Rollover Prevention: Heavy Goods Vehicles

Contents

About rollover risks 4
What makes vehicles roll over? 6
Prevention – how? 7
Road, weather and traffic factors 8
More knowledge reduces risk 9
Technical resources 10
Your responsibility 11
Creating safe driving conditions 12
Risks 13
Tankers 14
Vehicle Mounted Cranes 15
Log trucks 16
Double-decker vehicles 17
General Goods 18
Solid Bulk Transport 19
Hooklifts – with containers 20
Concrete trucks 21
Wood chips- and lumber trucks 22
Specialised Transports 23
Load securing and rollover risks 24
Table of risks 25

Rollover accidents have long been a serious risk for road transport. There is a clear need for taking a collective approach to spreading awareness of these risks.

This guide aims to briefly describe rollover risks and the risks of driving with a high centre of gravity. The guide provides information about the risks for various types of vehicles, external conditions, and other factors.

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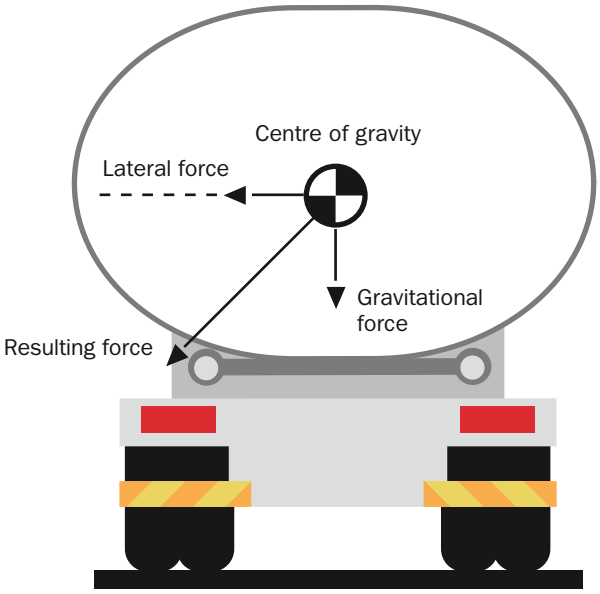
Bill Rehn MD,
TYA

About rollover risks

Rollover risks have existed for as long as vehicles have travelled on roads. Recent insurance statistics for Sweden show that one to two rollover accidents occur every day despite major improvements in vehicle performance and the computerisation of safety systems.

Studies show the most common cause for many trucks rolling over is the driver's inability to assess the combination of speed, heavy loads, and cornering. Securing the load also plays an important role. The dangers these combined factors pose may seem obvious, but the problem is that the driver must learn to assess them from behind the wheel. Doing so requires good judgement, knowledge of your vehicle, and, if possible, practical training.

The factors affecting rollover risks are illustrated in the image to the right.



Influencing factors

The illustration shows how a vehicle will roll over when the resulting force from the combined lateral and gravitational forces point in a direction beyond the vehicle's outer wheel. Lateral force is determined by the vehicle's speed and the type of corner being taken. Greater speeds and sharper bends lead to higher rollover risks.

Position of the centre of gravity

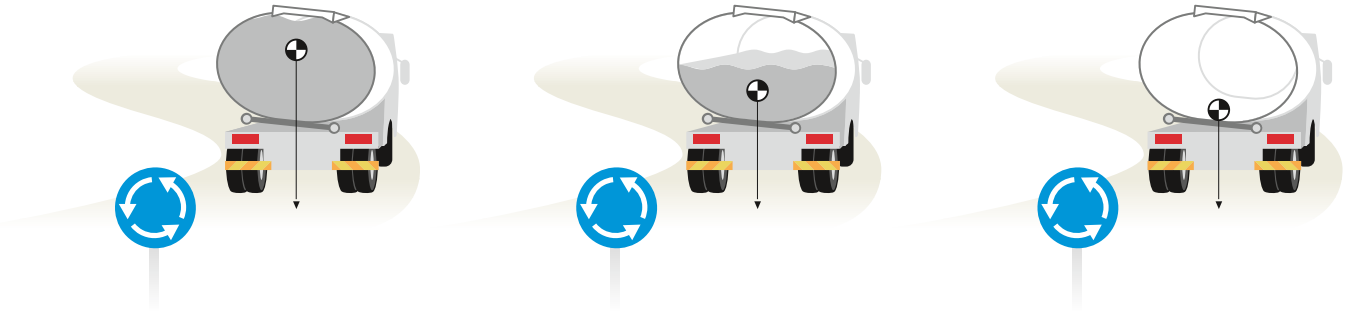
If the vehicle's centre of gravity is high or towards one side or the other, the resulting force points outside the vehicle's fulcrum during cornering may increase risk of rollover.

Axle track

Narrower axle track also increases rollover risks.

Never let yourself be surprised in traffic!

Drivers should be mindful of potential problems on the road ahead. Those who drive at inappropriate speeds are often caught by surprise. Inappropriate speed for the road environment and conditions is a major factor in accidents. Driving speed should allow time to react to an animal running out in the road, a blow-out, or a collision ahead. Knowing your vehicle's limitations and avoiding sudden movements of the steering wheel is key to preventing rollovers.



Even if a vehicle is driven at speeds below the road's recommended limits the risk of rollover accidents still exists. The factors outlined below indicates the various conditions that affect rollover risks. Note that rollover accidents can occur at even lower speeds.

Radius of the bend

In a roundabout 25 metres in diameter there is a high risk for a heavily loaded timber trailer to roll over even at speeds of approximately 20 km/h. The equivalent speed for a roundabout 100 metres in diameter is approximately 40 km/h.

Position of the centre of gravity

A truck with tall stacks of paper rolls runs a high risk of rolling over at speeds of approximately 30 km/h in a roundabout 50 metres in diameter. The equivalent speed for the same truck when loaded with steel products less than half a metre in height is 50 km/h. However, at that speed the risk that the vehicle will skid or slide off the road or that the load will come loose is greatly increased.

Free liquid surfaces

When a tanker is not filled, the liquid's centre of gravity moves outwards and upwards during cornering. A sudden manoeuvre causes wavelike movement of the liquid (see diagrams above), further destabilising the vehicle. For vehicles with completely filled tanks, the centre of gravity lies higher up. In both cases, the vehicle risks rolling over at roughly the same speed in a curve with a wide radius.

In brief

Doubling the speed increases lateral force four times!

Increasing the speed by as little as 1 km/h is enough to roll over. The margin is always less than you expect.

Keep in mind

The longer a turning manoeuvre takes, the greater the risk of rollover. This means that turning in a roundabout is riskier than driving straight.

What makes vehicles roll over?

Vehicle rollover is caused by a number of factors. Incidents on the road may lead to injury, death, damage to property and the environment.

Fast facts

As mentioned earlier, the most common cause for many trucks rolling over is the driver's inability to assess the combination of speed, heavy loads, and cornering. Securing the load is also an important factor in vehicle stability.

The following list highlights the main risk factors for rollover:

- High centre of gravity.
- High speed.
- Load displacement.
- Bad road conditions.
- Driver behaviour, aggressive driving and distraction are key issues to address.
- Secondary fault, such as collision with another vehicle, or skidding towards the edge of the road.

What happens to the vehicle?

- Wheels on driving axles are most often the first to lift up.
- For semitrailers, the trailer wheels are the first to lift up.
- For vehicles with trailers, the trailers are usually better balanced than the vehicle.

THE NEWS

Truck roll-over sparks traffic chaos on E4 highway!

The elaborate tow-away job severely slowed city-bound traffic near York St from 4.30pm until about 9.30pm.

Two right-hand, inbound lanes were first closed at 5.30pm as emergency services attended to the accident.

A third lane was blocked off before 8pm to allow the Metropolitan Fire Brigade to bring in special equipment to clear the truck, which had rolled on its side.

Prevention – how?

Preventing rollover accidents depends on how well you know your vehicle and your load. The keys are knowledge, attitudes, skills, behaviour, and making safe choices throughout the journey.

Do it right from the beginning!

Basic measures include:

- Choose the right vehicle for the job/load.
- Review loading and unloading procedures.
- Check the load securing regularly, and before and during the journey.
- Choose the best route possible for your vehicle and load. (See page 8).
- Update your knowledge of specific risks for your vehicle. E.g. when you have changed tyres or suspension, vehicles properties may have changed.
- Speak openly about risks and maintain a good attitude to safety.

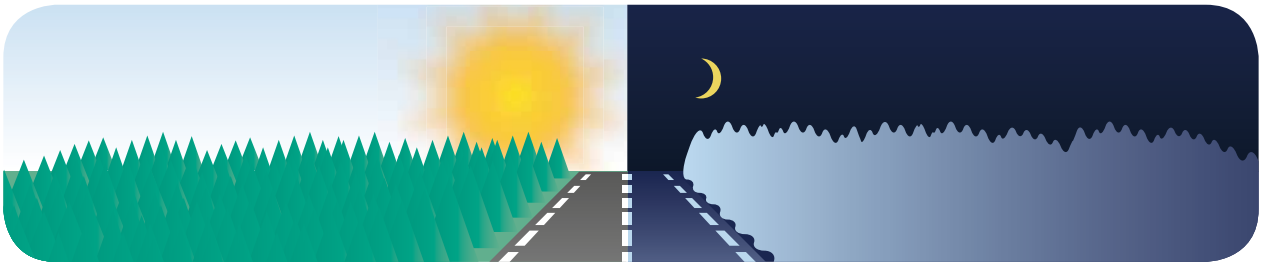
Prevent and think ahead

The best way to achieve a good safety culture is to take control of long-term planning. For this, education and information are important. Below is a list of areas the company can work on with safety personnel:

- Add rollover risks to the company's vehicle safety policy.
- Arrange introductory courses and further training on rollover risks.
- Hold regular safety meetings where rollover risks are a regular item on the agenda.
- Keep a guide (like a driver's manual) with a summary of rollover risks.
- Provide familiarisation training for drivers of new vehicles by a representative from the supplier.
- Ensure close cooperation between the company and safety representatives.
- Know the risks for each type of vehicle in the fleet.

Do you have an extra or unusual load today?
Keep load securing and rollover risk in mind.

Road, weather and traffic factors



Many variables affect safety and prevent rollover accidents — not the least of which are external factors such as roads, weather, and traffic. Planning and risk assessment are important aspects of transportation safety.

Roads

You travel on everything from the narrowest gravelled roads to wide motorways with the best possible asphalt and safety barriers. It is important to keep the road's load bearing capacity in mind, as well as to make your own judgement of the conditions. Have natural phenomena such as ground frost or floods affected the road's condition? Be especially observant of the road's edges.

Other, more unusual risks come as wheel tracks and the road's banking, which must be correctly angled to counteract lateral forces. Incorrect banking can pose great risks to overall traffic safety and result in lane departure or rollover risk.

Weather

Weather and wind are common conversational topics, but for a professional driver they are essential to your risk assessment for your journey. In addition to safety and equipment checks before setting out, it is important to consider rollover risks. Keep the weather and the vehicle in mind in relation to your route.

In a worst case scenario, you may be driving a vehicle with a covered trailer over a heavily trafficked bridge with signs warning of high winds, while freezing rain has been predicted. In a best case scenario you will be driving a short distance in nice summer weather on a motorway.

Always take the weather into consideration in your risk assessment and ask traffic management for help if you are unsure.

Day and night

Different light conditions bring different risks. You may be driving on a poorly lit road where one second of inattention can put you at the edge of the road and in risk of rollover.

But even if you are driving on a main road, you may experience risks such as dazzle, ice, frost or wildlife that can cause you to make sudden changes to your path, with the chance of rollover. Remember to adapt your speed and dip your headlights well in advance.

Traffic situation

A tough traffic situation can be both stressful and risky. Heavy traffic or emergency situations (accidents/obstacles) force you to make quick decisions that affect the vehicle's ability to stay balanced and on the road.

Keep times and your route in mind to enable you to avoid the worst situations by planning ahead.

Vehicle

Your vehicle may not be best suited for various road, weather and traffic conditions. It may have a high or low centre of gravity depending on the type of vehicle or load carried. Generally speaking, newer and more technically equipped vehicles (with ABS and ESP) are a safer choice. It is important to know your vehicle's capabilities and match your driving to its characteristics. See the next section, 'More knowledge reduces risks.'.

Keep in mind

Lower your speed at the beginning and end of an inclined bend. The bank angle may result in higher than normal lateral forces, causing the load to shift sideways.

More knowledge reduces risk

You may drive the same vehicle every day and are well aware of its characteristics. But some drivers drive several vehicles during a working day.

Get to know your vehicle

- When driving a new and unfamiliar vehicle it is important to find out as much as possible about it and to take extra care with safety procedures and checks.
- The things you can do to reduce rollover risks while driving a new vehicle are:
- Perform out a daily vehicle safety check.
- Know the vehicle safety system (the driver's manual is very helpful).
- Ask colleagues who have driven the vehicle and/or ask management if there is anything you should keep in mind about the vehicle.

Be especially aware of:

- **Steering rear axle:** A steering rear axle gives the vehicle special properties. It may be a rollover risk if the driver is unfamiliar with this type of vehicle.
- **Centre of Gravity:** Is it low or high? How is the load distributed?
- **Load securing:** Is the cargo secured correctly and sufficiently?
- **Technical resources:** Truck, crane, loading ramp, electronic support systems such as ESP and ABS. Function check and going through the manual may be required.

…and get to know your load!

Is there a chance the load's centre of gravity can shift while travelling? This is especially relevant when driving a tanker, bulk truck, concrete truck, or other loose non-secured load. Possible measures are to adapt speed and to turn off rotation of the concrete mixer while in risk areas.

Is there a chance the load changes shape or settles while travelling? This is especially relevant if transporting timber or miscellaneous goods. Possible measures are controlling load securing and to re-securing it more often than for other types of transport.

Are you driving an unusual, large, or heavy transport — a so-called special transport? Many risks and solutions may be relevant. One suitable measure might be to devote extra time to planning and checking the centre of gravity, load securing, and transport route.

Technical resources

In order for you to take appropriate action to avoid rollover risks, it is important to know your vehicle. We will review the most common technical systems of modern vehicles. It is also important to read the driver's manual for the vehicle you will be driving.

ESP – Electronic Stability Program

ESP plays a vital role in vehicle safety. It has its downsides though, as a vehicle that is practically 'untippable' may tempt the driver to push limits more.

ESP senses inclines, lateral forces and wheel movement separately, enabling the computer to process correction for the driver's actions to a very high degree, mainly through engine braking and free-wheeling. New trucks are required to be equipped with ESP.

ABS – Anti-lock Braking System

The most common version of ABS consists of individual sensors on each wheel that continuously feed information about each wheel's rotational speed to an electronic central unit. If a wheel begins rotating slower or is about to lock, the braking circuit is automatically adapted, reducing the brake effect on that wheel. However, the effect is counterproductive; the wheel(s) that were about to lock spin faster when they are braked again. This process is repeated constantly, resulting in the characteristic brake pedal quiver.

The difference between ESP and ABS

Modern ESP systems contain three additional sensors registering the direction of the wheels in relation to the steering wheel's movement and a gyro monitoring the vehicle's lateral movement.

The system kicks in when the sensors send conflicting information. The wheel (or wheels) affected are braked with the help of the ABS system to prevent swerving. Engine torque is also cut off to prevent wheel spin. In most cases the system has acted long before the driver even has time to notice the swerve starting.

EBS – Electronic Braking System

EBS is an electronic system that controls both the truck and the semitrailer braking functions and integrates these with the ABS, ASR[1], and EBL[2] systems. The system also combines the effects of the trucks engine brake and intarder[3], and controls both automatically to improve efficiency and minimise wearing of the manual break.

Hill Holder – helps when starting uphill

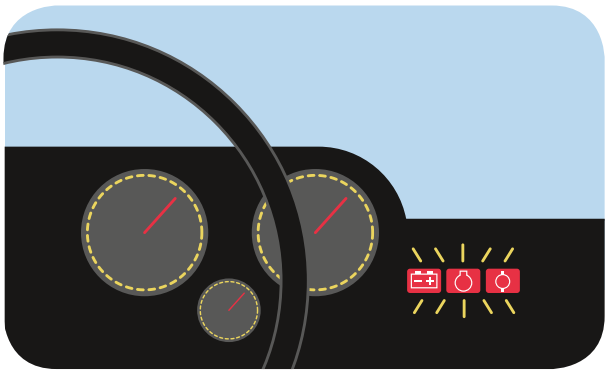
The Hill Holder system is a great help when starting the vehicle on an uphill slope. It works by preventing the truck from rolling backwards for a few seconds after the driver lets go of the brake, enabling starts without rolling backwards or slipping the clutch. It also reduces wear on the tyres.

ACC – Adaptive Cruise Control

ACC helps the driver keep a safe distance to the vehicle in front of them. It works first automatically on the engine brake and then on the truck intarder.

LDWS – Lane Departure Warning System

LDWS gives of a warning signal if the truck crosses the road's middle line without the driver first activating the indicators. The system is extremely efficient in preventing accidents caused by inattention or fatigue.



1. Anti slip Regulation.
2. Electronic Brake force Limitation.
3. Intarder = Integrated retarder (in the transmission). The Intarder that is integrated in the transmission relieves the service brakes by up to 90 percent. In doing so, it reduces environmental impact and maintenance costs.

Your responsibility

In addition to having the right qualifications for the vehicle you are driving, and complying with rules of the road, you need to take individual responsibility to reduce rollover risk.

A safe driving style and good risk awareness are a good way to start.

There are many risks to consider (for example external ones like weather and roads), but driver behaviour is also important. It may be about ensuring you manage your breaks and are well rested to focus on driving. The responsibility is yours.

Another important aspect is communication with transport management, depot, and colleagues. Having an open and clear approach to safety issues such as rollover risks is helpful.

Distractions – disturbances while driving

Currently we have a constant flow of information that demands our attention. In the truck cab there are usually a telephone, navigation instruments, and more.

The best advice for handling these distractions is to use the equipment only when the vehicle is not moving and the engine is switched off.

The Load – Your Safety Focus

You are responsible for securing your load. This is a basic safety measure for your transport.

Example excerpt from the Swedish Road Traffic Regulation 1998:127, Ch. 3, 80§:

Load may not be transported on or in a vehicle in such a way that it

1. Represents a danger to people
2. Causes damage to property
3. Drags behind or falls off the vehicle
4. Causes interfering dust build-up or similar
5. Hampers driving the vehicle
6. Produces unnecessary noise pollution

Depending on the conditions of the load space or the load, the load shall, if needed, be secured. If necessary, the load must be covered.

Read more about load securing on page 24.

Laws on Distraction

Many EU countries strictly enforce laws about driver distraction, which can lead to penalties or disqualification. Drivers must comply with laws about distraction to avoid collisions.

Creating safe driving conditions

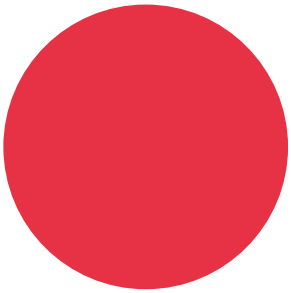
There are many things you can do to create the safest possible conditions for avoiding rollover accidents. The most important ones are summarised here.

How to avoid rollover risks

- Good knowledge of the vehicle and its equipment.
- Use vehicles equipped with ABS, ESP and/or equivalent support systems.
- Consult with loading/terminal staff or the driver who last used the vehicle.
- Aim for a low centre of gravity for both the vehicle and load.
- Ensure that load is secured properly.
- Good route planning that avoids risks from external conditions (weather/road).
- Comply with laws and regulations (such as traffic laws, driving and rest time limits, alcohol and drugs).
- Adopt a safe and consistent driving style, avoiding sudden lane changes and high speeds on roundabouts.
- Keep in touch with transport management during the entire journey. Report safety issues to a supervisor and/or safety representative.
- Avoid driver distraction. Use a telephone, GPS, and hand-held devices only when the vehicle is not moving and the engine turned off.

Risks

In this chapter on various load and vehicle types, the following symbols for describing risks will be used.

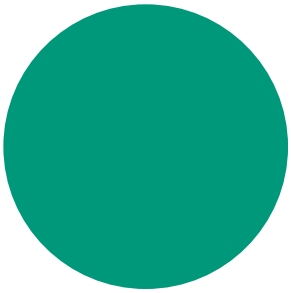


Warning!

Serious rollover risk requiring action and countermeasures to prevent.

Keep in mind

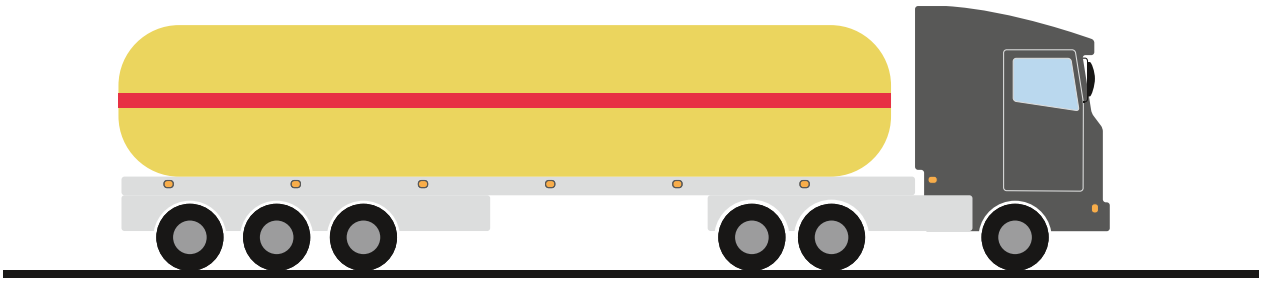
Rollover risks requiring extra attention from the driver.



Correct action

Preventative measure.

Tankers



Things to keep in mind as a tanker driver
Movement of liquids (surging) in the tank can cause roll over. Regulations concerning load securing of solid goods are rigorous, but there are no equivalent regulations concerning tankers. During cornering and evasive manoeuvres, liquid cargo may surge from side to side causing the tanker to swerve or roll over.

Tests concerning rollover risks have been carried out under controlled conditions with vehicles one-tenth the size of regular tankers. The results have been verified by tests that use real vehicles.

Surging occurs during all tanker transports. Just because a tanker is fully loaded doesn't mean that the entire tank volume is filled. Tankers are built for liquids with low density, low weight per litre, such as petrol. Tanks cannot be completely filled with heavier liquids such as diesel without becoming overloaded.

Furthermore, the compartments can never be filled to the top or overpressure may cause a leak. The result is that there will always be enough space for surging.

Filled, circular tanks result in lower rollover risk. From a surge point of view, half-filled tanks are far more dangerous than filled ones despite the resulting lower centre of gravity. Practical tests have also shown that in terms of risk, swerving appears more dangerous than driving in a roundabout.

Warning!
High speed. Half-full tanks (surge risk). Full tanks (lateral force).

Keep in mind
Driving in roundabouts.

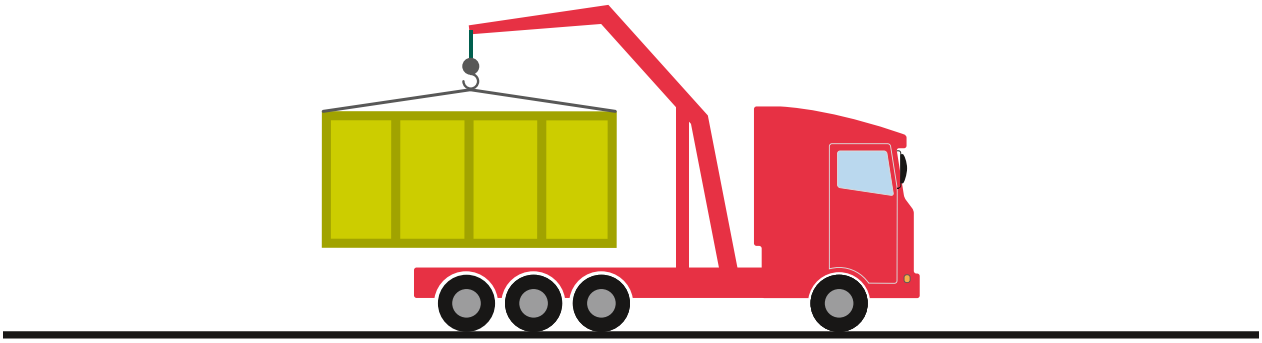
Correct action
Drive slowly in bends. Avoid sudden movements of the steering wheel.

To induce surging during tests, all three compartments are filled to the same level, resulting in some rollover risk. If one compartment is left empty and the other two are filled completely, rollover risk is reduced. It does not matter which compartment is left empty. Even though the vehicle's centre of gravity is higher, stability increases.

Drive slowly on bends
Low speed is the best guarantee for safe driving.

NOTE!
In low and flat tanks, liquid builds more kinetic energy and lateral speed than in circular tanks. Low and flat tanks therefore result in greater rollover risks than circular ones.

Vehicle Mounted Cranes



Things to keep in mind as a crane truck driver
Crane trucks or self-loading vehicles with cranes have special properties you need to be aware of while driving and doing stationary crane operation. The truck's design and road handling properties often result in higher centres of gravity than regular trucks. The weight may also be distributed out in front or behind the truck's axles.

According to available statistics, this vehicle type has a moderate rollover risk. One obvious risk is for the crane or the load to be too high up and so cause accidents. But it has a higher incidence of rollover or toppling when used in its primary capacity as a stationary crane; not driving-related.

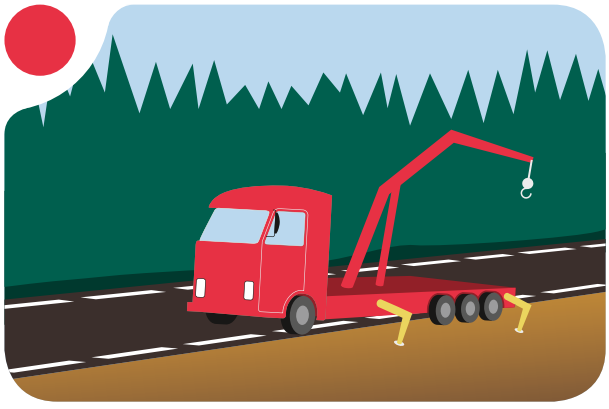
The most common causes of rollover during crane work are:

- Not all support legs being extended.
- Load table/markings not being properly followed. Sometimes the table calls for "fully extended support legs", sometimes for "extending support legs" to a specific marking.
- Ground plates too small to properly distribute the weight.
- Insufficient checking of ground conditions.

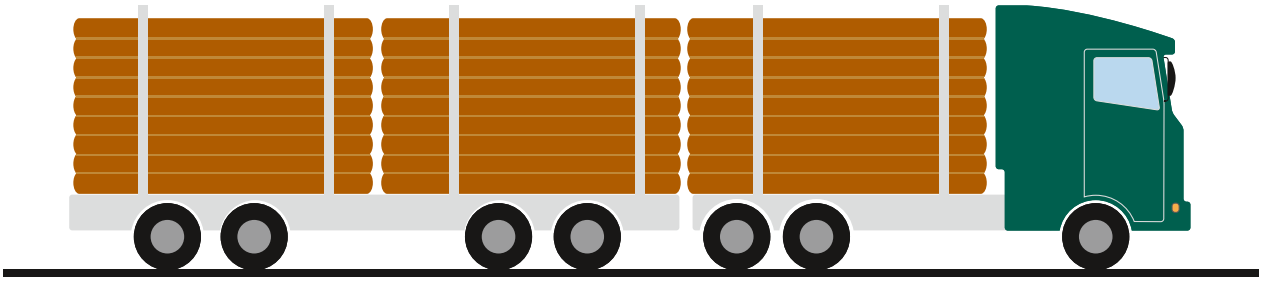
Warning!
Stationary crane work. Crane or cargo set too high on the bed (risk of collision and rollover).

Keep in mind
Roadsides with poor bearing capacity.
(Both during driving and stationary work.)

Correct action
Proper maintenance and use of the support legs and crane.



Log trucks



Things to keep in mind as a log truck driver
For tanker transport the original weight is known. For log trucks the weight may vary from transport to transport. A log truck may be loaded to its maximum gross weight.

If the vehicle is loaded to its maximum gross weight, the cargo height increases. In that case it is important to try and lower the centre of gravity by loading the heaviest logs in the bottom and the lighter ones up top and to keep the high centre of gravity in mind while driving.

The figures below illustrate how centre of gravity affects truck stability.

Speed and the load's centre of gravity are crucial to a log truck's stability.

Most log truck drivers drive professionally and carefully and don't roll over in roundabouts. Nonetheless, because of the lateral forces at play, there is an increased risk of rollovers while driving in roundabouts and during evasive manoeuvres to avoid obstacles.

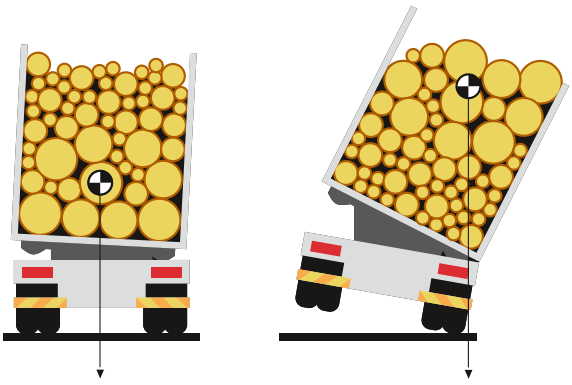
Warning!
The load's centre of gravity (see illustration below).

Keep in mind
The roads' bearing capacity (for smaller road networks).

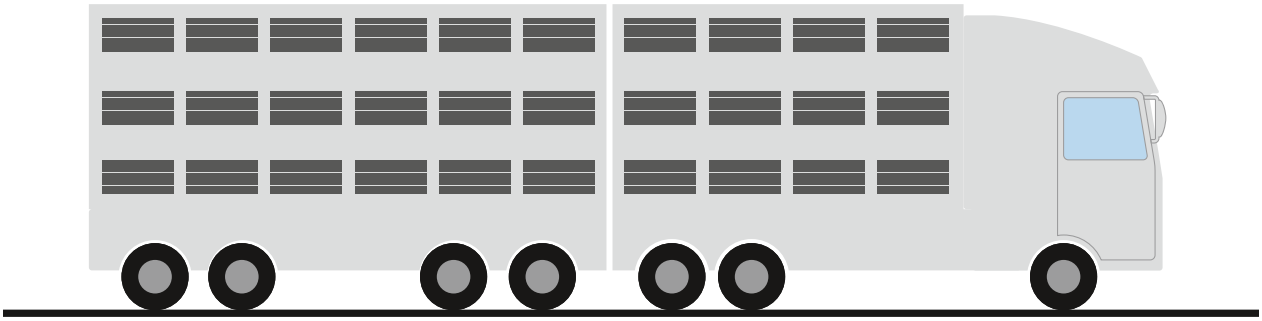
Correct action
Checks during loading, and arrangement and securing of load.

The lateral force is dependent on speed, the radius of the curve, and the vehicle's total weight. It is however most often the speed that determines whether the truck rolls over or not. Just a marginal speed increase of a few km/h is enough to cause an accident.

In terms of load securing automatic tighteners are available in addition to regular manual methods and tightening straps. All equipment including the functioning of the automatic tighteners should be monitored regularly.



Double-decker vehicles



Things to keep in mind while driving double decker trailers

Transport vehicles with double loading beds are becoming more common, especially for transporting animals and cars, which can be beneficial for the environment and transportation industry. If carelessly loaded or off-loaded however, risks to the driver may increase.

If the vehicle is incorrectly loaded, the high centre of gravity may cause it to roll over.

The vehicle also risks oversteer due to movement of the load caused by the high centre of gravity.

For your own and others' safety it is vital to always ensure that your vehicle's centre of gravity is as low as possible.

When driving a double-decked trailer you should always avoid driving with load on the upper deck if the lower deck isn't fully loaded.

A check of some key items can help prevent rollover other risks.

Example of a check list for double-decked vehicles

Check:

- Cables, cable rolls, cable locks
- Hydraulic hoses and vents
- Overload protection
- Lugs
- Spring clamps
- System lock-up
- Deformations and damage
- Bracing edges, damage, cracks
- Lashing points
- The load capacity of the upper deck

Warning!
Centre of gravity. Always load more weight into the lower bed than the upper one.

Keep in mind
The vehicle's equipment. Faults/flaws (see list below).

Correct action
Thorough safety check before and after loading (see list here).

Use smooth correcting movements!
Sudden jerking movements in combination with high speeds affect vehicle stability more than you might think. Drive intuitively. Reduce your speed in advance of every bend and keep to the middle of the lane. Never cut across the bend, as there may be oncoming traffic. Never apply the brakes on a bend.

General Goods

Things to keep in mind while driving general goods

Vans and delivery trucks for transporting general goods are a category of vehicles whose safety while driving is heavily reliant on good load securing and route planning.

Load displacement can be devastating in several ways. Goods thrown around on the bed may damage the vehicle. The most serious consequence is the way it affects the vehicle's centre of gravity in a matter of seconds, increasing the risk of rollover accidents, material damage and injuries to the driver and other road users.

Training in load securing is an effective way to reduce the risk and is helpful throughout a driver's working life. See TYA's range of available load securing training courses and resources further on in this guide (Swedish language only).

Warning!
Stress. Route planning.

Keep in mind
Load securing. Loading and unloading, order and goods placement.

Correct action
Training in load securing. Good/undamaged load restraint equipment.

Solid Bulk Transport

Things to keep in mind while driving bulk transport vehicles

Broken rock and other rough or heavy bulk goods transported in open beds are a type of load that sits compactly as long as it has been loaded and spread evenly. It is important to keep in mind that it can still be dynamic and mobile in certain situations. The load may settle, shifting the centre of gravity during transport. Tipping loads from a long bed is a risky activity. Under unstable ground conditions, the vehicle may roll over during unloading, as the centre of gravity shifts upwards during tipping process.

Also keep in mind that judging distances may be harder when tipping near a steep edge or slight incline.

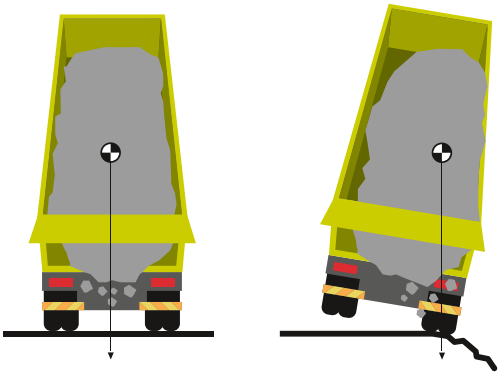
Bulk Goods

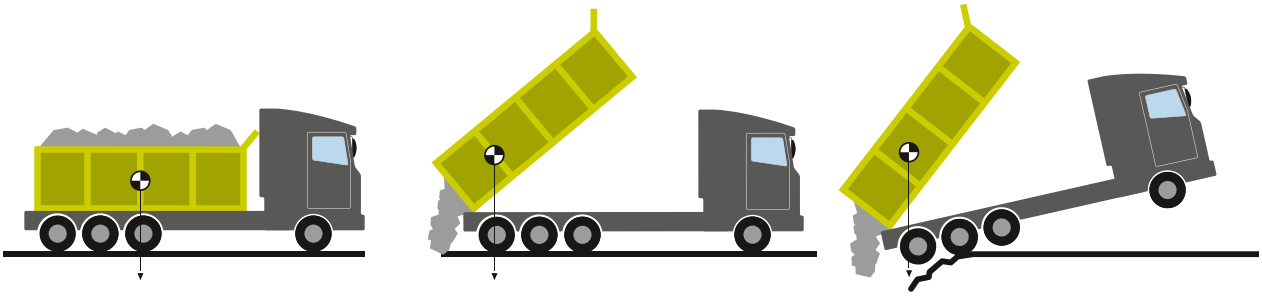
This category includes dirt, sand, gravel, shingle, rock, and similar. When the load is evened, the centre of gravity for any load must not be above the front or side walls of the bed. In the back, the load's centre of gravity must not exceed a line that passes 45 degrees above the tailgate.

Warning!
Load placement and angle on the bed.

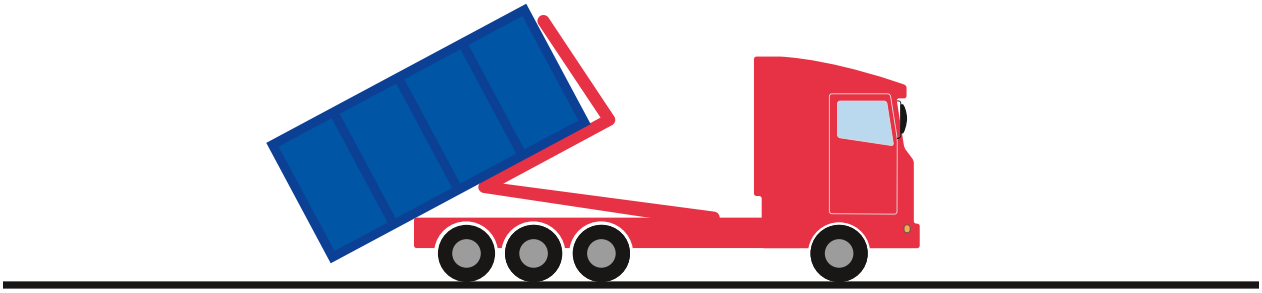
Keep in mind
Keep track of the tipping height and ensure the vehicle is standing straight and level.

Correct action
Check/measure carefully and communicate with loaders if you are not loading the bed yourself.





Hooklifts – with containers



Things to keep in mind while driving hooklifts – with containers

Hook lifts can transport many types of load from several of the categories described in this guide. The design of some hook lifts may result in slightly higher centres of gravity than for other vehicles.

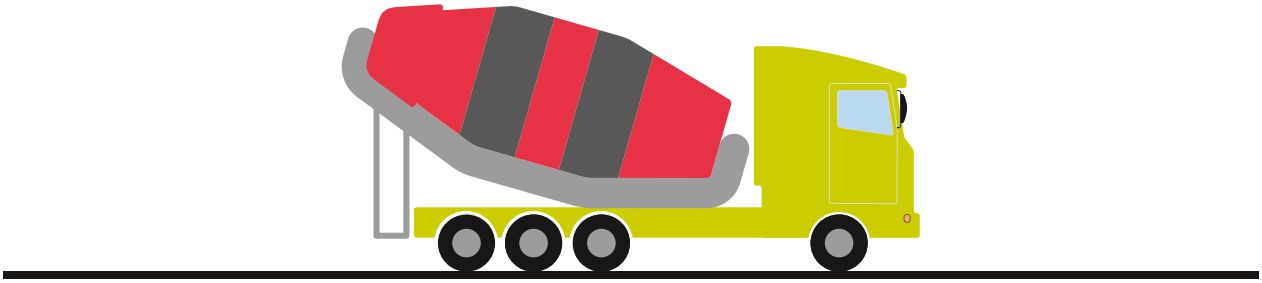
One risk factor is that the container may be locked and have been loaded by a third party. If it is sealed as well, it is impossible to verify the load securing and centre of gravity.

Warning!
Load properties vary greatly.

Keep in mind
Technical equipment and load's centre of gravity.

Correct action
Request loading plan for the container.

Concrete trucks

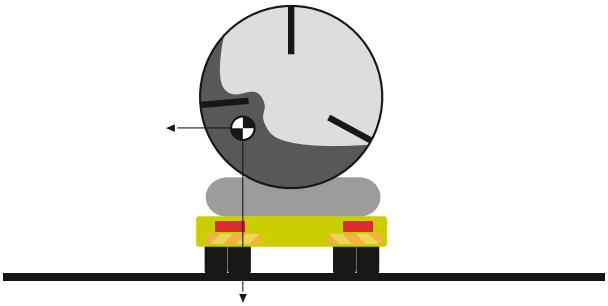


Things to keep in mind as a concrete truck driver
Concrete trucks have a dynamic cargo, which means that the centre of gravity shifts along with the rotating movement of the mixer. In a vehicle loaded with concrete, the fluid concrete follows the movement of the mixer upwards and to the side in the direction of rotation. The centre of gravity is therefore shifted towards one side, so that turning and sudden movements in the opposite direction involve added risk. As a countermeasure, you can turn the rotation off and drastically reduce speed while driving in difficult areas.

Warning!
Tight and small roundabouts. High speed.

Keep in mind
Sudden movements.

Correct action
Low speeds. Plan your driving.



Wood chips- and lumber trucks

Things to keep in mind while driving a wood chip truck

Wood chip trucks are designed to allow for a relatively high centre of gravity. The large surface areas also result in the truck having relatively high wind sensitivity. The risks are inherent. Self-loading wood chip trucks and those without self-loading are only marginally different in terms of risk, and the same care should be taken while driving both. The self-loading ones are somewhat heavier though.

Choice of road and speed is crucial to safety. Uneven roads or shoulders may cause the vehicle to rock dangerously from side to side. The rocking may cause the vehicle to roll over even on straight stretches of road.

Things to keep in mind while driving lumber trucks

Lumber trucks don't have as high centres of gravity, but require careful load securing to keep it low and prevent the load from shifting.

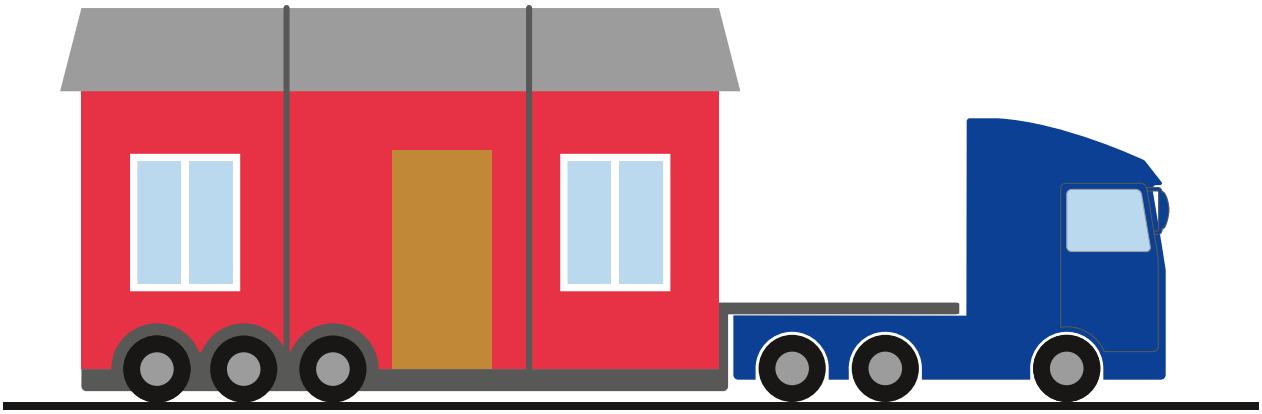
Be aware of the lateral equilibrium as well. Don't load completely on just one side. Spread the load across load bed.

Warning!
In high wind velocity, and on small uneven roads (rocking risk).

Keep in mind
Load securing and loading/unloading order.

Correct action
Keep the centre of gravity low for lumber transports, choose route carefully when transporting wood chip.

Specialised Transports



Things to keep in mind while driving special transports

Special transports may include driving anything from machinery to entire houses. This means that the centre of gravity and the shape of the load varies greatly. It is important to measure, weigh, and secure the load carefully during these types of transports. Often you'll be cooperating with local personnel in various work environments.

Communication, cooperation, consultation and good safety awareness are vital.

Successfully carrying out a special transport requires careful and well thought out planning based on practical information about how the specific load should be handled. A coordinator may be required, to handle contact with authorities and ensure all applicable laws and regulations are observed. The coordinator also checks accessibility, tunnels, road bearing capacity, and other limitations that may arise.

Warning!
Different sets of risks for each transport.

Keep in mind
Specialised load securing.

Correct action
Communicate and cooperate with all relevant authorities.

Load securing and rollover risks

Transporting loads safely involves knowledge of the work environment, traffic safety, and customer service. In addition, knowledge of how load securing impacts rollover risk is essential for improving road, traffic and workplace safety for drivers and others.

Things to keep in mind about load securing

Load securing practice is based on the laws of physics. Unsecured or improperly secured loads can cause the vehicle to roll over.

Packages that come loose from the bed can damage other vehicles or injure road users.

It is therefore important to:

- Take the necessary time to secure the load.
- Check parcels and individual items to ensure that they stay packed during travel.
- Check the condition of the load restraint equipment.
- Consider axle pressure, max load, and centre of gravity when loading the vehicle.

More information from TYA

TYA offers training courses and material (Swedish language only) where you can learn more about cargo securing and rollover risks.

- Booklet: The quick guide ”Cargo Securement for Highway Transports”.
- Training: ”Cargo Securement 1 day”.
- Booklet: YKB module 2 ”Goods Transports”.
- Training: YKB module 2 ”Goods Transports”, that brings up the importance of cargo securement and centre of gravity.
- Booklet: ”Loading and Securing Cargo on Vehicles – Textbook”.
- Load securing app. Download via the QR-code below.

Read more at

http://www.tya.se
http://skolor.tya.se/tyaskolan/
http://shop.tya.se/

Download TYA’s Load securing app

Table of risks

The table below provides a basic overview of known risk factors for various kinds of vehicles. No risk can be ignored when driving. It is also obvious that the greatest risk factors are common to all types of vehicles (marked in yellow in the table).

Risk factors	Tanker	Vehicle Mounted Cranes	Log truck	Double-decker vehicle	General load, distribution, Vans/ Delivery	Bulk Transport	Hooklifts/ container	Concrete truck	Wood chip truck	Special transports
Centre of gravity	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕
Wind sensitivity		✕	✕	✕	✕		✕		✕	✕
Driver behaviour/ driving style	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕
Load displacement/ surging	✕					✕	✕	✕		✕
High speed	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕
Road conditions	✕	✕	✕	✕						✕
Route planning	✕	✕	✕	✕	✕	✕	✕	✕	✕	✕
Technical training				✕	✕		✕	✕		✕
Loading/unloading						✕				✕
Load securing			✕		✕					✕

TYA
Box 1826, 171 26 Solna, Sweden
Tel +46 (8)-734 52 00
Fax +46 (8)-734 52 02
tya.se

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About TYA

Our business concept is to actively contribute to skills, the work environment and the reputation of the transport industry, and to thereby contribute to its increased productivity and profitability. TYA is a collaborative agency made up of both employer and employee organisations from the transport sector. Our operations focus on training courses and projects aimed at professional knowledge and work environments. We collaborate with schools and authorities and produce informational and teaching materials.

TYA | Box 1826, 171 26 Solna, Sweden
Tel +46 (8)-734 52 00 | Fax +46 (8)-734 52 02 | info@tya.se | tya.se