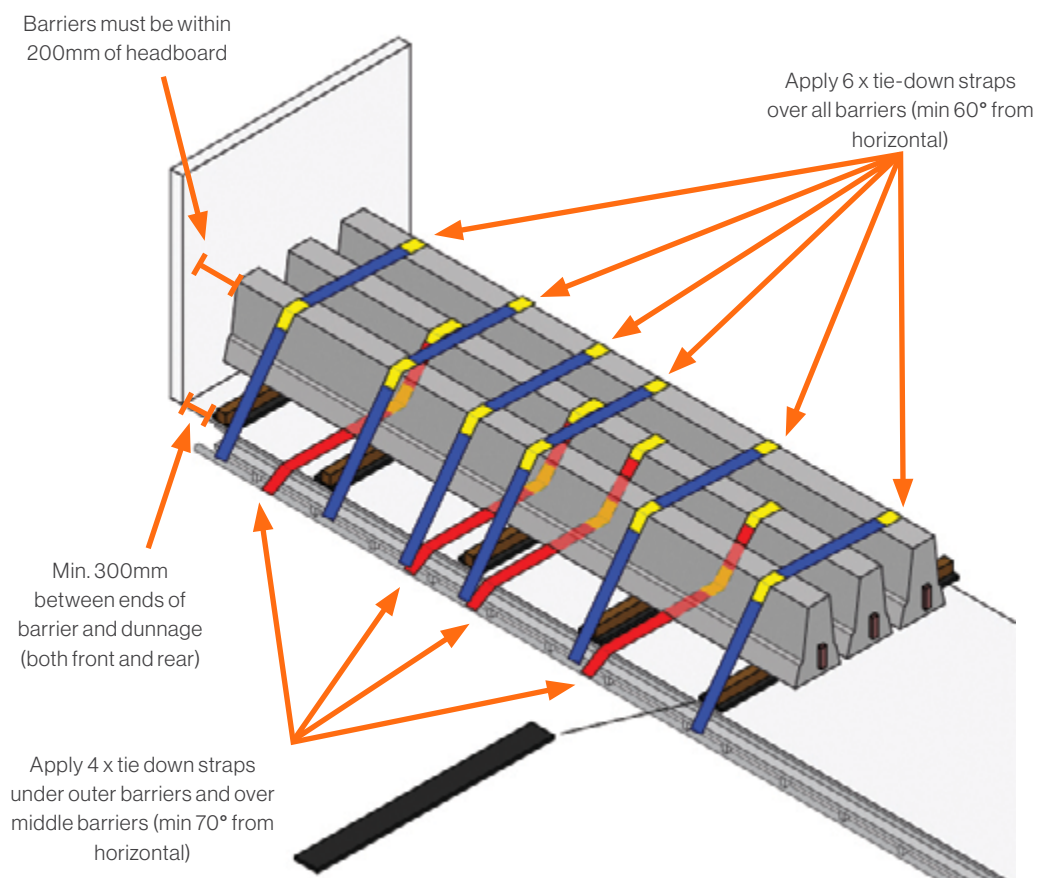


Applies to:

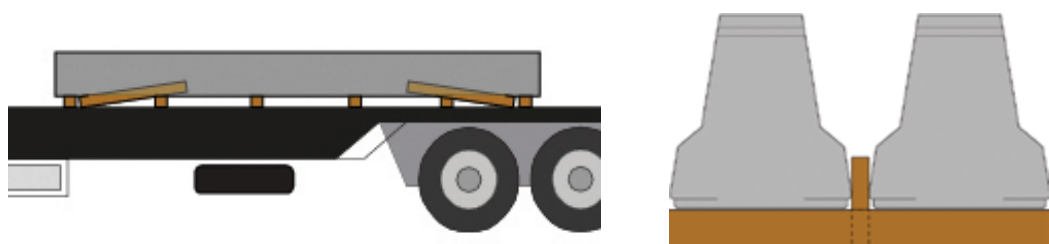
- 3 x 6m 4.5t Concrete Barriers - BLOCKED

Loading and configuration:

- Place anti-slip matting along the deck between the timber dunnage and the trailer deck.
- Place timber dunnage on top of the anti-slip matting and under the concrete barriers.
- Ensure dunnage and matting is positioned = or < 300mm from end of concrete barriers.
- Place angled timber dunnage at each end between outer barriers to prevent chain damage between barriers - timber must be longer than gap between dunnage
- Apply six tie down webbing straps over the top.
- Apply four tie down webbing straps under outer barriers and over middle barrier.
- Block barriers against rated headboard with gap of 200mm or less.

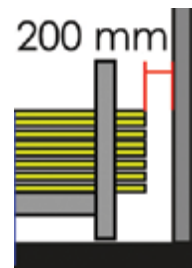
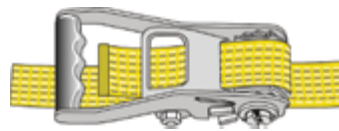


Place angled timber dunnage at each end between outer barriers to prevent chain damage between barriers - timber must be longer than gap between dunnage.

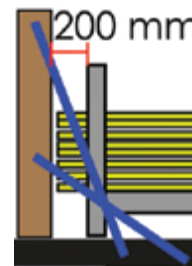


Section L: PVC/Plastic Pipes

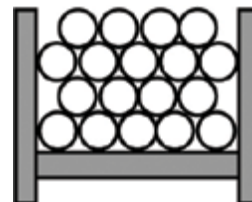
- Ensure the pipes are blocked forwards and rearwards.
- Forward blocking can be either an engineered headboard or a 3-pallet stack tied down with 3 x 50mm webbing straps.
- Rearwards blocking can be with a single pallet with 2 x 50mm webbing straps to hold it against the stillage or a 3-pallet stack tied down with 3 x 50mm webbing straps.
- Hardwood pallets acceptable for blocking.
- Do not use softwood pallets for blocking.
- No pipes above blocking surface.
- Ensure 2 x 50mm webbing straps are used for each stillage.
- Ensure anti-slip or industrial rubber matting or plywood is placed between stillage and vehicle deck.
- Use standard 50mm webbing straps with a minimum pretension of 300kg.f averaged across the load.
- Ensure stillage is in good condition.
- Do not load more than two stillages across the deck.



Maximum gap to headboard and blocking pallets is 200mm for blocked loads

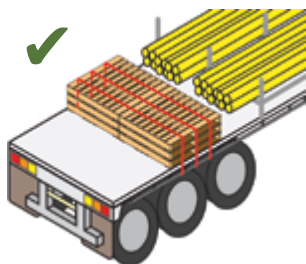


Maximum gap to rear blocking pallets is 200mm for blocked loads

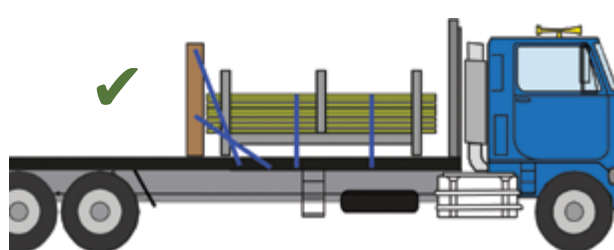
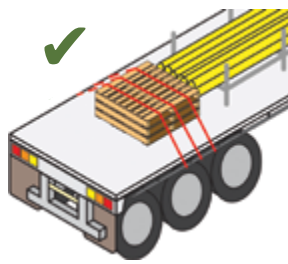


Ensure stillage is in good condition

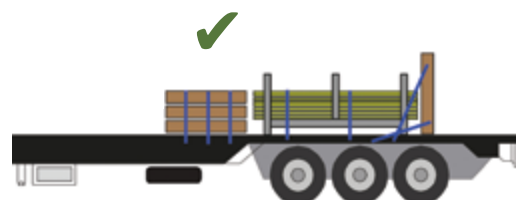
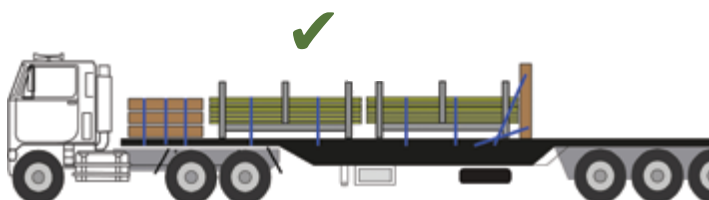
Loading configuration

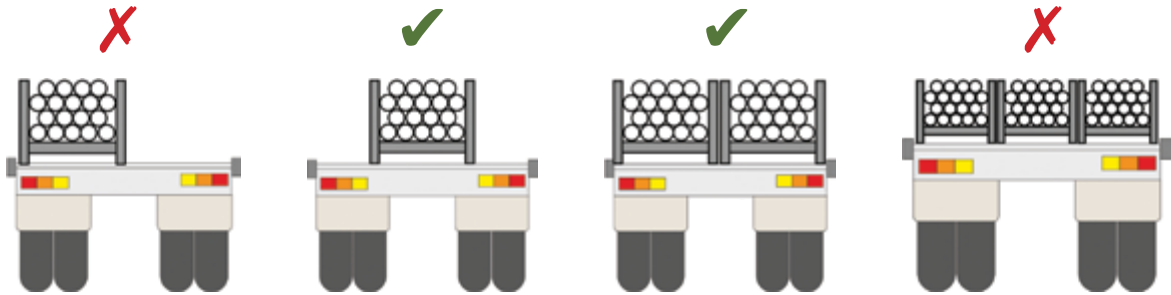


Use three 50mm webbing straps to secure blocking pallet stacks



Ensure load is blocked in both front and rear directions





Ensure load is placed centrally on the deck

Do not load 3 stillages across the deck as the centre stillage may spear



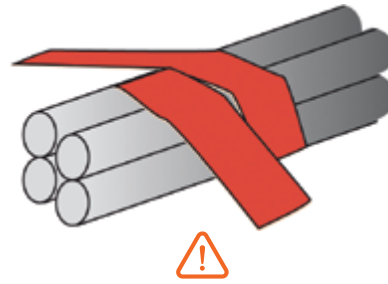
Anti-slip rubber matt or plywood



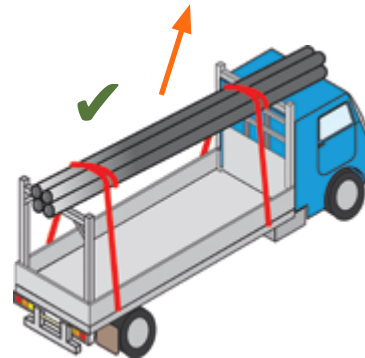
	Nearly vertical (80-90°)	Over 60° (60-80°)	Nearly horizontal (30-60°)
Tie-down angle 2 x 50mm webbing straps			
Max payload (kg)	1100	1000	600

Section M: PVC/Scaffold Poles

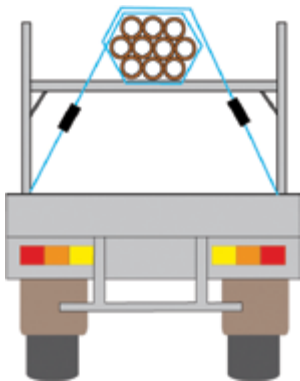
- Loads must be belly strapped to ensure scaffold poles do not spear.
- Join two straps together and tension both sides to achieve the minimum clamping required.
- Maximum mass of poles loaded on H-frame racks is 150kg.
- Scaffold poles can be blocked by either an engineered headboard or a 3-pallet stack tied down with 3 webbing straps.
- Hardwood pallets acceptable for blocking.
- No softwood pallets for blocking.
- Maximum load masses must not exceed the specified values for each configuration.



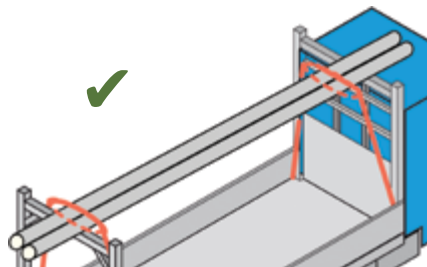
Ensure all webbing is done as a belly wrap to secure bundles and top spearing



Scaffold poles on H-frame racks:



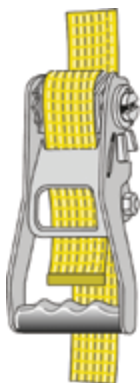
Max 150kg on steel racks



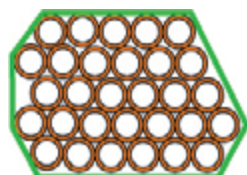
Ensure scaffolding is supported on both ends

Scaffold Poles on Timber Dunnage:

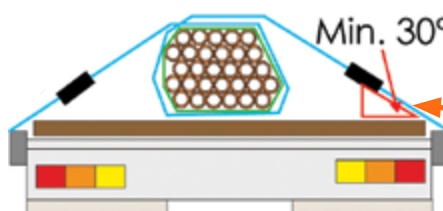
2 x 50mm



Ensure load is tensioned on both sides



Ensure poles are bundled to prevent loads falling apart after lashings removed



Min. 30°

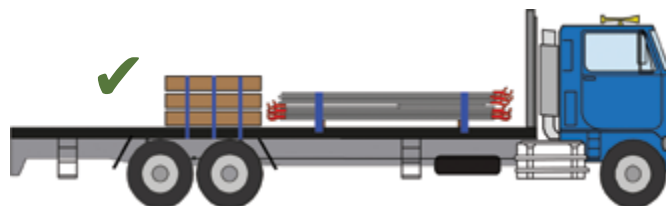
Lashing angles to be minimum 30°

Centralise load on deck

Blocked forwards and rearwards

Max. 2400kg

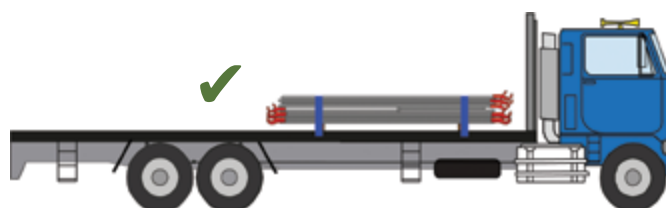
2 x 50mm webbing straps required



Blocked forwards only

Max. 1200kg

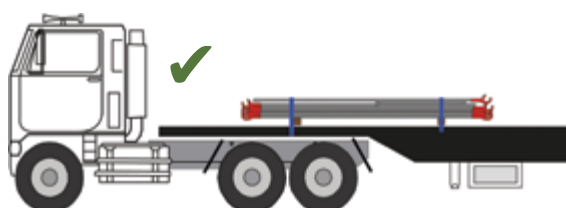
2 x 50mm webbing straps required



Unblocked

Less than 600kg

2 x 50mm webbing straps required



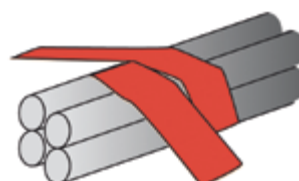
Unblocked on H-frame

Max. 150kg

2 x 50mm webbing straps required



Ensure all webbing is done as a belly wrap to secure bundles and top spearing



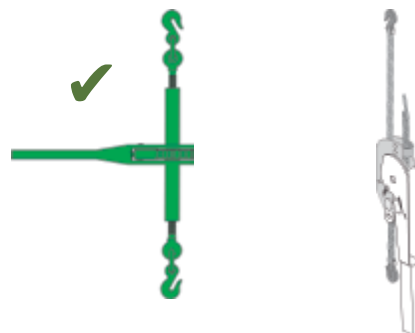
Load restraint: Portable Buildings

Applies to:

- Portable buildings with a maximum mass of 5000kg
- Portable building size up to 12.0m x 3.0m

Load restraint equipment requirements:

- 8mm, 10mm & 13mm transport chain, conforming to AS/NZ 4344 tensioned to a minimum pre-tension of 750kg.f averaged across the load.
- 50mm webbing, conforming to AS/NZS4380 tensioned to a minimum pre-tension of 300kg.f averaged across the load.
- Equipment must be in good working order. Inspect the lashings for wear.
- All fittings must be in good condition and are required to have the same rated capacity, or greater, as the chains being used.
- To prevent load binder hooks becoming detached from the chain secure using suitable method (i.e. cable tie or other).
- 50mm webbing straps can be placed over the top of the building to secure the roof, if required by Coates. However, this is not classed as restraint.
- Chains with excessively damaged, worn or bent links must not be used.
- Over-centre lever load binders (dogs) are a high risk and are not to be used on Coates sites.
- Ausbinders, turnbuckle ratchet, Web Dog binders or similar are a suitable alternative to dogs provided a minimum pretension of 750kg.f can be achieved.
- Webbing straps torn more than 10% of their width should be discarded.



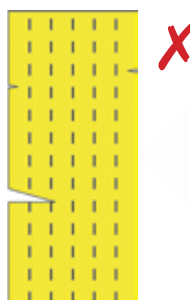
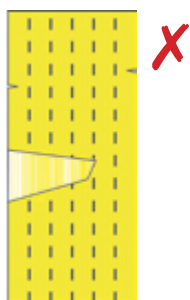
No over-center lever load binders (Dogs)



To prevent load binder hooks becoming detached from chain secure using suitable method (i.e. cable tie or other)

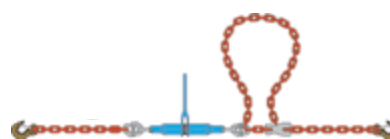


Small building movements are expected during transit resulting in chain slack, cable ties will prevent load binder hooks becoming detached from the chain



Stretched webbing

More than 10% wear

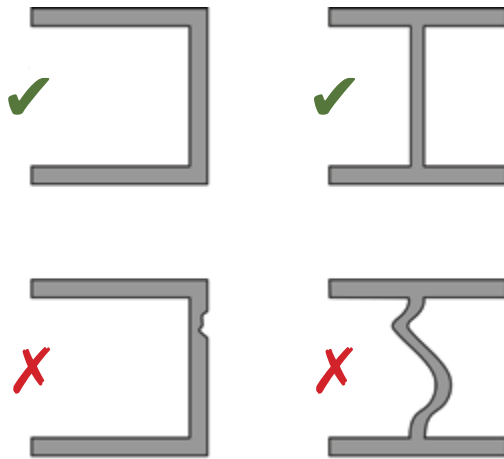


All fittings at least the same rating as the rating as the chain

Portable Buildings

Essential building requirements:

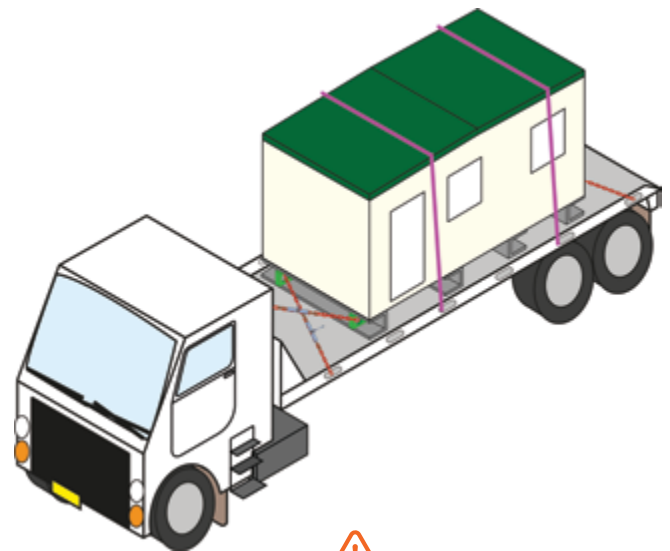
- Building pre-transit checklist must be completed prior to transport.
- All windows, doors and openings must be securely locked.
- All objects inside buildings must be secured, no loose items to remain inside the building.
- All air conditioners must be secured prior to transport.
- Wagon support (jockey wheel or similar) must be in place to maintain wagon balance.
- Wagons must be in good condition and structurally sound without damage or rust that would prevent safe restraint or transport.
- Chain anchorages must be free from visual cracking or damage, some surface rust is acceptable.
- All buildings must be structurally sound for transport.
- Do not use overhead lifting points as tie down points.
- Do not use anchor points located in the horizontal position.



Structural beams must be free of excessive deformity and material removal



Do not use lifting points as tie down points



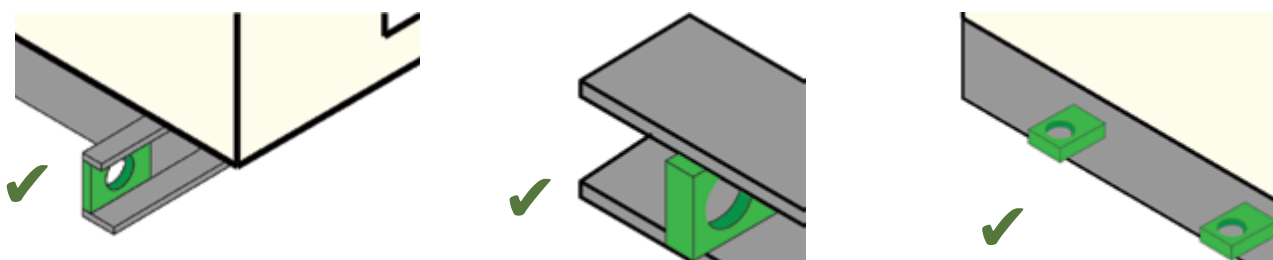
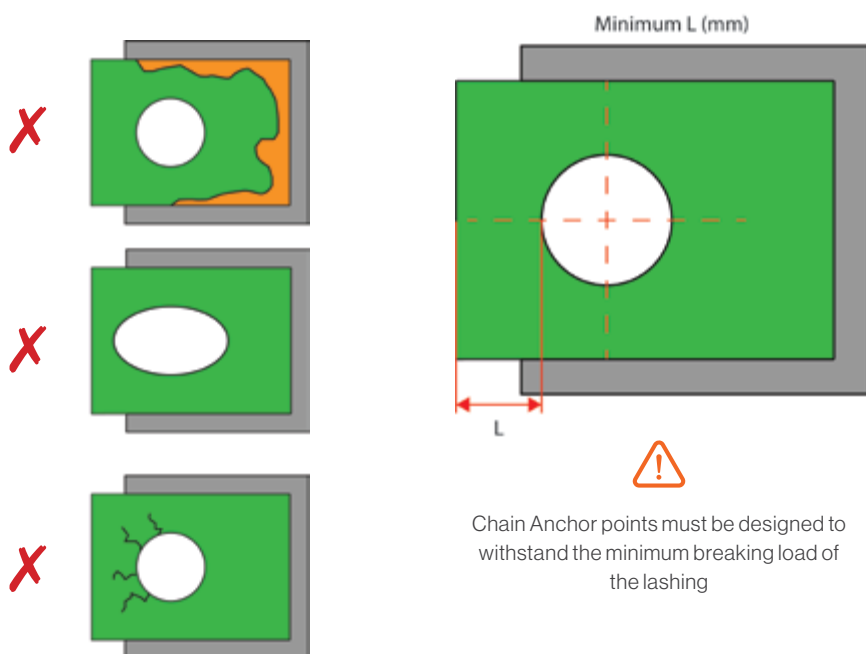
Webbing straps can be placed over the top of the building to secure roof, if required by Coates.
Not classed as restraint.

Anchor point requirements:

- Anchor points must be welded to the cross beam. A minimum of two welds, at least 50mm in length and 2mm throat thickness.
- The required thickness of the anchor points can be determined using the table on this page.

Min. length (mm)		Required thickness (mm)	
31		5	
16		10	
10		16	

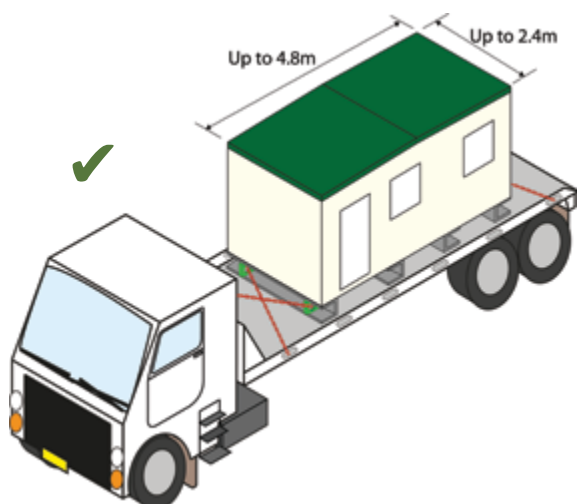
Chain Anchor points must be free of excessive corrosion, elongation and cracking of holes



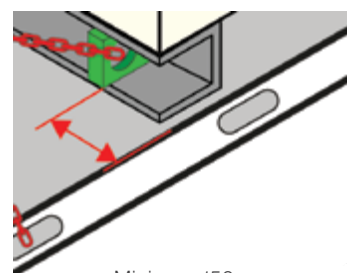
Chain Anchor points must be welded on to cross beam

Maximum building size 2.4m x 4.8m and up to 2000kg in mass

- Buildings to be positioned central on the tray.
- Buildings to be secured using a minimum 4 x 8mm separate chain combination as per below.
- Chains wrapped and tensioned to 750kg.f to coaming rail using appropriate tensioner.
- Check condition of building anchor points before transport.
- All chains to be secured on the trailer between 550mm and 850mm from the building anchor point.

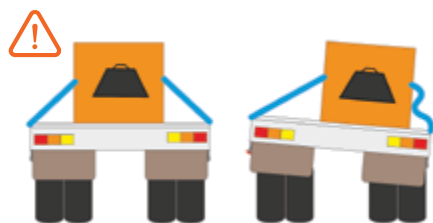


Minimum 8mm Chain
(Gr 70 - AS4344)

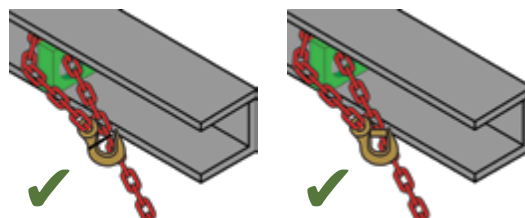


Minimum 150mm

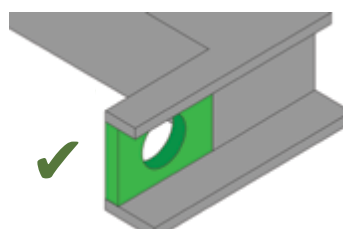
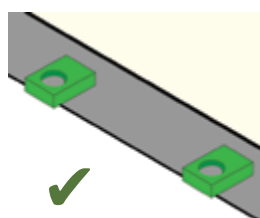
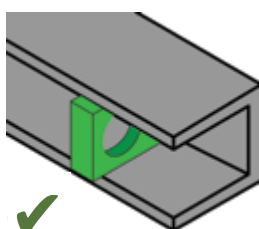
Ensure anchor point is a minimum of 150mm from the coaming rail



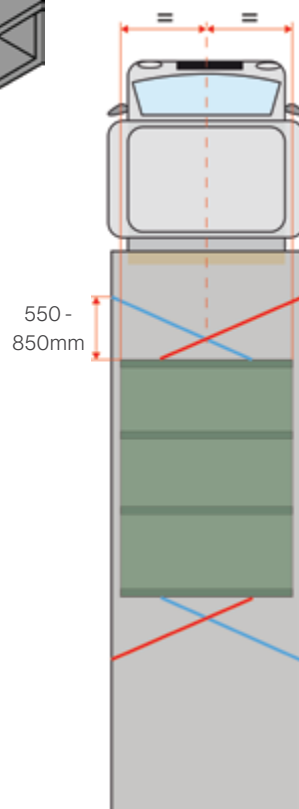
Small building movements are expected during transit resulting in chain slack, cable ties will prevent chain hooks becoming detached from the chain



Chain Anchor points - loop through tie down points and secure hook to chain using suitable method (i.e. cable ties, self locking safety hook)



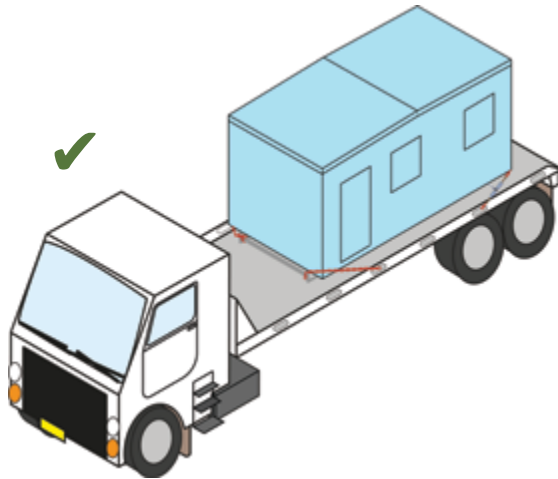
Chain anchor points must be welded on to cross beam. Refer to page 81 for anchor point requirements



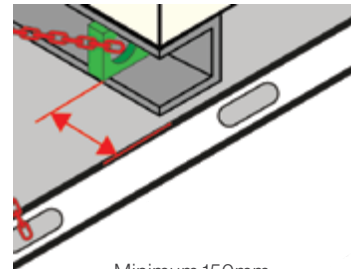
550 - 850mm

Maximum building size 2.4m x 4.8m and up to 2000kg in mass (alternative)

- Buildings to be positioned central on the tray.
- Buildings to be secured using a minimum 4 x 8mm separate chain combination as per below.
- Chains wrapped and tensioned to 750kg.f to coaming rail using appropriate tensioner.
- Check condition of building anchor points before transport.
- All chains to be secured on the trailer between 550mm and 850mm from the building anchor point.

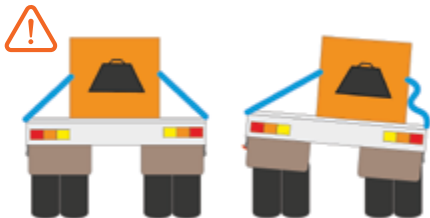


Minimum 8mm Chain
(Gr 70 - AS4344)

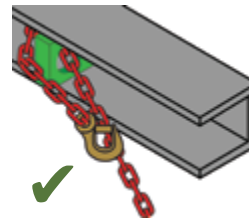
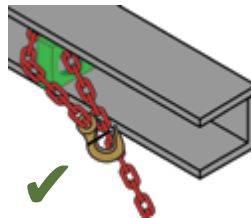


Minimum 150mm

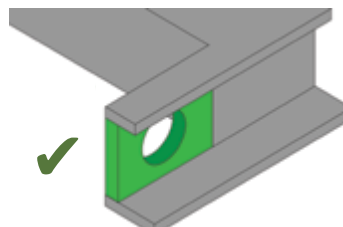
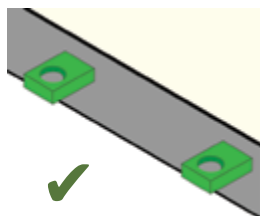
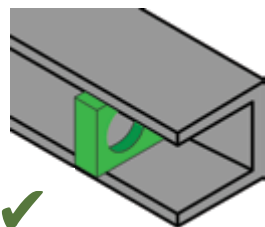
Ensure anchor point is a minimum of 150mm from the coaming rail



Small building movements are expected during transit resulting in chain slack, cable ties will prevent chain hooks becoming detached from the chain

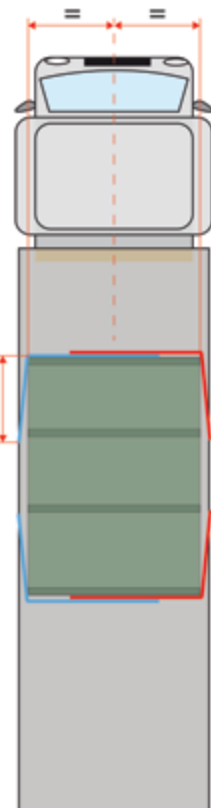


Chain Anchor points - loop through tie down points and secure hook to chain using suitable method (i.e. cable ties, self locking safety hook)



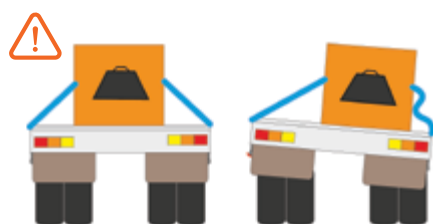
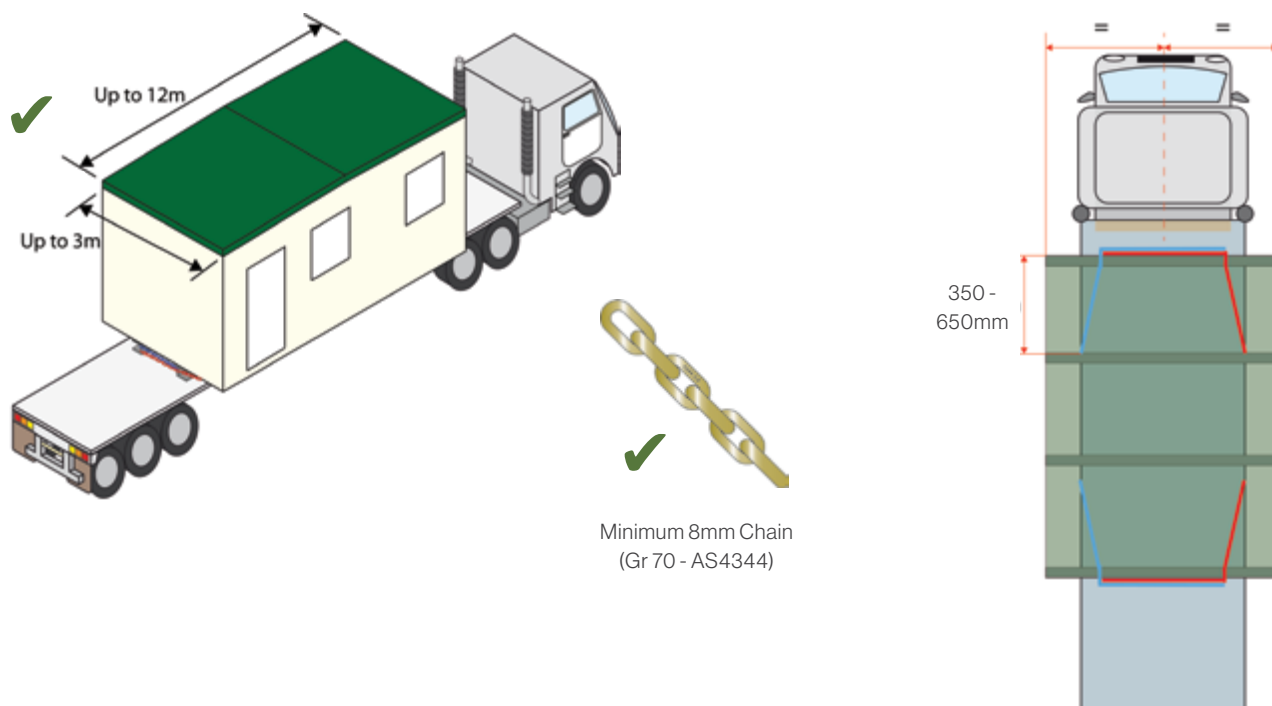
Chain anchor points must be welded on to cross beam. Refer to page 81 for anchor point requirements

300 -
650mm

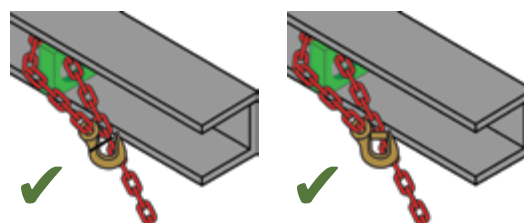


Building size approx. 3.0m in width, up to 12.0m in length and up to 5000kg in mass (Option A)

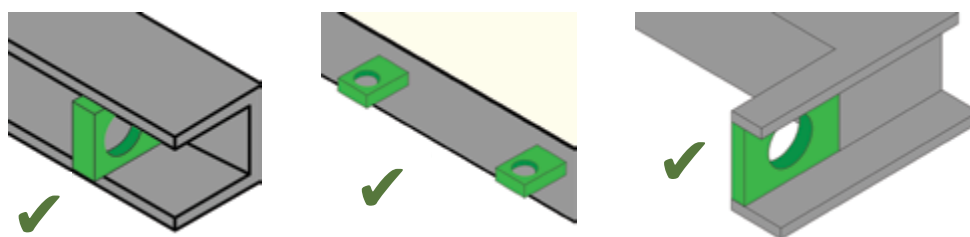
- Buildings to be positioned central on the tray.
- Buildings to be secured using a minimum 4 x 8mm separate chain combination as per below.
- Chains wrapped over skids and tensioned to 750kg.f to rail using appropriate tensioner.
- Check condition of building anchor point before transport.
- All chains to be secured on the trailer between 350mm and 650mm from the building anchor point.



Small building movements are expected during transit resulting in chain slack, cable ties will prevent chain hooks becoming detached from the chain



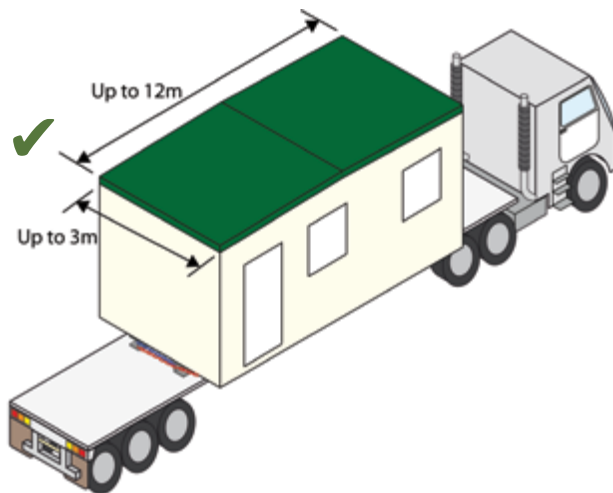
Chain Anchor points - loop through tie down points and secure hook to chain using suitable method (i.e. cable ties, self locking safety hook)



Chain anchor points must be welded on to cross beam. Refer to page 81 for anchor point requirements

Maximum building size 3.0m x 12m and up to 5000kg in mass (Option B)

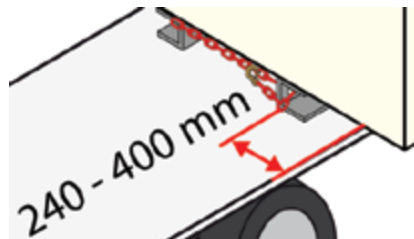
- Buildings to be positioned central on the tray.
- Buildings to be secured using a minimum 4 x 8mm separate chain combination as per below.
- Chains wrapped over skids and tensioned to 750kg.f to rail using appropriate tensioner.
- Check condition of building anchor point before transport.
- All chains to be secured on the trailer between 350mm and 650mm from the building anchor points.



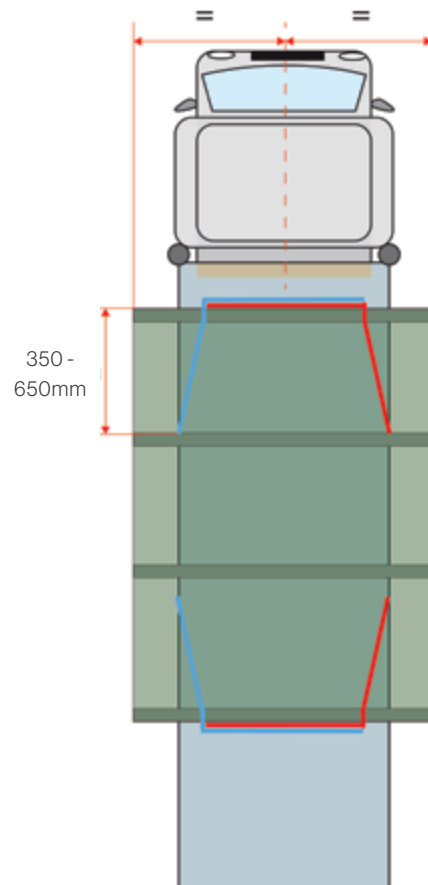
Minimum 8mm Chain
(Gr 70 - AS4344)



Ensure C channel is located
between 240 and 400mm from
the coaming rail



Chain Anchor points - loop through tie
down points and secure hook to chain using
suitable method (i.e. cable ties, self locking
safety hook)



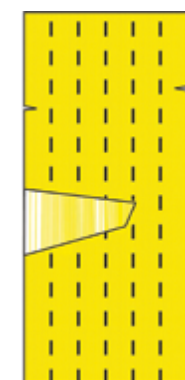
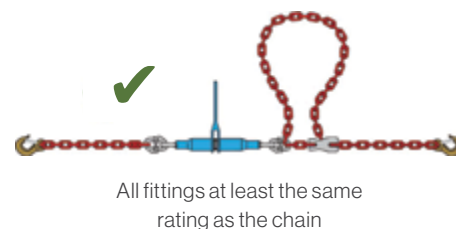
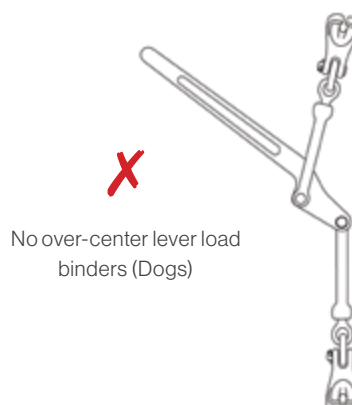
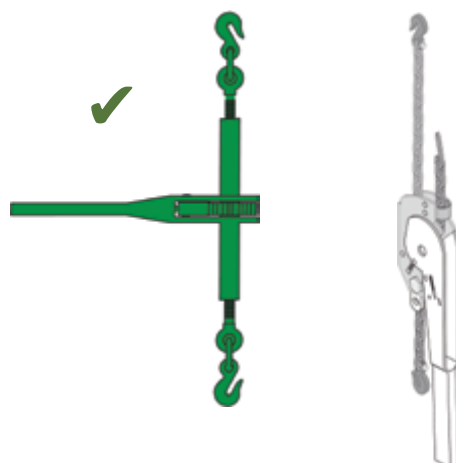
Load restraint: Portable Building Wagons

Applies to:

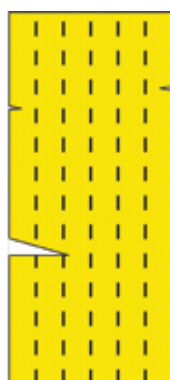
- Dual axle portable wagons weighing up to 3500kg.

Load restraint equipment requirements:

- 10mm transport chain, conforming to AS/NZ 4344 tensioned to a minimum pre-tension of 750kg.f.
- 50mm webbing straps, conforming to AS/NZS 4380 tensioned to a minimum pre-tension of 300kg.f averaged across the load.
- Equipment must be in good working order. Inspect the lashings for wear.
- All fittings must be in good condition and are required to have at least the same rated capacity or greater, as the chains being used.
- Chains with excessively damaged, worn or bent links must not be used.
- Over-centre lever load binders (dogs) are a high risk and are not to be used on Coates sites.
- Ausbinders, Turnbuckle ratchet, Web Dog binders or similar are a suitable alternative to dogs provided a minimum pre-tension of 750kg.f can be achieved.
- Webbing straps torn more than 10% of their width should be discarded.



Stretched webbing



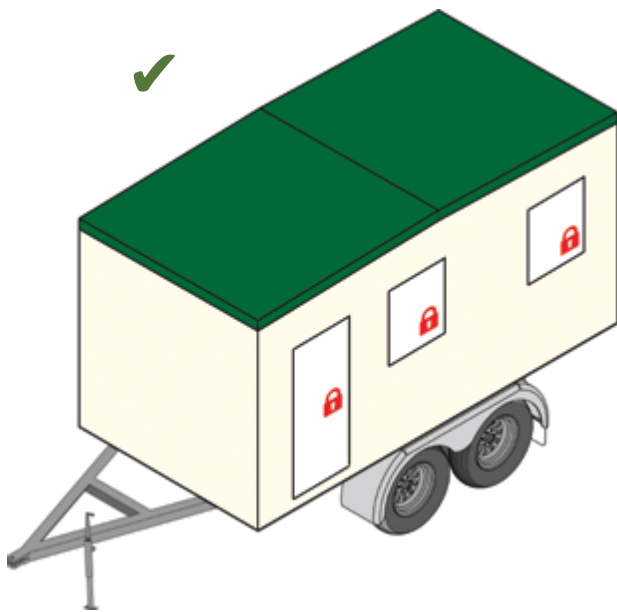
More than 10% wear



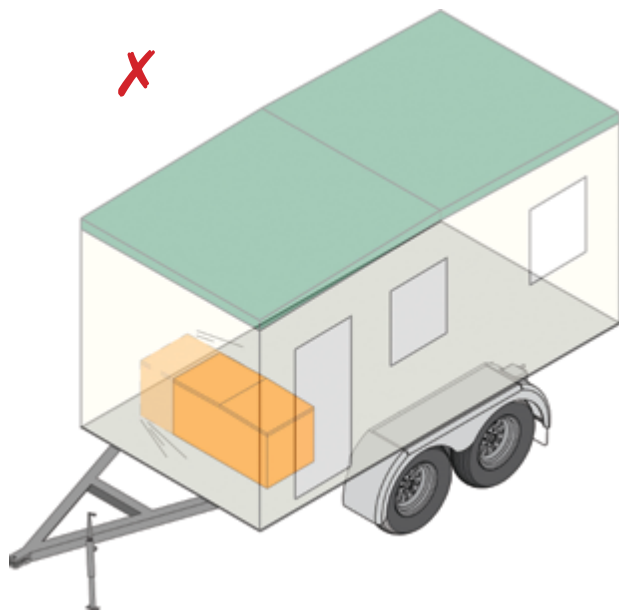
Chains with elongated, worn or bent links must not be used for restraint

Loading requirements:

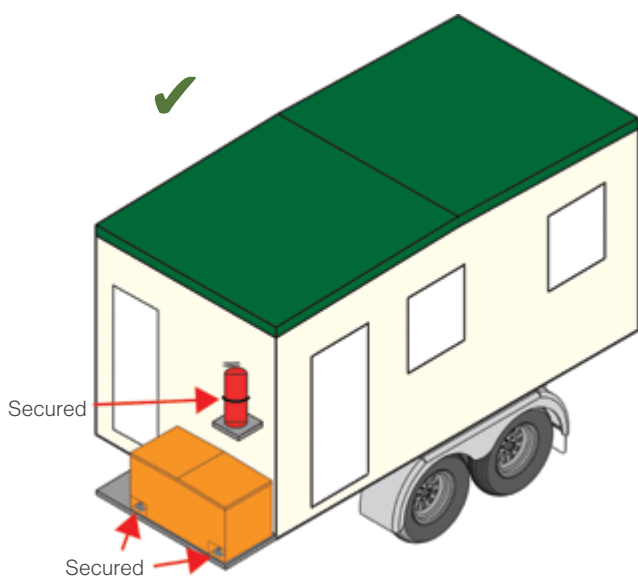
- Complete a building pre-transit checklist prior to transport.
- All windows, doors and openings must be securely locked.
- All objects inside buildings must be secured, no loose items to remain inside the building.
- All auxiliary equipment (e.g. generators, fire extinguishers etc.) must be secured to prevent movement when subjected to the performance standard forces.
- Wagon support (jockey wheel or similar) must be in place to maintain wagon balance.
- Wagons must be in good condition and structurally sound without damage or rust that would prevent safe restraint or transport.



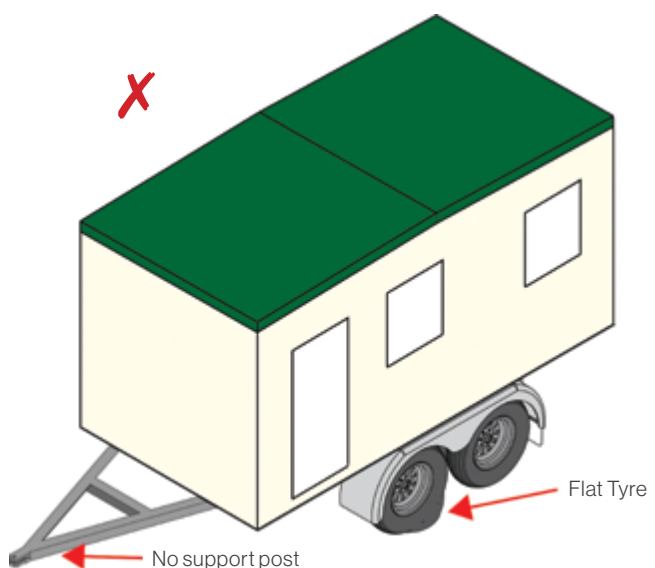
All windows and doors secured/
locked to prevent opening in transit



No loose items inside buildings



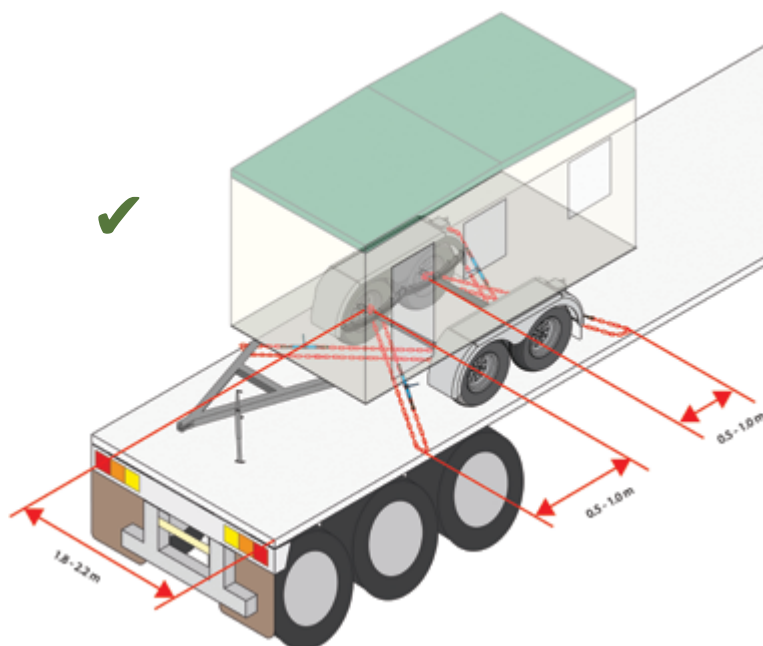
Auxiliary equipment secured to
prevent movement



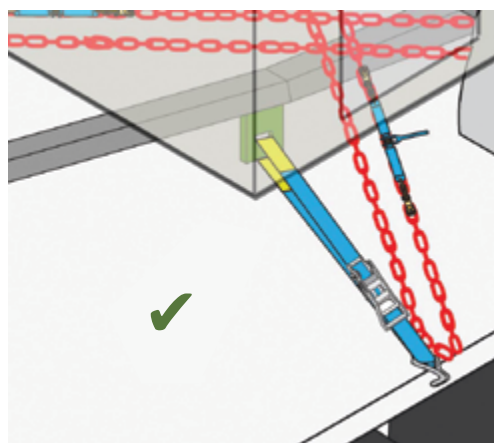
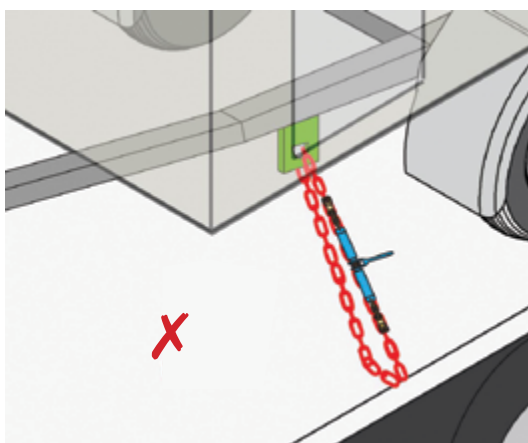
Do not transport buildings that aren't in
good condition

Lashing requirements - up to 3.5t:

- Apply four x looped chains around the axles of the wagon in the arrangement shown below.
- Chains must be located between the wheels and the axle mounts / suspension to prevent the chain moving sideways.
- Axles must be in good condition, without damage, and be of sufficient strength to withstand the restraint forces.
- Ensure chains do not contact brake lines or other similar components that may be damaged.
- Axles must be between 300 and 500mm above ground/deck.



- Do not use lifting/lashing points as chain anchor points.
- Additional 50mm webbing straps may be placed through lifting/lashing points as a means of limiting the bounce of the building during transit if required.

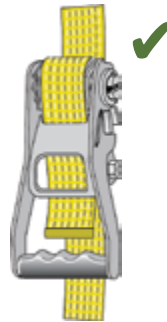
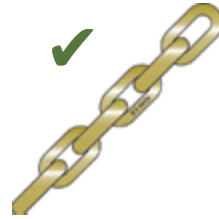


Load restraint: Shoring equipment

Shoring Boxes: Unassembled

Load restraint equipment

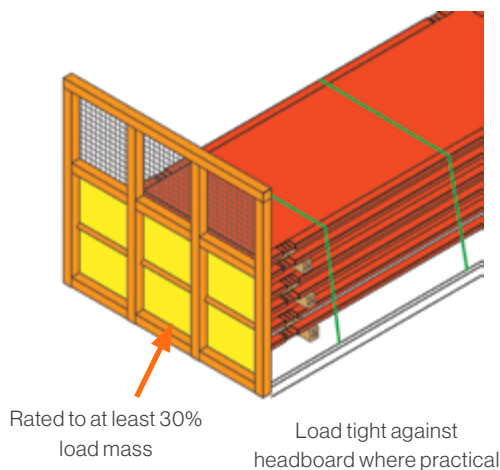
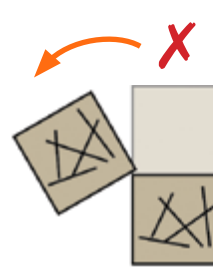
- 8mm transport chains to AS/NZS 4344 and fully pretensioned.
- 50mm webbing straps to AS/NZS 4380 and fully pretensioned.
- Standard or high pre-tension ratchets may be used.
- Timber Dunnage shall be a minimum of 75 x 75 mm or rectangular on wide base (e.g. 100 x 75 mm).
- Timber dunnage to be used between each pair of panels. Align dunnage vertically between layers.
- Timber must be in good condition - free of splits or knots that may weaken the dunnage and risk breaking during transport.
- Rubber squares must be placed between spigots and panels to separate steel on steel contact.
- Use only approved and tested rubber.
- Incorrect rubber can tear or be too slippery (low friction).
- Steel on steel is low friction and high risk.
- Strapping used to package components fully pretensioned.
- Headboards used to block the load must be rated to at least 30% the load mass.
- Load racks and pipe gate are not considered rated/engineered headboards.



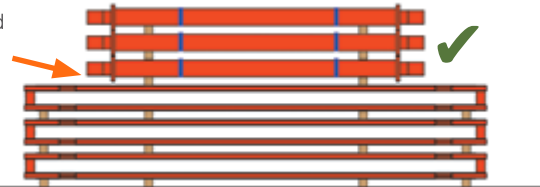
Standard ratchet



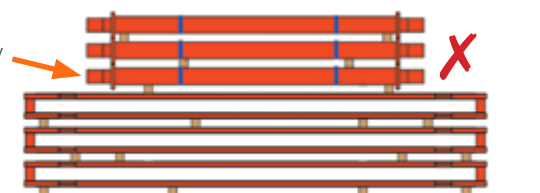
High pre-tension ratchet



Dunnage aligned vertically

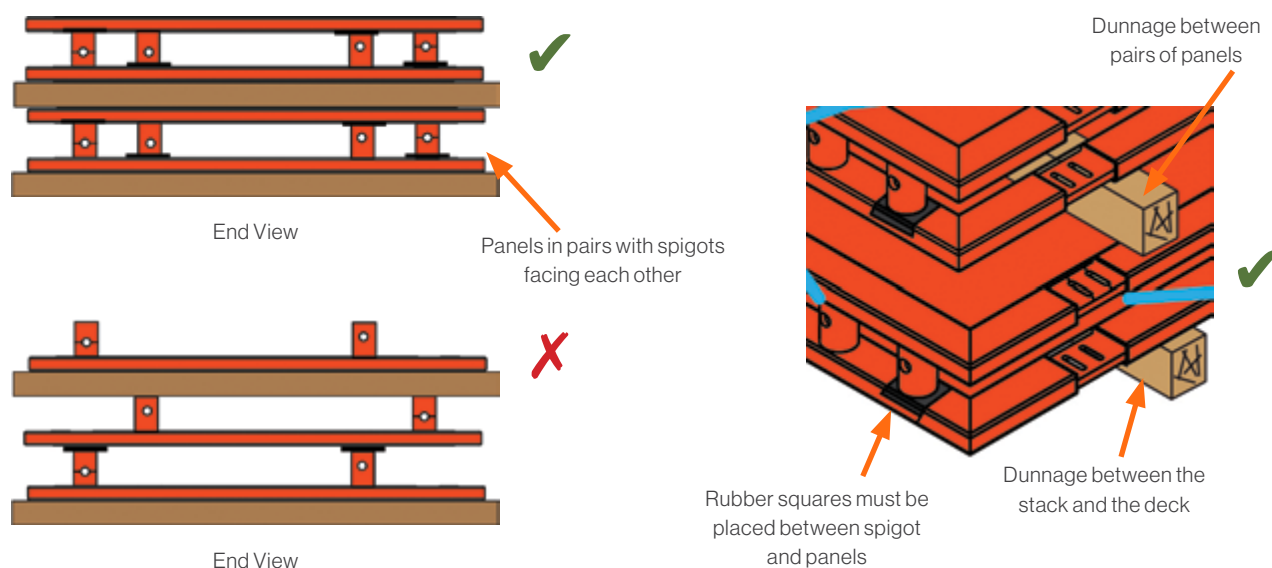


Dunnage NOT aligned vertically



Load configuration

- Panel stacks must be loaded centrally across the trailer.
- Panels must be loaded in pairs with the spigots facing each other.
- Stacks to be aligned carefully to ensure spigots are fully supported by the opposing panel.

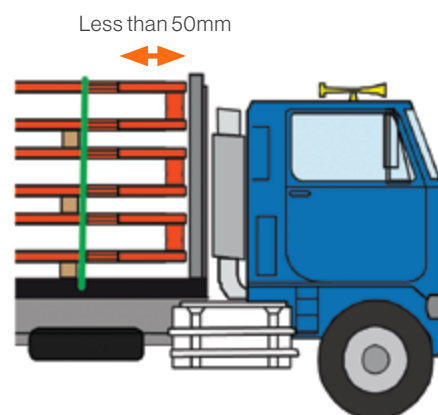


Blocked loads

- Blocking the load forwards is the preferred method.

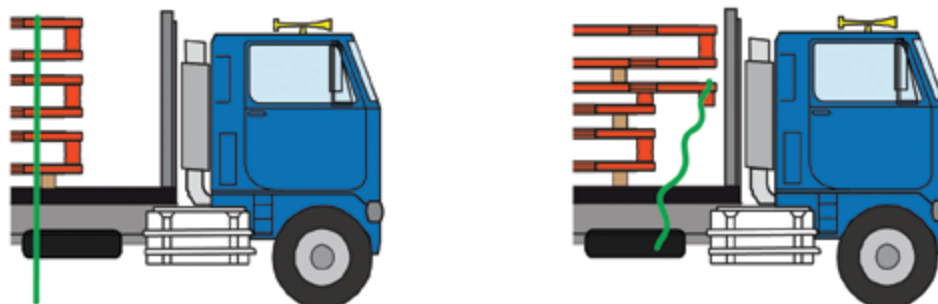
Blocking forward includes either:

- Blocking within 50mm to a rated headboard.
OR
- Direct restraint from cross-over lashings.



Unblocked loads

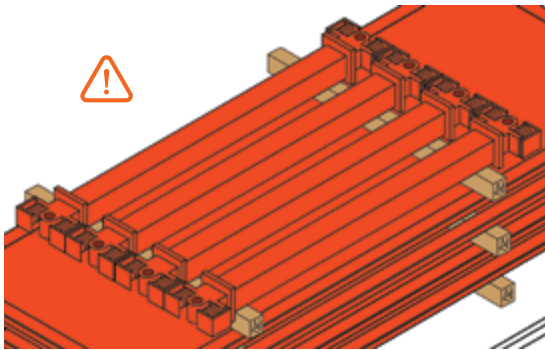
- Unblocked loads are allowed, but more tie-down lashings are required.
- Components are assumed to be unblocked most of the time.



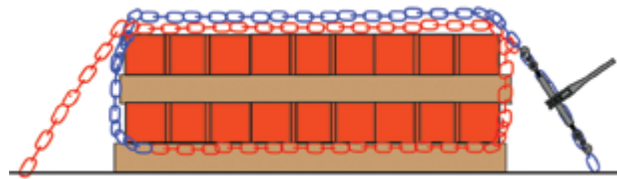
Larger gaps to rated headboard = Unblocked

Packaging components

- Up to 300 kg of components may be packaged together using two straps.
- Components that have not been suitably packaged must be restrained with belly wrapped or choked lashings.



Components without strapping



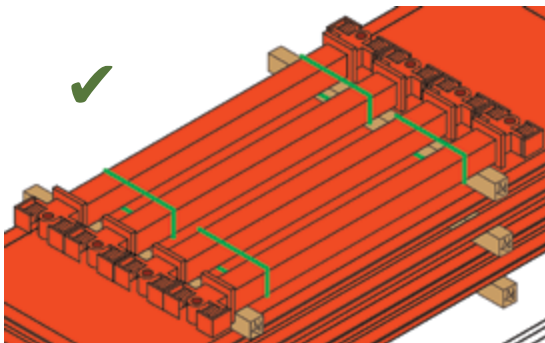
Belly-wrapped components



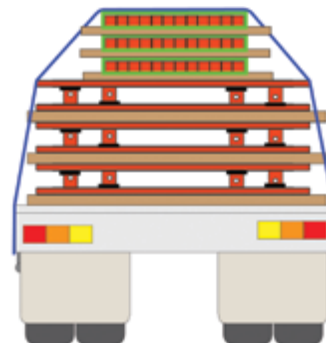
Choked chain using choking device

Applying Tie-downs

- Tie-downs can be applied over panels and components that are suitably packaged.
- Locate and align tie-downs as close to timber dunnage as practicable.
- Take care to avoid damaging the packaging straps when applying the tie-downs.



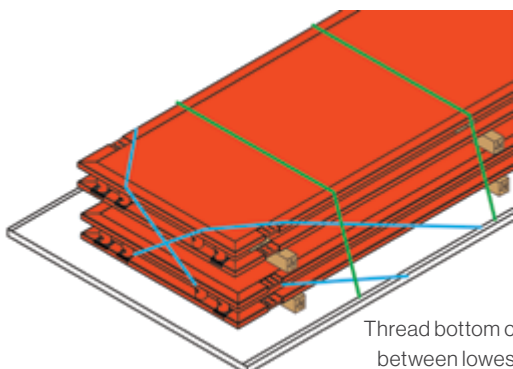
Components with suitable strapping



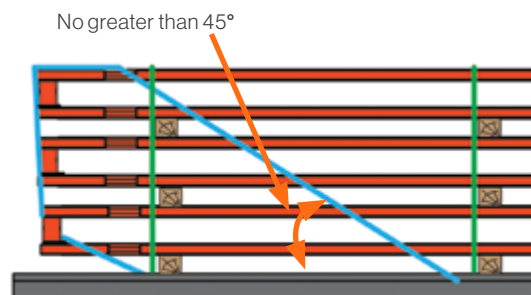
Tie-downs applied over panels and suitably packaged components

Cross-over chains

- Two cross-over chains can be used to block loads with gaps or unrated headboards.
- Cross-over chain angle is no greater than 45°.



Thread bottom crossover between lowest pair of panels as shown



No greater than 45°

Cross over chains blocking the load forwards

Assessing restraint for blocked and unblocked combinations

Use this section to assess:

- Which part of the load is blocked, if any.
- How to determine the number of tie-downs required.
- Which angle to use for the tables.

Unblocked

For smaller loads with no blocking at all:

- Determine the number of tie-down lashings required from the Unblocked Tie-Down Tables. Lashing angle for the tables is the lower base angle.

Fully blocked

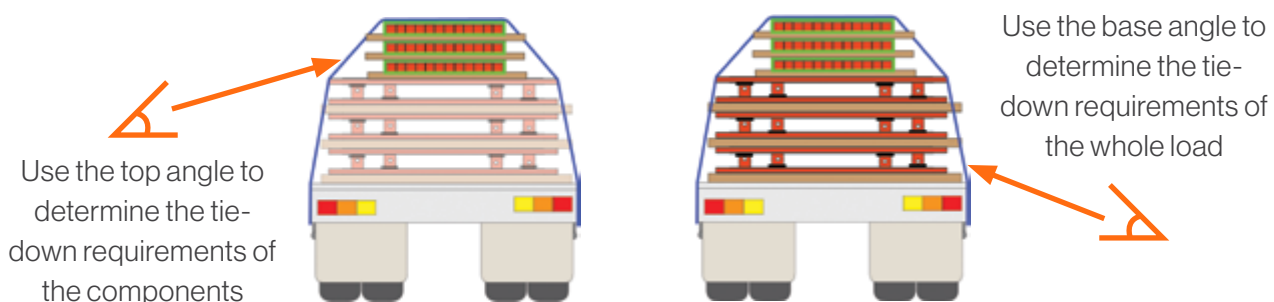
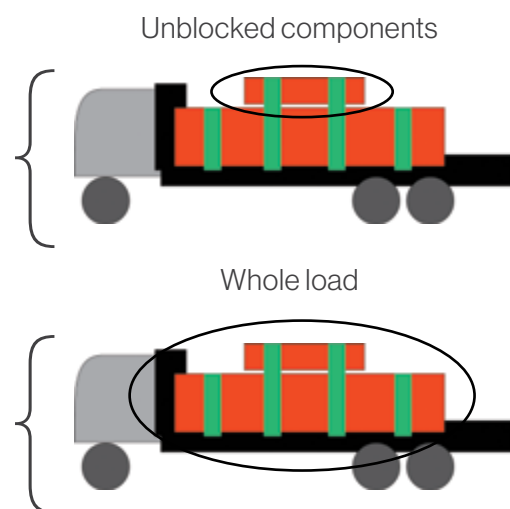
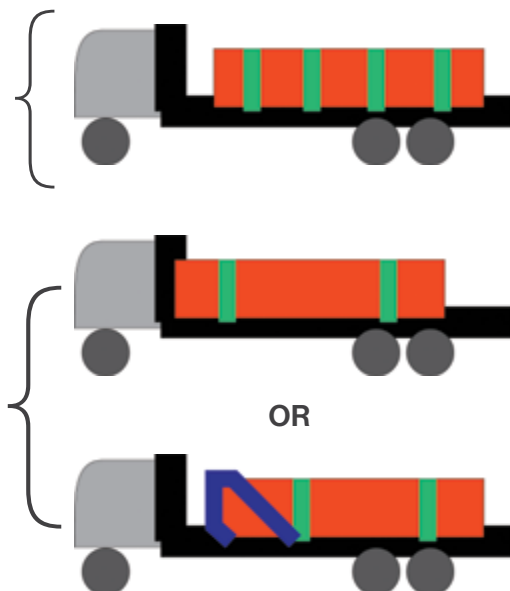
If just panels are loaded, and the load is fully blocked:

- Determine the number of tie-down lashings required from the Blocked Tie-Down Tables. Lashing angle for the tables is the lower base angle.

Partly blocked - Base to headboard or cross-overs

If the base panels are blocked, but there are unblocked components loaded above, then:

- Determine the number of tie-downs required for the unblocked components. The lashing angle used for the table is the top angle going up to the components from the edge of the panels.
- Determine the number of lashings required as if the whole load is blocked (weight of the panels + components + dunnage). Lashing angle for the table is the base angle.
- The number of tie-downs over the components can be counted towards the number of tie-downs required over the whole load. See page 95 for a worked example.



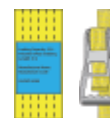


Table 1. Number of tie-downs required - UNBLOCKED (tonne)

Weight (kg)	Lashing angle - unblocked			
	30°- 44°	45°- 59°	60°- 74°	75°+
0 - 2000	7	5	4	4
2001 - 4000	14	10	8	7
4001 - 6000	N/A	15	12	11
6001 - 8000	N/A	N/A	N/A	14
8001 - 10000	N/A	N/A	N/A	N/A
10001 - 12000	N/A	N/A	N/A	N/A
12001 - 14000	N/A	N/A	N/A	N/A
14001 - 16000	N/A	N/A	N/A	N/A



Table 2. Number of tie-downs required - BLOCKED (tonne)

Weight (kg)	Lashing angle - blocked			
	30°- 44°	45°- 59°	60°- 74°	75°+
0 - 2000	2	2	2	2
2001 - 4000	4	3	2	2
4001 - 6000	5	4	3	3
6001 - 8000	7	5	4	4
8001 - 10000	9	6	5	5
10001 - 12000	10	8	6	6
12001 - 14000	12	9	7	7
14001 - 16000	14	10	8	7



Tie-down tables - webbing straps - high pre-tension ratchet



Table 3. Number of tie-downs required - UNBLOCKED (tonne)

Weight (kg)	Lashing angle - unblocked			
	30°- 44°	45°- 59°	60°- 74°	75°+
0 - 2000	4	3	2	2
2001 - 4000	7	5	4	4
4001 - 6000	10	8	6	6
6001 - 8000	14	10	8	7
8001 - 10000	N/a	12	10	9
10001 - 12000	N/a	15	12	11
12001 - 14000	N/a	N/a	14	13
14001 - 16000	N/a	N/a	N/a	14



Table 4. Number of tie-downs required - BLOCKED (tonne)

Weight (kg)	Lashing angle - blocked			
	30°- 44°	45°- 59°	60°- 74°	75°+
0 - 2000	2	2	2	2
2001 - 4000	2	2	2	2
4001 - 6000	3	2	2	2
6001 - 8000	4	3	2	2
8001 - 10000	5	3	3	3
10001 - 12000	5	4	3	3
12001 - 14000	6	5	4	4
14001 - 16000	7	5	4	4





Table 5. Number of tie-downs required - UNBLOCKED (tonne)

Weight (kg)	Lashing angle - unblocked			
	30°- 44°	45°- 59°	60°- 74°	75°+
0 - 2000	3	2	2	2
2001 - 4000	6	4	4	3
4001 - 6000	8	6	5	5
6001 - 8000	11	8	7	6
8001 - 10000	14	10	8	7
10001 - 12000	16	12	10	9
12001 - 14000	N/A	14	11	10
14001 - 16000	N/A	N/A	13	12



Table 6. Number of tie-downs required - BLOCKED (tonne)

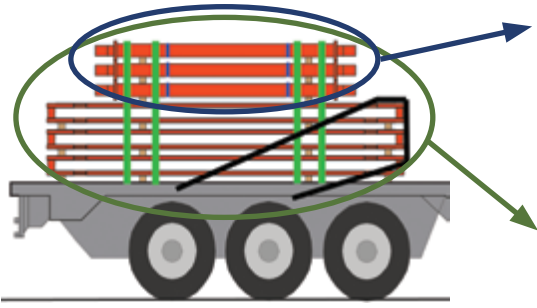
Weight (kg)	Lashing angle - blocked			
	30°- 44°	45°- 59°	60°- 74°	75°+
0 - 2000	2	2	2	2
2001 - 4000	2	2	2	2
4001 - 6000	2	2	2	2
6001 - 8000	3	2	2	2
8001 - 10000	4	3	2	2
10001 - 12000	4	3	3	3
12001 - 14000	5	4	3	3
14001 - 16000	6	4	4	3



Example - Blocked with cross-over chains and tie-down chains

Weight of components = 2600 kg
 Top lashing angle = 50°
 Total weight = panels # components # dunnage = 14600 kg
 Base lashing angle = 80°



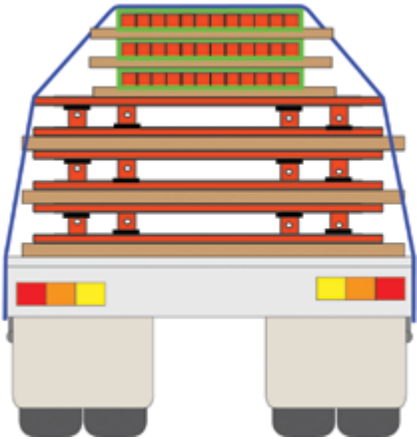


4 tie-downs in total

Weight (kg)	Lashing angle - unblocked			
	30°- 44°	45°- 59°	60°- 74°	75°+
2001 - 4000	6	4	4	3

Weight (kg)	Lashing angle - blocked			
	30°- 44°	45°- 59°	60°- 74°	75°+
14001 - 16000	6	4	4	3


 50° Top Lashing
 Angle/Unblocked




 80° Base Lashing
 Angle/Blocked

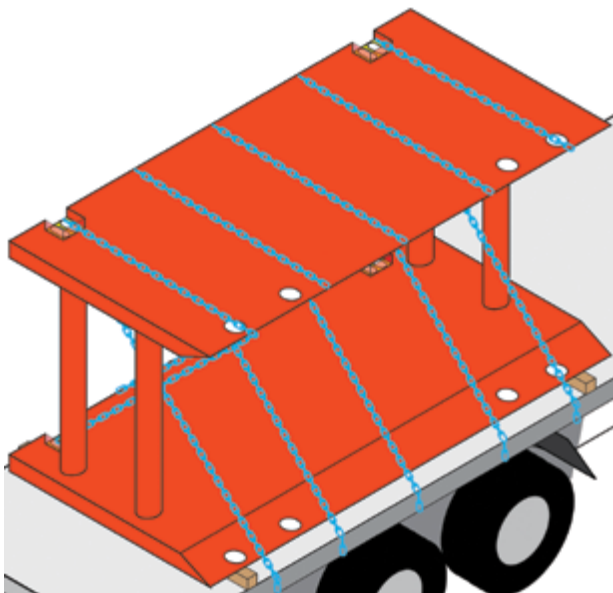
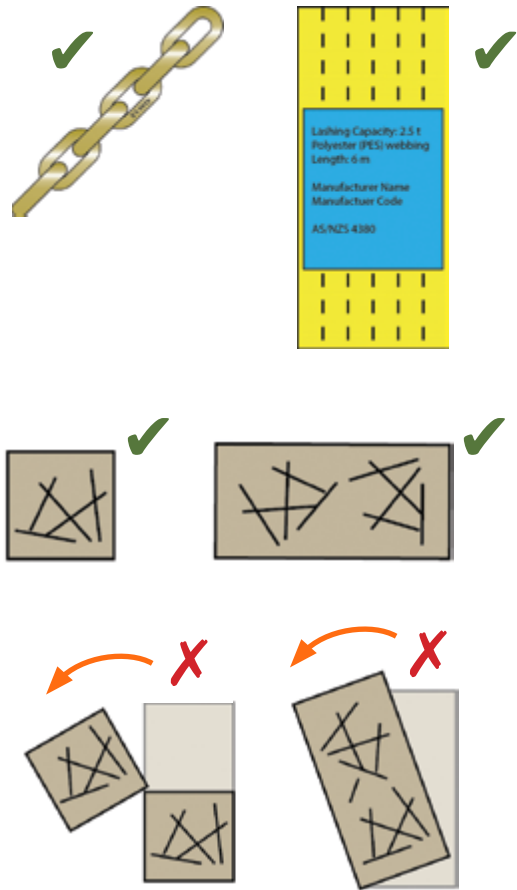
Solution:

1. Assess the load type: The load is partly blocked (panels blocked with cross-over chains while components unblocked).
2. Determine the number of tie-downs for the components: Referring to Table 5 (Chains - Unblocked), with a top lashing angle of 50° and weight of 2600 kg, a minimum of 4 x tie-downs required.
3. Determine the number of tie-downs for the whole load: Referring to Table 6 (Chains - Blocked), with a base lashing angle of 80° and total weight of 14600kg, a minimum of 3 x tie-downs required.
4. Applying the tie-downs: The tie-downs over the components can be counted towards the tie-downs over the whole load. With 4 x tie-downs over the components, no additional tie-downs are required over the whole load as only 3 were required.

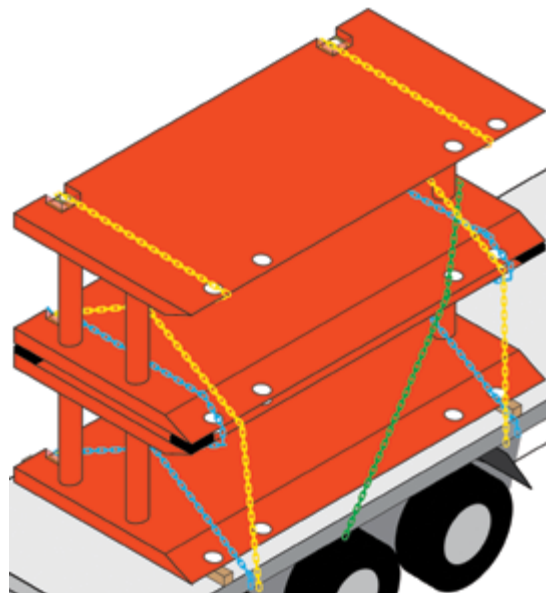
Shoring Boxes: Assembled

Load restraint equipment

- 8mm transport chains to AS/NZS 4344 and fully pretensioned.
- Do not use webbing straps as primary restraint.
- Timber dunnage shall be a minimum of 75 x 75 mm or rectangular on wide base (eg 100 x 75 mm).
- Timber must be in good condition - free of splits or knots that may weaken the dunnage and risk breaking during transport.
- Rubber squares must be placed between stacked shoring boxes to separate steel on steel contact.
- Use only approved and tested rubber.
- Incorrect rubber can tear or be too slippery (low friction).
- Steel on steel is low friction and high risk.



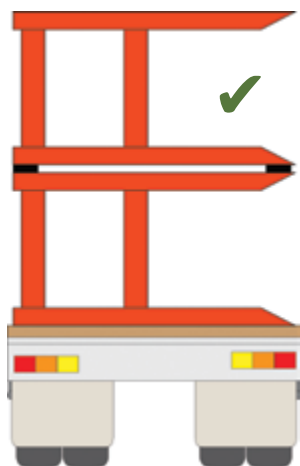
Shoring box loaded single high



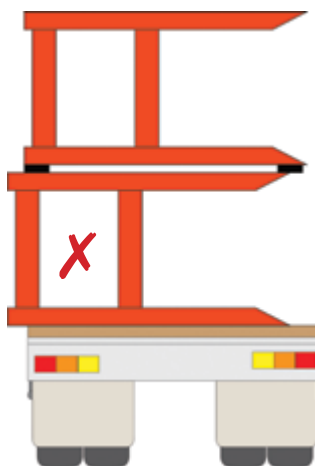
Shoring box loaded two high

Load configuration

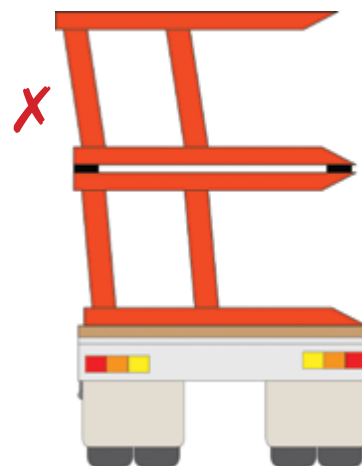
- Load shoring boxes centrally across the trailer.
- Ensure shoring box struts are vertical and locked in place.
- The bottom shoring box must be loaded on timber dunnage.
- The top shoring box must always be the same size and be loaded on rubber matting.
- Do not load steel on steel. Ensure no contact between shoring boxes.
- Check to make sure the load is not over width or over height prior to departure.



Centrally located and vertical



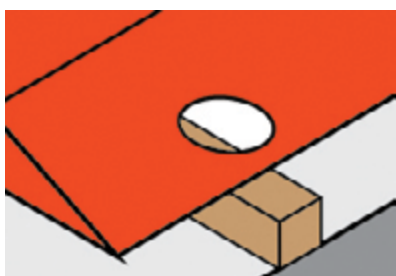
Not centrally loaded



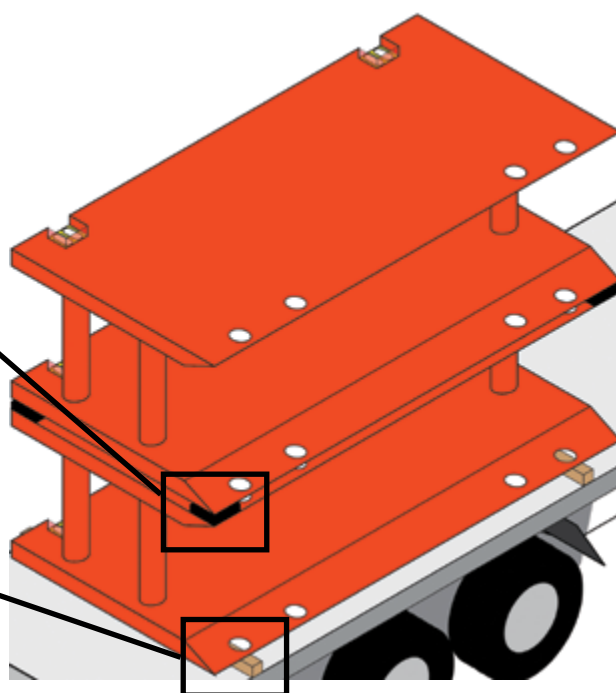
Not vertical



Rubber matting between shoring boxes

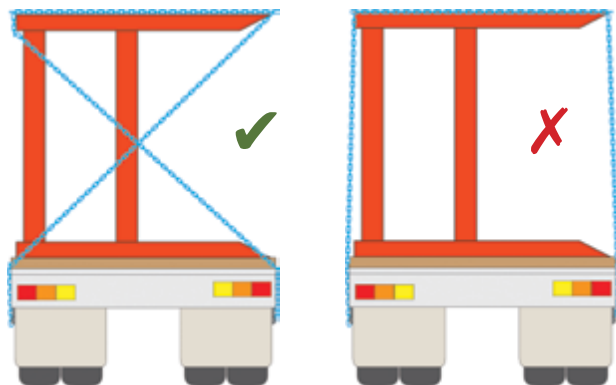


Timber dunnage under bottom shoring box

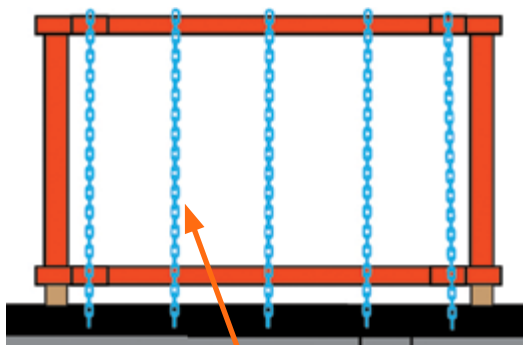
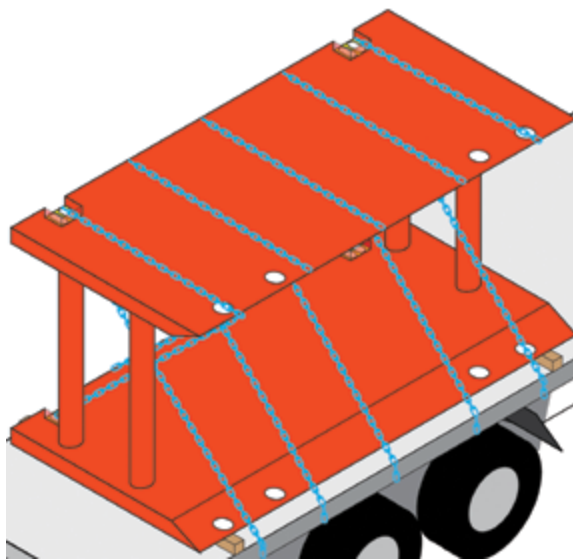


Load restraint method - single high

- Apply the number of tie-down chains as required per Table 1 below.
- Tie-down chains must cross to the opposite side of the load, between the panels.



Tie down chains must cross to opposite side



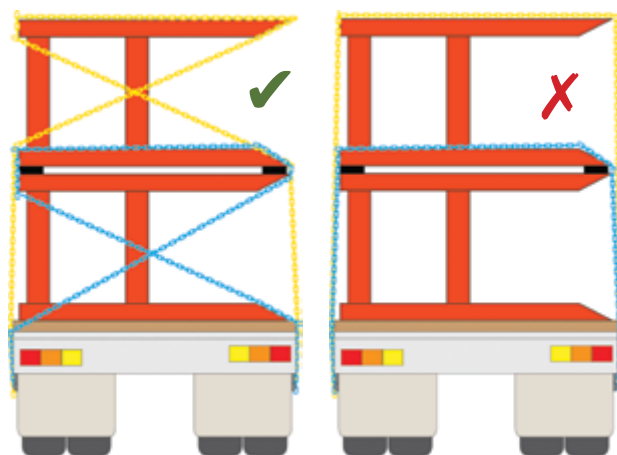
Tie downs vertical

Table 1. Number of tie-downs required - single high

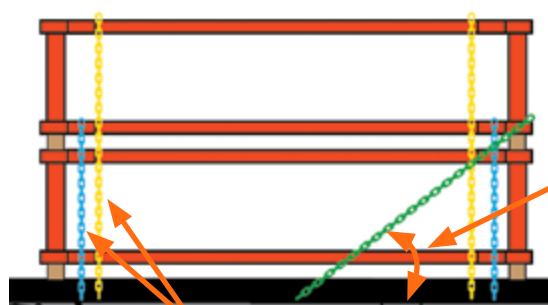
Weight (kg)	Lashing angle			
	30°- 44°	45°- 59°	60°- 74°	75°+
0 - 2000	3	2	2	2
2001 - 4000	6	4	4	3
4001 - 6000	8	6	5	5
6001 - 8000	11	8	7	6
8001 - 10000	14	10	8	7
10001 - 12000	N/A	12	10	9
12001 - 14000	N/A	14	11	10
14001 - 16000	N/A	N/A	13	12

Load restraint method - two high

- Apply the number of tie-down chains as required per Table 2 below, restraining each shoring box separately (will have an equal number of chains over the top and bottom shoring boxes).
- Tie-down chains must cross to the opposite side of the load, between the panels.
- Apply a direct chain around the top shoring box's struts as per the images below.

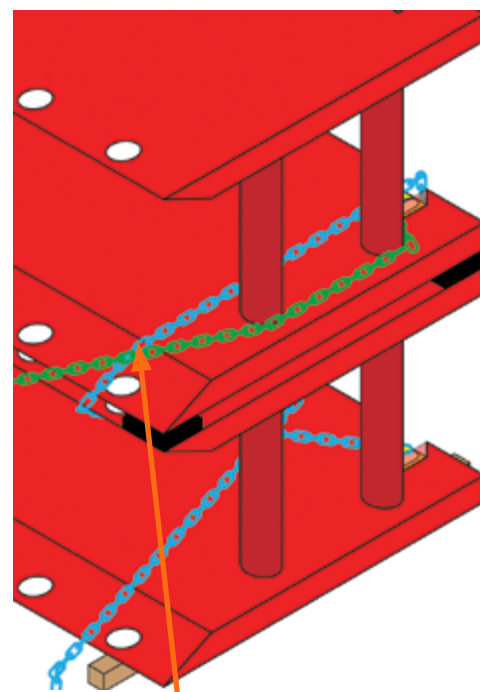


Tie down chains must cross to opposite side



Tie downs vertical

Direct chain no greater than 45°



Direct chain (shown in green) must feed around the top shoring box's struts

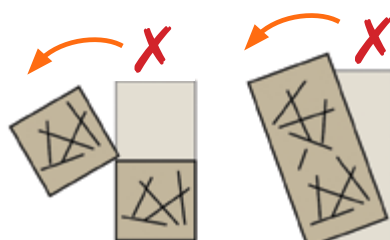
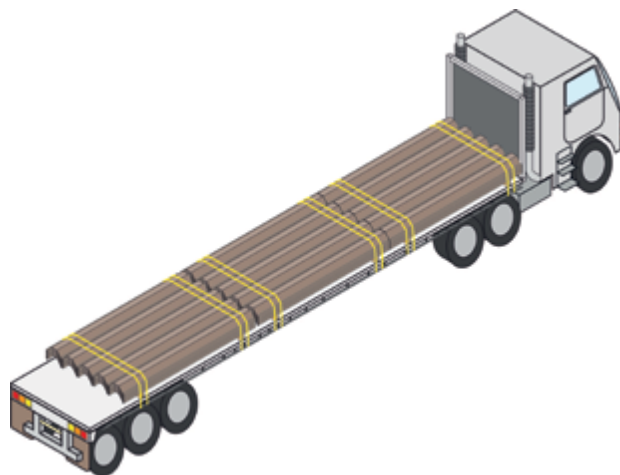
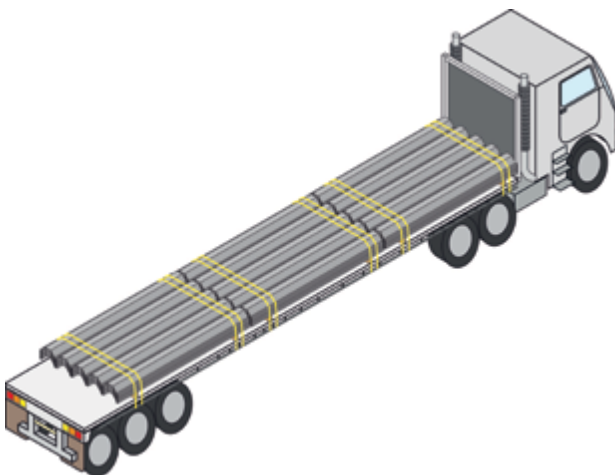
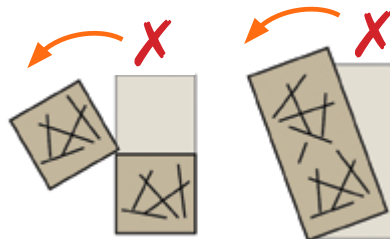
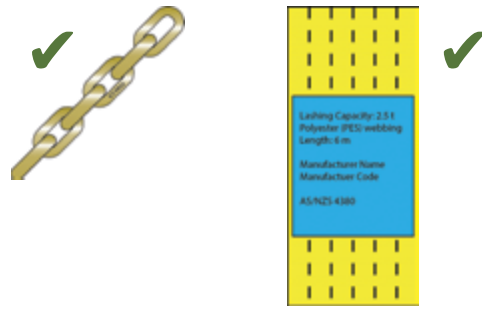
Table 2. Number of tie-downs required - two high

Weight (kg)	Lashing angle			
	30° - 44°	45° - 59°	60° - 74°	75°+
0 - 2000	2	2	2	2
2001 - 4000	2	2	2	2
4001 - 6000	2	2	2	2
6001 - 8000	3	2	2	2
8001 - 10000	4	3	2	2
10001 - 12000	7	5	4	4
12001 - 14000	11	8	7	6
14001 - 16000	N/A	11	9	8

Load restraint: Sheet Piles

Load restraint equipment

- 8mm transport chains to AS/NZS 4344 and fully pretensioned.
- 50mm webbing strap, conforming to AS/NZS 4380 and fully pretensioned.
- All equipment must be in good working order. Inspect the lashings for wear.
- Webbing straps torn more than 10% of their width must be discarded.
- Use wear sleeves for webbing straps over sharp edges.
- Headboards must be rated capable of withstanding 30% of the load weight.
- Tailboards be rated and capable of withstanding the load weight experienced.
- Timber Dunnage shall be square and a minimum of 75 x 75 mm.
- Timber must be in good condition - free of splits or knots that may weaken the dunnage and risk breaking during transport.

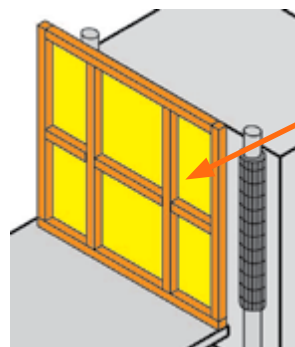


Dunnage requirements: if used

- Square timber dunnage in good condition. Minimum 75 x 75 mm.
- Do not use rectangular dunnage.
- Hardwood dunnage only.
- No softwood dunnage.

Load configuration - blocking requirements engineered headboard:

- Block the load forwards to an engineered headboard.
- Pipe gates are not suitable for blocking.
- To be considered blocked the load must be cumulative less than 200mm to the blocking surface.



Typical Engineered Headboard
4 x large section uprights



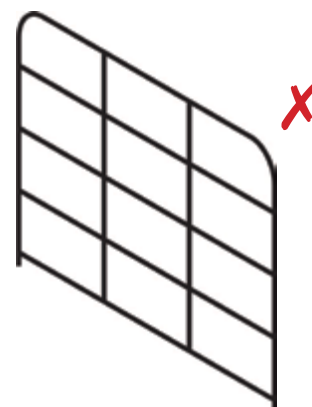
Engineered Headboards can be used to provide blocking restraint



Max 200mm total gap to blocking surface for Blocked loads



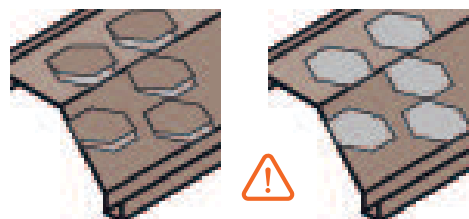
Unblocked load if total gaps are larger than 200mm



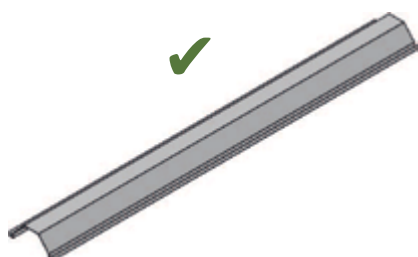
Pipe gates are not suitable for blocking

Rusted vs clean steel

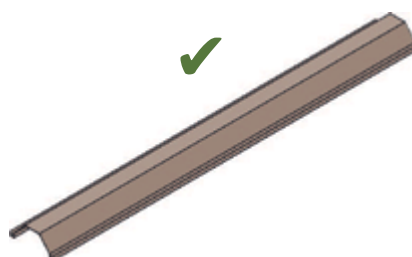
- Rusted steel must have at least 90% of the surface area covered in rust.
- If rust is flakey or powdery then restrain as per clean steel.



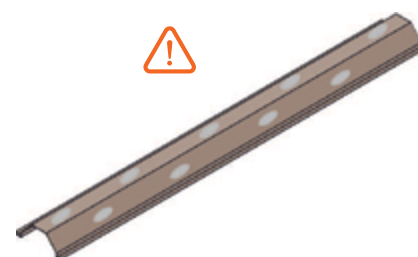
Flakey rust is likely to become clean during loading/transport



Clean steel



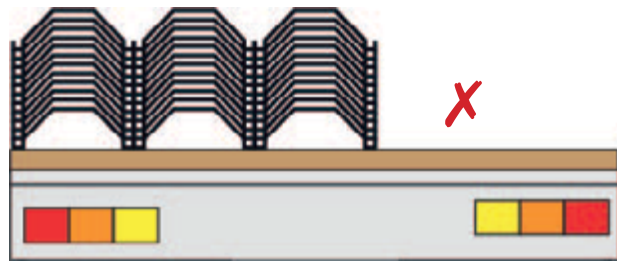
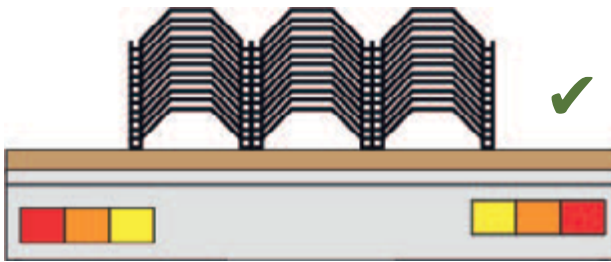
Rusted Steel



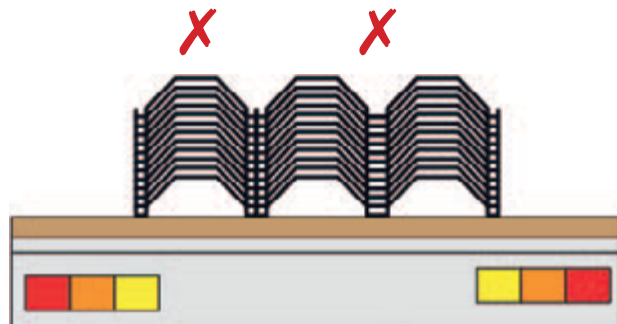
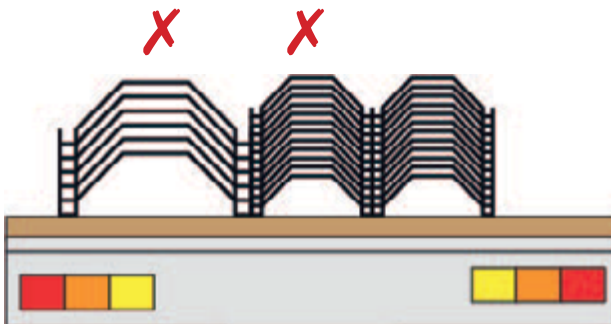
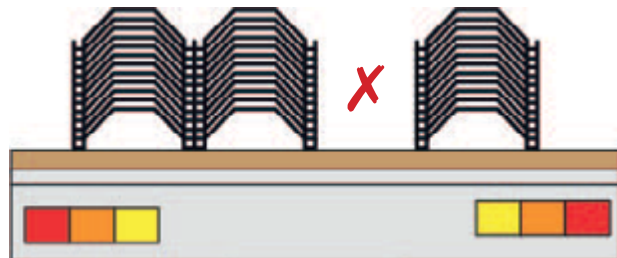
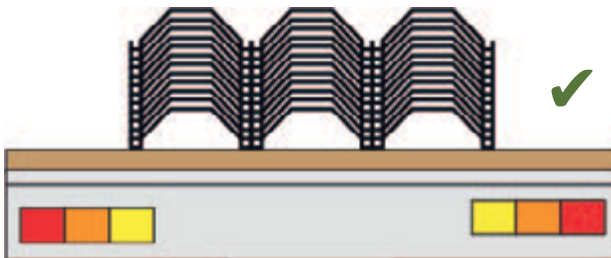
At least 90% covered in rust

Loading requirements:

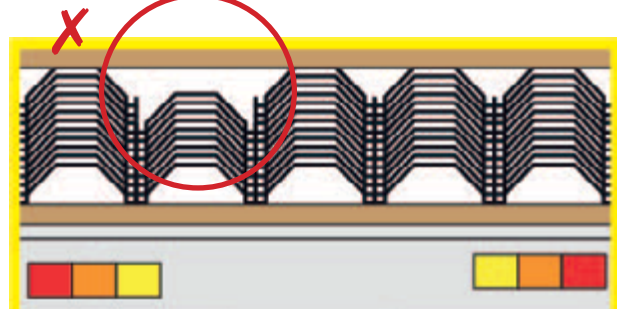
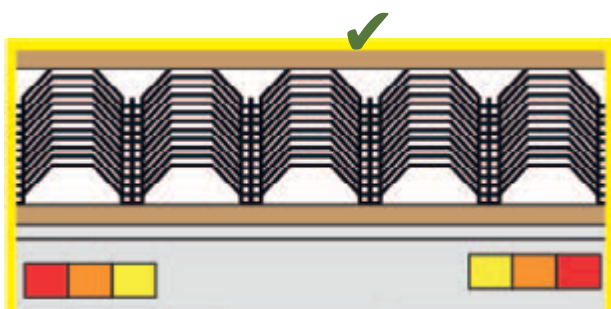
- Load piles centrally across the trailer.
- Check to make sure the load is not over width or over height prior to departure.



- Do not leave gaps within the group of piles.
- Only stack sheet piles of the same size and profile.

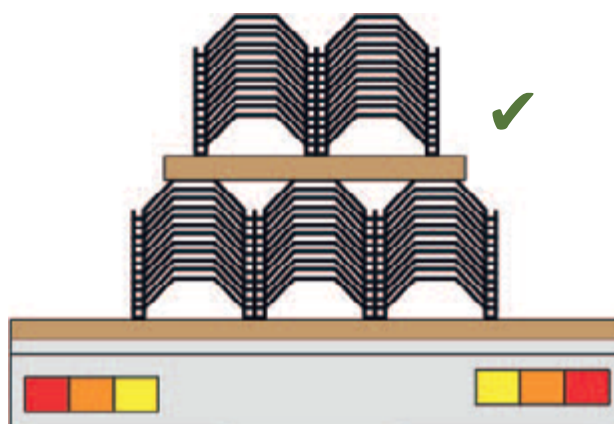


- Clamping with dunnage on top must be in contact with all stacks of piles.

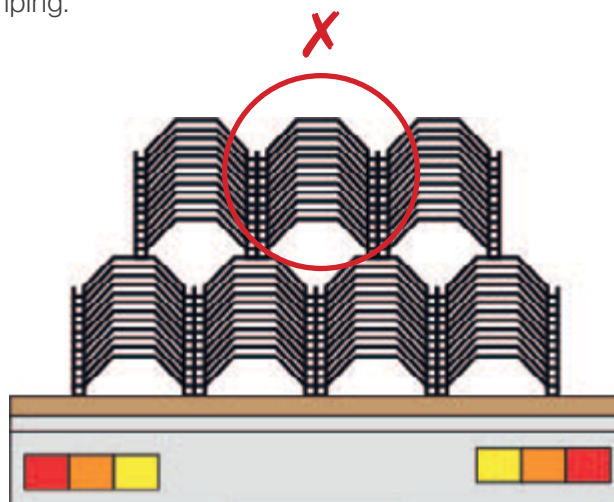


Stacking requirements:

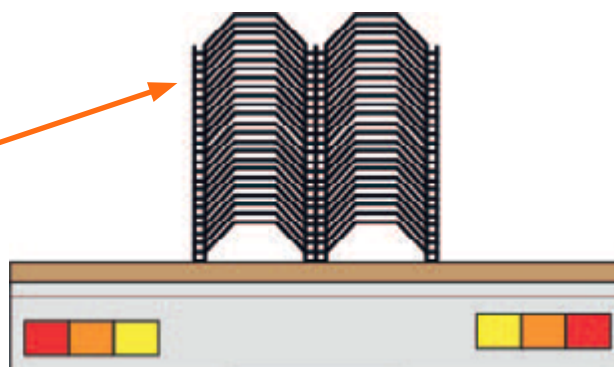
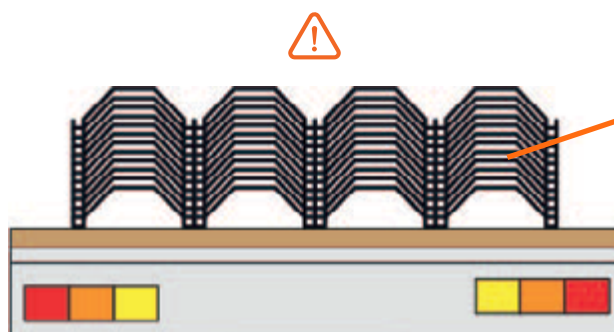
- When stacking ensure all groups of piles have clamping.



Bottom row 3 piles with 2 piles on top



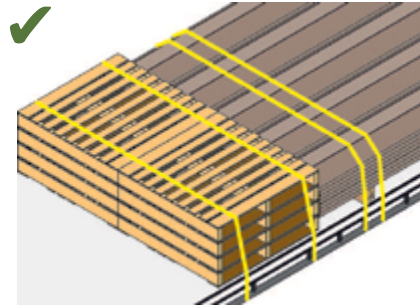
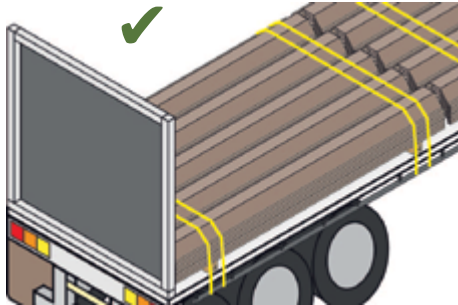
Top middle stack not restrained



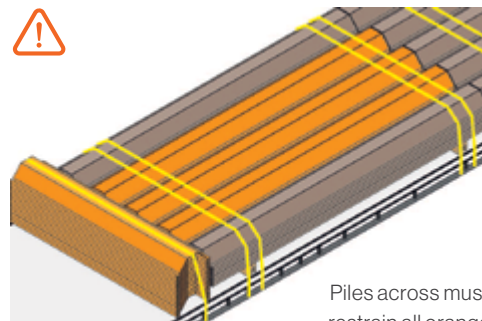
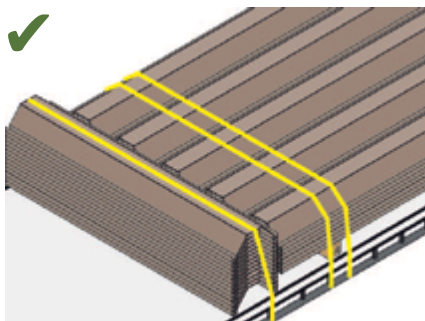
Combine piles into two stacks

Loading requirements (continued):

- Multi-abreast loads must be loaded to prevent spearing. Fully blocked or ensure clamping on all parts of the load.
- Block multi-abreast loads rearwards to tailboards; or
- Block multi-abreast loads rearwards to other product or stacks of pallets; or

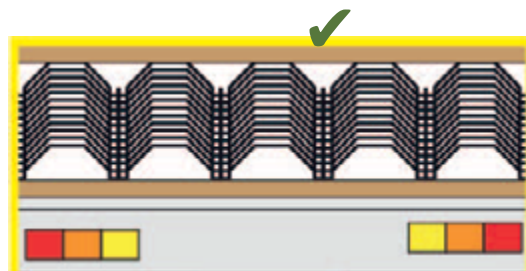
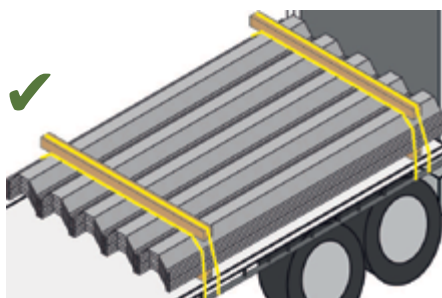


- Blocked to stacks of rusted piles (less than 2400mm) loaded across the trailer.
 - Stack of rusted piles must be restrained to 50% of the weight of central stacks (spearing) and the weight of the stack across the trailer.



Piles across must restrain all orange stacks rearwards

- Dunnage can be strapped to the top of the load.



Load restraint method - clean steel

- Apply the number of lashings depending on the condition of the steel and tensioning device.

Table 1. Number of lashings required - clean steel - standard - webbing strap

Load weight (kg)	Lashing angle			
	30° - 44°	45° - 59°	60° - 74°	75°+
500	3	2	2	2
1000	5	4	3	3
1500	8	6	5	4
2000	10	8	6	6
2500	13	9	8	7
3000	15	11	9	8
3500	18	13	11	10
4000	20	15	12	11

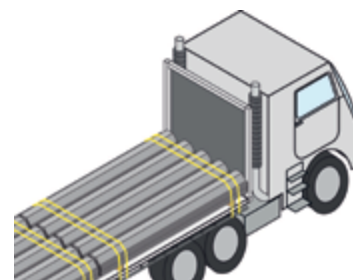
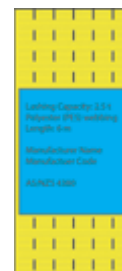
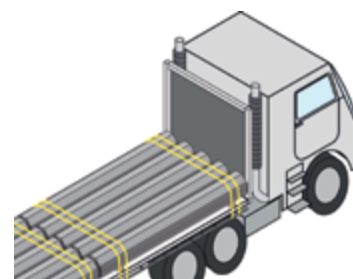


Table 2. Number of lashings required - clean steel - standard - chain

Load weight (kg)	Lashing angle			
	30° - 44°	45° - 59°	60° - 74°	75°+
500	1	1	1	1
1000	2	2	2	2
1500	3	3	2	2
2000	4	3	3	3
2500	5	4	3	3
3000	6	5	4	4
3500	7	5	5	4
4000	8	6	5	5
4500	9	7	6	5
5000	10	8	6	6
5500	11	8	7	6
6000	12	9	7	7
6500	13	10	8	7



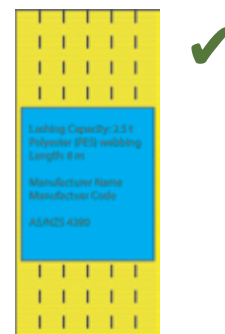
Load restraint: Auxiliary Plates

Applies to:

- Flat, rectangular, steel shoring plate
- Cattle Grids

Load Restraint Equipment Requirements:

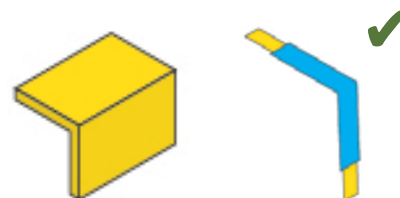
- 50mm webbing tensioned to a minimum pre-tension of 300kg.f averaged across the load.
- Corner protection and wear sleeves required on each corner to prevent damage to plate and strap.
- Plates must be loaded must be loaded onto hardwood timber dunnage 75x75mm.
- Do not use industrial rubber or conveyor belt.
- Webbing straps torn more than 10% of their width must be discarded.
- 8mm transport chain tensioned to a minimum pre-tension of 750kg/f averaged across the load.
- All equipment must be in good working order. Inspect the lashings for wear.



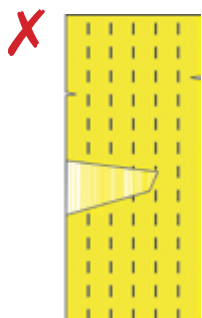
50mm webbing strap



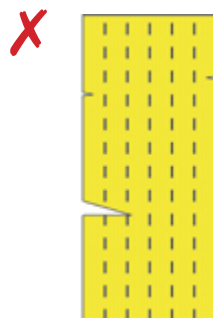
8mm Transport Chain



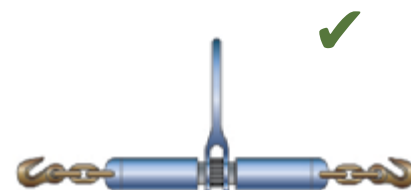
Corner Protection and wear sleeves to prevent damage



Stretched Webbing



More than 10% wear



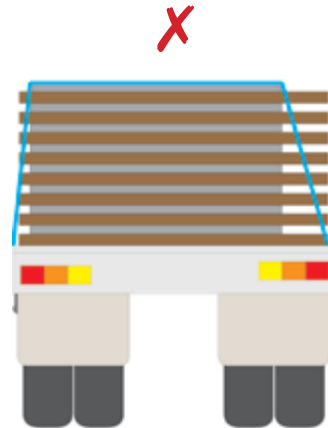
Turnbuckle style or maxibinder tensioners for chain

Loading and Restraint Requirements:

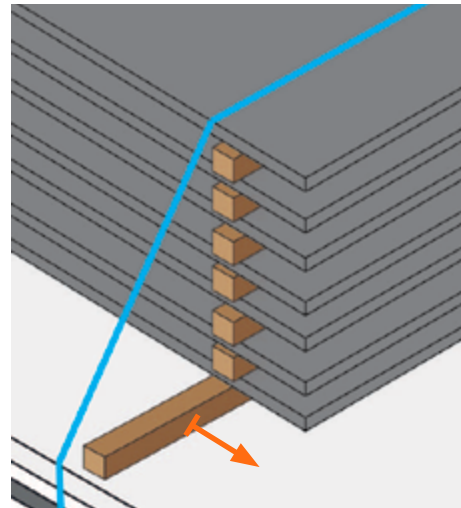
- Place timber dunnage between deck and Shoring Plates at all contact points.
- When loading Shoring plates single file, ensure they are positioned centrally across the deck.
- When loading Shoring plates two abreast, ensure they are butted up against each other.
- Ensure the load does not exceed axle weight limits.
- Ensure dunnage line up with each other.
- Ensure lashings line up with dunnage.



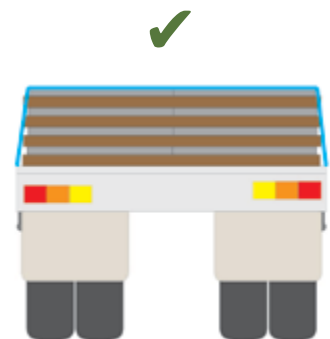
Load single file Shoring plate centrally across the deck.



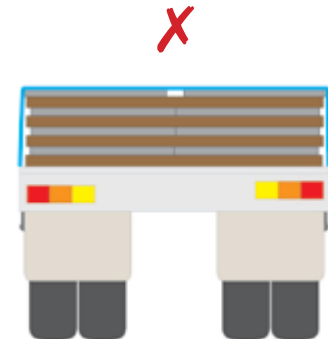
Do not load single file Shoring plate to one side.



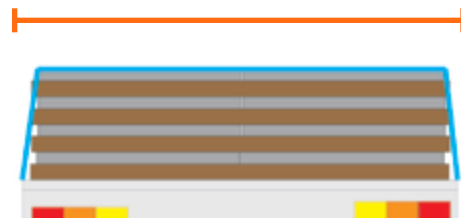
Ensure dunnage is min. 100mm from Shoring plate edge



Ensure Shoring plate are butted together when loading two abreast.



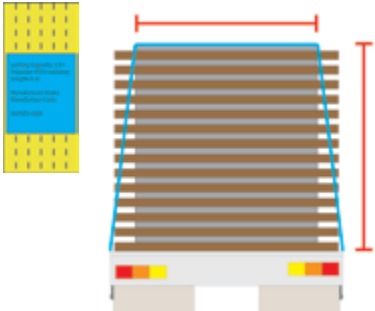
Do not leave gaps between Shoring plates when loading two abreast.



Ensure dunnage spans at a minimum, the entire width of the plate.

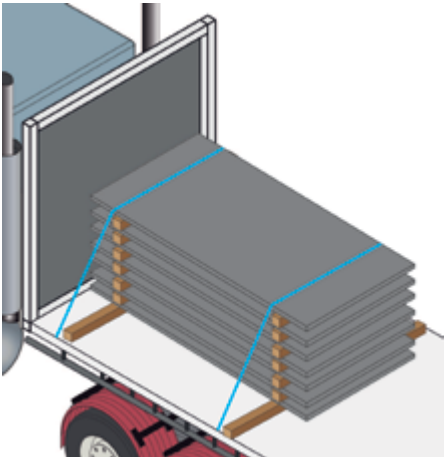
Load restraint webbing: blocked

Angles	Two lashings	Three lashings	Two lashings	Three lashings
	Single file (kg)		Two Across (kg)	
30°	2400	3600	1200	1800
60°	4100	6100	2000	3000
75°	4550	6900	2250	3400

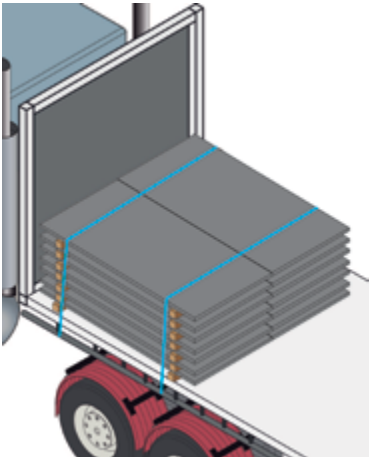


Maximum Stack height set at 2 times the width of the stack.

Single file

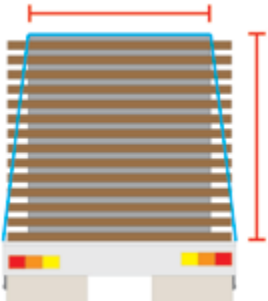


Two Across



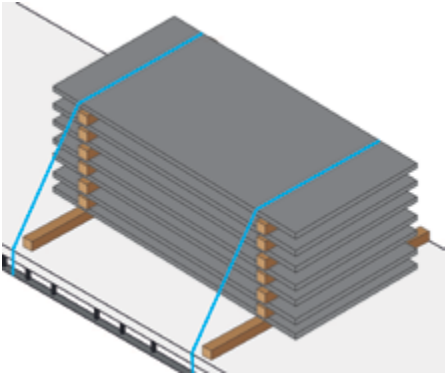
Load restraint webbing: unblocked

Angles	Two lashings	Three lashings	Two lashings	Three lashings
	Single file (kg)		Two Across (kg)	
30°	600	900	300	450
60°	1000	1500	500	750
75°	1100	1650	550	850

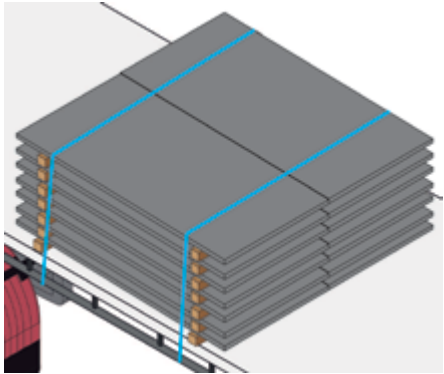


Maximum Stack height set at 2 times the width of the stack.

Single file

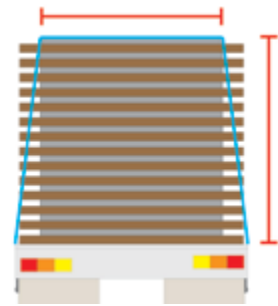


Two Across



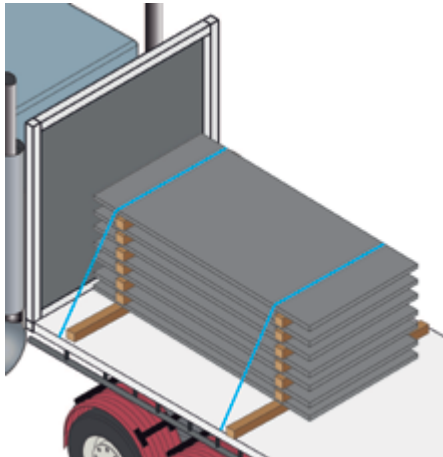
Load restraint chain: blocked

Angles	Two lashings	Three lashings	Two lashings	Three lashings
	Single file (kg)		Two Across (kg)	
30°	6000	9000	3000	4500
60°	10 300	15 500	5100	7700
75°	11 500	17 300	5700	8600

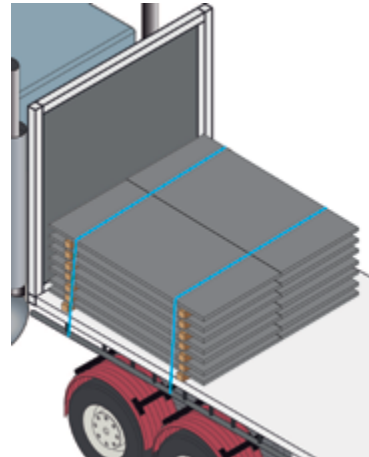


Maximum Stack height set at 2 times the width of the stack.

Single file

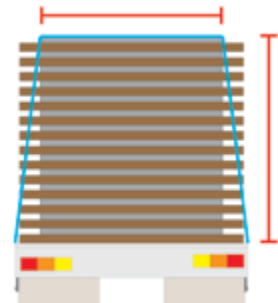


Two Across



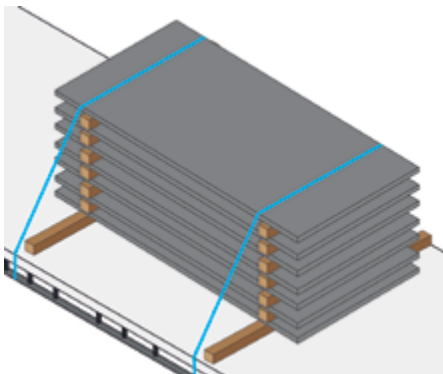
Load restraint chain: unblocked

Angles	Two lashings	Three lashings	Two lashings	Three lashings
	Single file (kg)		Two Across (kg)	
30°	600	900	300	450
60°	1000	1500	500	750
75°	1100	1650	550	850

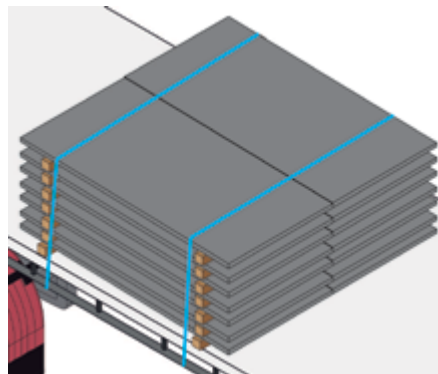


Maximum Stack height set at 2 times the width of the stack.

Single file



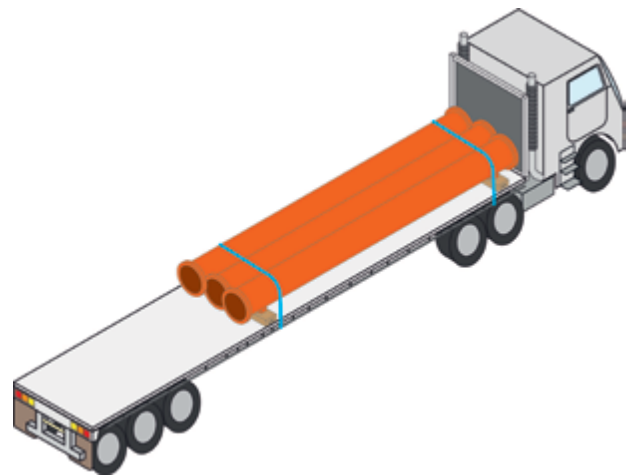
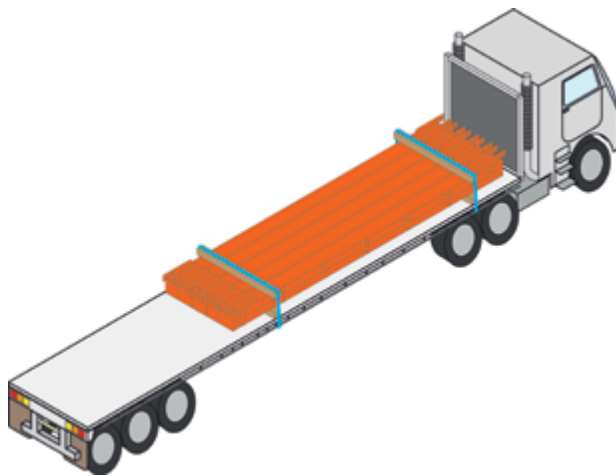
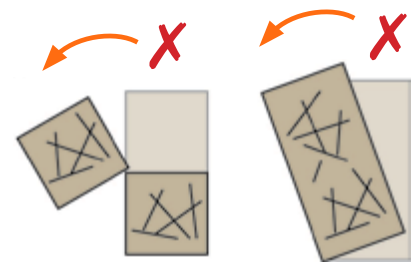
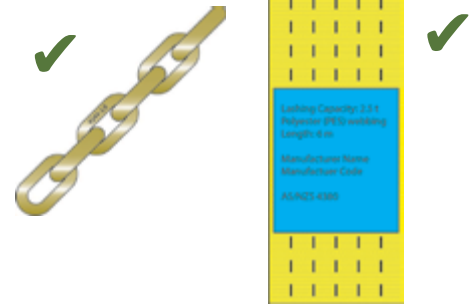
Two Across



Load restraint: Hydraulic Struts and Bracing

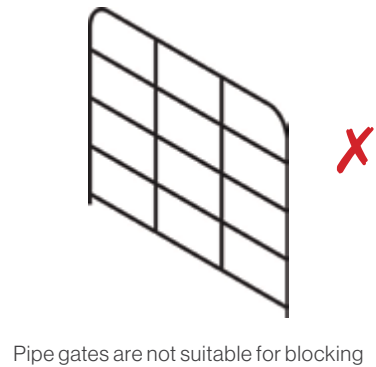
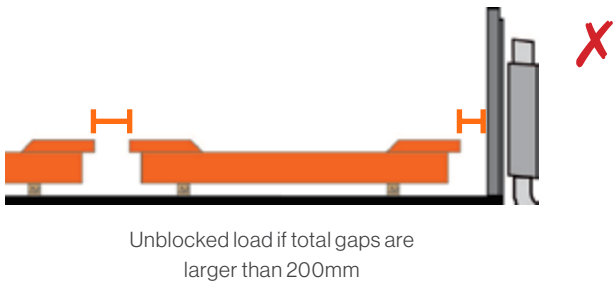
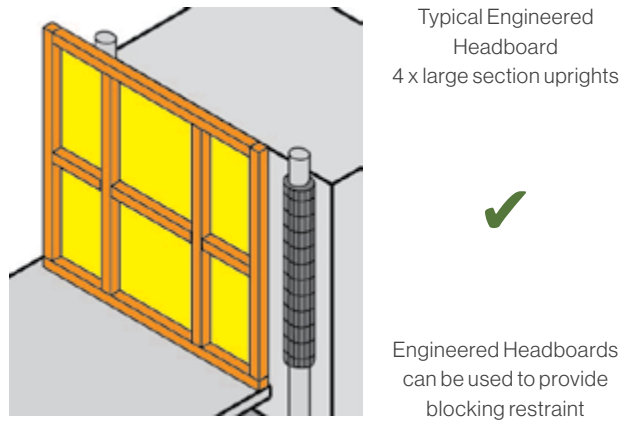
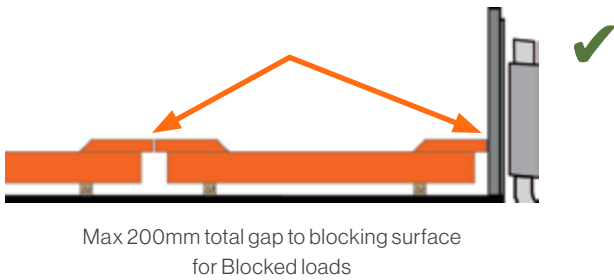
Load Restraint Equipment

- 8 mm transport chains to AS/NZS 4344 and fully pretensioned.
- 50 mm webbing strap, conforming to AS/NZS 4380 and fully pretensioned.
- All equipment must be in good working order. Inspect the lashings for wear.
- Webbing straps torn more than 10% of their width must be discarded.
- Use wear sleeves for webbing straps over sharp edges.
- Headboards must be rated capable of withstanding 30% of the load weight.
- Tailboards be rated and capable of withstanding the load weight experienced.
- Timber Dunnage shall be minimum of 75 x 75 mm or rectangular on wide base.
- Timber must be in good condition - Free of splits or knots that may weaken the dunnage and risk breaking during transport.
- Rubber may be used under strut feet as an alternative to timber dunnage. Use approved and tested rubber only.
- All loads must be blocked to the front.

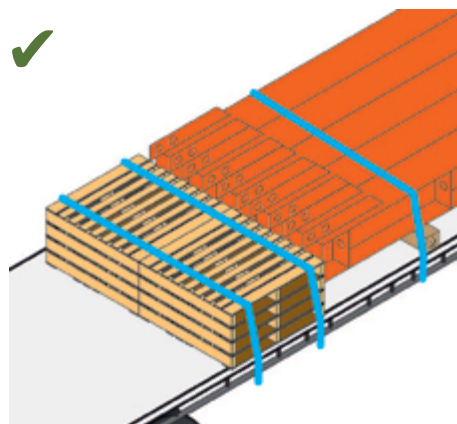
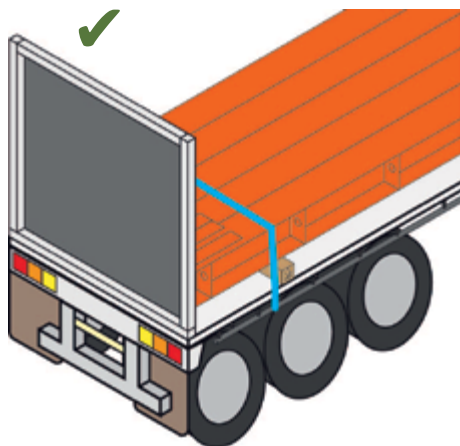


Load configuration blocking requirements:

- Block all loads forwards to an engineered headboard or other blocked product.
- Pipe gates are not suitable for blocking.
- To be considered blocked the load must be cumulative less than 200 mm to the blocking surface.

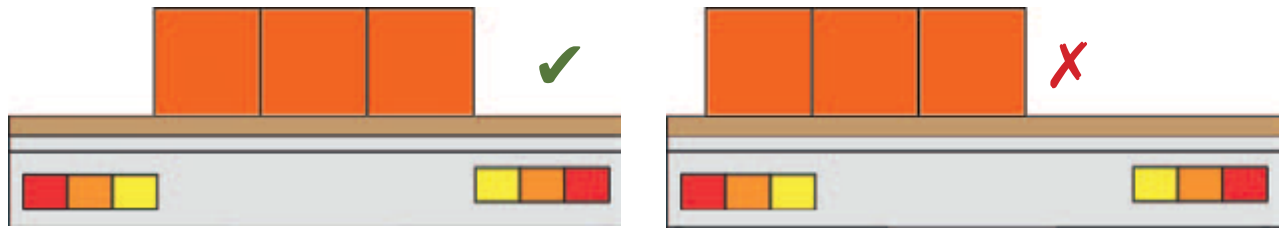


- Block multi-abreast loads rearwards to tailboards, OR;
- Block multi-abreast loads rearwards to other product or stacks of pallets, OR;
- Strap dunnage over the top of the load (see page 114).

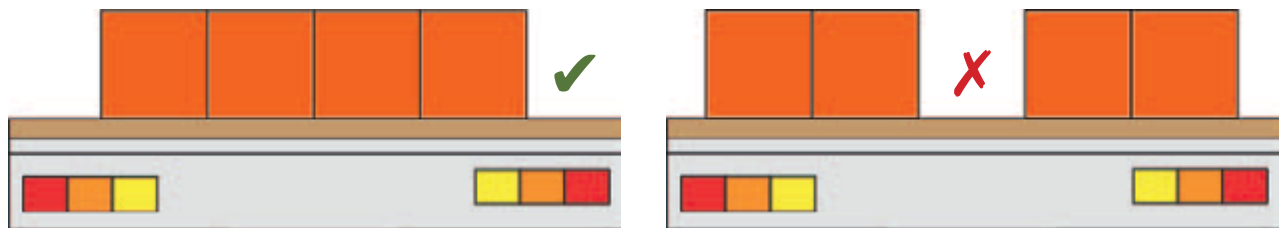


Loading requirements:

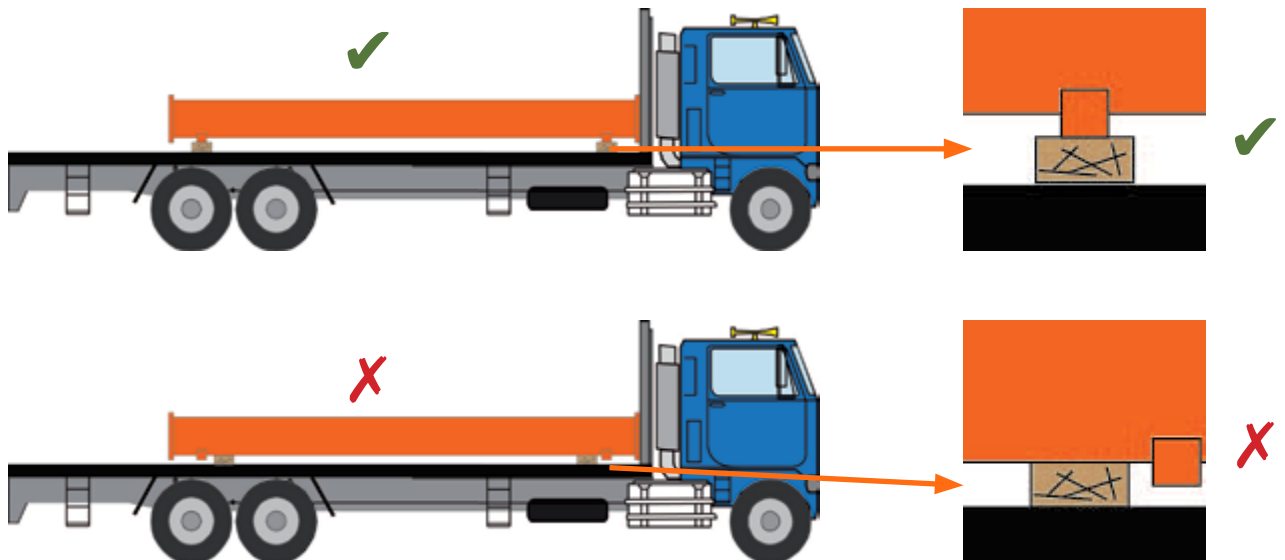
- Load struts and bracing centrally across the trailer.
- Check to make sure the load isn't over width or over height prior to departure.



- Do not leave gaps within the group of struts or bracing.

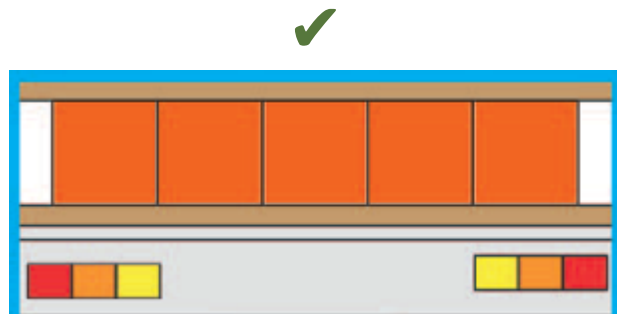
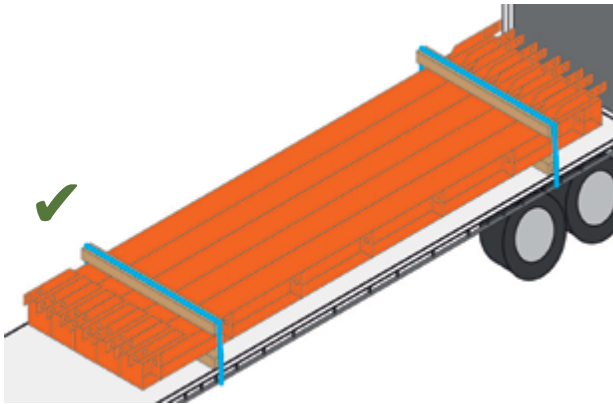


- When loading struts, ensure timber or rubber is placed under all feet.
- Do not load struts on rounded surface. Load on feet only.

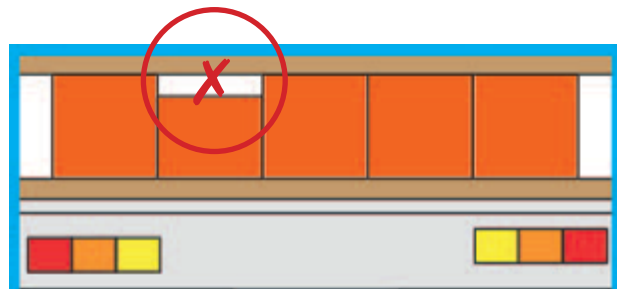
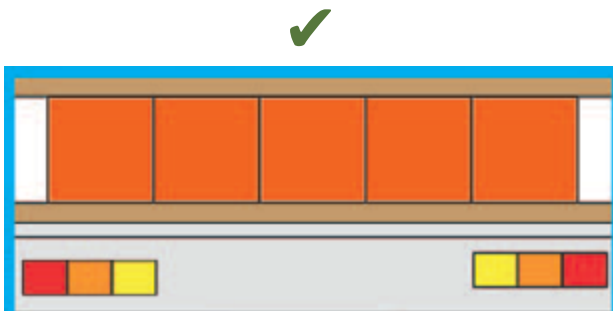


Loading requirements (continued):

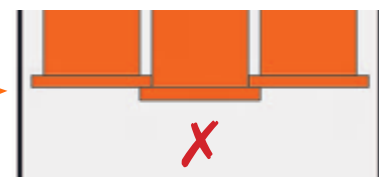
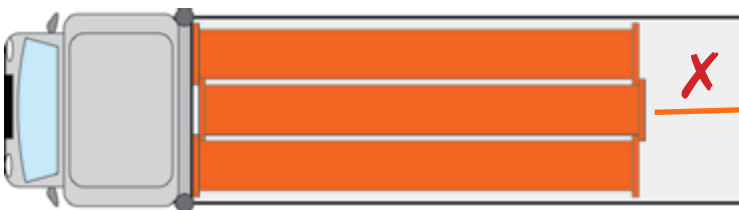
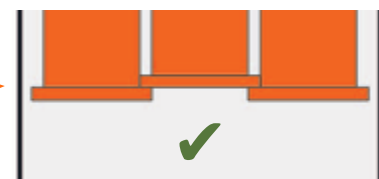
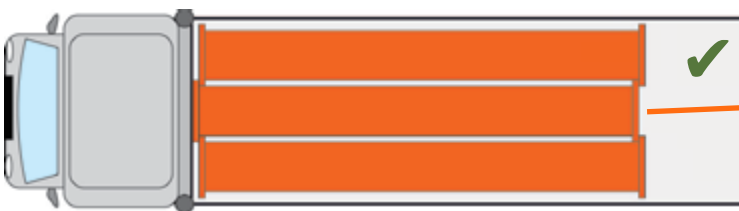
- Multi-abreast loads must be loaded to prevent spearing. Fully block (front and rear) or ensure clamping on all parts of the load.
- Dunnage can be strapped to the top of the load.



- Clamping with dunnage on top must be in contact with all struts or bracing.



- Maximum three struts multi-abreast. Central strut to have flange on front side of outer strut flanges, as per image below.



Load restraint method – Struts

- Apply the number of lashings for struts, depending on the tensioning device.



Table 1. Number of Lashings Required - Struts - Webbing Strap

Load Weight (kg)	Lashing Angle			
	30° - 44°	45° - 59°	60° - 74°	75° +
500	2	2	2	2
1000	4	3	2	2
1500	5	4	3	3
2000	7	5	4	4
2500	9	6	5	5
3000	10	8	6	6
3500	12	9	7	7
4000	14	10	8	7
4500	15	11	9	8



Table 2. Number of Lashings Required - Struts - Chain

Load Weight (kg)	Lashing Angle			
	30° - 44°	45° - 59°	60° - 74°	75° +
500	2	2	2	2
1000	2	2	2	2
1500	2	2	2	2
2000	3	2	2	2
2500	4	3	2	2
3000	4	3	3	3
3500	5	4	3	3
4000	6	4	4	3
4500	6	5	4	4



Load restraint method – Bracing

- Apply the number of lashings for bracing, depending on the tensioning device.



Table 3. Number of Lashings Required - Bracing - Webbing Strap

Load Weight (kg)	Lashing Angle			
	30° - 44°	45° - 59°	60° - 74°	75° +
2000	2	2	1	1
4000	4	3	2	2
6000	5	4	3	3
8000	7	5	4	4
10 000	9	6	5	5
12 000	10	8	6	6
14 000	12	9	7	7
16 000	14	10	8	7
18 000	15	11	9	8



Table 4. Number of Lashings Required - Bracing - Chain

Load Weight (kg)	Lashing Angle			
	30° - 44°	45° - 59°	60° - 74°	75° +
2000	2	2	2	2
4000	2	2	2	2
6000	2	2	2	2
8000	3	2	2	2
10 000	4	3	2	2
12 000	4	3	3	3
14 000	5	4	3	3
16 000	6	4	4	3
18 000	6	5	4	4



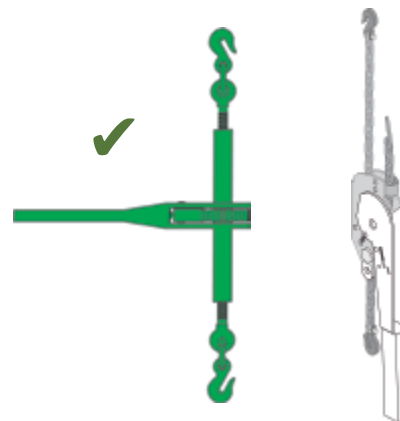
Appendix 1: Load restraint – Portable Buildings and Ablution Blocks (Melbourne)

Applies to:

- BAU Sewer Blocks with a maximum mass of 5000kg
- 16 User Number 14 Event Blocks with a maximum mass of 5000kg
- Event Tank Mount Number 13 with a maximum mass of 5000kg

Load restraint equipment requirements:

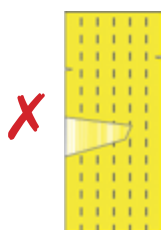
- 8mm, 10mm & 13mm transport chain, conforming to AS/NZ 4344 tensioned to a minimum of 750kg.f; typical force achievable by an operator with an Ausbinder, Web Dog ratchet or turn-buckle.
- 50mm webbing straps, conforming to AS/NZS4380 tensioned to a minimum pretension of 300kg.f averaged across the load.
- Minimum 25x29mm 8.5 tonne working load limit shackle, conforming to AS2741.
- Equipment must be in good working order. Inspect the lashings for wear.
- All fittings must be in good condition and are required to have at least the same rated capacity or greater, as the chains being used.
- To prevent load binder hooks becoming detached from the chain secure using suitable method (i.e. cable tie or other).
- 50mm webbing straps can be placed over the top of the building to secure roof, if required by Coates. However, this is not classed as restraint.
- Chains with excessively damaged, worn or bent links must not be used.
- Over-centre lever load binders (dogs) are a high risk and are not to be used on Coates sites.
- Webbing straps torn more than 10% of their width should be discarded.



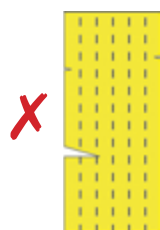
To prevent load binder hooks becoming detached from chain secure using suitable method (i.e. cable tie or other)



Small building movements are expected during transit resulting in chain slack, cable ties will prevent load binder hooks becoming detached from the chain.



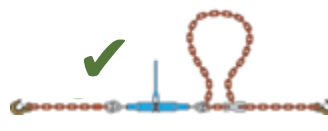
Stretched webbing



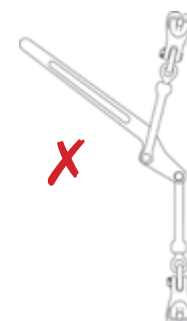
More than 10% wear



Minimum 25x29mm
8.5t WLL Shackle
(Gr S - AS2741)



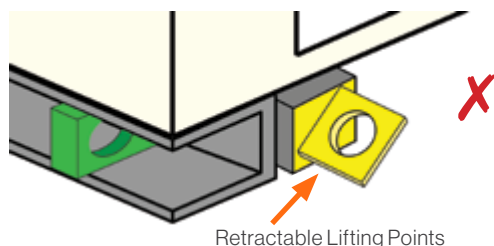
All fittings at least the same
rating as the chain



No over center lever
load binders (dogs)

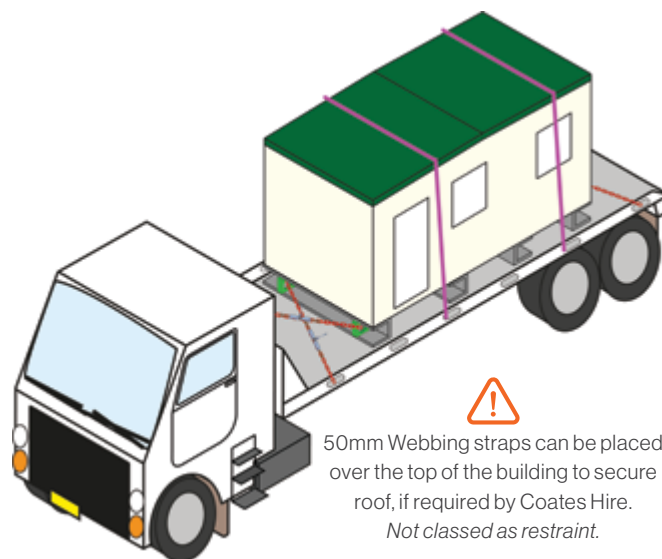
Essential building requirements:

- Building pre-transit checklist must be completed prior to transport.
- All windows, doors and openings must be securely locked.
- All objects inside buildings shall be secured, no loose items to remain inside the building.
- All air conditioners must be secured prior to transport.
- Chain anchorages must be free from visual cracking or damage, some surface rust is acceptable.
- All buildings must be structurally sound for transport.
- Do not use overhead lifting points as tie down points.
- Do not use anchor points located in the horizontal position.

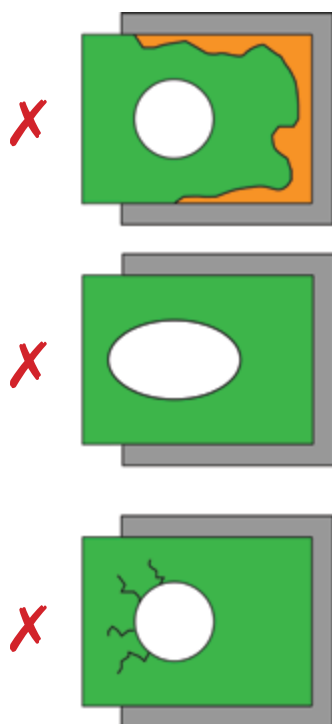


Retractable Lifting Points

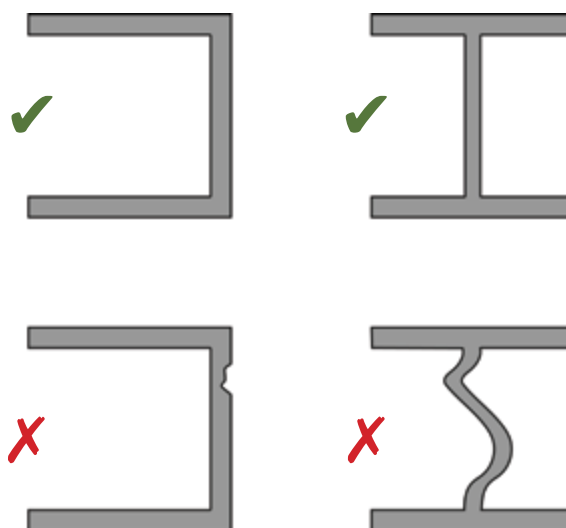
Do not use overhead lifting points as tie down points



50mm Webbing straps can be placed over the top of the building to secure roof, if required by Coates Hire.
Not classed as restraint.



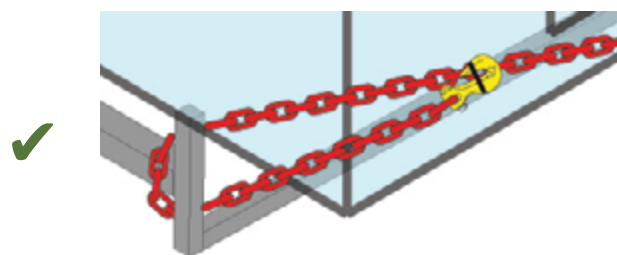
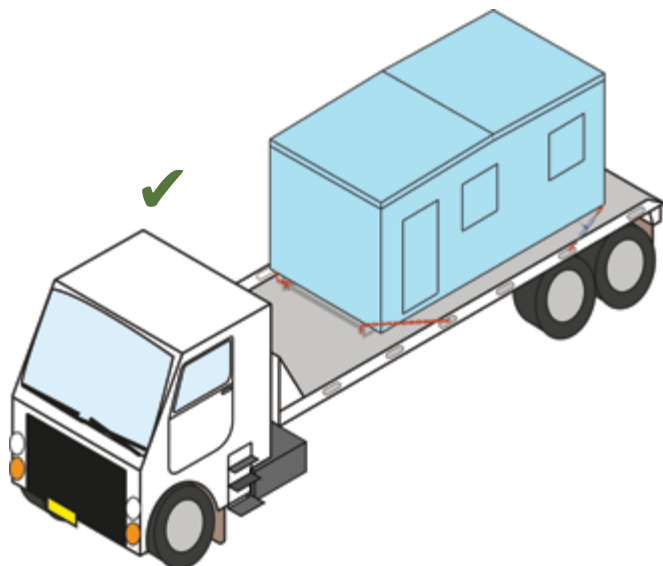
Chain Anchor points must be free of excessive corrosion, elongation and cracking of holes



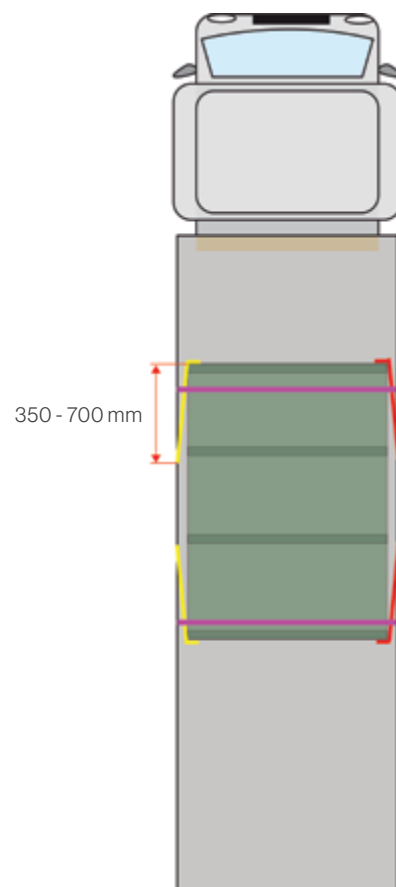
Structural beams must be free of excessive deformity and material removal

BAU Sewer Block up to 5000kg in mass

- Buildings to be positioned central on the tray.
- Buildings to be secured using a minimum 4 x 8mm separate chain combination as per below.
- Chains wrapped and tensioned to 750kg.f to coaming rail using appropriate tensioner.
- Check condition of building anchor points before transport.
- All chains to be secured on the trailer between 350mm and 700mm from the building anchor point.



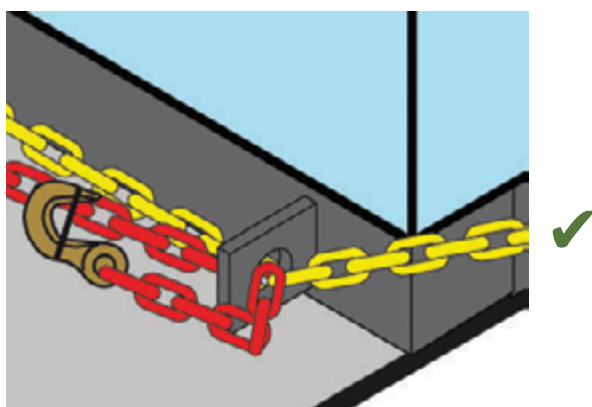
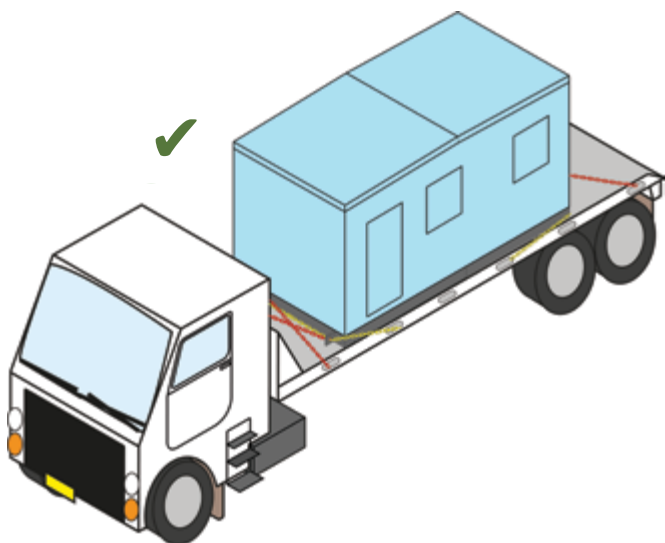
Chain Anchor points - loop through tie down points and secure hook to chain using suitable method (i.e. cable ties, self locking safety hook)



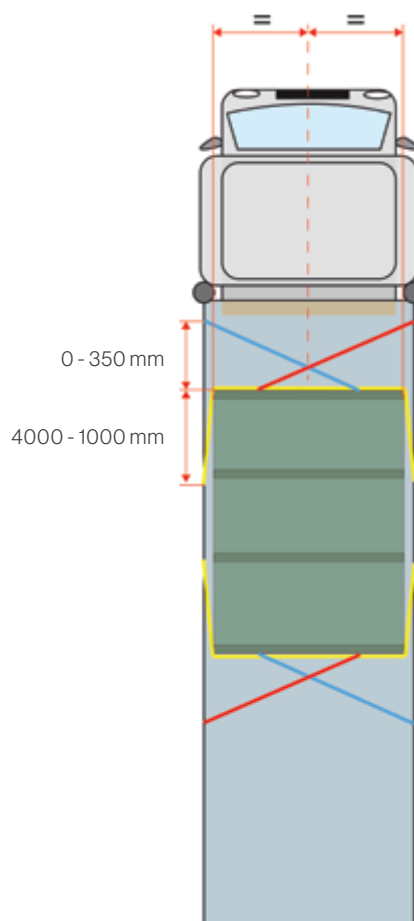
Small building movements are expected during transit resulting in chain slack, cable ties will prevent chain hooks becoming detached from the chain

16 user number 14 event blocks up to 5000kg in mass

- Buildings to be positioned central on the tray.
- Buildings to be secured using a minimum 6 separate chain combination as per below.
- Chains wrapped and tensioned to 750kg.f to coaming rail using appropriate tensioner.
- Check condition of building anchor points before transport.
- Shackle to be placed through each anchor point to accommodate chains.
- Four chains to be secured on the trailer between 0mm and 350mm from the building anchor point.
- One chain to be placed through two bow shackles at the front of the building, one chain to be placed through two bow shackles at the rear of the building with chains to be secured on the trailer at both ends between 400mm and 1000mm from building anchor point.



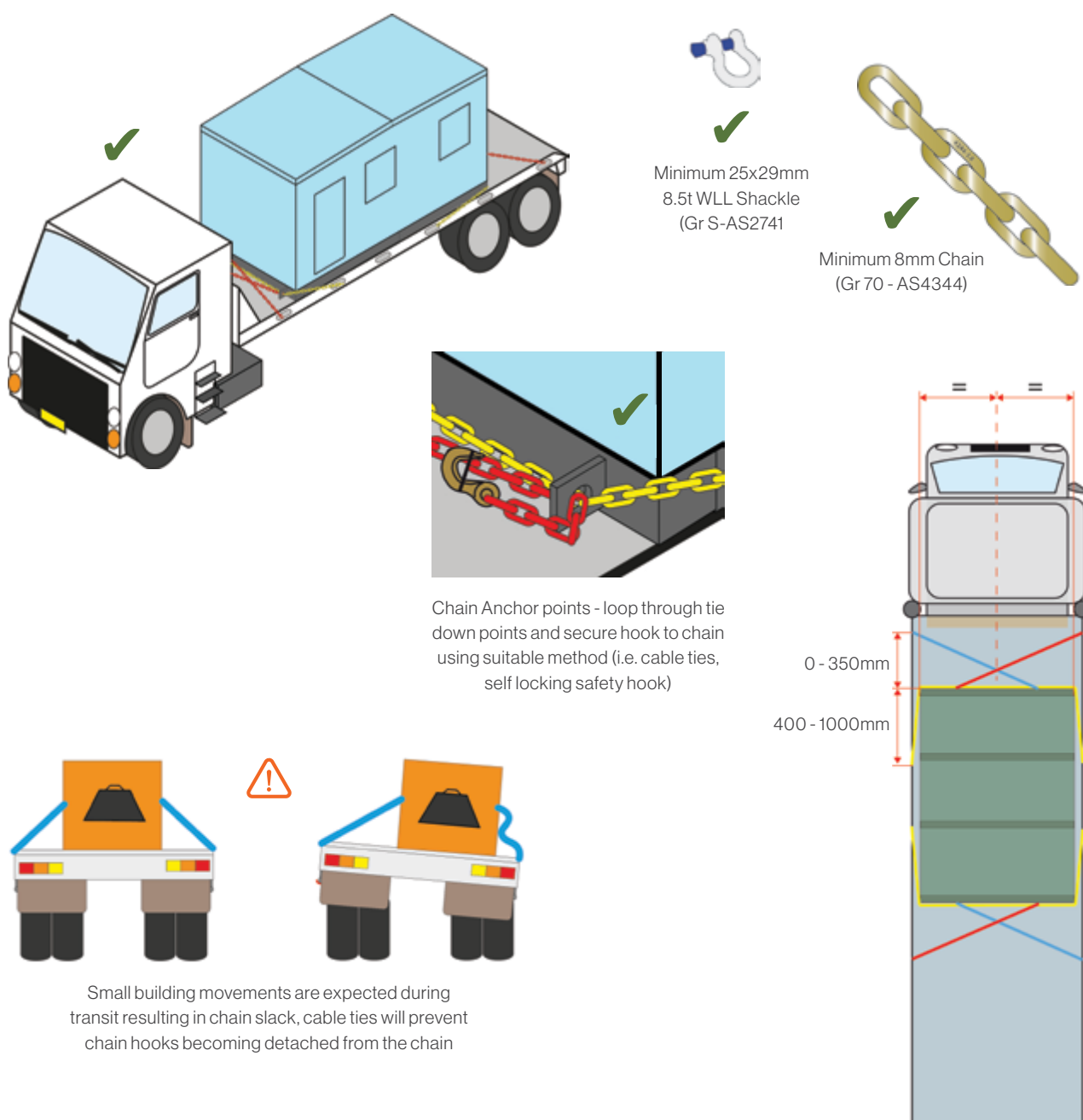
Chain Anchor points - loop through tie down points and secure hook to chain using suitable method (i.e. cable ties, self locking safety hook)



Small building movements are expected during transit resulting in chain slack, cable ties will prevent chain hooks becoming detached from the chain

Event Tank Mount Number 13 up to 5000kg in mass

- Buildings to be positioned central on the tray.
- Buildings to be secured using a minimum 6 x 8mm separate chain combination as per below.
- Chains wrapped and tensioned to 750kg.f to coaming rail using appropriate tensioner.
- Check condition of building anchor points before transport.
- Shackle to be placed through each anchor point to accommodate chains.
- Four chains to be secured on the trailer between 0mm and 350mm from the building anchor point.
- One chain to be placed through two bow shackles at the front of the building, one chain to be placed through two bow shackles at the rear of the building with chains to be secured on the trailer at both ends between 400mm and 1000mm from building anchor point.



Appendix 2: Load restraint - SMC SL80 Light Cubes

Applies to the following items transported on behalf of Coates:

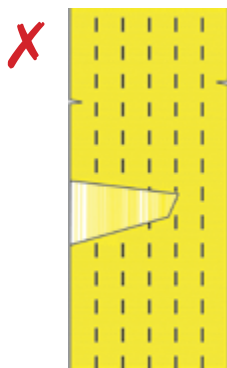
- SMC SL80 Pallet Light Cubes weighing up to 1100 kg

Load restraint equipment requirements:

- 50mm webbing straps, conforming to AS/NZS4380 tensioned to a minimum pre-tension of 300kg.f averaged across the load.
- Light cubes must be loaded onto anti-slip rubber matting, minimum thickness of 8mm, and 0.6 or greater static coefficient of friction.
- Do not use industrial rubber or conveyor belt as the friction is much less than anti-slip matting.
- All equipment must be in good working order. Inspect the lashings for wear.
- Webbing straps torn more than 10% of their width must be discarded.



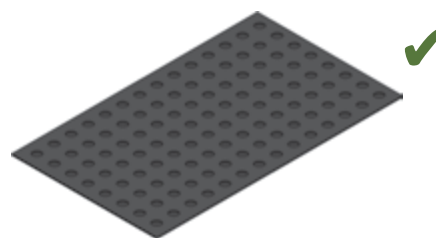
50mm webbing strap to AS/NZS4380



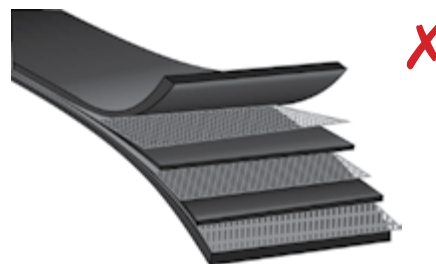
Stretched webbing



More than 10% wear



Anti-slip matting



Do not use conveyor belt or industrial rubber

Loading and restraint requirements:

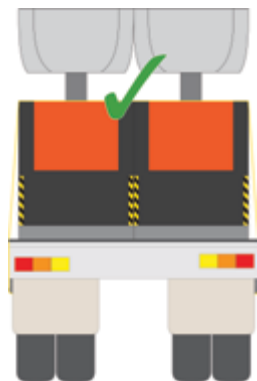
- Check that all stabilisers, mast, and other moving parts are securely locked in place.
- Place anti-slip rubber matting between deck and light cubes at all contact points.
- When loading light cubes single file, ensure they are positioned centrally across the deck.
- When loading light cubes two abreast, ensure they are butted up against each other.
- Ensure the load does not exceed axle weight limits.
- Fit 2 x tie-down 50mm webbing straps per row over single file light cubes.
- Fit 2 x tie-down 50mm webbing straps per row over two abreast light cubes.



Load single file light cube centrally across the deck



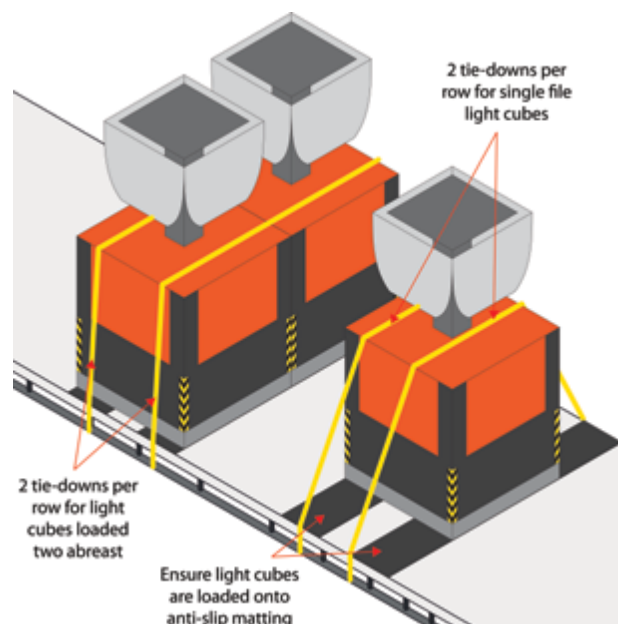
Do not load single file light cubes to one side



Ensure light cubes are butted together when loading two abreast



Do not leave gaps between cubes when loading two abreast



Appendix 3: Load restraint - small items hand-loaded

Applies to:

- Light trailers, utility vehicles and light rigid trucks with containment capacity.
- Boxed tools, light wheeled equipment and other lightweight items.



Load restraint equipment requirements:

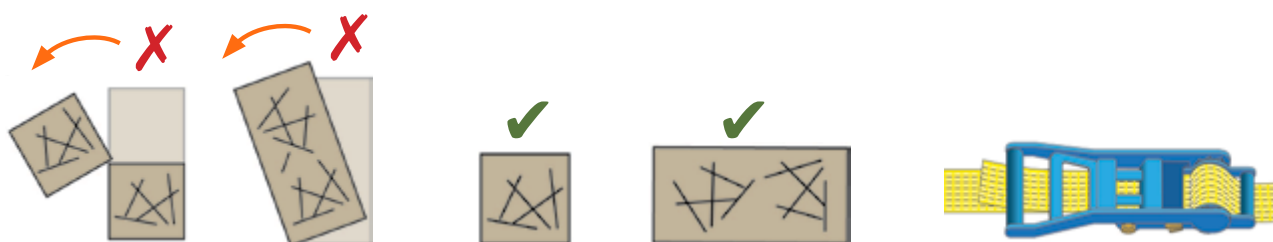
- Webbing straps, conforming to AS/NZ 4380. Tensioned to an average of:

Lashing size	50mm webbing	35mm webbing
Pre-tension	300kg.f	250kg.f

- Rubber or rough sawn plywood underneath all loads to improve friction:

Friction type	Anti-slip rubber	Industrial rubber	Exterior grade plywood
Static Friction Coefficient	0.6	0.4	0.4

- If timber dunnage used, it must be hardwood and in good condition. Minimum 75 x 75mm.
- Rectangular dunnage must be placed on long edge.
- Freight must be packaged by strapping or banding or placed in cages or crates to withstand forces specified in the NTC loading performance standards or Light Vehicles Edition 2018.
- Tailgates, side gates and headboard when used for blocking must be in good condition.
- Do not stack or bridge dunnage or use rectangular dunnage on short edge.

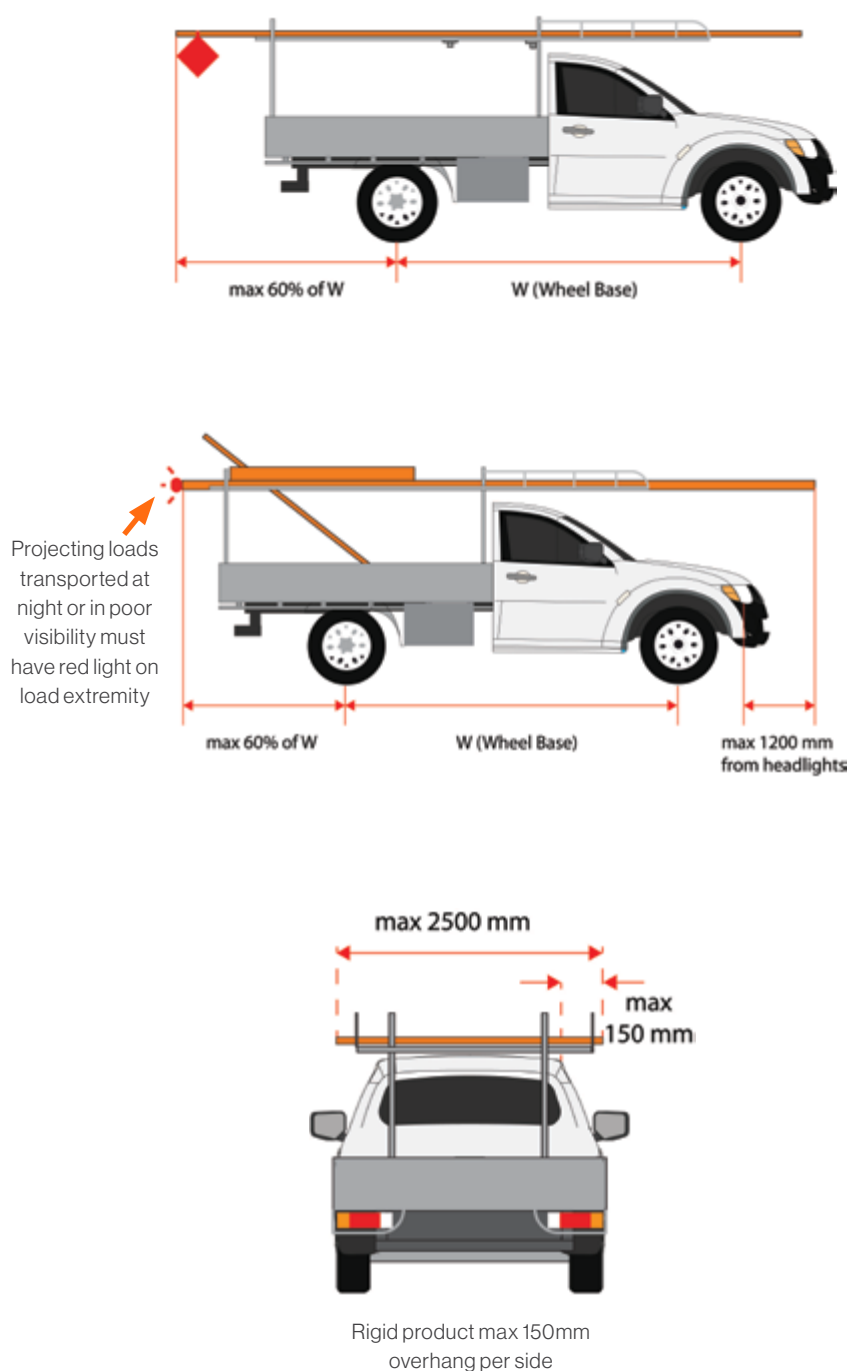


Dimension requirements: light vehicles

General conditions on loading:

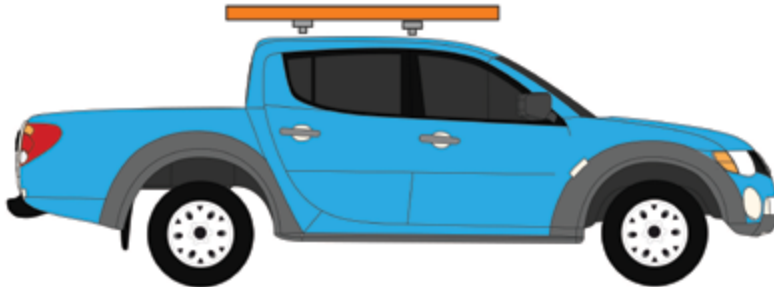
- Maximum rear overhang is 60% of the wheelbase or 1200mm, whichever is less.
- Maximum front overhang 1200mm from headlights.
- Maximum front and rear overhang of sheet products is 20% of the item length.
- Drivers forward vision must not be obstructed by product loaded on the vehicle.
- Loads projecting from the rear of the vehicle must have a red flag attached of minimum size 450 x 450mm. (Nighttime or poor visibility requires a red light).
- Maximum side projection 150mm per side up to 2500mm total width (light vehicles and trailers).

Rigid self-supporting loads

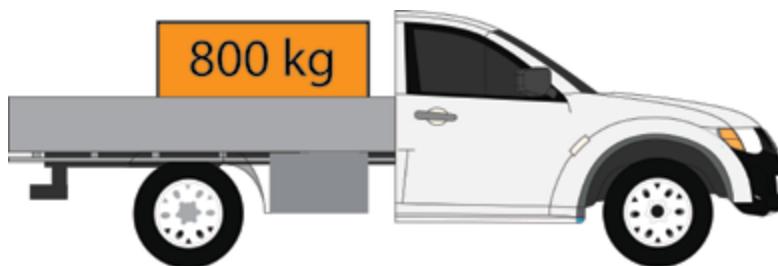


Mass requirements: light vehicles

- Maximum mass of commercial factory standard roof racks is 40kg for 2 racks.^
- Maximum restrained payload mass of typical light pickup/ute 800kg. ^
- Maximum masses include the product payload, any supporting items and restraint equipment.



40kg for 2 racks - factory fitted ^



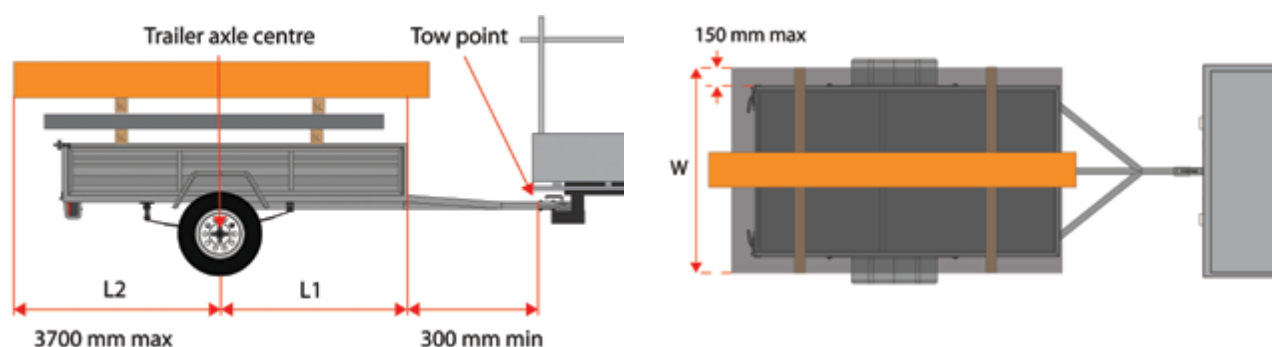
Maximum tray Payload 800kg
^based on Toyota Hilux 4x2 Single cab 2018

Light trailer loading

General conditions on loading:

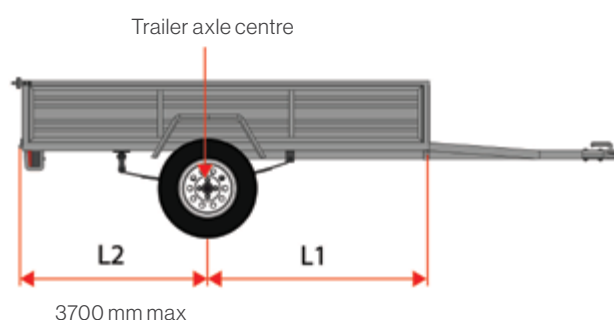
- Maximum load width (W) is 2500mm.
- Maximum sideways overhang is 150mm each side.
- Load should be positioned to apply approx. 10% of mass onto tow ball.
- Loads projecting more than 1.2m from the rear of the vehicle must have a red flag attached of the minimum size 450 x 450mm.
- State specific requirements also apply (see below).

Trailer dimension limits - QLD / WA / SA:



- L2 must be less than or equal to L1.
- Front overhang must maintain a minimum 300mm clearance to tow ball.

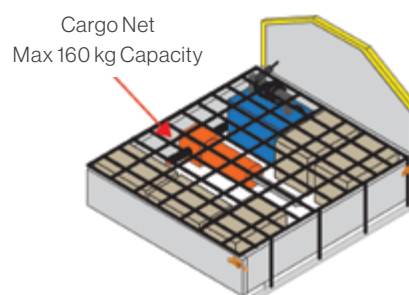
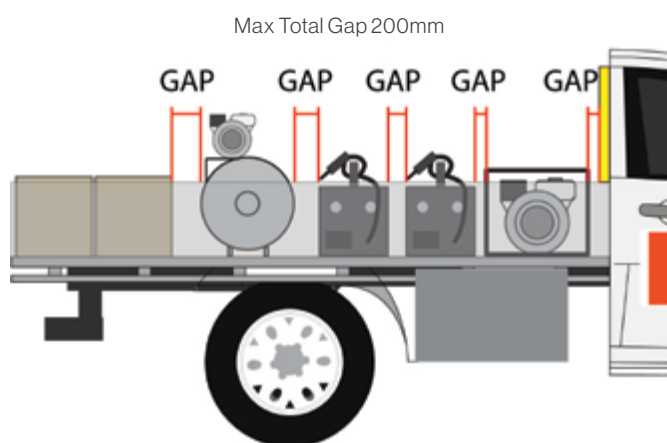
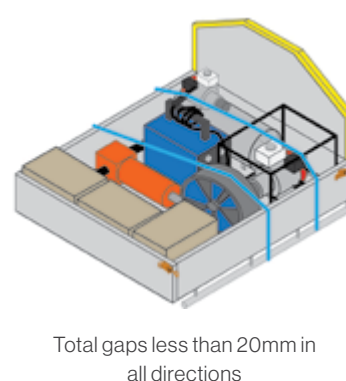
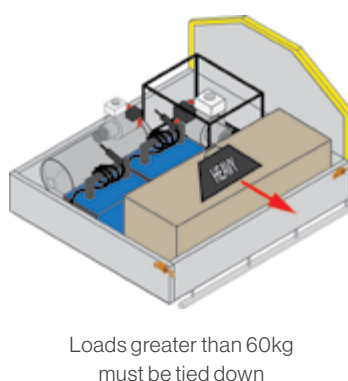
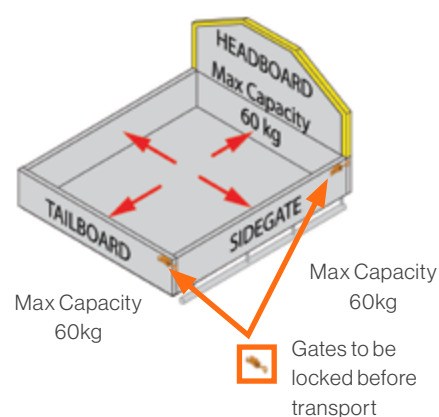
Trailer dimension limits - VIC / NT / NSW / ACT / TAS:



- L2 must be less than or equal L1 to a maximum of 3.7m. Where L1 is the distance from the axle centre to the front of the load carrying area (front of box for box trailer).

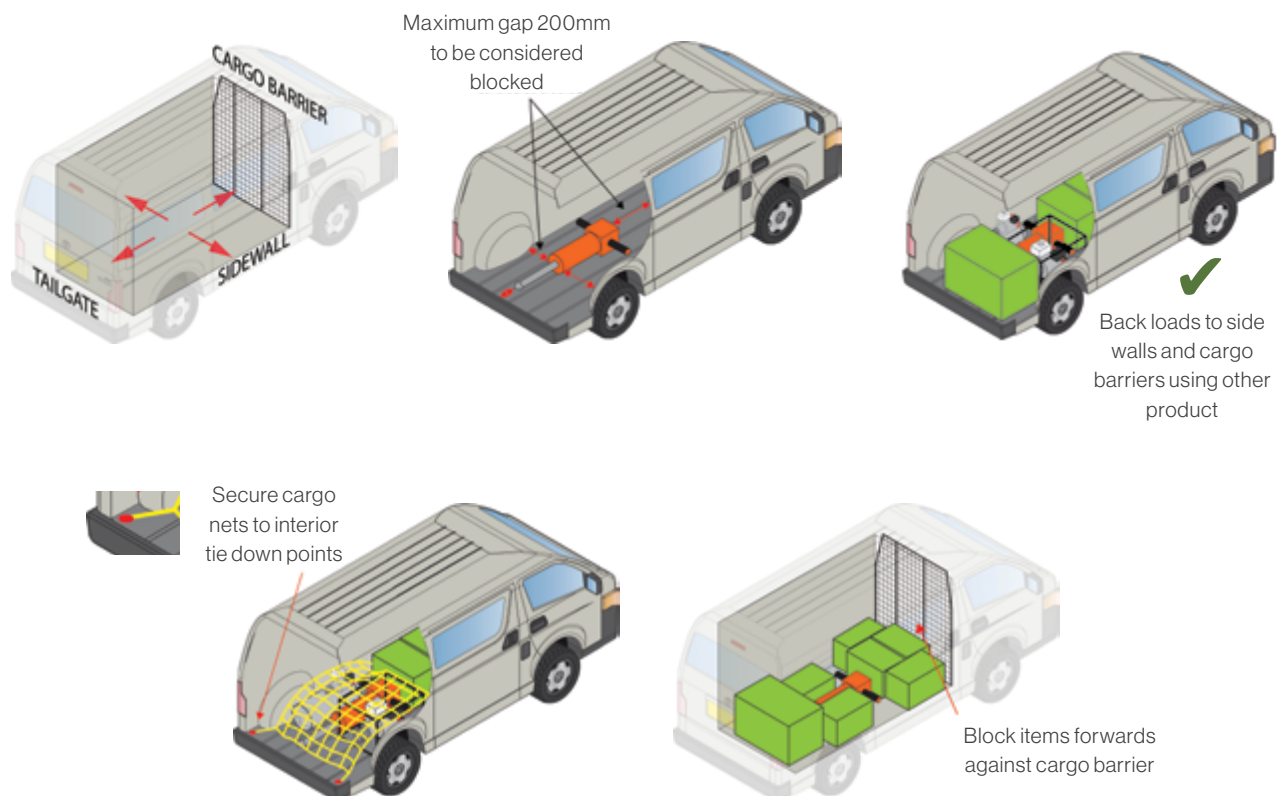
Containment inside tray drop gates

- Block loads using headboards, side gates, tailgates or other product.
- Tie-down loads where blocking is unavailable, or the load exceeds the blocking capacity.
- Avoid low friction sliding surfaces such as metal-to-metal, plastic-to-plastic and metal-to-plastic.
- Objects must be strong enough to withstand the force from the surrounding items if they are to be considered blocked.
- Maximum mass blocked by side gates is 60kg unless they have an engineered rating.
- Maximum gap to blocking surface is 200mm in all directions.
- Cargo nets or covers must be used where lashings do not prevent all objects from sliding, rolling or bouncing out of the tray.
- Unrestrained stacked items must sit below the top of gates.



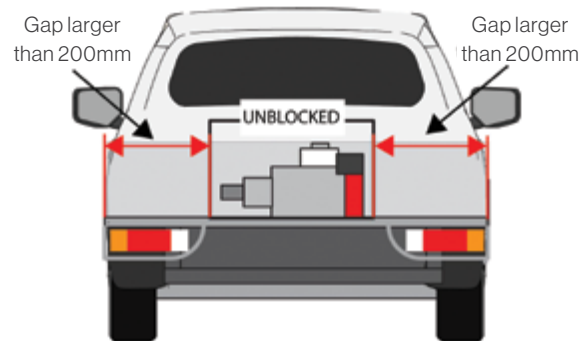
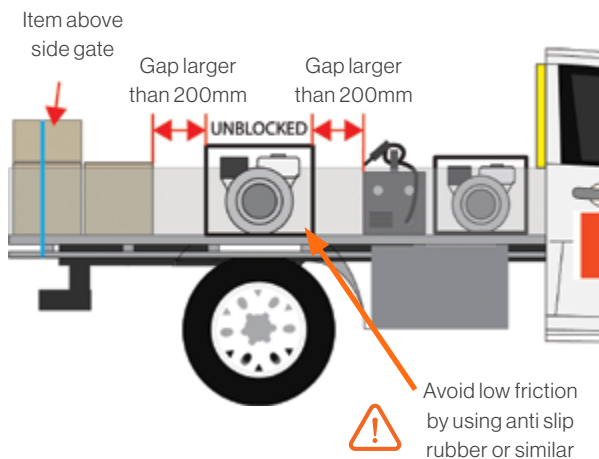
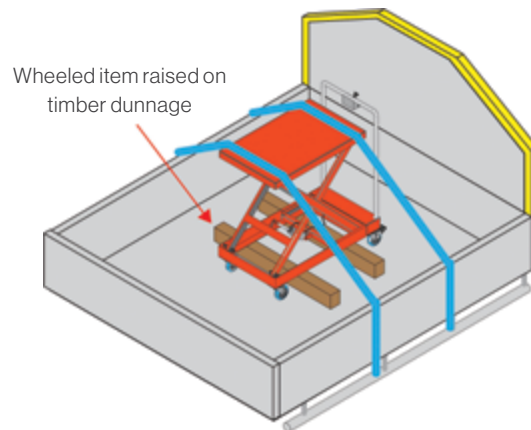
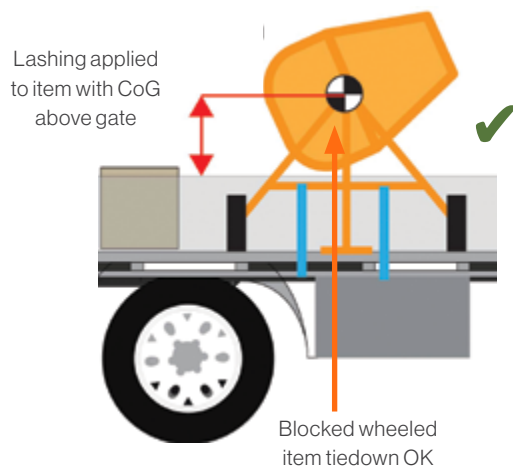
Containment inside vans

- Block loads using cargo barriers, side walls and rear doors.
- Cargo barriers must be designed to withstand forces specified in AS4034.
- Maximum individual item mass for blocked loads is 60kg.
- Avoid low friction sliding surfaces such as metal-to-metal, plastic-to-plastic and metal-to-plastic.
- Objects must be strong enough to withstand the force from the surrounding items if they are to be considered blocked.
- Maximum gap to blocking surface 200mm in all directions.
- Cargo nets or covered can be used to contain products and prevent them bouncing out of position during transport.



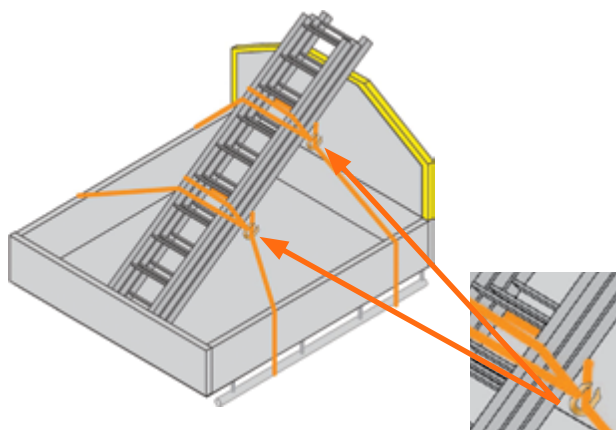
Loads requiring tie-down lashings

- Stacked loose loads must be lower than the top of gates.
- Use tie-downs, belly wraps and chokes, per page 132, for loads that cannot satisfy the containment requirements, especially;
 - Heavy items, not well blocked with gaps larger than 200mm
 - Loose loads stacked higher than the gates
 - Loads with Centre of Gravity (CoG) higher than gates
 - Loads exceeding gate capacity (60kg)
- Tie-down can be used for wheeled items only if they are blocked in the direction of rolling or raised on timber dunnage.

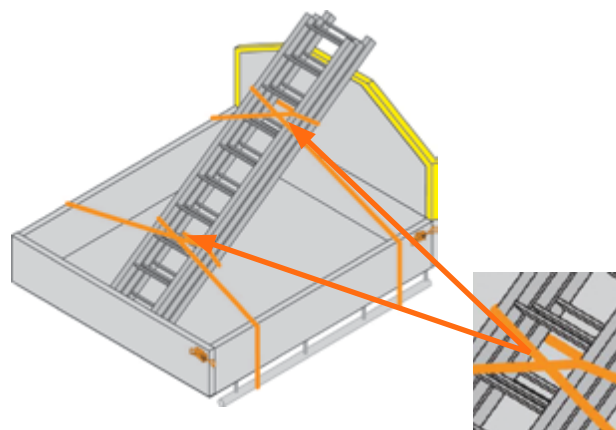


Loads requiring tie-down lashings

Long product – bundled:

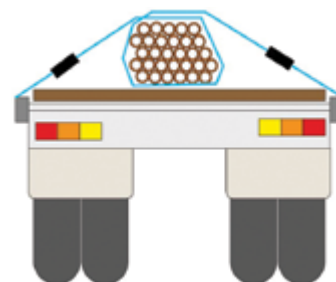
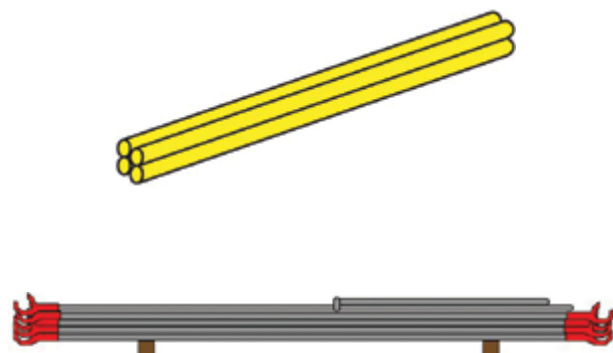


Load Choker



Belly Wrap

- Load choke or belly wrap long slender product such as:
 - Scaffolding
 - Ladders
 - PVC pipe



Belly Wrap

Lashing restraint requirements

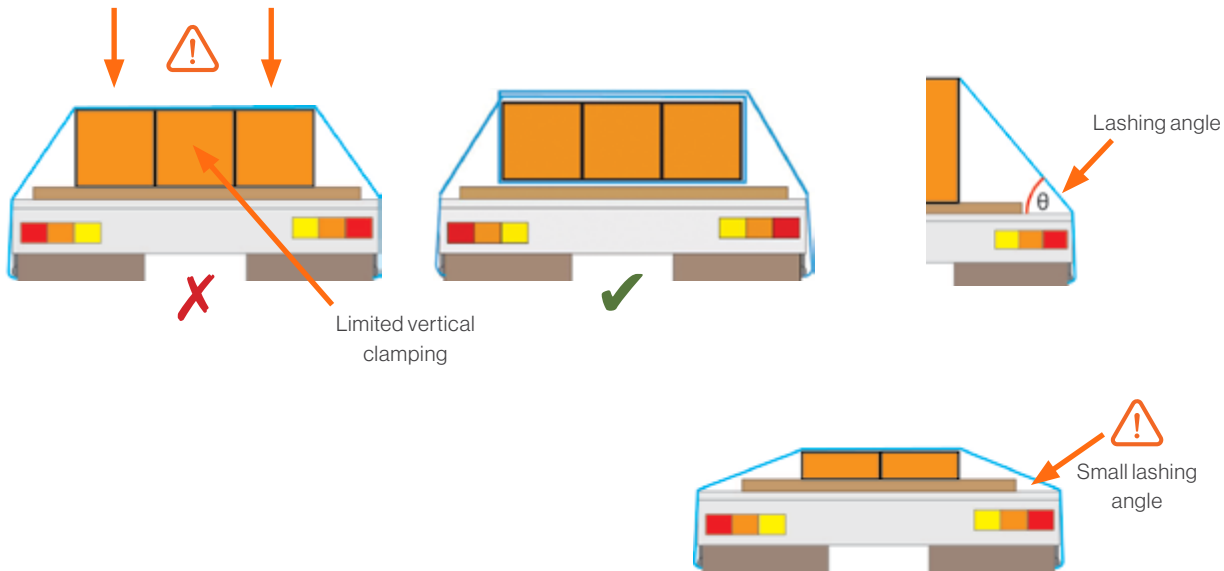
- Minimum of 2 x lashings on all loads longer than 1200mm.
- Avoid damaging side gates when tensioning lashings - do not lash over side-gates where possible.
- Choke (preferred) or belly-wrap lashings for round objects, bundles, objects with low lashing angles below 30 degrees or multiple packs (more than 2) next to each other.
- Do not load more than two abreast when using tie-down lashings.
- Tie-down lashings must be applied at angles greater than 30 degrees.
- All items must be placed on rough sawn plywood or similar to achieve a minimum static coefficient of friction equal to 0.4.

Lashing restraint requirements

Tie-down to tray – maximum weight per lashing

Load unblocked	Lashing angle to horizontal	Preferred	Preferred
		50mm or over webbing strap and ratchet	35mm or over webbing strap and ratchet
	30 - 44 degrees	300kg	250kg
	45 - 59 degrees	420kg	350kg
	60 - 90 degrees	520kg	430kg

Load blocked	Lashing angle to horizontal	Preferred	Preferred
		50mm or over webbing strap and ratchet	35mm or over webbing strap and ratchet
	30 - 44 degrees	1200kg	1000kg
	45 - 59 degrees	1690kg	1410kg
	60 - 90 degrees	2070kg	1730kg



Appendix 4: Direct load restraint of up to 1.5t excavators on purpose-built trailers

Load restraint equipment and key requirements:

- 6mm or larger transport chain and tensioners, rated to min. 2300kg lashing capacity and conforming to AS/NZ 4344. Tensioned to a minimum of 345kg.f; typical force achievable by an operator with a turn-buckle ratchet.
- Visually inspect lashings for wear and tear and replace if necessary.
- Anchor points must be rated to min. 1850kg SWL.
- Do not mix chain and webbing.
- Avoid low friction steel on steel contact surfaces.
- Use caution when applying lashings. Be aware of potential trip hazards on trailer.
- Throwing chains is a manual handling risk. Use caution when lashing freight.

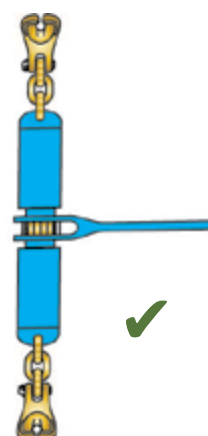
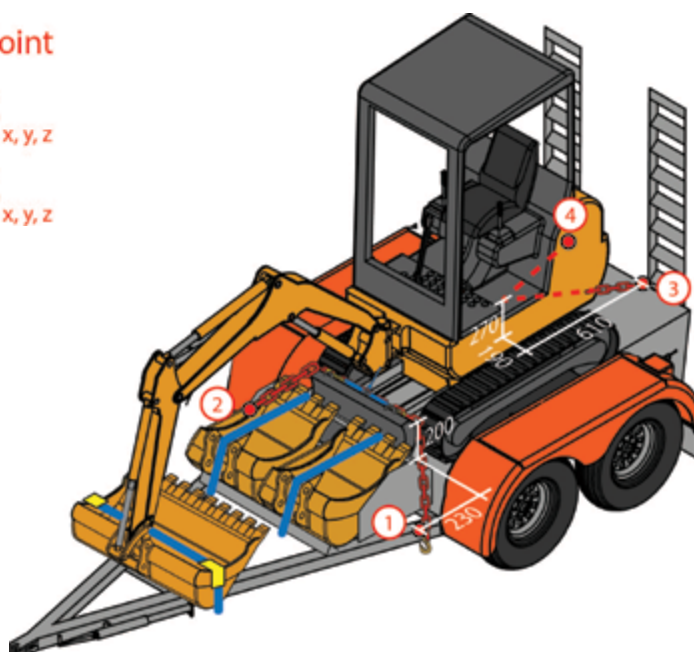


Assumed lashing geometry:

(X) Lashing Point

(2) $x, y, z = (1)_{x, y, z}$

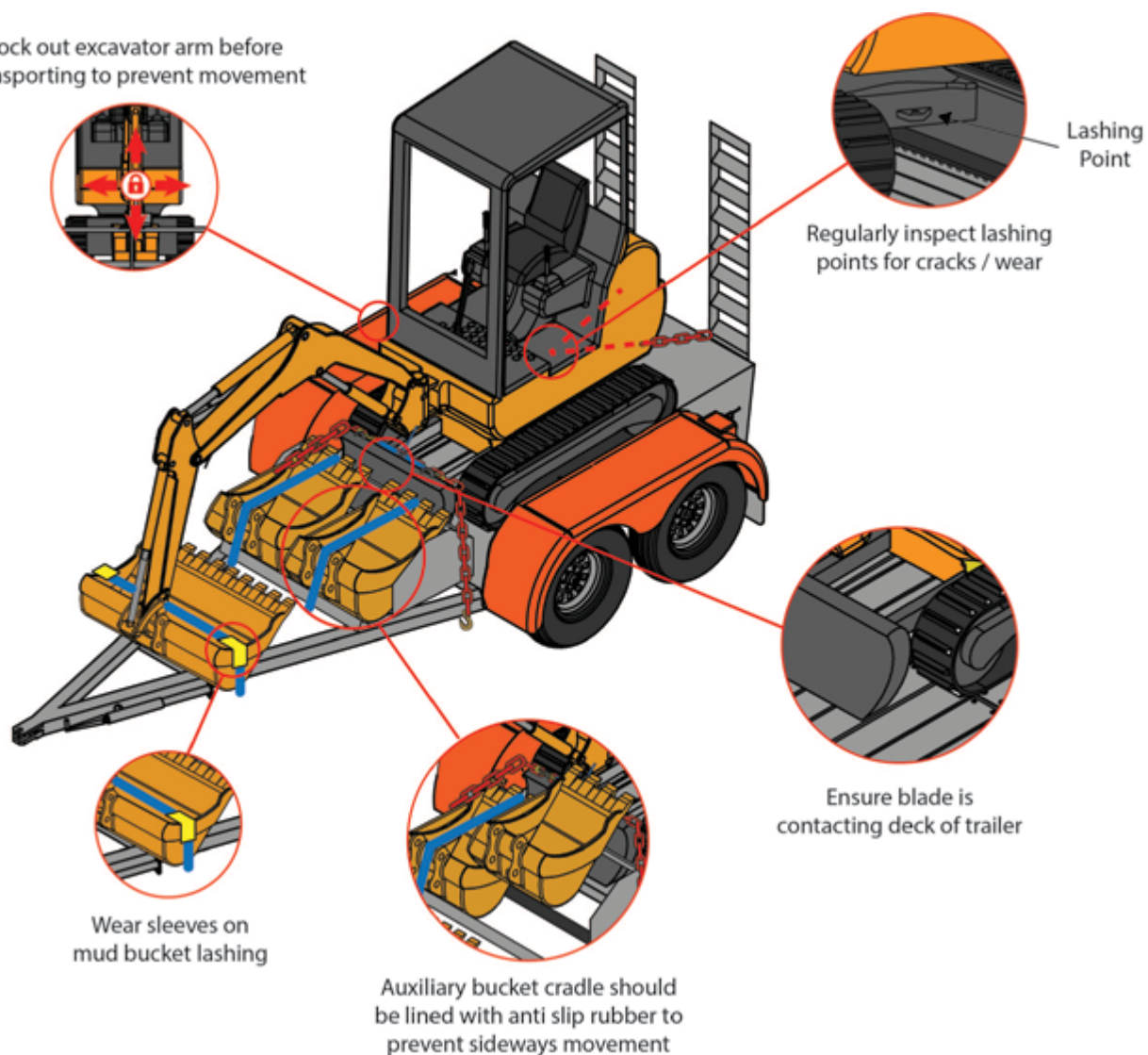
(4) $x, y, z = (3)_{x, y, z}$



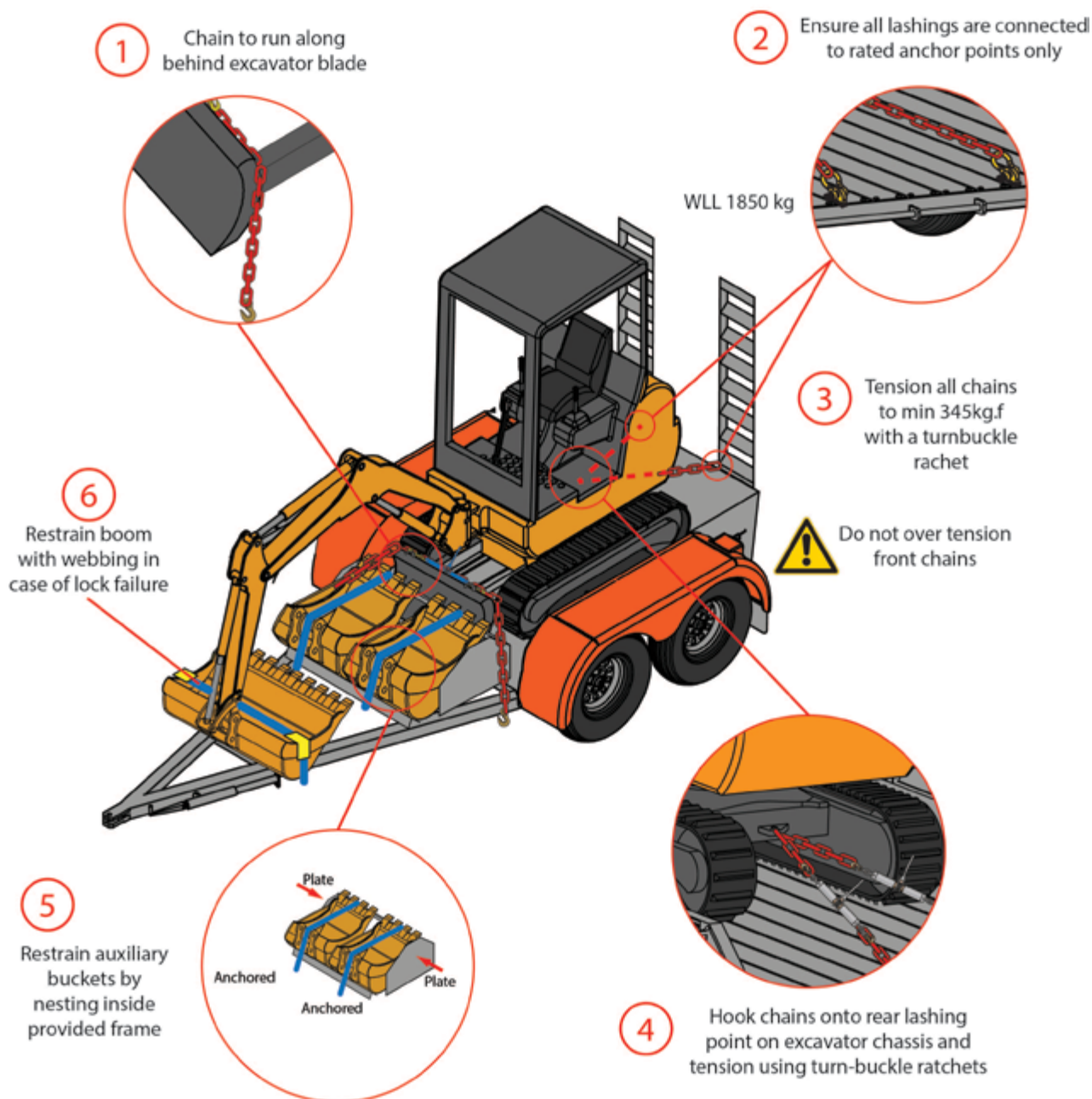
2300kg LC

Loading requirements:

Lock out excavator arm before transporting to prevent movement



Loading requirements:



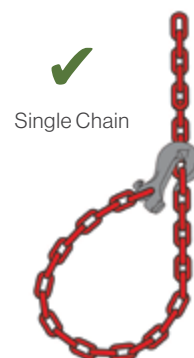
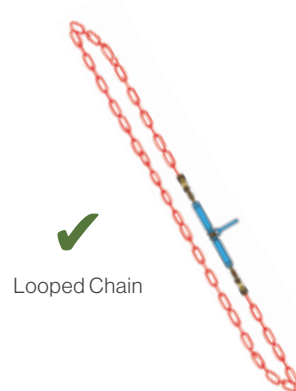
Appendix 5: Load restraint matrix worked example

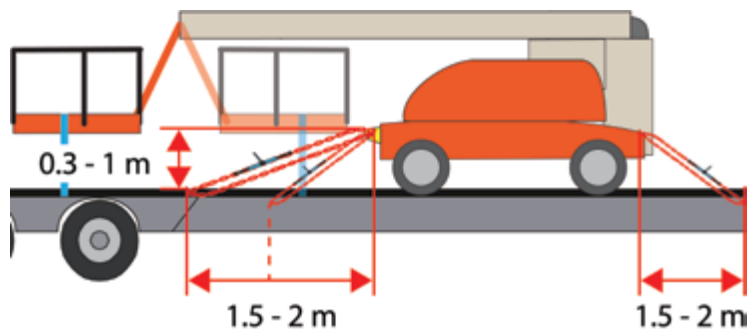
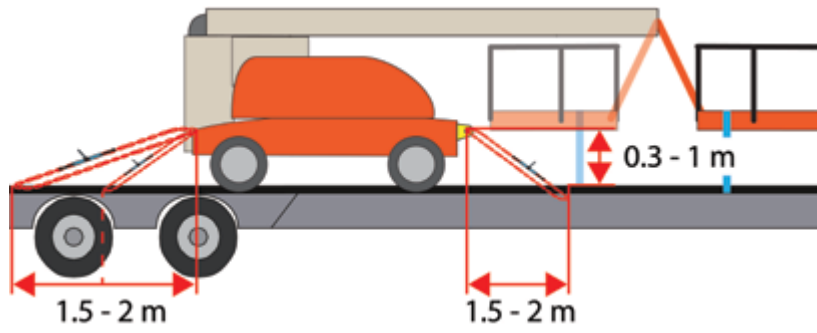
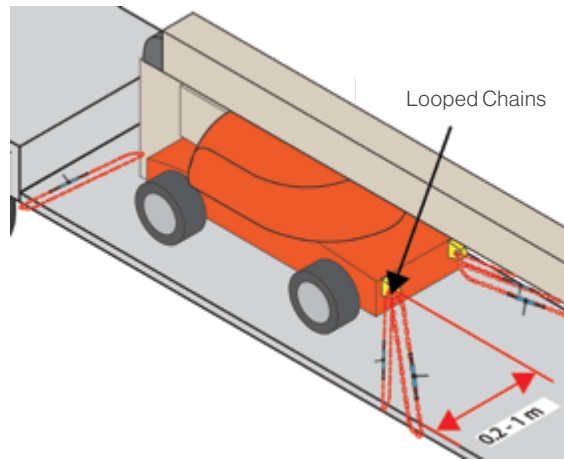
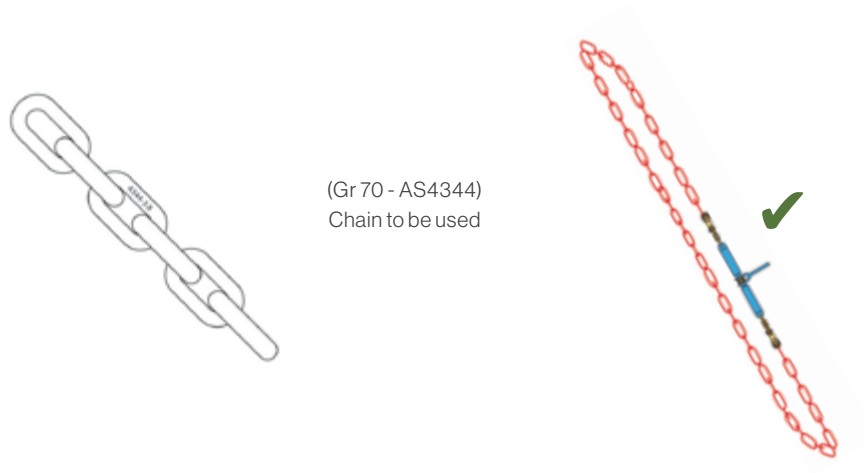
Make	Coates description	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	50mm webbing straps	Drawbar basket buckets secured	50mm wheel straps	8mm chain single	8mm chain looped	10mm chain single	10mm chain looped	13mm chain single	13mm chain looped
NIFTY	Trailer Mounted Boom 10.2m Diesel/ Electric	4500	1500	1900	1420	4	Yes	2	4	4	4	4		
NIFTY	Trailer Mounted Boom 15m	5550	1600	2000	1725		Yes		4	4	4	4		
GENIE	Knuckle Boom 34ft (10.4M) - Diesel	5700	1800	2000	4740		Yes			4	4	4	4	4
GENIE	Knuckle Boom 34-35ft- Electric- Narrow	5700	1500	2000	5171		Yes			4	4	4	4	4
GENIE	Straight Boom Lift 40ft (12.2M) - Diesel	7390	2300	2490	5284		Yes		6	4	4	4	4	4
JLG	Knuckle Boom 40ft (12.2M) - Electric	5280	1500	2010	5350		Yes			4	6	4	4	4
HAULOTTE	Knuckle Boom 34ft (10.4M) - Diesel	5640	1800	2150	5640		Yes			4	4	4	4	4
HAULOTTE	Knuckle Boom 34-35ft- Electric- Narrow	5430	1340	1990	6000		Yes			4	4	4	4	4
JLG	Knuckle Boom 45ft (13.7M) - Diesel	6710	1750	2010	6290		Yes			6	6	4	4	4

1. Identify item to be restrained: **Genie 40' Straight Boomlift**
2. Check the overall weight of machine including any accessories: **in this case 5284kg**
3. Find item (or similar) in load restraint matrix and move across to the right to show available load restraint options

In this example, load restraint that can be used:

- 6 x 8mm Grade 70 chain – Single (4 x forwards acting chains, 2 x rearwards acting)
- 4 x 8mm Grade 70 Chain – looped or
- 4 x 10mm Grade 70 chain – Single or
- 4 x 10mm Grade 70 Chain – Looped or
- 4 x 13mm Grade 70 Chain – Single or
- 4 x 13mm Grade 70 Chain Looped





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