Railway level crossing safety

- In Australia, from 2014-2019, there were 194 collisions between trains and vehicles, and 27 collisions between trains and pedestrians at level crossings.
- Fatalities are most likely to be the road user, not train passengers.
- Level crossings are governed by a simple rule: the road user must give way to trains. Almost all collisions are the result of the road user failing to obey this rule.

**The Facts**

- Australian level crossings are equipped with active protection systems (i.e. flashing lights and sometimes boom gates and auditory warning tones). The remainder utilise passive protective measures, such as stop and give-way signs.
- Research has documented that the majority of risky behavior at railway crossings is a result of violations of road rules.
- The following are the most common factors in driver error at level crossings:
  - Drivers' difficulty in gauging the time and space required to cross safely;
  - Risk-taking behaviours such as trying to "beat the train" to avoid delays and meet unrealistic delivery schedules;
  - Driver complacency due to familiarity with the travel route;
  - Not driving according to the conditions;
  - Distraction;
  - Sighting limitations;
  - Operational aspects of heavy road vehicles;
  - Fatigue, which has profound effects on driver performance (e.g. longer reaction times, reduced ability to judge distances, speed and time); and
  - Driver impairment.

- Research has shown that most drivers underestimate the travelling speed of trains by at least 30%.
- If a vehicle or pedestrian is present on the crossing while a train is approaching, the train driver can only sound the horn and apply emergency braking. However, it

The rule is simple: **road users and pedestrians must give way to trains.**

**Who is most at-risk?**

- All road users are at risk at railway level crossings if they do not follow the rules.
- Pedestrians are the most common fatalities, and occupants of motor vehicles are the next most frequent group of fatalities.
- At urban railway crossings it was found that pedestrians were responsible for the most violations (e.g. going through the level crossing before boom gates had completely risen).
- Collisions occur most often between light vehicles (i.e. cars) and trains (64% of fatal collisions), followed by collisions with heavy vehicles (e.g. road trains and B-doubles; 23% of fatal collisions). Heavy vehicles are over-represented, meaning that truck drivers may be at higher risk at level crossings.
- In a collision with a light vehicle, the vehicle occupants are at most risk of fatality. However, in a collision with a heavy vehicle, train passengers are most at risk of fatality.

**How and why do level crossing collisions occur?**

- The state of the road
  - At present, approximately 20% of crossings are equipped with active protective measures such as stop and give-way signs.
  - Researchers have found that drivers underestimate the time and distance required to safely cross a level crossing.
  - Most crashes occur where the driver has a local understanding of the railway level crossing.
  - Most crashes occur during the daytime.
  - Most violations (e.g. going through the No Entry gate) are committed by motorists who are the next most frequent group of offenders.
  - Pedestrians are responsible for the majority of violations and level crossing collisions.
  - Australian level crossings are equipped with active protection systems (i.e. flashing lights and sometimes boom gates and auditory warning tones). The remainder utilise passive protective measures, such as stop and give-way signs.

**State of the Road**

A Fact Sheet of the Centre for Accident Research & Road Safety - Queensland (CARRS-Q)
CARRS-Q WORK IN THIS AREA

- Evaluation of an advanced Active 'Expect Trains' sign for passive level crossings.
- Investigation of the efficacy and safety benefits of train horn use as a warning.
- Investigation of pedestrian behaviour at level crossings, examining the prevalence of intentional rule breaking and mistake making in the general population, the reasons for this and interventions which may be effective at reducing these behaviours.
- Evaluation of driver behaviour changes with the introduction of new in-vehicle and road-based technologies for level crossings increasing driver awareness during the approach of level crossings.
- Evaluation of the effects of increased train and road traffic on congestion at level crossings, as well as its consequences on drivers’ violations at railway level crossings.
- Validation of the CARRS-Q simulator to study driver behavior at passive crossings confirming that our driving simulator research findings are transferable to actual road behaviours.
- Evaluation of adequate sighting distances for stop sign level crossings as part of the revision of the Australian Standard AS1742 Part 7 for railway level crossings.

FUTURE DIRECTIONS

Anticipated future directions include:

- The removal of dangerous and congested level crossings around Melbourne.
- The Australian government Boom Gates for Rail Crossings program, which aims to upgrade level crossings with flashing lights, stop sign and give way sign, to boom gates protection.
- The National Railway Level Crossing Safety Strategy (2017-2020), provides a nationally coordinated approach which aims to reduce the likelihood of incidents and near misses at Australian railway level crossings. It has adopted and integrated the Safe System approach of the National Road Safety Strategy as a core principle.

REFERENCES