

June 2018

MINING AND QUARRY OPERATIONS

Articulated truck rollovers

What is the issue?

WorkSafe's High Hazards Unit has recently been notified of rollover incidents involving the use of trucks in open cast mines, alluvial mines and quarries. The trucks involved range from road certified truck and trailer units through to heavy off-road articulated dump trucks. These incidents resulted in workers being injured and in one recent case, a tragic loss of life. Any truck rollover has potential to cause harm to the truck operator, passengers and/or bystanders.

This safety alert highlights the serious health and safety risks for operating articulated machinery in open cast mines, alluvial mines and quarries.

How did these incidents happen?

Key factors that were found included:

- uneven ground, particularly when tipping and reversing
- excessive speed
- loss of ground stability or subsidence beneath the truck
- hold up of material in the tray when tipping
- use of machinery outside of design capability
- under inflation or rapid deflation of tyres
- roads being too wet causing loss of traction
- tipping at a 90 degree angle to the dump tray
- untrained or inattentive drivers.

Vehicle incident one

A truck was tipping material and backed up onto a load that was dumped previously. Material was sticky and hung up in the tray causing the trailer to tip over.



Vehicle incident two

Large rocks were caught up within the tailgate of an articulated dump truck (ADT) tipping down grade without a dump windrow. This caused the ADT to lift upwards allowing the cab to lift off the ground and rotate.



Vehicle incident three

A service truck at an open cut mining operation drifted sideways when negotiating a sweeping right hand bend. The truck travelled approximately 20 metres before it lost traction at its rear wheels which spun the truck around 180 degrees. The left wheel then gripped into the road surface tipping the truck onto its side.



Comment

Use of heavy machinery in mines and quarries is a critical risk that the sector needs to address through effective controls and effectiveness monitoring.

Critical risks controls must be understood by all personnel and applied without exception to ensure everybody's safety.

What can be learned?

It is essential to have and to implement a vehicle maintenance plan, road way design, tip design as well as a traffic management plan. These plans should address relevant controls to prevent rollovers. These controls may include:

- maintaining truck suspension systems and check to ensure they are in good order appropriate for the environment
- ensuring tipping areas are level, without cross grade
- tipping is not carried out in manoeuvring zone of any other vehicles and machinery
- keeping tipping areas stable, capable of withstanding truck wheel pressures, and not prone to subsidence
- ensuring tyres are in good condition and at correct pressure
- fitting speed limiting controls to vehicles
- having safety functions in place to alert the operator of a pending overturning of the dump body or out-of-balance situation
- checking for material that has hung up in the tray while tipping and knowing material density and flowability
- operating trucks within original equipment manufacturer (OEM) design limits
- operator training, induction and observation
- maintaining haul roads to design standards, without pot holes and loose rocks
- ensuring road watering procedures do not make roads slippery
- ensuring out-of-control vehicle emergency recovery procedures are adequate
- operating brakes and retard systems to OEM standards
- undertake regular static and dynamic brake testing programmes to ensure optimal braking efficiency
- disabling machinery while turbo timers are in operation.

Controls to mitigate the risk of injury following a truck rollover should also be implemented and include:

- the fit-out and use of operator seat restraints
- the use of operator protective structures
- measures to ensure all tipping can only be completed in line so truck is not at an angle to the dump tray and in the fall zone
- appropriately designed and maintained windrows, berms and bunding.

More information

worksafe.govt.nz/topic-and-industry/extractives/guidance-position-statements/health-and-safety-at-opencast-mines-alluvial-mines-and-quarries/

www.nzta.govt.nz/assets/resources/roadcode/truck-loading-code/docs/tlc.pdf

**AUTHORISED BY PAUL HUNT, CHIEF INSPECTOR EXTRACTIVES
ISSUED BY WORKSAFE NEW ZEALAND**