LOAD RESTRAINT
TRAINING & ASSESSMENT

Loads that aren’t restrained properly can injure or kill and can cause significant property damage. Personnel required to pack, load, move or unload a vehicle are required to complete this training & assessment. Personnel undertaking this training shall review the National Transport Commission (NTC) Load Restraint Guide. The Guide is available at https://www.ntc.gov.au/sites/default/files/assets/files/Load-Restraint-Guide-2018.pdf

Name: __________________________ Signature: __________________________ Date: __________________________

1. Loading performance standards state: A load on a heavy vehicle MUST be restrained by a load restraint system that prevents the load from moving in relation to the heavy vehicle. Review P4
   ☐ True ☐ False

2. If you’re involved in packing, loading, moving or unloading a vehicle you are responsible for complying with load restraint laws. Review P7 & 8
   ☐ True ☐ False

3. Loading performance standards set out the minimum amount of force a restraint system must be able to withstand in each direction. Review P 8
   ☐ True ☐ False

4. For a 10 tonne load the minimum restraint against forward movement is: Review P8
   ☐ 8 tonnes ☐ 5 tonnes ☐ 2 tonnes

5. For a 10 tonne load the minimum restraint against sideways movement is: Review P8
   ☐ 5 tonnes ☐ 8 tonnes ☐ 2 tonnes

6. As a worker you have a duty of care to make sure you work in a manner that is not harmful to your health and safety or the health and safety of others. Review P9
   ☐ True ☐ False

7. The key elements of a load restraint system include planning the load, loading and unloading the vehicle and driving according to the load and driving conditions. Review P10
   ☐ True ☐ False

8. When a vehicle is loaded, the Gross Vehicle Mass (GVM) or Aggregate Trailer Mass (ATM) and, where applicable, Gross Combination Mass (GCM) must not be exceeded. Review P12, 258 & 260
   ☐ True ☐ False

9. Intermediate Bulk Containers (IBCs) and auxiliary attachments should be restrained using the: Review P13 & 23

10. Rubber tyred, steel wheeled and tracked vehicles should be restrained using the: Review P13 & 27
   ☐ T____________________ R____________________ Method.

11. Mark the correct Position of Load ☑. Review P14

   ![Diagram of trucks with different loading positions]
12. Inspect all vehicle and restraint equipment before _________ trip. Review P15

13. Do not use equipment weakened by cracked, broken or worn components for restraining loads. Review P15
   □ True □ False

14. Ground personnel must always be clear of loading and unloading activities. Review P17 & 18
   □ True □ False

15. Many rollovers are caused by inappropriate speed when changing direction, particularly on corners. Review P20
   □ True □ False

16. Drivers should make allowances for high and wide loads when driving around corners, under bridges and electric cables and near power poles, traffic lights and other obstructions. Review P20
   □ True □ False

17. Drivers must check the load and its restraint regularly during a journey with the amount of checking dependant on the type of load, the type of restraint system, the roughness of the road and how well the trailer is loaded. Review P21
   □ True □ False

18. The lashing capacity of 8mm transport chain with winged grab hooks is: _________ tonnes. Review P27

19. When direct lashings are angled at less than 25° from the horizontal, and 45° from the centerline of the vehicle when viewed from above, a simple rule is to select lashings with a combined lashing capacity of: Review P28 & 220
   • In the forwards direction = twice the weight of the load
   • In the sideways direction = the weight of the load
   • In the rearward direction = the weight of the load
   Chains should be of the same length and at the same angle to be considered working together.
   List the correct chain capacity of each chain below.

20. Lashing points should be clearly identified by colour-coding or labelling and have their load restraint capacity specified. Review P105 to 108
   □ True □ False

21. Mark the correct attachment method ☑ Review P110
22. Steering locks must be engaged on articulated machines before transporting.  Review P111
☐ True  ☐ False

23. Auxiliary attachments & any part of the equipment that can move or rotate must be restrained.  Review P111
☐ True  ☐ False

24. IBCs have low-friction bases. IBCs should be placed on timber or rubber surfaces to reduce the risk of movement. Do not use carpet under IBCs as this will create low friction.  Review P126
☐ True  ☐ False

25. Care must be taken when securing IBC’s as the surrounding aluminium cage can deform with excess lashing pressure. Strains imposed during transportation can deform the cage resulting in lashings becoming loose.  Review P21
☐ True  ☐ False

26. A vehicle does not require Dangerous Goods licencing if carrying less than 3,000 L. However, when transporting Dangerous Goods in a receptacle with a capacity of more than 500L (e.g. IBCs for cutter or additive), each IBC is required to be placarded and the vehicle transporting Dangerous Goods is to be placarded front & rear.  Review P34
☐ True  ☐ False
27. Gas cylinders are potentially very hazardous if not adequately restrained or become ruptured. When transporting gas cylinders, they must be adequately restrained in the upright position. Review P4
☐ True ☐ False

28. Webbing assemblies, with in-line ratchet winch (1 assembly) or attached ratchet winch (2 assemblies), must be fitted with a compliance tag/s documenting that each assembly complies with AS/NZS 4380 and the lashing capacity. Review P166
☐ True ☐ False

29. Webbing assemblies must be replaced if the webbing or attachment is weakened by ________ % of more of its original minimum breaking strength. Review P170

30. Transport chain is not designed for lifting and must not be used for any lifting or unloading. Review P171
☐ True ☐ False

31. Name these types of hooks. Review P173

32. The lashing capacity of a chain is reduced by 25% when using a hook on chain links. Review P173

33. Mark the allowed chain tensioners ✓ Review P174 & 175

34. A chain must be replaced if any link is weakened by wear, damage or corrosion which reduces the diameter by more than ________ %. Review P175 &176
☐ True ☐ False

35. A chain must be replaced if any link is bent, twisted, stretched or collapsed. Review P176
☐ True ☐ False

36. The effectiveness of direct lashings (the angle effect AE) can be calculated by measuring the horizontal distance in the direction of restraint, from the tie point on the load to the tie point on the vehicle and dividing it by the length of the lashing. Review P252
☐ True ☐ False
37. The recommended direct lashing angle is a slope of 1 in 2 approximately 25° to the horizontal.
Review P252 - 253
☐ True    ☐ False

38. As direct lashings become more vertical, they become less effective in providing horizontal restraint.
Review P253
☐ True    ☐ False

39. The direct lashing effectiveness of the recommended lashing angle of 1 vertical to 2 horizontal is:

__________________ %  Review P253

40. Where distance \( F^1 \) is 900mm and \( L^1 \) is 1000mm the angle effect (\( E^1 \)), forwards = ________________

The direct lashing effectiveness is: ________________ %  Review P252 & 253

Minimum lashing capacity for direct restraint of a 5t load forwards (80% of load weight) using two chains with an angle effect of =>0.85  Review P255

41. Where distance \( F^1 \) is 700mm and \( L^1 \) is 1200mm the angle effect (\( E^1 \)), forwards = ________________.

The direct lashing effectiveness is: ________________ %  Review P252 & 253

42. Loads that are not restrained properly can injure or kill and can cause significant property damage.
Review P7
☐ True    ☐ False

Use of Load Restraint Chains

In the past RPQ Group has had several instances of load restraint chain assembly failures while transporting rubber tyre mobile plant (front end loaders).

<table>
<thead>
<tr>
<th>Slip Hook Failure</th>
<th>Slip Hook Failure</th>
<th>Chain Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Slip Hook Failure Image]</td>
<td>![Slip Hook Failure Image]</td>
<td>![Chain Failure Image]</td>
</tr>
</tbody>
</table>

In all instances the failures can be attributed to shock loading forces caused by tyre bounce during transportation. The common denominator in all failures was that the chain assemblies all had a slip hook attached to the lashing point. Although in all cases the lashing capacity of the load restraint assemblies exceed requirements, the chain assemblies still failed due to shock forces from tyre bounce.

The lashing capacity of a load restraint chain assembly is increased by eliminating the use of slip hooks and utilising a continuous loop of chain connected by winged grab hooks on a rachet turnbuckle chain tensioner.

For transporting all mobile plant, RPQ has stopped the use of slip hooks attached to lashing points and mandated the use of continuous loop chain assemblies.

If you come across a load restraint chain assembly fitted with a slip hook/s, you are obliged to replace the chain assembly with a continuous loop chain assembly.
Chain Not Looped, Slip Hook On Lashing Point

Continuous Loop Chain Assembly

Continuous Loop Chain Assembly

Chain Not Looped, Slip Hook On Lashing Point
To ensure effective direct load restraint, load restraint chains **MUST** be connected to a single point on the trailer.

In the example below, the image on the left shows a twist in the chain as it passes through the tiedown point on the mobile plant, and the chain around more than one upright bar on the trailer coaming rail. This does not prevent forwards or rearwards restraint as the chain can still slip on itself and/or around the upright bars on the coaming rail.

**DO NOT** wrap a load restraint chain around more than one upright bar on a coaming rail.
**DO NOT** wrap/twist a tensioned load restraint chain around itself.

---

**Chain Twisted & Multiple Conneation Points On Trailer**

![Image of chain twisted and multiple connection points on trailer]

**Single Connection Point On Trailer**

![Image of single connection point on trailer]

---

To ensure effective direct load restraint, load restraint chains **MUST** come from and return to a single point on the trailer.

In the example below, the image on the right shows the load restraint chain passing through the tie down point on the mobile plant, and the chain around more than one upright bar on the trailer coaming rail. This does not prevent forwards or rearward movement as the chain can slip through the tiedown point and/or around the upright bars on the coaming rail.

Attaching load restraint chain to multiple connection points while passing though a tie down point on the mobile plant **DOES NOT** provide effective direct load restraint.

**Single Connection Point On Trailer**

![Image of single connection point on trailer]

**Multiple Connection Points On Trailer.**

![Image of multiple connection points on trailer]
PRACTICAL ASSESSMENT

1. Choose a trailer/float used to carry mobile plant.

<table>
<thead>
<tr>
<th>Plant No.</th>
<th>Plant Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tare Weight =

Load Weight =

Load Weight =

Load Description:

Load Description:

<table>
<thead>
<tr>
<th>A. Sub Total =</th>
<th>B. ATM =</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B must be greater than A

2. What strength chains are required (by calculation) Forward restraint?

Angle of effect \((AE) = 1\). Calculate the angle of effect \(P252\)

Required forward restraint = 2.

Required lashing capacity of each chain = 3.

Allowance for the Angle of effect = 4.

Minimum size chain required to restrain load = 5.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

3. What strength chains are required (by calculation) Sideways restraint?

Angle of effect \((AE) = 1\). Calculate the angle of effect \(P252\)

Required sideways restraint = 2.

Required lashing capacity of each chain = 3.

Allowance for Angle of effect = 4.

Minimum size chain required to restrain load = 5.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

4. Are the chains in good condition? ☐ Yes ☐ No If “NO” replace chains. Destroy old chains.

5. Are lashing points clearly colour coded or labeled? ☐ Yes ☐ No If “No” you are required to raise a Work Request.

6. Are chain assemblies a continuous loop continuous loop of chain connected by winged grab hooks on a ratchet turnbuckle chain tensioner? ☐ Yes ☐ No If “No” you must replace the chain assembly with a continuous loop chain assembly.

7. Loaded Vehicle Height

Height of trailer/float deck =

Height of the load =

Height of loaded trailer/float =

Height of the trailer/float ramps =