Adequate Load Restraint – A Fundamental Responsibility

The National Heavy Vehicle Law (NHVL) has a section that concerns load restraint – Loading Requirements Part 4.4 of Division 1. It is an offence to drive a heavy vehicle on a road when the load does not comply with safe loading requirements, and the prescribed penalties are severe. Responsibility to ensure the safe restraint of a load on a heavy vehicle falls not only on the driver, but also on the vehicle owner, the packer, the loader and the consigner. Proof that the load was placed and secured in a way that meets a performance standard in the Load Restraint Guide, prepared by the National Transport Commission (NTC), can provide a reasonable defence unless the load has shifted or fallen off. The current version, the second edition, was released in 2004. A new edition for 2017 is currently being developed, and a draft can be found on the NTC website. The main purpose of this article is to draw your attention to the draft Guide.

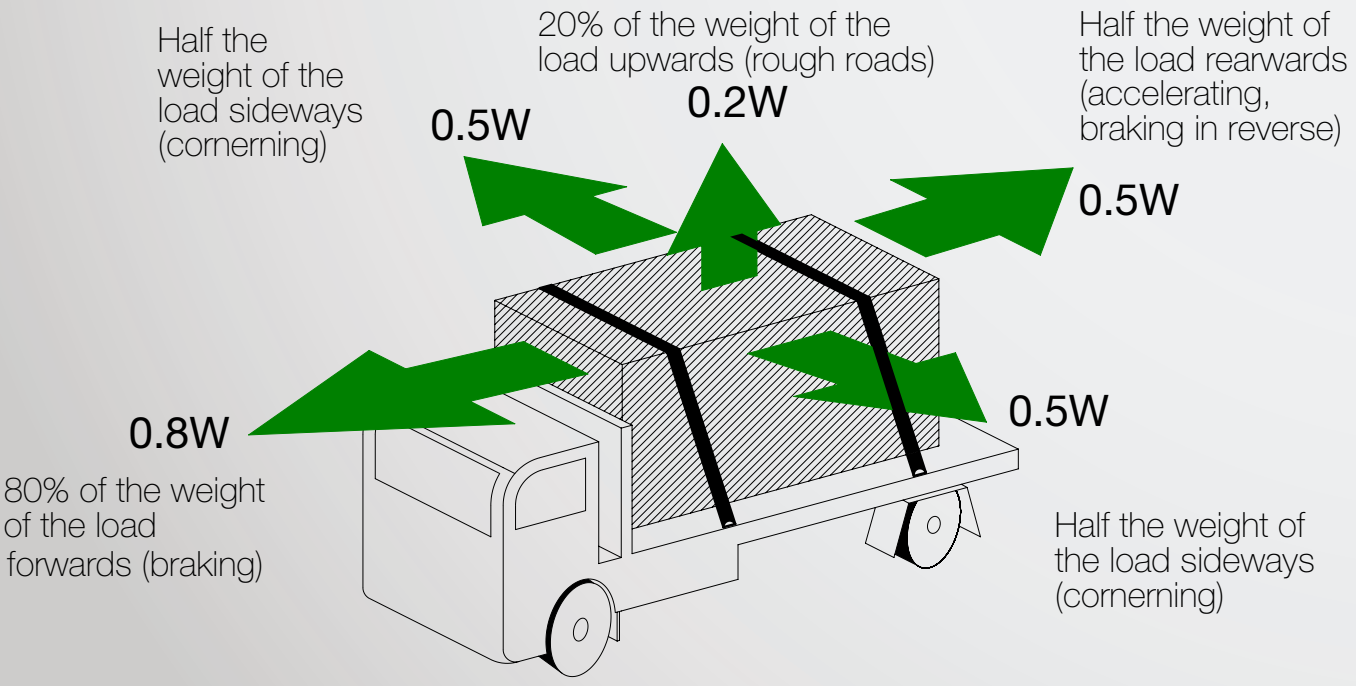
The Load Restraint Guide is based upon performance levels that the restraints must withstand without substantial movement of the load, with respect to the carrying vehicle. These levels are shown in the illustration.

The following 11 steps underpin safe load restraint:

1. Understand the load and its characteristics. The weight of the load should always be determined and, if the load is in a container or compartment, its weight distribution and restraints should also be determined. The load length should be greater than 80 per cent of the load height and the load width should be greater than 50 per cent of the load height.
2. Choose a suitable vehicle for the load type and size.
3. Use a restraint system that is suitable for the load.
4. Position the load to maintain vehicle stability, steering and braking. The location should spread weight between axles so that no axle is overloaded.

A load that is top heavy requires particular care because it will reduce rollover stability.

5. The vehicle must comply with dimensional and axle weight limits when laden. These need to be known beforehand and any required warning systems put in place.
6. Check that the vehicle structure and restraint system are in good working condition and sufficiently strong.
7. Ensure that the load is stabilised, which means using robust chocks, blocks and bars under a non-flat load.
8. Understand safe work practices when



loading and unloading the vehicle. In particular, define an exclusion zone around the vehicle with cones when it is being loaded or unloaded.

9. Use sufficient load restraints to keep the load stable.

10. Allow for changes in vehicle stability, steering and braking when driving the loaded vehicle. The response of the vehicle when an unfamiliar load is carried must be determined by conservative driving over the first few kilometres.

11. Check the load and restraints regularly during the journey. The vehicle should be stopped and inspected within a few kilometres of starting and periodically on rough roads.

There are four types of load restraint:

1. Tie-down, which relies upon the friction between the load and the tray.

2. Containment, such as within a tanker, tipper body or a container.

3. Blocking, which involves restraining the load against a vehicle headboard, tailgate or sidewall.

4. Attaching, which involves direct lashing onto tie-down points, twist locks or restraint beams. Both the load and the vehicle must have attachments points.

Load movement and overloading are potentially destabilising – the load must be restrained by adequately strong lashings in each of the five directions identified by green arrows in the diagram.

When a load is tied-down, a minimum force of 20 per cent of the load weight is needed to stop it from shifting upwards on a rough road.

Slippery loads are unsuitable for tie-down. In particular, steel on steel is unsuitable to be tied down; instead rubber should be used underneath. Steel stillages can slide around on steel trays – they need to be blocked as well as tied down.

Off-set loads, those positioned off the centre-line of the tray, should not be tied down as the lashings will loosen if the load shifts sideways. More generally, loads should be stabilised by good placement so that the lashings take the minimal length.

Rope is unsuitable for tie-down restraints because hand tightening is unsatisfactory.

Where tie-down lashing is used, it is most effective when the lashing is close to vertical.

Lashing chain strength is specified in the Guide. For example, a 10mm chain has a working load of six tonnes with claw hooks, and 4.5 tonnes with grab hooks. Refer to the guide for a table of values.

The sides of a curtain-sided van body can be used as a containment, but only if they are engineered for this function. The gap between the load and the curtains must not exceed 200mm, but it is preferable to fill the gap with a timber block because load movement is the enemy of stability.

Cargo sitting on a pallet or within a stillage should be restrained against the pallet or stillage.

Do not use a tarpaulin or a curtain side to restrain packs unless they are properly engineered for the specific type of load.

Cradles will usually be needed to restrain cylindrical loads. The optimal wedge angle for cradles and chocks is 39°.

Divide loads to achieve more effective crowning, which improves the lashing effectiveness.

Packed containers present a particularly challenging load when the nature of the packing, centre of mass height and total weight inside are unknown. The consigner should provide these details.

Gates should be lashed or otherwise secured to provide additional containment.

Restrain the axles on vehicles that are carried – bouncing of the vehicle presents a particular problem.

These points are only a smattering of the guidance information provided in the draft of the 2017 Load Restraint Guide. I urge you to look at this excellent publication and apply its advice once it is released.

The performance weight forces that are shown in the illustration are applicable to 'normal' conditions. They do not account for crash forces or abnormal operating conditions. Load movement during a crash event is potentially life threatening to the driver. The question of whether a coupling between vehicles in a combination can survive a crash involving laden vehicles is an important safety consideration.

The performance level in the forward direction is 0.8W. Consider for example, the fifth wheel and its kingpin on a semi-trailer combination. The semitrailer weight could be 32 tonnes, so the coupling should be able to withstand a force of 0.8W x 32t x 9.81 (gravity) = 251kN. The minimum horizontal strength required by rules, for a fifth wheel coupling for a semi-trailer application, is about half this.

If the trailer is a B-double set weighing 55 tonnes, then the performance standard force is about 0.8W x 55t x 9.81 = 431kN. The minimum horizontal strength of a fifth-wheel coupling is about 190kN. Hence, there is significant doubt that a fifth wheel coupling could restrain a laden trailer at the performance standard level of 0.8g if the trailer is treated as a load. Maybe it is time to introduce a proof test into the couplings rule ADR 62.

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