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Heavy Vehicle Crashes in Australia: A Comprehensive Analysis

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Executive Summary

Heavy vehicles, including trucks and buses, are a critical part of Australia's transport and logistics sectors. However, their involvement in road incidents presents significant safety challenges.

This report examines the latest statistics, key causes, and trends associated with heavy vehicle crashes in Australia, referencing recent data from leading agencies such as the Bureau of Infrastructure and Transport Research Economics (BITRE), Safe Work Australia, the National Road Safety Partnership Program (NRSPP), and the Monash University Accident Research Centre (MUARC).

Despite the heavy vehicle sector being classified as high risk, recent data reveals a complex trend. Between 2017 and 2021, the road transport industry had the highest workplace fatality rate, with vehicle collisions accounting for 74% of fatalities[1].

However, fatalities involving heavy trucks decreased by 17.6% in the 12 months ending September 2024, with an average annual reduction of 9.5% over three years[2].

While fatalities have declined, the number of heavy vehicle incidents has increased significantly, reflecting broader concerns about road safety.

Findings from the 2024 Major Incident Investigation Report - NTARC 2.0 highlight a 27% increase in heavy vehicle incidents since 2022, with a substantial rise in human-factor-related crashes[3].

Inattention and distraction were the most prevalent causes, increasing by 75% between 2022 and 2023, with a 2.6-fold increase over five years[3].

Inappropriate speed incidents also rose by 41% over five years, with 89% involving single-vehicle crashes, and 85% of these crashes occurring on curves[4].

Additionally, inadequate following distance incidents increased by 73.5% over five years, primarily resulting in rear-end collisions, mostly in urban areas[3].

Human factors remain the dominant cause of heavy vehicle incidents, with urban areas particularly affected by inattention and distraction.

Articulated vehicles have the highest rates of distraction-related crashes, while inappropriate speed is a significant factor in rural and regional areas, often leading to rollovers.

Research indicates that existing driver training and road safety strategies may not be sufficient, necessitating a more comprehensive approach to managing cognitive workload and driver awareness.

Introduction

Heavy vehicles, encompassing trucks and buses, are integral to Australia's transport and logistics sectors.

However, their involvement in road incidents presents notable safety challenges. This report delves into the latest statistics, high level causes, and trends associated with heavy vehicle crashes in Australia, referencing the latest available data.

The heavy vehicle sector has long been the focus for road safety activities within Australia and on a global scale as well.

As with many aspects of road safety, there seems to be a lack of up to date and current research in this area.

However, there has been some new statistical insights from a handful of key agencies in Australia over past few years, meaning that some of the more current and robust road safety data is related to the heavy vehicle sector.

There has been a number of lead agencies that have been leading the way in reporting on this data.

These include the National Heavy Vehicle Regulator, the Bureau of Infrastructure and Transport Research Economics (BITRE), the National Road Safety Partnership Program (NRSPP) and the Monash University Accident Research Centre (MUARC).

In a recent report from the Bureau of Infrastructure and Transport Research Economics (BITRE), fatalities involving Heavy Vehicles in 2021, resulted in 163 fatalities from crashes involving heavy trucks. This accounted for 15.4% of total road deaths in Australia[5].

Whilst the sector still remains a high-risk category, there have been some interesting trends when compared to the overall road safety outcomes in recent years.

From an overall standpoint, transport incidents currently remain the leading cause of death in the workplace. Vehicle incidents (84 workers; 42%) and Being hit by moving

objects (24 workers; 12%) accounted for more than half (54%) of all worker fatalities in 2023[1].

The road transport industry has the highest fatality rate of any sector, with 16.2 deaths per 100,000 workers in 2021. Between 2017 and 2021, the industry accounted for 21% of all worker fatalities, with 74% of these deaths caused by vehicle collisions (Safe Work Australia, 2023)[1].

Some of the most in-depth current research data around heavy vehicle incidents in Australia can be found in the 2024 Major Incident Investigation Report - NTARC 2.0[3]

For more than two decades, insurance provider, NTI has utilised its claims data to produce the National Truck Accident Research Centre (NTARC) Major Incident Investigation Report, providing industry and policymakers with a comprehensive snapshot of the heavy vehicle sector.

The NTI has established a collaborative partnership with the National Road Safety Partnership Program (NRSPP) and the Monash University Accident Research Centre (MUARC) to produce NTARC 2.0.

The 2024 Report highlights a challenging operating environment for heavy vehicles, with concerning trends in both the severity and frequency of incidents.

The findings reflect wider road safety trends and social factors in the post-COVID economy, including low unemployment, high economic activity, and increased freight volumes, all of which have worsened the industry-wide driver shortage.

Key Trends Identified:

- Most categories of ‘Human Factors’ crashes increased in 2023.
- In fatal crashes involving trucks and cars, the truck was not found to be at fault in 85% of cases.
- It is essential to move beyond ‘blame’ and focus on identifying systemic risk factors while supporting drivers with solutions to reduce incidents.
- Inattention and distraction-related crashes are a growing concern. While device-based distraction plays a role, other contributing factors include rising traffic volumes and increased stress levels.
- To reduce rear-impact crashes, all road users must prioritise maintaining a safe following distance in front of trucks.

Trends in Heavy Vehicle Incidents and Fatalities

For the 12 months ending September 2024, 154 individuals died in crashes involving heavy trucks. This period saw a 17.6% decrease in such fatalities compared to the previous year, with an average annual reduction of 9.5% over the past three years[2].

Interestingly, the data obtained from this site has shown some significant reductions in fatal crashes involving heavy vehicles, at a time when many other road sectors, and the overall road fatality rates have increased.

For example, during the 12 months ending September 2024, there were 82 deaths in crashes involving articulated trucks and 77 deaths in crashes involving heavy rigid trucks.

Fatalities in crashes involving heavy trucks:

- decreased by 17.6% when compared with the previous 12-month period
- decreased by an average of 9.5% per year over the 3 years to September 2024

Fatalities in crashes involving articulated trucks:

- decreased by 20.4% when compared with the previous 12-month period
- decreased by an average of 4.0% per year over the 3 years to September 2024

Fatalities in crashes involving heavy rigid trucks:

- decreased by 17.2% when compared with the previous 12-month period
- decreased by an average of 13.5% per year over the 3 years to September 2024.

However, whilst fatalities involved had decreased, the number of incidents involving heavy vehicles has increased.

According to the findings for the 2024 Major Incident Investigation Report for NTARC2.0[3].

The overall incident rate in 2023 has increased by 27% since 2022, marking a concerning trend that has been accelerating since 2020.

This marks a significant contrast between the reductions in the fatality rates and the increases in the incident rates for heavy vehicles.

The report also highlighted some alarming increases in four other key trend areas. These did not relate to heavy design or infrastructure but are focused on the role of human factors in heavy vehicle incidents.

1. Losses have risen across almost all cause codes, with crashes related to Human Factors seeing a 42% increase since 2022.
2. Inattention/Distraction incidents were the most prevalent cause in 2023, with incidents doubling the rate of any other cause and increasing 75% since 2022. Over the past five years, there was a 2.6-fold increase.

3. Over five years, incidents due to Inappropriate Speed increased by 41%. In 2023, 89% of these incidents involved a single vehicle, with 85% resulting in vehicles going off the path on curves.
4. Inadequate Following Distance incidents have increased by 73.5% over five years. These incidents mainly resulted in collisions with the rear of third-party vehicles, occurring predominantly in major cities and involving heavy vehicles and cars travelling in the same direction.

The information below has been sourced from the 2024 Major Incident Investigation Report for NTARC2.0[3].

Human Factors

Compared to figures in 2022, overall Human Factor Incidents increased by 42% in 2023.

The Human Factors with the largest increases in incidents were Inattention/Distraction, Inadequate Following Distance, and Inappropriate Speed. Inattention/Distraction was the leading cause of incidents in 2023, with a rate of 25.4 incidents per 10,000 powered units—double that of any other cause in the same year[3].

Inattention/Distraction

Crashes caused by inattention and distraction have risen sharply, presenting a significant challenge in developing effective response strategies.

More than one third of Inattention/Distraction incidents occurred in the major cities of Australia (35.7%), followed by 27.9% of Inattention/Distraction incidents occurring in inner regional areas and 21.6% in outer regional areas[3].

Remote and very remote areas make up 14.7% of Inattention /Distraction incidents. This distribution is generally consistent across all incidents, with the exception of a lower proportion of incidents in major cities and a higher proportion of incidents in inner regional areas[3].

Addressing incidents caused by lapses in focus is complex, requiring a balance between operational demands—such as the increasing use of in-cab technology—and the need to manage cognitive workload.

This challenge is further heightened by the increased risk of inattention associated with extended long-distance driving.

Over a five-year period, Inattention/Distraction incidents have increased 2.6-fold and a 75% increase in 2023 from 2022[3].

Approximately two-thirds (65%) of these incidents involved a single vehicle. Articulated vehicles recorded the highest rate of Inattention/Distraction incidents, with 39.2 incidents per 10,000 powered units, accounting for 18% of all incidents involving articulated vehicles[3].

37% of Inattention/Distraction incidents involved the truck crashing off the road on a straight road incidents[3].

Inattention/Distraction is a significant issue for all road users.

Factors contributing to this rise may include self-regulation ability, age, gender, personality, mental health, social attitudes, and cultural background (Griffith University, 2021)[6].

Self-regulation and social attitudes can be addressed through education, focusing on enhancing driver awareness of the importance of maintaining attention on the primary task of driving rather than allowing distractions from secondary tasks.

Inappropriate Speed

Inappropriate Speed refers to driving at a speed that is unsuitable for the conditions, road environment, vehicle type, or legal speed limits.

For heavy vehicles, Inappropriate Speed is not just about exceeding the posted speed limit—it also includes situations where the speed is too fast for the road, traffic, or weather conditions, even if it is within the legal limit.

Heavy vehicles, including trucks, buses, and other large commercial vehicles, operate differently from passenger cars due to their size, weight, and handling characteristics. Proper speed management is essential because:

- Increased Stopping Distance: Heavy vehicles require significantly longer stopping distances compared to smaller vehicles
- Reduced Manoeuvrability: At higher speeds, heavy vehicles become harder to control, making sudden lane changes, evasive manoeuvres, or sharp turns more dangerous.
- Vehicle Stability Issues: Travelling at an inappropriate speed increases the risk of rollovers, particularly when cornering or navigating uneven road surfaces.
- Impact Force in Crashes: Due to their mass, heavy vehicles generate more kinetic energy, meaning collisions at inappropriate speeds can be catastrophic.

Inappropriate Speed had the second highest incident rate in 2023, at 13.1 incidents per 10,000 powered units[4].

Over a five-year period, these incidents have increased by 41%. The vast majority (89%) involved only a single vehicle, with 85% resulting in the heavy vehicle leaving the roadway on a curve[4].

Inappropriate Speed incidents were most prevalent in outer regional areas (33.5%) and resulted in rollovers in 65% of cases[4].

This suggests that most Inappropriate Speed incidents were single-vehicle, untripped rollovers. Notably, 78% of these incidents occurred in lower speed zones (<80 km/h) [4].

International research supports these findings.

A study from the United States of large vehicle rollovers found that nearly half resulted from drivers misjudging the appropriate speed for the road geometry or conditions (McKnight & Bahouth, 2008) [4].

This suggests that Inappropriate Speed is a global issue, not limited to the Australian trucking industry.

The complexity of speed selection for heavy vehicle drivers involves assessing road geometry, surface conditions, weather, mechanical condition, vehicle configuration, load weight, and load distribution (Alrejjal & Ksaibati, 2022)[7].

A key challenge is that recommended speed signage is often not tailored for heavy vehicles (McKnight & Bahouth, 2008).

Inadequate Following Distance

Inadequate Following Distance was the third most prevalent factor contributing to incidents in 2023. In fact, the five-year trend shows that inadequate following distance incident rates increased by more than 80% in 2023[6].

Inadequate following distance refers to a driver not leaving enough space between their vehicle and the one in front.

For heavy vehicles, this is particularly dangerous due to their longer stopping distances and reduced manoeuvrability. A safe following distance allows time to react to sudden stops, obstacles, or emergencies.

Key Risks of Inadequate Following Distance:

- Increased Crash Risk: Limited reaction time can lead to rear-end collisions.
- Longer Stopping Distances: Heavy vehicles take more time to stop, especially when loaded.
- Reduced Visibility: Following too closely limits a driver's ability to see hazards ahead.

Secondary tasks that divert driver attention include mobile phone and wearable device use, eating or drinking, talking with passengers, and looking at infotainment systems or roadside advertising.

Research suggests that advanced driver assistance systems, such as lane-keeping assist, adaptive cruise control, and traffic sign recognition, may contribute to driver disengagement, allowing attention to shift to secondary tasks.

Training programs that improve organisational attitudes towards safety and implement better time management strategies can help reduce technological distractions for professional drivers (Griffith University, 2021)[6].

Additionally, it's essential to educate other road users about safe driving behaviours when sharing the road with heavy vehicles. Key topics for education should include the dangers of blind spots, stopping distances, and the distinct manoeuvring characteristics of these large vehicles.

Urban Impact and Heavy Vehicle Types

While Inattention/Distraction is a concern across the industry, rigid trucks and buses recorded higher rates of these incidents, accounting for 21.8% of all rigid truck incidents and 30.8% of all bus/coach incidents[3].

Inattention/Distraction is largely an urban issue, with one-third of incidents occurring in major cities. The most common mechanism for these incidents was the vehicle veering off course on a straight road.

Given these trends, addressing Inattention/Distraction, Inappropriate Speed, and Inadequate Following Distance requires a multi-faceted approach, including improved driver education, enhanced industry training methods, and systemic adjustments to road safety policies.

Research indicates that current heavy vehicle driver training methods, such as printed materials and workshops, may not be sufficient to provide the depth of guidance and practical experience necessary for effective risk management.

Conclusion

The heavy vehicle sector remains a high-risk category in Australian road safety, with human factors playing an increasingly prominent role in crash causation. While fatality rates have shown a promising decline, the rising number of incidents underscores the urgent need for targeted interventions.

Addressing key concerns such as inattention, inappropriate speed, and inadequate following distance requires a multi-faceted approach, including enhanced driver education, improved safety policies, and advanced technological solutions.

Self-regulation and social attitudes are critical factors influencing driver behaviour and overall road safety. These can be managed through targeted education, aiming to improve driver awareness and responsibility towards maintaining focus on the primary task of driving.

Research suggests that self-regulation ability, age, gender, personality, mental health, and cultural background all contribute to a driver's likelihood of becoming distracted. By fostering an industry-wide culture that prioritises safety, drivers can be encouraged to adopt proactive measures to mitigate risks associated with inattention and distraction.

Education programs should focus on enhancing driver understanding of these risks and reinforcing the importance of maintaining attention while operating heavy vehicles.

Research has also suggested that providing training for professional drivers that enhances organisational attitudes toward safety and integrates better time management strategies can significantly reduce technological distractions while driving (Griffith University, 2021).

Effective training should not only focus on individual driver behaviour but also address systemic issues within organisations, such as unrealistic scheduling pressures and workplace cultures that inadvertently encourage risky driving practices.

Furthermore, research has indicated that traditional methods of heavy vehicle driver training—such as printed materials and training workshops—may be insufficient in equipping drivers with the necessary skills to make informed speed choices in complex driving environments.

These conventional approaches often fail to provide real-world exposure to critical decision-making scenarios. Instead, previous studies have recommended the incorporation of video-based training and driving simulation technologies, which allow drivers to experience various driving conditions, environmental factors, and hazard scenarios without real-world consequences (McKnight & Bahouth, 2008).

Expanding on these findings, modern driver training programs should incorporate experiential learning techniques that actively engage drivers in decision-making. Simulation-based training, interactive video analysis, and scenario-based learning can enhance risk perception and improve drivers' ability to assess and adapt to changing conditions.

Additionally, integrating cognitive load management strategies into training can further improve drivers’ ability to process information under pressure, maintain situational awareness, and make safer driving choices in high-risk environments.

By shifting towards a more immersive and holistic training approach—one that combines technological advancements with behavioural and organisational safety strategies—driver education can become more effective in reducing road risks and improving overall safety outcomes.

Future strategies should focus on systemic risk reduction rather than attributing blame to individual drivers.

Measures such as improved training methodologies, increased adoption of in-cab safety technology, and industry-wide initiatives promoting safe driving practices are essential.

Additionally, policies must address the broader challenges of driver workload, economic pressures, and fatigue management to ensure a safer operating environment.

Ultimately, reducing heavy vehicle incidents and enhancing road safety will require collaboration between industry stakeholders, policymakers, and researchers.

By implementing evidence-based interventions and prioritising driver support systems, Australia can achieve long-term improvements in heavy vehicle road safety and minimise the impact of crashes on both drivers and the broader community.

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