

Dump Point Safety

Vehicle concerns and Additional Points

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Dump Point Fatal Accidents:

- 2013 to 2018 (year to date): 15 total fatalities in 5 years
 - 7 Victims drove off or backed off dump points.
 - 4 victims ground gave way beneath them (2 in vehicles, 2 on foot).
 - 2 victims Inundated in material while troubleshooting dumping.
 - 1 victim in Pickup truck crushed by front end loader.
 - 1 victim Jumped from tipping truck.
- 5 Coal, 10 Metal/ Non-Metal
- Each Category has analogous fatal accidents that happen elsewhere in mines.

Drove or Backed off Dump Points



Drove or Backed off Dump Points

The Problem:

- 7 fatalities over 5 years.
 - 2 dozers smoothing dumped material into a drilling bench traveled over the edge.
 - 4 trucks dumping material traveled over the edge.
 - 1 LHD (Underground MNM) traveled into a stope while pushing material.

Drove or Backed off Dump Points

The Problem:

- In each case, berms were either missing, inadequate, or didn't stop the moving vehicle.
- Mitigations:
 - For trucks: Dump Short and push material over with a dozer.
 - For Dozers: push carefully, be perpendicular to edge when near it. Maintain line of sight to the edge and before every push confirm that the edge hasn't eroded or softened.
 - Berms are not intended to stop vehicles; they are only intended to provide a warning to operators, a sense of contact, and a restraint to assist operators in regaining control. (See MSHA's Haul Road Inspection Handbook for more information).

Drove or Backed off Dump Points

Similar fatalities:

- Multiple fatalities in the last 5 years have involved vehicles leaving a roadway and going over a high wall or into nearby water.
- Additional Mitigations:
 - Multiple recent fatal accidents have involved fatigued drivers. Short nights and long days don't mix well, especially for more mature personnel.
 - Around water: Know your exits! 2 fatal drownings on powered haulage occurred in the last 5 years where the primary exit was blocked and the secondary exit was jammed or the victim didn't know how to operate it.
 - Don't squeeze operations; make dump points, drill benches, and other operational locations big enough so that required machinery can carry out their tasks away from the edge.

Ground Gave Way

The Problem:

- 4 fatalities over 5 years, 2 on foot and 2 in vehicles.
- Loose or soft ground.

Ground Gave Way

Mitigations:

- Stay Away from the edge
- Learn to read ground – see MWGED presentation

Other Applications:

- Settling fill and loose ground can undermine roads and buildings or lead to slides blocking roads and burying equipment.

Inundated while troubleshooting

The Problem:

- 2 fatalities over 5 years.
- 1 victim worked on stuck tailgate with load elevated. Victim was buried by his load
- 1 victim attempted to clear clogged hopper and sank in loose material.



Inundated while troubleshooting

Mitigations:

- Release stored energy and don't work under suspended loads.
- Don't work on unsteady footing – use supports, lanyards, and/ or engineered solutions.

Similar Fatal Accidents:

- Crushers, hoppers, and stock piles all feature large amounts of loose material and can have problems feeding. Conveyor belts can grab clothing and extremities if not powered down and locked out/ tagged out.
- In the last 6 years, 2 fatalities have occurred when workers were in a crusher working on stuck drill bits. In the last year, 3 workers have died after being caught in conveyors that were not powered down.

Crushed by Other Vehicle

The Problem:

- 1 fatality in 5 years.
- Pickup truck crushed by Front End Loader.

Mitigations:

- Communicate! Make sure the equipment operator knows when and where other vehicles are approaching.
- Segregate large vehicles from smaller ones and pedestrians as much as possible.

Similar Fatal Accidents:

- In the last 5 years, an additional 5 fatal accidents involved pedestrians or smaller vehicle occupants being hit by larger vehicles.

Tipping Vehicle



Tipping Vehicle

The Problem:

- 1 fatality in 5 years at a dump point.
- On road haul truck had a stuck load at paved dump point. Driver attempted to free load by moving bed and vehicle.
- When vehicle tipped, the driver jumped and was crushed by his truck.

Special notes:

- The manual for this dump trailer had 10 listed “Don’t”s for safe dumping. At least 3 of them were violated.
- Operator training should include the operator’s manual.

Tipping Vehicle

Mitigations:

- Follow OEM guidance for clearing stuck loads. Bed vibrators or anti stick sprays can help.
- Maintain dump points to be smooth and clean, especially in winter.
- Stay inside out of control vehicles – don't jump!
- Use seat belt.

Warning:

- On road vehicles can tip easily while dumping, especially in cold weather where loads can freeze to the bed; check manuals for “don'ts” and proper operation.

Additional Fatalities: Killed by Own Vehicle

- Since 2014:
 - 4 Dozer operators have been run over by their Dozer.
 - 2 truck drivers have been run over by their truck
- Mitigations:
- Always set the parking brake and turn off the engine before leaving the cab.

Additional Fatalities: Killed by Own Vehicle

- Specific Mitigations for Dozers:
 - Do NOT stand on tracks to check or look at engine while engine is running!
 - Check that parking brake handle is properly adjusted and that parking brake holds on the grades in use.
 - On some dozers and excavators, the parking brake handle or hydraulic activator is close to the entry/ exit route for the operator: if improperly maintained, it can get accidentally released and allow unintended machine movement.
 - Drop blade and create a berm before exiting machine, especially on slopes.

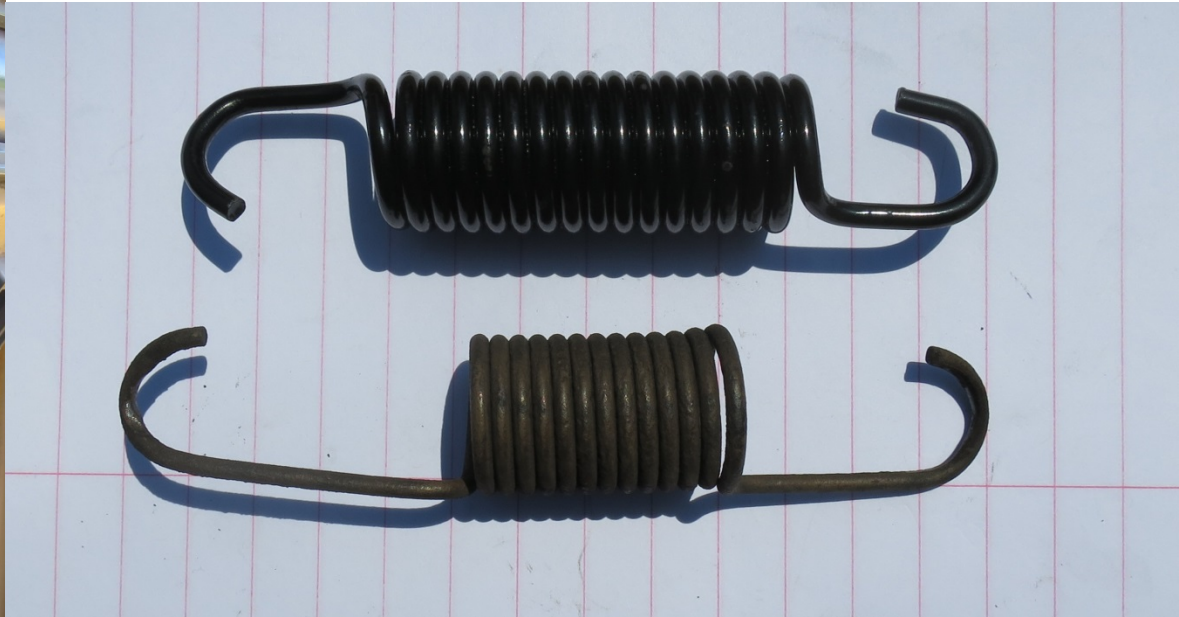
Caterpillar D9L Fatal: Parking Brake Adjustment



Caterpillar D9L Fatal: Parking Brake Adjustment



OEM Spring



Spring Installed in
Accident Machine

Notes on Technology and Safety Features:

- Some vehicles are equipped with cameras, back up radars, and other technological aids. These can be useful features BUT all have limitations that must be understood by operators and management.
- Safety features, particularly seat belts, are often modified or bypassed for comfort or convenience.
- Not using a seat belt, or reducing its effect, can turn a minor accident into serious injury or a fatality.

Technology Shortcoming Example:

Cat 785D Backed off Dump Point

- Equipped with cameras and radar
- Cameras got dirty easily and caught glare in many situations
- Radar located in middle of vehicle
- Vehicle didn't back up straight; one tire broke through berm before radar alerted operator to berm's presence



Seat Belt bypasses:

Seat belts adjusted “for comfort”

- 2 examples of accidents within the last 3 years, one fatal, one non-fatal serious injury.
- Do not modify, bypass, or change safety features – they are there for a reason!



Modifications and Misuse:

- Some vehicles have been modified by mine personnel or by small companies without OEM information.
- Overloaded or modified vehicles are less stable than properly loaded unmodified vehicles.
- OEMs and major body companies understand vehicle loading and stability.
- Stay within OEM weight limits. Overloading vehicles decreases the stopping ability of the vehicle, shortens the life of major components, and can make handling unpredictable.

Conclusions:

- Stay away from the edge of a dump point – Dump Short!
- Brake before you get to the edge.
- Keep an eye on ground conditions.
- Proper maintenance is key, especially of braking systems.
- Use seat belts
- Don't modify the vehicle, particularly including safety systems.
 - Exception: Upgrading seatbelts, when done with the OEM, or a major third party company, can increase safety in certain situations.