

Heavy Vehicles and Preventing Rollaway

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Introduction

Vehicle rollaway is a regular occurrence in the heavy vehicle industry. Many people involved in rollaway incidents receive serious and sometimes fatal injuries, plus damage can be caused to infrastructure, homes and other vehicles. Incidents involving uncontrolled vehicle movement are not limited to one vehicle type – they occur with any vehicle, from passenger cars, trucks and buses to forklifts, tractors and earth moving equipment (Safe Work Australia, 2014).

A Daily Occurrence

Heavy vehicle rollaways are relatively common. On average, there is an incident every day and there will be an incident every week that requires emergency services, according to anecdotal evidence from the Australian Road Transport Suppliers Association (ARTSA, 2018).

There are significant risks of injury and fatality for both vehicle operators and the general population when a vehicle rollaway occurs, as well as potential damage to infrastructure, homes and other vehicles (Noble, Frampton & Richardson, 2019). In the United States, for example, death and injury numbers published by the National Highway Traffic Safety Administration (NHTSA) estimated that 142 people were killed and 2,000 injured due to vehicle rollaways in 2015 (NHTSA, 2018). This represented almost one in five (17%) of all non-traffic deaths and injuries that year.

In Australia, serious and fatal injuries are recorded each year due to incidents involving vehicle rollaways. Two recent examples in New South Wales (NSW) are provided below (Safe Work NSW, 2017).

Example 1: 11 October, 2020 (Safe Work NSW, 2020a)

A 50-year-old mechanic suffered fatal crush injuries in Tumut, in the Snowy Mountains, while working on the brake line of a tipper truck. The worker was situated underneath the truck when it rolled forwards over the worker, coming to rest after colliding with another parked tipper truck.



Example 2: 10 January, 2020 (Safe Work NSW, 2020b)

A 51-year-old man was crushed by his truck in the north western Sydney suburb of Marsden Park when it rolled down a slope as he was fitting a dog-trailer to it.



Two Types of Vehicle Rollaway

Creep rollaway: is where a vehicle is moved from its standing position by a range of possible sources, such as forklifts or other manual handling equipment impacting the chassis of the standing vehicle during unloading. Gravity may also lead to creep runaway if the standing vehicle is not adequately braked.

Running vehicle rollaway: is when an operator fails to adequately apply the parking brake, and a rollaway occurs as a result of the vehicle being located on a gradient. Heavy vehicle loads can add to these risks.

Source: Australasian Mine Journal, 2019



Common Causes of Vehicle Rollaways

According to Safe Work NSW, common causes of vehicle rollaways can include:

- The operator not engaging the parking brake, or not engaging the parking brake sufficiently
- The vehicle being left in gear when exiting the vehicle
- Not parking on a level surface
- Inadequate inspection and maintenance of the braking system
- Inadequate design integrity of interlocked braking systems, that is the brakes can be intentionally or unintentionally released by the operator's actions
- loads added to or removed from a vehicle that is supported by stabilisers/outriggers on an inclined surface
- forces imposed by the movement of parts of a vehicle supported by stabilisers/outriggers on an inclined surface, for example, boom on a mobile crane
- Failure of a component within the braking system.



Records of vehicle rollaway incidents reveal that one of the most prevalent contributing factors to vehicle rollaways involves a decision by the driver to exit the vehicle without engaging the parking brake. Analyses of work-related fatalities involving trucks between 2003 and 2012 by Safe Work Australia (2014) identified incorrect braking as a key area in need of attention to prevent truck fatalities, with 15% of workers killed in non-public road incidents because they or another worker failed to adequately brake a vehicle.

While incident data does not exist to conclusively determine the factors involved in vehicle rollaway (Bus Safety Victoria, 2016), several factors have been highlighted as possibly contributing to a failure to engage the parking brake safely.

- **Distraction and fatigue** increase the likelihood of errors or oversight, including forgetting to engage the parking brake. This is particularly relevant for occupational drivers. The 'time-on-task' effect shows that sustained attention on a given task results in reduced performance, including increased reaction times and mental fatigue. Many incidents from truck drivers occur after the busy 'high vigilance' peak hour run is completed, leading to an onset of fatigue and a reduced ability to sustain sufficient attention to remember to apply the parking brake (Bus Safety Victoria, 2016).
- **Post-completion errors** may play a role in the failure to engage the parking brake. Post-completion errors are characterised by a failure to remember subsequent 'clean-up' steps after the main task has been accomplished. For a driver, the 'main task' of stopping their vehicle safely in an appropriate spot may lead to peripheral 'clean-up' steps, such as applying the parking brake, being forgotten (Bus Safety Victoria, 2016).
- **Driver safety attitudes and beliefs** are another prominent factor observed among some occupational drivers, with a 'it'll be fine' attitude potentially contributing to the decision to exit the vehicle without engaging the parking brake, particularly if drivers believe they will only be out of the vehicle for a short time.

These common factors can have significant consequences, resulting in damage to the vehicle and potentially injury or death to the operator as well as other workers or the general public within the area of the incident. As such, vehicle rollaway must be considered as a component of an organisation's risk management approach (Safetysure, 2020).

Effective safety management plans around heavy vehicles and machinery must acknowledge and account for the potential of human error.

Preventing Rollaways - Best Practice



Park the vehicle on level ground, or be aware of the limitations of the vehicle and what to do when parking on a gradient



Apply the parking brake when you get out of the vehicle



Have the vehicle inspected and maintained according to manufacturer recommendations; maintenance issues can result in reduced brake performance, and represent a roadworthiness problem that must be fixed (ATA, 2015)



Know the limitations of the braking system and what may cause brakes to release



Check the wheels of vehicles and trailers before conducting inspection or maintenance activities

Source: SafeWork NSW (2020a)

Vehicle Technology

One of the best practice methods to prevent rollaways is to install fail-safe braking systems into your vehicle fleet, combined with training vehicle operators to integrate new technological applications into their driving routine.

Modern integrated systems that provide active (mitigates risks) and passive (sends alert) safety solutions if a driver neglects to fully apply the parking brake before leaving their vehicle already exist in the Australian market (see three examples below). These systems automatically engage the parking brake when a driver exits their seat and the parking brake has not been engaged.

Retrofitting anti-rollaway technology into your fleet may incur upfront cost, but the immediate benefits of heavily reducing possible damage and insurance costs makes it financially worthwhile. Additionally, it may be one measure worth considering as fleet assets are renewed. Most importantly, such technology ensures workers and the general public stay safe on and around work sites, reinforcing a strong safety culture.

These systems are not designed to replace a traditional parking brake but to guard against driver oversight. It is still the vehicle operator's responsibility to secure the parking brake before exiting.

Integrated Anti-Rollaway System (i-ARS)

A failsafe system designed to automatically apply the brakes if the operator experiences a lapse in concentration, i-ARS (EMA, 2022) will automatically apply the park brake system if the occupant has left the vehicle without the park brake applied. It is able to detect if the operator leaves the seat or opens the door. The system works with the ignition on or off and provides audible and visual alerts to ensure the operator's attention is caught in time.

The system incorporates a speed radar that monitors ground speed and if the vehicle reaches 5kmh without an occupant, the brakes are automatically applied. If any of the sensors (seat, door, radar) are in 'unsafe' mode, the park brake will apply and it cannot be released until all 'unsafe' conditions are rectified.



MAX-SAFE Anti-Rollaway Braking System

Designed for commercial vehicles to guard against driver oversight, the system provides early warnings of potential danger to the driver and anyone in the vicinity. Then, if the driver leaves the cabin without fully applying the parking brake, the MAX-SAFE™ system activates immediately to prevent the vehicle from rolling away, creating a safe environment.

Available for both pneumatic and mechanical park brake type vehicles, the system provides audible and visual alarms to warn of potential danger (SGESCO-MAX, 2022).

BrakeSafe (LSM technologies)

BrakeSafe automatically applies the vehicle parking brake in a range of instances, such as if the driver leaves the seat or opens the vehicle door. If the parking brake is engaged due to air pressure loss, BrakeSafe will monitor release to prevent rollaways during start-up (LSM Technologies, 2022).

The BrakeSafe system works with the ignition on or off, and provides audible and visual alerts to the vehicle operator. It can also integrate with on-board telematics or web-based systems for alerting, reporting, incident analysis and compliance.

Chain of Responsibility

Everyone in the supply chain shares responsibility for heavy vehicle safety. Owners, managers and drivers, in particular, can play key roles in preventing uncontrolled vehicle movements (SafeWork NSW, 2020a; Bus Safety Victoria, 2016).

Owners

- Where appropriate, consider developing a **long-term plan to upgrade or retrofit fleet vehicles** with technology that prevents uncontrolled movements of the vehicle, particularly through seat-sensor interlocked brakes or fail-safe braking systems.
- Develop an **education program** to train workers in the correct procedures for applying the parking brake. Ensure these procedures are included in driver handbooks, and develop suitable performance and behaviour criteria with disciplinary action for non-compliance behaviour.



- Develop an **instant reporting system** where managers review incidents to determine the cause and implement a suitable response to prevent a repeat.
- **Incentivise driver safety**, such as through bonuses or extra leave.
- Foster and **encourage a strong safety culture**.
- Actively audit and manage fleet lists, ensuring vehicles are inspected and maintained in accordance with manufacturer recommendations.



Managers

- **License checks** of drivers to ensure they are suitably licensed and skilled to perform assigned tasks.
- Assess driver awareness of safety risks to ensure workers have the necessary training, experience and supervision to identify hazards and control risks associated with vehicle rollaway.
- **Support drivers and encourage transparency** in management processes to encourage buy-in from drivers.
- **Include all staff** in processes to further encourage buy-in – this may include developing site-specific parking locations and procedures in consultation with workers.
- Encourage **openness and honesty in reporting** rollaways and other near miss events.
- Undertake **verification of competency testing** for all heavy vehicle drivers.
- Keep a **history of driver records** to inform assessment of the risk of drivers being involved in an incident.
- Foster and **encourage a strong safety culture**.

- Implement **journey management** practices that encourage drivers to take appropriate breaks and 'refresh' to adequately undertake the demanding work associated with driving a fleet vehicle.
- Facilitate driver participation in **toolbox talks**.
- Display stickers in vehicles and posters in workshops that highlight proper application of the parking brake, parking with front wheels directed to kerb and the use of vehicle chocks.
- Circulate driver handbooks and procedure manuals, and include reminders in newsletters and other communications regarding the dangers of vehicle rollaways and how to prevent them.

Drivers

- Participate in **toolbox talks**.
- Participate in education programs relating to all facets of driver behaviour and safety.
- Follow guidance displayed in vehicles and workshops that show proper application of the parking brake, parking with front wheels directed to kerb and the use of vehicle chocks.
- Apply **best practice** when parking fleet vehicles on site.

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