



Loads transported on the road, by rail or sea need to be secured for transport.



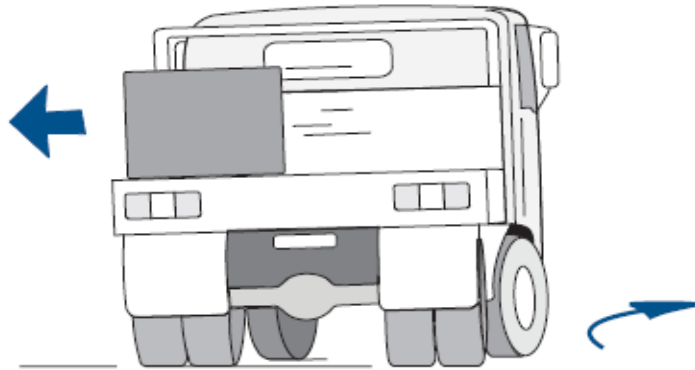
Load shifts aren't always this dramatic, or on this scale...



...but they can still cause problems!

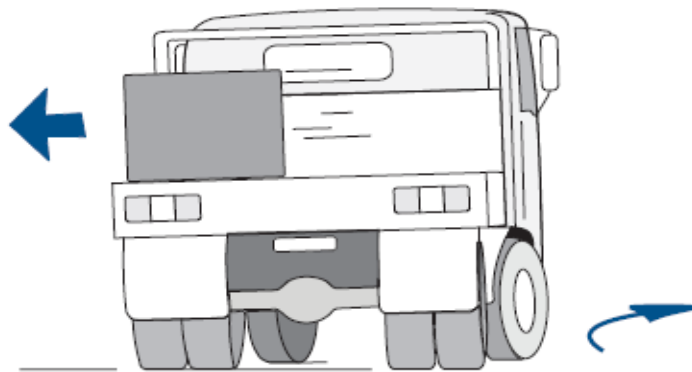
Collapsed loads cause product damage and can mean the load has to be unloaded manually.

Manual unloading on the trailer bed introduces risks from working at heights, as well as manual handling.



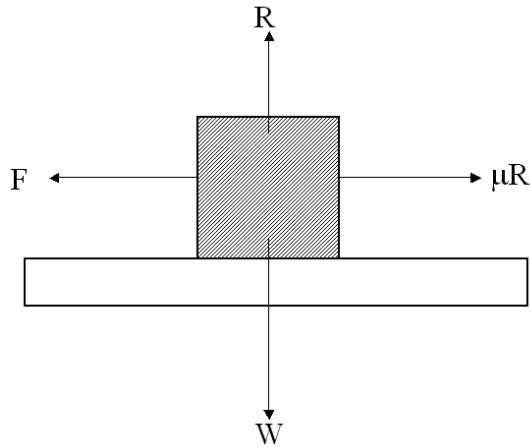
Load shifts on the road can increase the chance of rollover, particularly on roundabouts and motorway slip roads, and when cornering.

Loads can be ejected from the vehicle, leading to injuries and/or fatalities



Vehicles do not just travel on flat, straight roads!

Accelerating, braking and cornering will tend to cause the load to shift – and friction alone cannot be relied upon to hold the load in place.

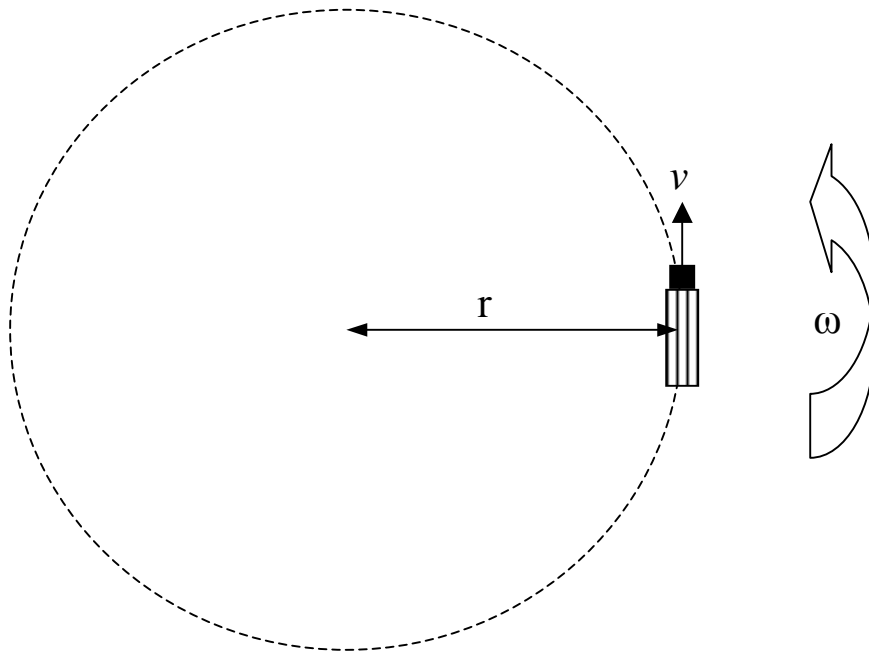


$$\mu = \frac{F}{R}$$

The weight of an object,  $W$ , has an equal and opposing reaction force,  $R$ .

If an attempt is made to pull the object sideways with a force,  $F$ , an opposing force,  $\mu R$ , resists the movement of the object.

Only when  $F$  is greater than  $\mu R$  will the object move.



A vehicle going round a corner is in fact travelling around an imaginary circle with a radius,  $r$ .

$$\omega = \frac{v}{r}$$

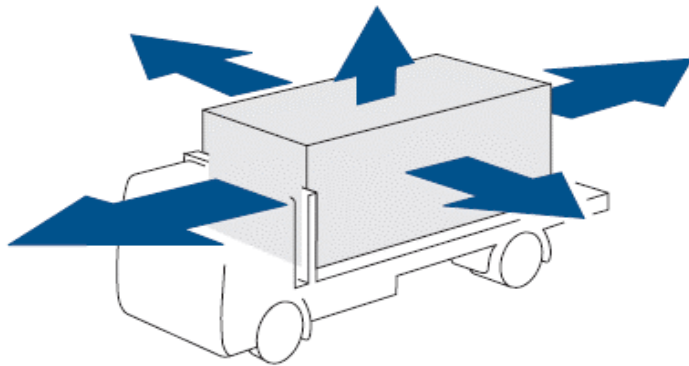
$$F = mr\omega^2$$

F is the force the trailer must exert on the load to make sure it turns into the corner with the trailer.

The load restraint system must be capable of providing this force.

If the force is not sufficient the load will continue to move in its original direction rather than turning into the corner.





Loads should be restrained from moving in each direction.

Load restraint means preventing the load from moving relative to the trailer bed

Load containment – preventing loads from falling from the trailer – is not the same as load restraint.



These containers are contained within the vehicle body but are still free to move relative to the trailer bed.



- Wherever possible, loads should be loaded tight against the front bulkhead.
- The bulkhead should be sufficiently robust to resist movement of the load.
- If it is not possible to place the load against the front bulkhead, intermediate bulkheads or other methods of restraint should be used.



On a curtain sider, closing the trailer curtain and hoping for the best is not transporting a load safely!



Even if the curtain stops the load falling out during transport, there is nothing to stop the load shifting inside the trailer



Once the curtain is opened, an unstable load may fall from the trailer.





Loads that have shifted within the trailer are more difficult to unload.

For example, a load normally unloaded by fork lift may have to be manually unloaded.

In addition, all or part of the load may be damaged.



Adequate load restraint requires thought - the strength of any load restraint system is dependent on the strength of the structure it is attached to.







- Current DfT guidance indicates that goods transported on curtain-sided vehicles should be secured as if they were being transported on a flatbed.
- This means that the load should be secured to the vehicle chassis, and not to the weather protection structure.
- The curtain is not part of the load restraint system.

- To transport a load safely, it is vital to have someone competent to assess the load and decide what restraints are required to prevent the load shifting.
- Different loads will often require different methods of securing – what works for one load may not be suitable for another.
- Whatever method is used, the aim should always be to prevent the load from moving relative to the trailer bed.



Whatever method of load securing is used, it should not introduce additional risks.



For example, working at heights may require the provision of access ladders or working platforms.



- Load restraint equipment should be checked regularly for damage or wear.
- The equipment should be clearly labelled to indicate the load it is rated for.
- Webbing straps are particularly vulnerable to damage.

# In summary

- Friction between the load and the trailer bed is not sufficient to hold the load in place.
- Load shift can increase the risk of an accident on the road, and lead to accidents when the vehicle reaches its destination.
- Loads should be restrained from moving in all directions.
- Wherever possible, loads should be placed tight against the front bulkhead.
- Loads carried on curtain-sided trailers should be secured to the vehicle chassis rather than to the weather protection structure.
- Load restraint equipment should be clearly labelled to indicate what load it is rated for, and inspected regularly for damage or wear.
- Load security should not introduce additional risks.
- Safe load transport relies on competent risk assessment.