



SAFETY ALERT

Updated December 2023

Risks associated with Cardan shaft park brakes

Anyone who owns or drives a vehicle with Cardan shaft park brakes must be aware of the associated risks. This safety alert explains what you need to know, and the precautions you should take to prevent vehicles rolling away.

Waka Kotahi NZ Transport Agency issued this safety alert following several incidents where a Cardan shaft park brake has failed. Four of these incidents in the last 10 years have resulted in fatalities.

Cardan shaft park brakes (also known as driveshaft or transmission type park brakes) are fitted to many small to medium trucks and a small number of passenger service vehicles. They're designed to hold the vehicle and its load but drivers must be aware of their limits.

Key points to note:

- Avoid parking on slopes, especially if the load changes and/or the vehicle is parked on an unstable surface.
- If you're parked on a slope or the vehicle is jacked, it may be appropriate to use wheel chocks. Follow the manufacturer's instructions and WorkSafe advice.
- Anyone driving the vehicle needs to understand the brake mechanism and its limitations.
- Vehicle owners must make sure the brake is serviced regularly to maintain performance.



Photo courtesy of TR Group

Parking your vehicle safely

- Avoid parking on slopes - vehicles can roll away, especially if the load changes and/or the vehicle is parked on an unstable surface.
- If you're parked on a slope or the vehicle is jacked, it may be appropriate to use wheel chocks. Use chocks with caution and consider health and safety risks. Follow the manufacturer's instructions and WorkSafe advice.
worksafe.govt.nz/about-us/news-and-media/driveshaft-parking-brake-failures-in-commercial-and-industrial-vehicles
- Leaving the vehicle in gear and/or turning the front wheels to the kerb may help, but may not be enough to stop a vehicle rolling away.
- Use enough force when you apply the brake. The force required increases with slope and additional weight on the vehicle, unlike other park brake systems. Refer to *Engaging the brake properly*.
- Park on surfaces with good grip for the tyres. Avoid unstable surfaces like gravel, mud or snow - one wheel slipping can allow the other wheel to turn, which could let the vehicle roll away.
- If you're towing another vehicle or trailer, don't use the brake to hold both vehicles on any surface. It will exceed the holding capacity of the park brake.

Engaging the brake properly

You must fully engage the park brake to the manufacturer's recommended setting. It may need more force than you're used to, especially if you don't drive a vehicle with this type of brake regularly.

The amount of braking applied before loading may not be enough to hold it once loaded. These vehicles are designed to carry heavy loads, so the loaded weight may be more than double the unloaded weight.

Don't engage the park brake while the vehicle is moving, it may damage the brake system. This damage is unlikely to be obvious.

Operating your vehicle safely

Vehicle owners must make sure:

- the park brake is regularly maintained and adjusted in line with the manufacturer's instructions
- the park brake is regularly inspected for oil leaks from the engine or gearbox
- a warning sticker is clearly visible to the driver.

Vehicle owners may also consider:

- keeping a copy of this safety alert in the vehicle
- supplying a set of chocks in the vehicle*.

***Use chocks with caution and consider all health and safety risks. Follow the manufacturer's instructions and WorkSafe advice.**

worksafe.govt.nz/about-us/news-and-media/driveshaft-parking-brake-failures-in-commercial-and-industrial-vehicles

Maintaining Cardan shaft brakes

Effective Cardan shaft park brake performance relies on following the maintenance schedule and adjustment techniques recommended by the manufacturer.

Remember, this park brake is a separate unit and not connected to the service brake system.

The location of Cardan shaft brakes makes them prone to contamination, especially from a leaking gearbox output seal. The damage this causes won't be visible. Other factors can also contribute to poor park brake performance:

- **Worn, misaligned or damaged brake mechanisms** will reduce clamping forces available to hold the vehicle.
- **Contaminated friction material** (like dirt or grease) getting into the system will cause a loss of friction between the brake components.
- **Incorrectly adjusted components** will lead to a low application force and poor friction between the brake shoe/pad and the brake drum/disc.

We recommend a heavy vehicle service provider or qualified technician maintains these brakes. Information on our website may be useful for large operators with in-house service personnel.

nzta.govt.nz/maintaining-cardan-brakes

How a Cardan shaft park brake works

Cardan shaft park brake units are relatively simple in construction, but must be operated and maintained correctly to avoid safety risks.

Cardan shaft park brakes use a foundation brake system, generally a single drum brake unit mounted to the gearbox housing. This acts directly on the driveshaft of the vehicle to provide the park brake function.

This type of park brake system usually consists of:

- a lever on the floor or dashboard near the driver, providing the operating force
- a linkage or cable system running from the lever to the brake unit
- an actuator connected to the linkage or cable system, transferring the operating force to the brake
- friction material attached to the brake shoes or disc pads, providing the holding power
- a drum unit with a friction surface for the friction material to act on, bolted directly to the drive shaft.

The brake system may also include:

- a mechanism to adjust the foundation brake and cable or linkages
- an inspection port to check the brake's condition.

Understanding park brake testing

Owners must maintain park brakes and keep them in good condition. Don't assume a current certificate of fitness (CoF) means the brake will be fully operational in all circumstances.

From 1 December 2022, most vehicles with Cardan shaft brakes must be tested with roller brake machines during a CoF inspection.

vehicleinspection.nzta.govt.nz/hv-brake-test-protocol

From 1 April 2023, a warning sticker must be displayed in the cab of any vehicle with Cardan shaft brakes. Testing stations will apply these stickers free of charge during CoF inspections.

If your brake fails the test you may be asked to have it serviced and supply a statement of compliance (4085D form) before submitting the vehicle for a re-test.

More information

For more information, visit our website.

nzta.govt.nz/cardanbrakes

WorkSafe also issued a Cardan shaft park brake alert.

worksafe.govt.nz/about-us/news-and-media/driveshaft-parking-brake-failures-in-commercial-and-industrial-vehicles