

Semi Tipper Trailer Overturns

Background

The longer tippers continue to overturn on road construction sites. The trailers involved include Semi Tippers as well as Quad Dogs. The most recent incident involved a Semi Tipper which overturned on a sharp curve with cross fall and gradient while dumping a wet load which stuck in the tray. No one was injured but the trailer was extensively damaged.

The Semi Tippers and Quad Trailers are longer than conventional Dog Trailers and have a higher centre of gravity when tipping. As a consequence the site ground conditions in terms of cross slopes, grades and uneven surfaces can result in overturning moments and the overturn of the trailer. The likelihood of overturning increases if the load sticks high in the tray.

Spreading the load through movement of the trailers during tipping also produces swaying of the trailer and the inertia of the tray and load can further increase overturning moments.

Key Learning's

Investigations conducted by VicRoads and the Quarry responsible for the truck involved in the recent overturn have identified the following key learning's:

- All delivery sites to be inspected before Semi Tippers and Quad Dogs are used on site. The hazards are to be identified in a site specific SWMS;
- The longer trailers, such as Semi Tippers and Quad Dogs, are NOT to be used to spread or dump loads on soft, uneven ground, downgrades or cross falls; and
- Ensure tipper exclusion zone for pedestrians, plant, light vehicles, and traffic management are in place prior to raising body on sites where downgrades and cross falls are not present.

In the past a number of shorter length Dog Trailers as well as Quad Dogs have also overturned while tipping loads on site. There is potential for a more serious incident if the tray were to fall onto pedestrians, other plant or vehicles in the area or onto an operational road.

Contributing Factors

The most common contributing factor is that the ground in the area is rough and uneven and has not been properly prepared for such an operation or if properly prepared a wheel set drops off or climbs onto the side of the area. It may only require one wheel set to drop lower or lift higher and the overturn will occur.

When the tray is elevated the trailer's centre of gravity moves upward- if any of the load sticks high up in the tray the potential for the trailer to overturn becomes even greater. All it requires is uneven ground conditions to tilt the trailer sideways and an overturning moment can be produced. The same mechanism of roll-over is presented to ordinary tip trucks and dump trucks (articulated or otherwise).

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The significant contributing factors vary but include:

- Reversing and dumping loads without supervision/spotter in place (note that radio control of tipping from associated plant used for earthworks has been observed on sites providing supervision, spotting and ground operation);
- Truck arriving when site is unattended and attempting to dump in areas not properly prepared;
- Truck drivers not being aware of the risk presented by uneven ground and the need for site preparation;
- Loads sticking high in the tray increasing the height of the centre of gravity; and
- Inappropriate trailers for the site when cross falls and/or grades are present.

Recommendations

The contractor in control of the site needs to ensure that:

1. A Safe Work Method Statement (SWMS) is required for mobile plant operations and it identifies the need for the ground to be properly prepared (flat) to prevent overturns and that Semi Tippers or Quad Dogs are not used on sites/locations where cross falls and/or grades are present;
2. All drivers are site inducted and inducted into a site specific SWMS;
3. That the ground is prepared before each load is tipped;
4. That tipping is not permitted if the site is not supervised safely;
5. Pedestrians, other plant and vehicles to be excluded from immediate tipping area;
6. That traffic in any adjacent lane is stopped by traffic controllers while the body of the trailer is raised;
7. Drivers wear seatbelts during the tipping operation as well as when travelling; and
8. Apply learning from Semi Tipper and Quad Tipper incidents detailed on page 1, as applicable.



An example of what can occur if a trailer overturns. Fortunately the operator of the excavator was not in the machine at the time



Semi tipper overturns with slight downhill gradient and cross fall

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The potential to fall onto adjacent traffic lanes, people, plant and vehicles