Journey To Safer Roads: Review of Australian & NZ Road Safety 1990-2024

Authors:
Christopher Witt, Primary Author
David Braybrooke, Primary Data Analyst
Michael Hitchcock, Research Analyst

Updated June 24, 2025

Euclidic Systems, Chifley Tower, Level 12, 2 Chifley Square, Sydney NSW 2000 www.euclidic.com

Report Structure

- ❑ Executive Summary
- ❑ Vehicle Census (ABS Dataset)
- ❑ Fatalities (ABS, BITRE Datasets)
- ❑ Euclidic Analytics
- ❑ Appendix

Executive Summary

This Briefing Paper synthesises high-quality data from multiple sources, including ABS, BITRE, and OECD/ITAD, to present key trends in Australian and New Zealand road safety between 1990 and 2025. Over this 35-year period, annual road fatalities in Australia declined by 45%, from 2,331 deaths in 1990 to 1,306 in 2024, despite a 115% increase in the number of vehicles. When adjusted for kilometres driven, the fatality rate has dropped by 68.8%, highlighting substantial national progress in reducing avoidable deaths.

The most recent 2 years has seen a slight rise in road deaths, while vehicles and population continue to grow. In broad terms, Australia's adjusted fatality rate is nearly half that of the United States. In contrast, New Zealand has experienced a 52% rise in road deaths from 2013 to 2021. Globally, negative safety trends persist among pedestrians, cyclists, and drivers aged 75 and over.

In this Briefing we add six years of forensic driver behaviour data from Euclidic Systems customers to the public datasets. These thousands of vehicles across every state are primarily light commercial vehicles performing business duties. Collectively, this dataset covers 322 million kms driven, and 28.4 million trips across the January 2019 to December 2024 period. Euclidic's driver safety data collects information about risk events within every trip, including all levels of speeding, harsh braking and harsh acceleration.

The primary objectives of this Road Safety Review is to inform the public, fleet owners and Govt policy makers on the core safety issues at macro and micro level, and to nominate specific steps that can yield improvement to outcomes.

Additional data tables and reference materials accompany this document.

Macro Trends

Road Fatalities from 1990 - 2024

This Briefing Paper aims to summarise multiple quality sources of Australian & New Zealand road safety information into a useful summary, harvesting key findings across the measurement period 1990 to 2024. Sources are ABS, BITRE, and OECD/ITAD. Some useful data summary tables as well as reference sources for more information are attached to this Briefing document.

Across the 35 years from 1990 to 2024, Australian annual road fatalities have fallen 44.7%, from 2,331 (1990) to 1,288 (2024). Add to this macro-trend, that today we have more than double the number of vehicles on our roads (116% more). Viewed through the lens of adjusted Kms driven, this reduction in fatalities is actually 66% down from 1990, and a strong result for the nation against premature and avoidable deaths.

Adjusted for Kms driven, we are nearly 2 times more likely to die on the roads in the United States than in Australia.

Against this progress, in NZ deaths have soared 52% from 2013 to 2021.

Globally, we have a strong undercurrent of adverse safety trends amongst:

- Pedestrians
- Cyclists
- Aged 75+ drivers

Road Fatalities by User Group

Road User Group	1990	2000	2010	2020	2024	Change 1990 to 2024	Change 2010 to 2024
Driver	1,569	1,302	722	524	594	-62.1%	-17.7%
Passenger	-	6	194	203	203		-4.6%
Pedestrian	420	287	172	136	174	-58.6%	-1.2%
Motorcyclist	262	191	224	190	279	6.5%	24.6%
Cyclist	80	31	38	41	38	-52.5%	0.0%
Totals **	2,331	1,817	1,350	1,094	1,288	-44.7%	-4.6%
Major City Roads			636	391	376		-40.9%
Rural Roads **			709	700	930		-31.2%
Deaths/100k Pop	13.7	9.5	6.1	4.3	4.7	-65.4%	-22.4%
Deaths/B-kms	14.4	9.8	5.9	4.5	5.0	-65.6%	-16.0%
Reg Vehicles ('000)	10,081	12,373	16,061	19,805	21,737	115.6%	35.3%

Sources:

Bureau of Infrastructure and Transport Research Economics Australian Road Deaths Database, 14 April 2023 and 25 Feb 2025

International Transport Forum (OECD), Report March 2021

*** Very small variations in certain data between years, reflect "unknown" unallocated to category*

Strong Progress

1990 to 2010

The greatest improvements in Australian road deaths occurred from 1990 to 2010, with the pace slowing since then. The reasons for these improvements are many, but experts say this is broadly attributable to:

- better vehicle designs (ABS braking, seatbelts, air bags, impact crumple zones)
- better road construction (divided roads, guardrails, overpasses and lighting)
- reduced drink driving (offset with more prevalent drug use)
- Other segments are more mixed, with deaths from cyclists, older drivers (75+) and on rural roads bucking the improvement trends.

In 2010, Australia formed a National Road Safety Strategy based on "Smart System" principles. A target for reducing road deaths of 30% for the decade ending 2020 was agreed. Over the 10 years, deaths were in fact reduced by 19%. A similar Road Safety review in 2021 has formed a new goal for 2030 with a 50% reduction of road deaths target. Looking across the various sources of improvement and regression, these can be visually summarised:

Figure 1. Evolution of road fatalities, motorisation, traffic and GDP in Australia, 2000-20

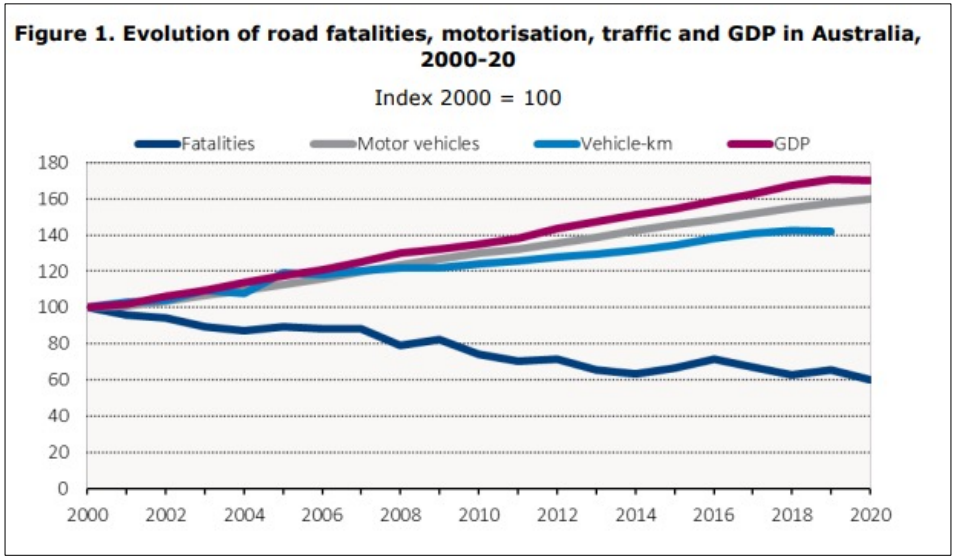
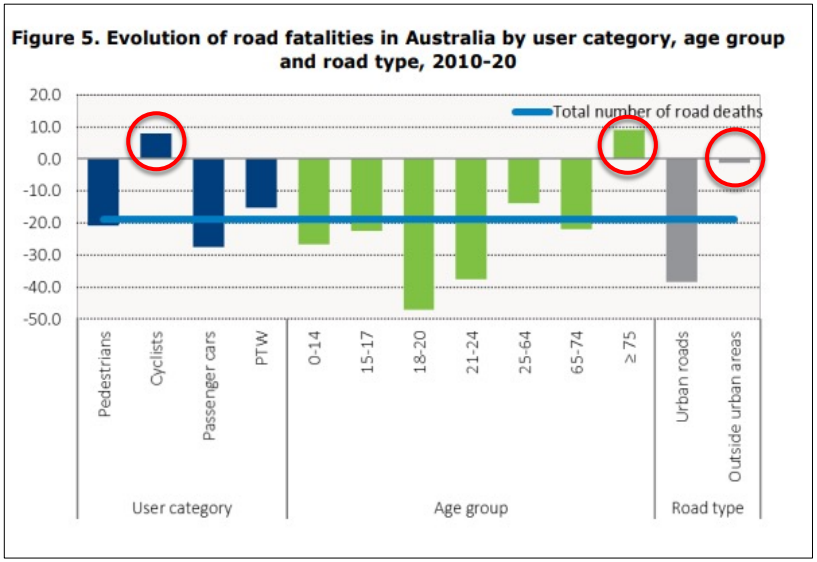


Figure 5. Evolution of road fatalities in Australia by user category, age group and road type, 2010-20



Source: International Transport Forum (OECD), Report March 2021

More Recent Trends

2010 - 2024

Across the period 2010-24, Australian registered vehicles grew by 35%, while Km-driven adjusted deaths declined by 16%. Whilst overall road deaths were reduced 23% across the 2010-20 period, pockets of regression and lack of improvement include:

- Aged Drivers (75+) Deaths grew by 10% across the period, yet all other age groups fell
- Cyclists Cycling deaths grew by 8%, while all other groups fell
- Pedestrians Has been increasing in the last few years for a combination of reasons

Under the banner of avoidable deaths, it is noteworthy that in 2020, the presence of drugs was(16.3%) was greater than alcohol (12.7%) as a factor in fatal accidents. Of particular alarm is the high and growing prevalence of drugs in motorcycle fatalities.

In total, 43% of road deaths in 2020 had indicators of three avoidable causes.

Motorcyclists and bicyclists have experienced increasing deaths over the period 2010 to 2024, largely arising from strong growth in those vehicle categories on our roads.

Avoidable Causes of Deaths (2020)		
Alcohol (BAC)	139	12.7%
Drugs	178	16.3%
No Seatbelt	154	14.1%
Total Deaths	**1094**	43.1%

Vehicle Census

Census of Vehicles

By Vehicle Class

Census by Class	2016	2020	2021	2022	2023	2024	*Mix ('24)*	*Growth ('16-'24)*	*Avg Age Yrs ('24)*
Source: Australian Bureau of Statistics (2021), BITRE (2024)									
Passenger Vehicles	13,815,107	14,679,249	14,850,675	15,050,528	15,325,339	15,699,852	*72.2%*	*13.6%*	11.18
Light Commercial Vehicles	2,985,592	3,407,016	3,519,457	3,784,952	3,931,469	4,076,365	*18.8%*	*36.5%*	11.41
Light Rigid Trucks	145,426	176,680	187,329	185,477	204,974	233,100	*1.1%*	*60.3%*	9.72
Heavy Vehicles	430,997	463,971	474,916	492,684	507,632	521,190	*2.4%*	*20.9%*	14.36
Motorcycles	828,965	880,881	913,803	940,456	957,693	970,286	*4.5%*	*17.0%*	12.51
Buses **	96,582	105,137	109,927	95,467	98,207	99,977	*0.5%*	*3.5%*	12.43
Campervans **	60,900	72,220	74,324	90,573	94,811	97,701	*0.4%*	*60.4%*	17.06
Non Freight Vehicles **	23,567	24,841	25,378	36,459	37,611	38,495	*0.2%*	*63.3%*	13.76
Totals	18,387,136	19,809,995	20,155,809	20,676,596	21,157,736	21,736,966		*18.2%*	11.40

On-road fleet growth across 2016-24 period is 18.2%, with variance of 13.6% for passenger vehicles, and growth of approximately 40% for Light Commercial vehicles (LCV + Light Rigid).

Currently, aging of the fleet where ICE vehicles average a life span of more than 18 years, with an average age today of 11.40 years. It is estimated that the current penetration of EVs is less than 2%. As an example, Telsa – as the EV market Brand leader – represents 0.6% of on-road vehicles as of Jan 2024.

Missing from current census numbers are estimates of vehicles based on Gross Vehicle Mass (GVM). Safety metrics are directly correlated to GVM.

Census of Vehicles

By State

Census by State	2016	2020	2021	2022	2023	2024	*Mix ('24)*	*Growth ('16-'24)*
Source: Australian Bureau of Statistics (2021), BITRE (2024)								
New South Wales	5,374,419	5,779,039	5,892,206	6,048,288	6,154,783	6,295,697	*29.0%*	*17.1%*
Victoria	4,681,337	5,119,560	5,157,172	5,268,134	5,384,177	5,514,720	*25.4%*	*17.8%*
Queensland	3,854,205	4,205,100	4,303,713	4,462,027	4,596,947	4,752,569	*21.9%*	*23.3%*
South Australia	1,364,700	1,444,960	1,477,899	1,519,767	1,554,957	1,597,655	*7.3%*	*17.1%*
Western Australia	2,208,812	2,278,759	2,314,712	2,369,230	2,437,243	2,528,655	*11.6%*	*14.5%*
Tasmania	457,629	506,391	516,451	520,433	532,157	541,140	*2.5%*	*18.2%*
Northern Territory	157,717	160,474	162,641	164,540	166,059	168,676	*0.8%*	*6.9%*
Australian Capital Territory	288,317	311,048	318,148	324,177	331,413	337,854	*1.6%*	*17.2%*
Australia	18,387,136	19,805,331	20,142,942	20,676,596	21,157,736	21,736,966		*18.2%*

The national fleet has grown 18.2% from 2016 to 2024. It is no surprise that the largest fleet sizes are in NSW and Victoria.

But a look at the Census by State shows fleet growth rates are strongest in Queensland, followed somewhat by all other states. Slowest fleet growth is the Northern Territory which represents less than 1% of the national fleet. This pattern likely reflects levels of economic activity and business investment.

Census of Vehicles

By Make Model (Passenger)

Amongst passenger vehicles, trends indicate petrol (ICE) driven vehicles continue to dominate on-road counts.

According to the Electric Vehicle Council, new vehicle sales for 2024 were:

Total New Vehicle Sales	1,181,340
Fully Electric Vehicles	91,000
Plug-In Hybrid EVs	23,000

Thus, EV sales were 9.65% of total new car sales in 2024. This compares to 8.45% in 2023. EV sales have been growing quickly, up from a base of 4% of total sales in 2021.

As of 31 Jan 24, Tesla vehicles accounted for 89,235 total vehicles. Later in 2024, Tesla total vehicles reached 100,000. This now represents approximately 0.6% of on road vehicles.

Road Vehicles Australia, 31 January 2024

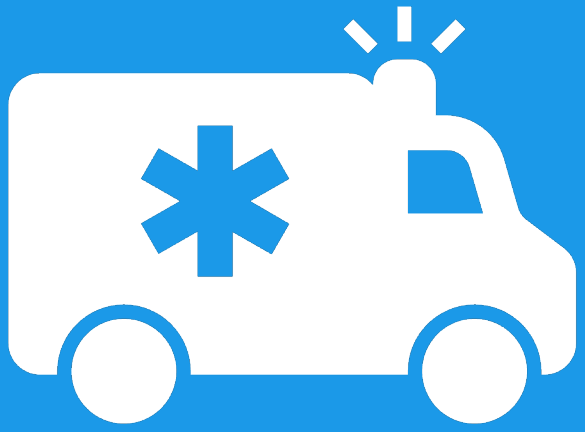
Released 23 July 2024 *Source: BITRE Census*

Make	2024 (vehicles)	2023 (vehicles)	2022 (vehicles)
Toyota	3,161,779	3,097,326	3,029,092
Mazda	1,506,751	1,463,533	1,417,177
Hyundai	1,284,161	1,246,865	1,210,052
Holden	1,186,098	1,277,008	1,369,528
Ford	900,461	940,215	984,789
Mitsubishi	890,593	876,241	862,407
Nissan	817,122	815,860	827,654
Subaru	771,165	748,533	733,405
Honda	727,910	735,138	742,710
Kia	697,249	636,774	570,674
Volkswagen	594,290	576,412	567,013
Mercedes-Benz	484,627	472,691	456,339
BMW	404,258	390,267	379,304
Suzuki	332,850	325,594	313,103
Audi	264,029	251,755	242,346
MG	183,167	127,917	80,960
Jeep	176,256	178,593	178,528
Lexus	158,476	145,154	140,149
Land Rover	149,784	144,801	143,926
Volvo	114,832	107,235	99,497
Tesla	89,235	45,501	22,256
Isuzu	86,502	72,300	61,672
Skoda	71,673	65,060	59,049
Renault	66,776	64,199	60,754
Porsche	65,529	59,885	54,722
Peugeot	63,618	67,316	71,046
Haval	59,512	35,472	17,665
MINI	53,168	49,750	47,339
Jaguar	35,199	35,405	35,554
Chrysler	27,701	29,288	30,882
Others	275,081	243,251	240,936
Total	15,699,852	15,325,339	15,050,528

Takeaways

- On-road vehicles are growing strongly (18% across 2016-24), with LCVs amongst the strongest growth (40%)
- All Electric Vehicle Brands combined, represent approximately 2% of on-road vehicles; this is growing each year where nearly 10% of new vehicle sales are EVs
- The largest new sales vehicle class is SUV. And EVs are substantially heavier than average Gross Vehicle Mass
- Missing from our analysis is the prevalence of vehicles by Gross Vehicle Mass categories. There is substantial accumulating evidence of varying safety levels between small, lighter vehicles, and larger, heavier vehicles.

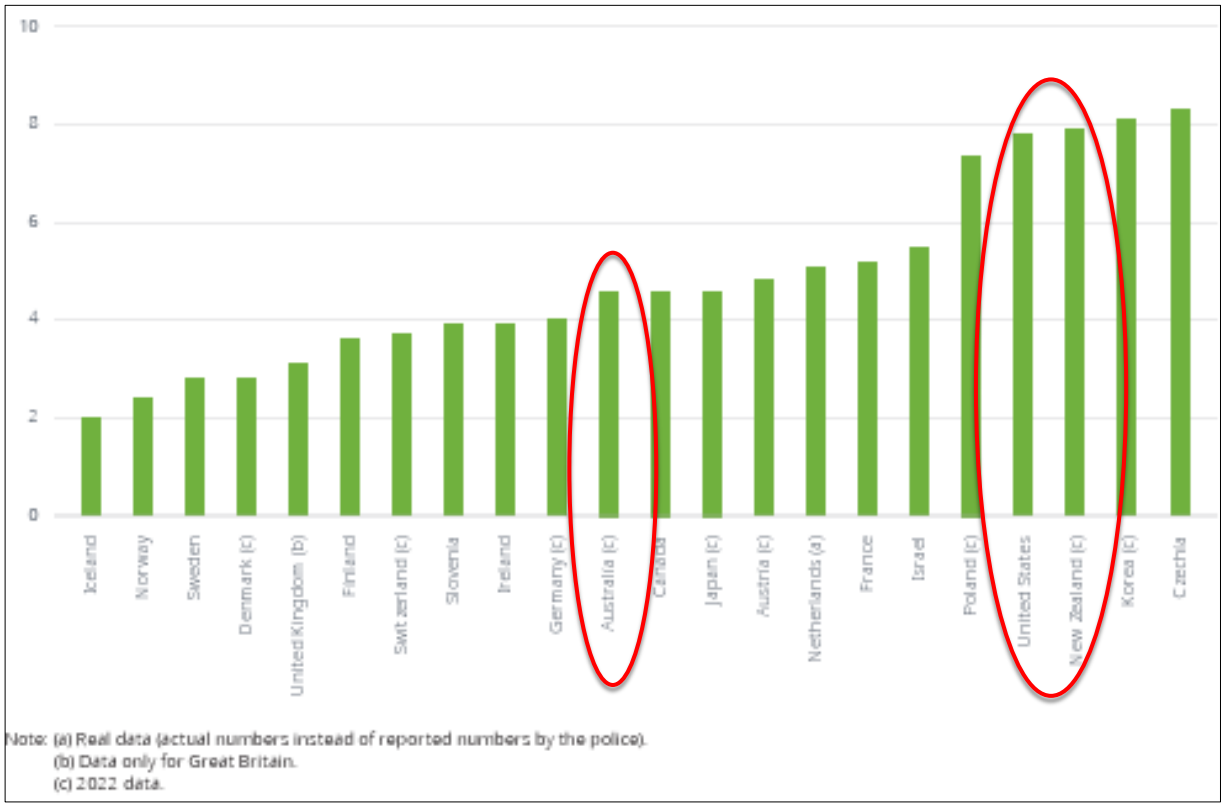
Fatalities



Fatalities

By International Data

Road Fatalities per Billion Vehicle-Kilometres, 2023



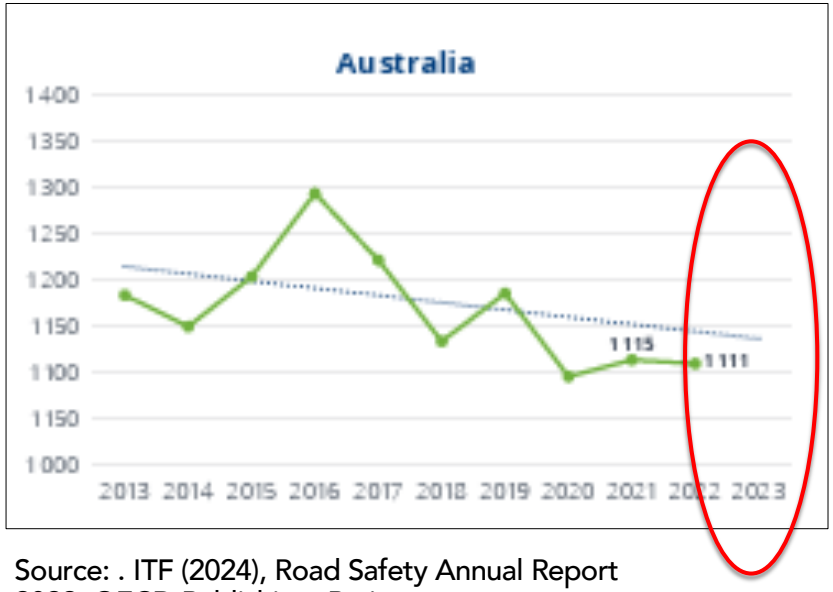
Source: . ITF (2024), Road Safety Annual Report 2022, OECD Publishing, Paris

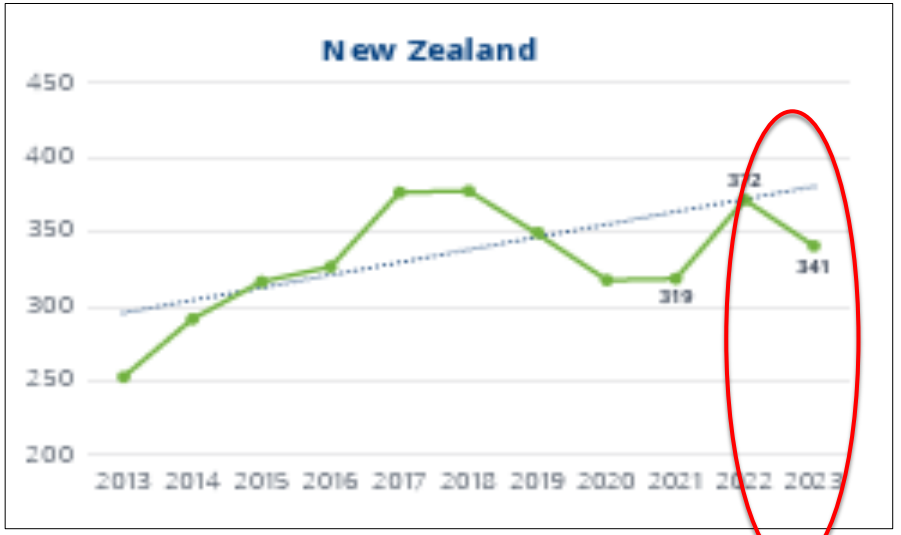
Road deaths per B-kms are Australia (4.7), NZ (7.8) and the USA (7.9). Australia has one of the best road safety records in the world, 40% less than New Zealand, and nearly half the rate of death as the USA.

Fatalities

Australia vs New Zealand

Road Death Trends Across 2013-23





Source: . ITF (2024), Road Safety Annual Report 2022, OECD Publishing, Paris

Road Deaths are trending down broadly across the world, and Australia continues its long-term downward trend.

However, New Zealand has experienced a significant increase in annual road deaths from 2013 to 2023. Where population has grown 16% since 2013, road deaths have grown 48%.

Fatalities

By Road User

Fatalities by Road User	2019	2020	2021	2022	2023	2024	*Mix % ('24)*
Driver	569	534	530	543	601	594	*45.5%*
Motorcycle pillion passenger	4	7	7	9	3	6	*0.5%*
Motorcycle rider	208	180	230	236	249	273	*20.9%*
Passenger	205	192	182	188	205	203	*15.5%*
Pedal cyclist	39	42	42	35	33	38	*2.9%*
Pedestrian	158	138	133	162	157	174	*13.3%*
Unknown	3	4	6	10	9	18	*1.4%*
Total	**1,186**	**1,097**	**1,130**	**1,183**	**1,257**	**1,306**	

Source: BITRE Road Fatalities Case Database, Feb 2025

Of alarm across the User groups, rates of motorcycle rider and passenger fatalities are on the rise. This is likely driven by the increase in motorbikes in the census, where this has grown by 17% across 2016-2024. This now accounts for 21% of all road deaths, while only being 4.5% of on-road vehicles.

Crucial to understand long term trends at work, we see the vehicle census showing on-road fleet growth of 18.2% across 2016-2024. And we have continued population growth, where Australia has now reached 27 million residents.

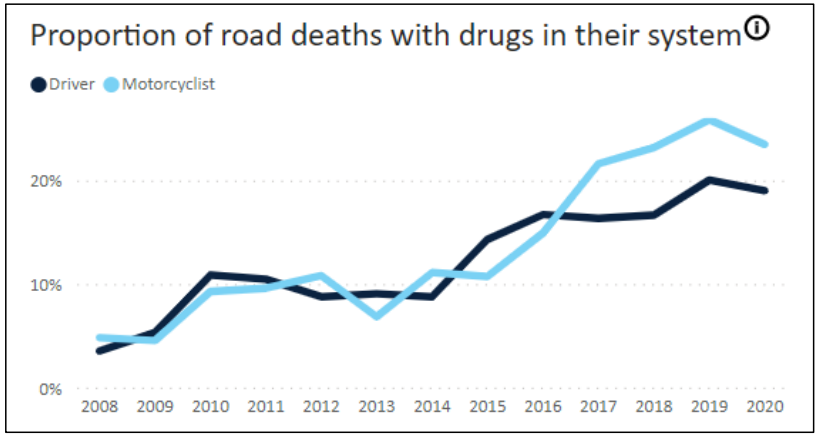
We have had long term down trends for road fatalities across the 1990-2022 period. When data is adjusted for kms-driven and fleet sizes, the progress of reducing road fatalities has performed better yet.

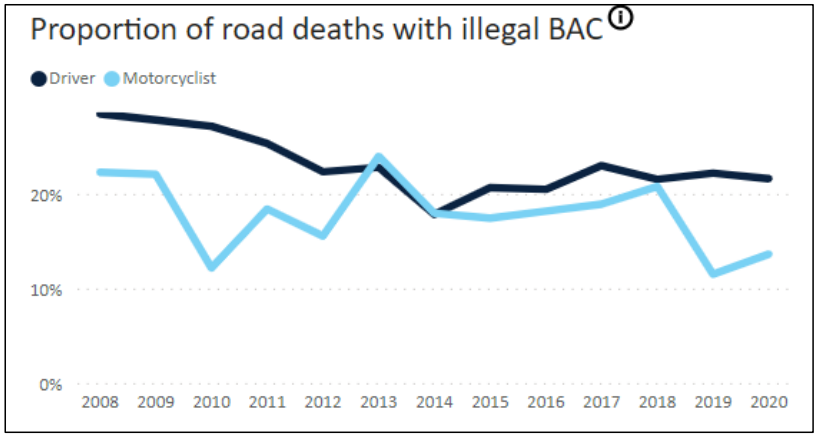
Now, for the past 2 years, we have seen a slight up-tick (10%) in gross fatalities. Let's have a closer look at this.

Drugs & Alcohol Trends

Recent Australian data is capturing factors such as alcohol and drugs present at fatal crash scenes. As of 2020, drugs or alcohol were present at 29% of fatal crashes. A further 14% arose from a failure to wear seat belts. Combined, these causes are present in 43% of road fatalities.

Whilst Blood Alcohol Content levels are declining moderately, the trend line is upwards for drug use in fatal accidents. The data suggests that drug use may be a larger contributing factor to fatal accidents than excessive alcohol use leading up to the end of this data sequence in 2020.





As we seek to understand road deaths, another 14% are pedestrians.

Anecdotal evidence suggests pedestrian fatalities may be related to aged individuals misjudging road crossings, children, distracted adults, or those with alcohol present. Detailed information is currently not made publicly available.

Fatalities

By Location

Fatalities by Location	2019	2020	2021	2022	2023	2024	*Mix % ('24)*	*Mix % ('23)*
Inner Regional Australia	379	350	355	376	450	384	*29.4%*	*35.8%*
Major Cities of Australia	408	381	389	410	436	376	*28.8%*	*34.7%*
Outer Regional Australia	269	250	260	259	267	258	*19.8%*	*21.2%*
Remote Australia	62	47	57	64	56	48	*3.7%*	*4.5%*
Unknown **	13	10	17	9	3	207	*15.8%*	*0.2%*
Very Remote Australia	55	59	52	65	45	33	*2.5%*	*3.6%*
Total	**1,186**	**1,097**	**1,130**	**1,183**	**1,257**	**1,306**		

*** Statistical abberation for uncategorised data; recommend use % mix from 2023*

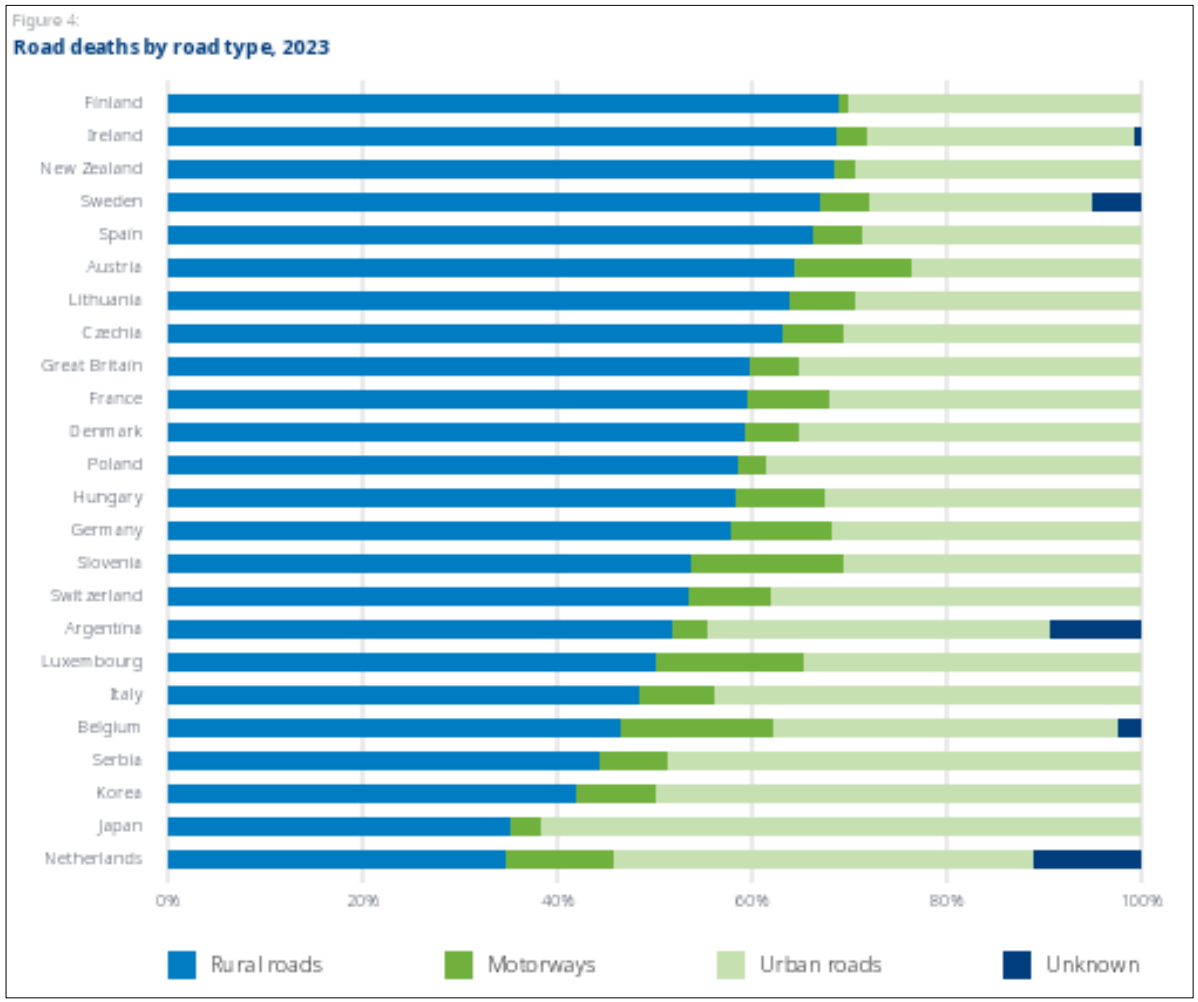
Source: BITRE Road Fatalities Case Database, Feb 2025

More than 65% of deaths are outside of major cities, with 35% within major cities. Contrast this with 73% of residents living in major cities.

Of note, there is a slight growth trend in gross fatalities, but this appears broadly in line with growth in vehicle census numbers and population.

A data anomaly in 2024 contains a large number of uncategorised locations, hence, we will rely on the 'mix %' profile from 2023, until this is corrected later in 2025.

International Comparisons



In Australia, more than 65% of road fatalities occur outside major urban centres.

This is particularly striking given that 73% of the population resides in major cities, which account for only 35% of deaths.

Although Australia did not submit data for the most recent ITF report (December 2024), comparable figures from New Zealand suggest similar trends.

Accordingly, Australia is likely to fall within the highest category for rural road fatality rates.

Fatalities

By Crash Type

Fatalities by Crash Type	2019	2020	2021	2022	2023	2024
Multiple	485	494	489	482	574	624
Single	701	603	641	699	679	682
Unknown	0	0	0	2	4	0
% Single	**59.1%**	**55.0%**	**56.7%**	**59.2%**	**54.2%**	**52.2%**

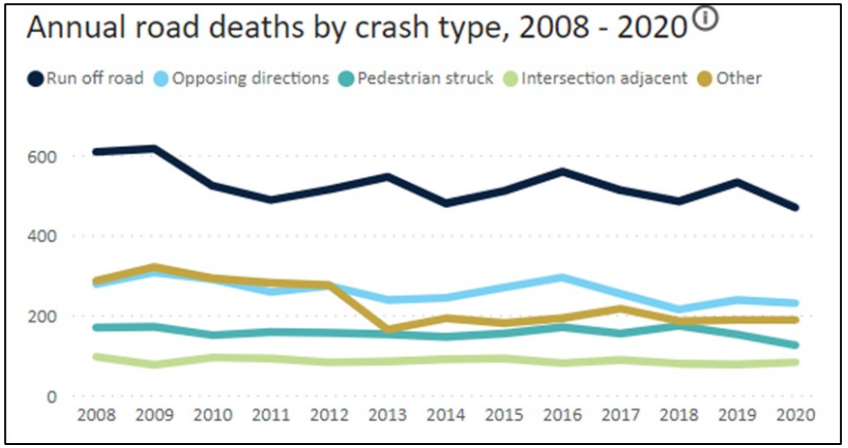
Source: BITRE Road Fatalities Case Database, Feb 2025

It is a long-term phenomenon that a large majority of road deaths arise in rural areas, as single vehicle crashes, most commonly road run-offs.

This is further amplified when km-driven adjustments render this an ever-larger share.

Interventions for this causality are expensive and complex, cutting across age licensing, road design, and in-vehicle distractions.

The urban myth of innocents in cities being run down in droves is not supported by the statistics.



Fatalities

By Gender & Age

Gender	2019	2020	2021	2022	2023	2024
Female	282	300	276	305	304	327
Male	904	793	853	877	953	976
Unknown	0	4	1	1	0	3
% Male	**76.2%**	**72.6%**	**75.6%**	**74.2%**	**75.8%**	**74.9%**

Fatalities by Age	2019	2020	2021	2022	2023	2024	*Mix % ('24)*
Under 25	259	247	260	269	274	287	*22.3%*
From 26 to 69	681	655	662	694	732	762	*59.3%*
Over 70	222	175	186	196	218	236	*18.4%*
Total	**1,162**	**1,077**	**1,108**	**1,159**	**1,224**	**1,285**	

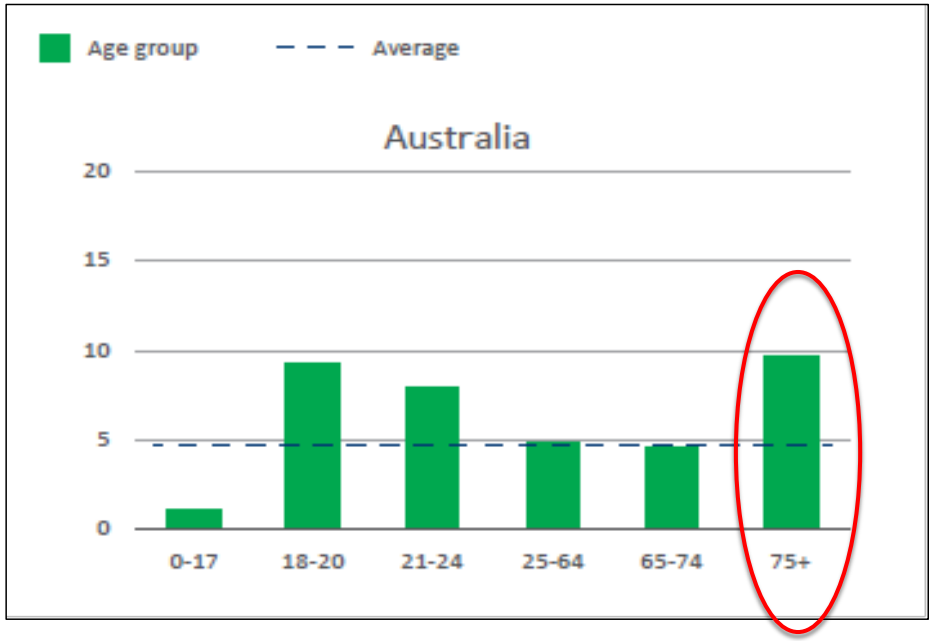
Source: BITRE Road Fatalities Case Database, Feb 2025

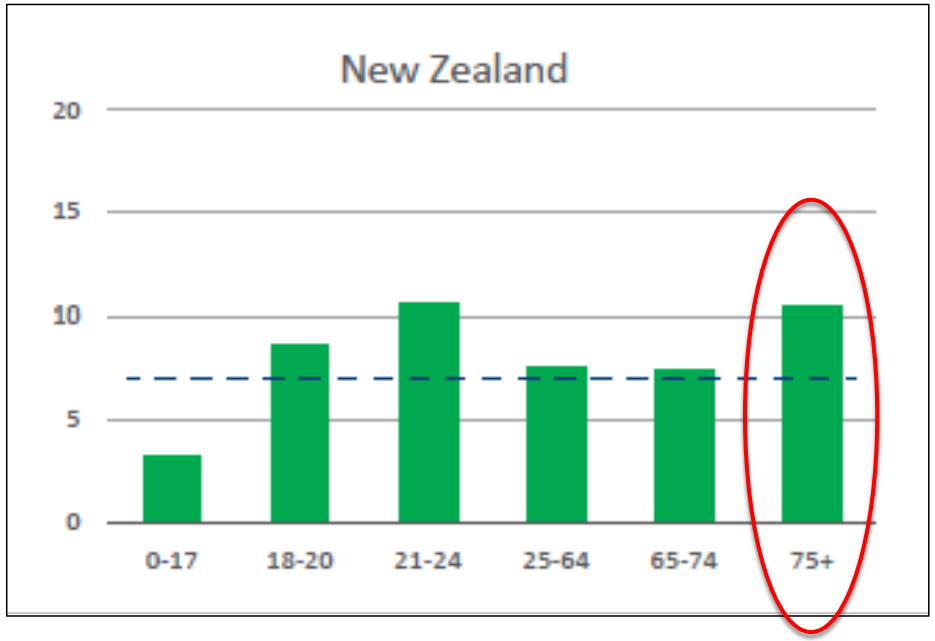
Consistently, Men represent ¾ of road deaths, whether as driver or passenger.

It is noteworthy that we are seeing age related deaths from over 70s approaching the levels of the under 25-year-old group. This is a similar trend world-wide, where, for example, over 65s represent more than 70% of deaths in the Netherlands.

International Data

By Age Groups





Source: . ITF (2022), Road Safety Annual Report 2022, OECD Publishing, Paris

Road Deaths are not evenly spread across age groups. In fact, over 75s are experiencing equivalent death rates to young drivers in both Australia and New Zealand. This speaks to the action needed to tackle driving skills and licensing conditions for both aged and young drivers.

Fatalities

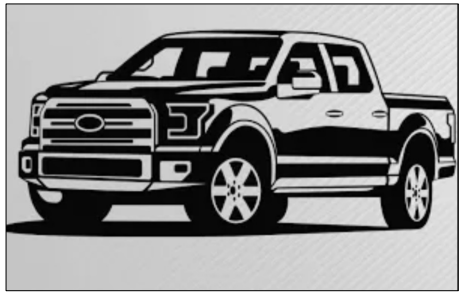
By Gross Vehicle Mass

In the 26 March 2025 edition of Economist Magazine, the Article "Too Much of a Good Thing" reports on researching the USA's love of big trucks and cars. They performed calculations within a 10.5 million crashes dataset from 14 USA states, across 2013-23.

The calculations create a view of fatalities per 10K crashes, based on Gross Vehicle Mass. This data is computed for deaths in own vehicle, and deaths caused in the other vehicle(s).

Crucial, the USA regulatory view of "Car Safety" is defined as own vehicle survivability. There is no accounting for the survivability of other vehicle occupants.

A composite view of fatality rates yields a different view of total vehicle safety impact.



Fatalities by GVM	*Deaths/10,000 Crashes*		
	Own Vehicle	Other Vehicle	Total Deaths
Heaviest 1% of GVM	4.1	37.0	41.1
Mid-Point GVM	6.6	5.7	12.3
Lightest 1% of GVM	15.8	2.6	18.4

Economist Research Notes:

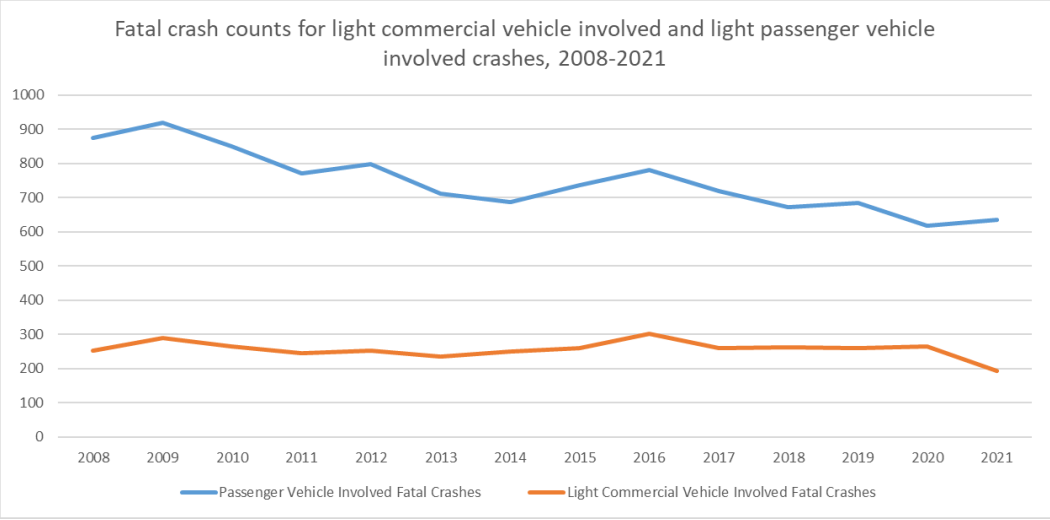
- *14 USA States*
- *Total Database 10.5m Vehicle Crashes*
- *Scrub data reduced to 7.5m Crashes*
- *Period 2013 to 2023*

Source: The Economist Magazine, 26 March 2025

Safety: Light Commercial vs Passenger Vehicles

The Australian Motor Vehicle Registry census from the ABS, breaks down 21.7 million vehicles (2024) in Australia into multiple categories. Light Commercial Vehicles (LCVs) have grown at the fastest rate of any category of registered vehicle, and by 41% between 2016 to 2024, to 4.3 million LCVs in 2024. LCVs now represent 19.9% of the national road fleet as of 2024.

Our most recent available data on relative safety between Passenger and LCVs shows there was strong growth in Kms driven per LCV with 23% growth over the period 2008 to 2015, versus 5% for passenger vehicles. Hence, total Kms driven by LCVs has grown substantially more than any other vehicle category.



Source: BITRE, Unpublished data series, released October 2023

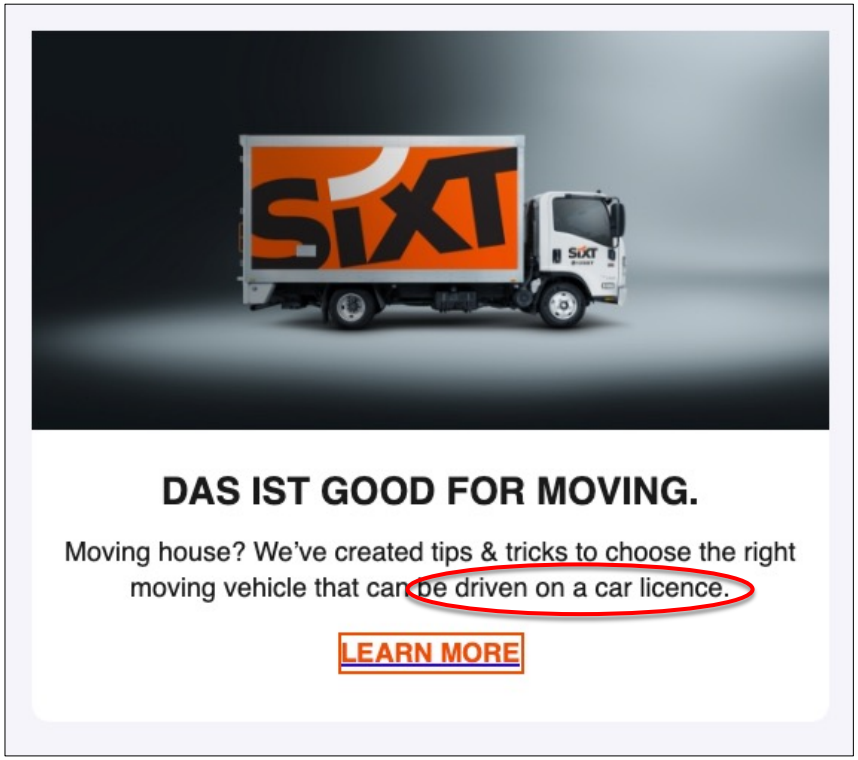
BITRE's most recent data on Light Commercial Vehicle report is 2021. At that time, fatal crashes were significantly more frequent with LCVs than Passenger Vehicles. Over the period 2008 to 2021:

- 48% higher per light commercial vehicles compared to light passenger vehicles (0.94 fatal crashes per 10,000 registered vehicles compared to 0.63 fatal crashes for light passenger vehicles).
- 18% higher fatalities per billion Km driven with LCVs than for passenger vehicles (5.53 compared with 4.70)

Overall, road fatalities for passenger and LCVs have trended lower, with more improvement arising with passenger vehicles.

LCVs Advertise C-Class License Standard

- SIXT Rental offers Light Commercial vehicles for rent, stating that standard C Class licenses is all that is needed
- Employers offer low wages for LCV drivers, and suffer from high turnover, poor retention
- Employers suffer from non-career driver candidate pool, with frequent LCV driver experience levels of less than 2 years



Takeaways

- Australian road safety improved dramatically between 1990-2010; since then, improvements have continued at a slower pace. Latest 5 years have seen mixed safety performance
- Australian road safety is consistently excellent when measured against international peer countries
- Road Deaths are heavily skewed to single vehicle, rural roads, not major city located
- Youth (<25) and Elderly (>70) have greatest fatality risk
- LCVs are less safe than Passenger vehicles, but require the same license criteria, and lack oversight requirements
- GVM Ratings and Licensing Conditions are obvious policy gaps
- Regulatory Action needs to consider licensing and workplace oversight for LCVs and based on GVM; these segments clearly have elevated public & workplace fatality risks, and where elevated skills are not reflected in licensing requirements.

Euclidic Analytics

Euclidic Dataset: 2019-24

The Euclidic dataset comprises 6 complete years, from 1 Jan 19 to 31 Dec 24, where (after data anomalies are scrubbed), there is a total of 28.4 million trips covering 322.3 million kms driven in 10.2 million hours across every state of Australia and New Zealand. These figures Light Commercial Vehicles (LCVs) with a common hardware platform, and consistent processing logic applied for all years.

Summary Totals	Total Trips	Total Distance (km)	Total Duration (hr)	Total Risk Points	Risk Points / Trip	Km / Trip	Safety Score
2019	3,381,806	30,547,184	1,180,717	1,355,704	0.40	9.03	4.44
2020	4,248,637	43,936,266	1,464,223	1,549,768	0.36	10.34	3.53
2021	4,771,646	54,802,585	1,782,550	2,037,140	0.43	11.49	3.72
2022	5,296,196	61,674,034	1,891,098	2,084,415	0.39	11.64	3.38
2023	5,677,320	72,308,676	2,061,903	2,032,794	0.36	12.74	2.81
2024	5,026,870	59,025,630	1,861,789	1,702,089	0.34	11.74	2.89
Totals	**28,402,475**	**322,294,375**	**10,242,280**	**10,761,910**			

KMs Driven - Region	2019	2020	2021	2022	2023	2024	Totals
Inner Regional Australia	7,057,824	10,404,494	12,318,025	13,180,651	14,383,693	12,996,228	70,340,915
Major Cities of Australia	18,262,002	24,285,510	28,261,771	31,108,838	39,276,898	28,020,218	169,215,237
Outer Regional Australia	3,139,088	5,312,485	9,054,334	9,794,601	10,025,147	9,872,901	47,198,556
Remote Australia	572,315	948,564	1,425,927	1,689,658	1,493,234	1,683,540	7,813,238
Very Remote Australia	364,616	413,735	528,199	680,528	595,135	1,020,385	3,602,598
Totals - Aust	**29,395,845**	**41,364,788**	**51,588,256**	**56,454,276**	**65,774,107**	**53,593,272**	**298,170,544**
Totals - NZ	1,151,340	2,571,479	3,214,329	5,219,758	6,534,570	5,432,358	24,123,834
All	30,547,185	43,936,267	54,802,585	61,674,034	72,308,677	59,025,630	322,294,378

Source: Euclidic Systems, FGA Database, 1 Jan 2019 – 31 Dec 2024

Safety Score

By Region

Safety Score - Region	2019	2020	2021	2022	2023	2024
Inner Regional Australia	5.42	3.81	4.11	3.47	3.01	2.76
Major Cities of Australia	3.89	3.22	3.38	3.06	2.42	2.90
Outer Regional Australia	4.95	3.83	3.12	3.45	3.49	2.77
Remote Australia	7.67	7.44	7.77	6.62	5.76	4.06
Very Remote Australia	7.45	6.31	13.44	8.77	3.46	3.85
Australia - WTD AVG	**4.49**	**3.57**	**3.73**	**3.40**	**2.80**	**2.90**
New Zealand	**3.25**	**2.81**	**3.45**	**3.18**	**2.95**	**2.80**

Source: Euclidic Systems, FGA Database, 1 Jan 2019 – 31 Dec 2024

A crucial finding in our analytics data is the relationship of driver behaviour safety score to locations.

Major cities generally have the safer driving behaviour, whilst remote and very remote locations are less safe. Road fatalities data support this view as well.

We also see a clear trend towards improved safety behaviour across the 6- year measurement period.

Driver Behaviour Safety Score

Safety Score is produced from risk events, as defined:

1. Harsh Braking: Any deceleration exceeding 0.6G for more than 0.3 seconds
2. Harsh Acceleration: Any acceleration exceeding 0.5G for more than 0.5 seconds
3. Low-Speed Speeding: 5-10 km/h over the limit
4. Medium-Speed Speeding: 11-15 km/h over the limit
5. High-Speed Speeding: 16+ km/h over the limit

Risk points are normalised over 100km of driving. A score of 4.00 equates to an average of 4 risk events per 100 kms of driving.

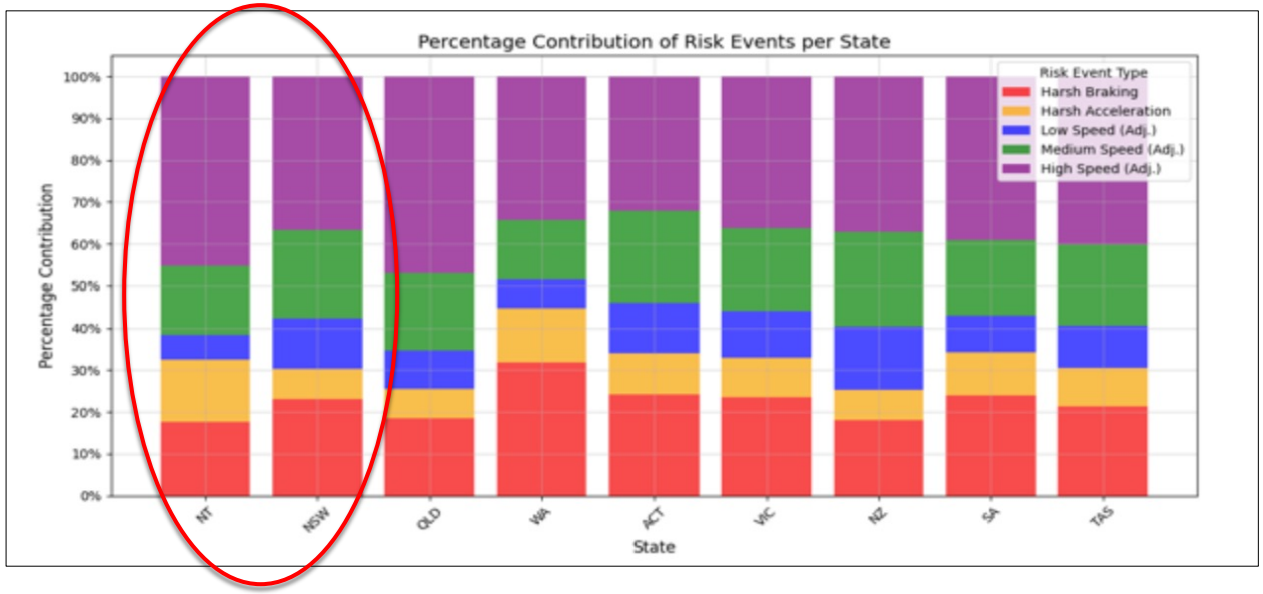
Safety Score

By State

States each represent unique landscapes, of urban or rural driving, even unpaved roads or animal crossings. They also vary for vast distances commonly travelled.

Less congestion, longer trip lengths point to greater safety risks from speeding.

Safety Score Trends	2019	2020	2021	2022	2023	2024
ACT	4.90	3.56	3.76	4.04	3.66	2.43
NSW	5.49	4.58	4.54	3.65	3.19	3.22
NT	7.58	6.16	9.13	7.52	7.41	5.06
NZ	3.25	2.81	3.45	3.18	2.95	2.80
QLD	15.77	4.15	11.16	5.65	4.70	3.08
SA	4.99	3.74	3.64	3.61	2.50	2.87
TAS	2.85	3.05	3.22	3.45	2.83	2.96
VIC	3.82	2.61	3.57	2.74	2.43	1.74
WA	3.59	2.70	2.75	2.94	2.41	2.31
Average	**5.80**	**3.71**	**5.03**	**4.09**	**3.57**	**2.94**



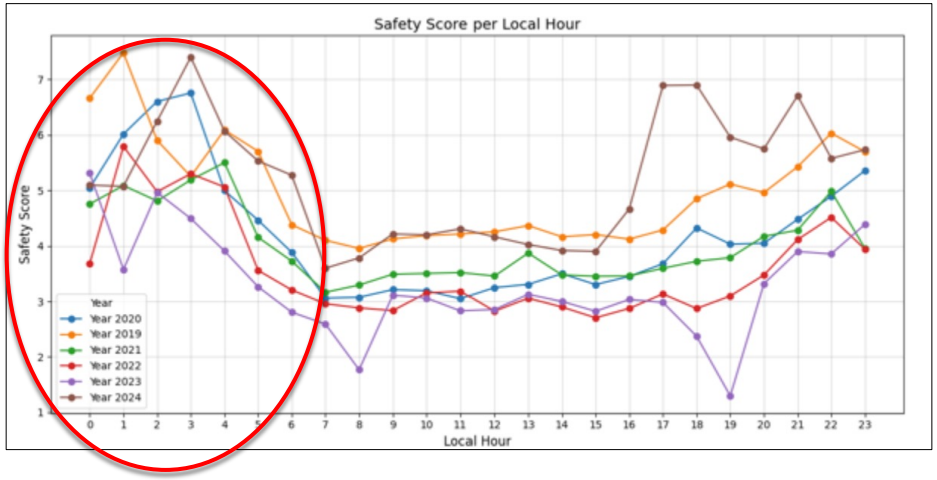
More congestion, shorter trips suggest greatest risks are sudden braking and acceleration events.

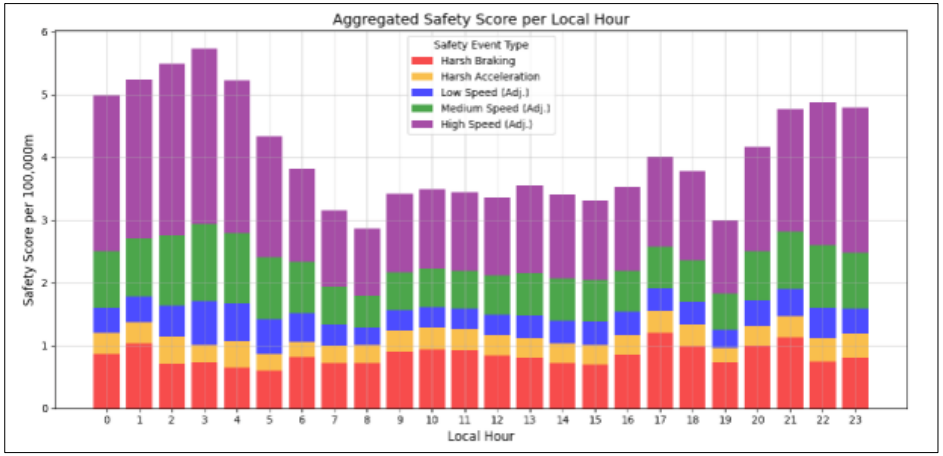
Victoria has consistently had the best Driver Behaviour performance, whilst Northern Territory has had the poorest performance over this period.

Source: Euclidic Systems, FGA Database, 1 Jan 2019 – 31 Dec 2024

Safety Score

By Time of Day

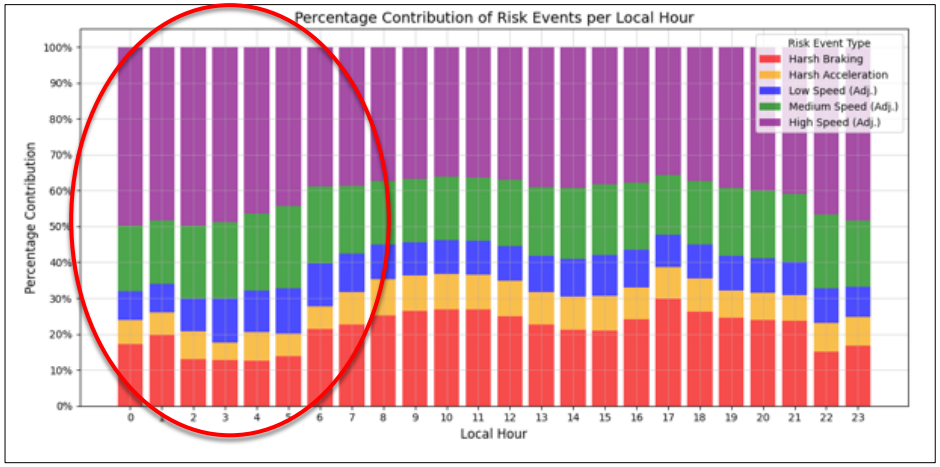




Safety risk profiles change notably between business hours and off-peak periods.

During business hours, higher traffic volumes make harsh braking and acceleration more dominant components of overall safety scores.

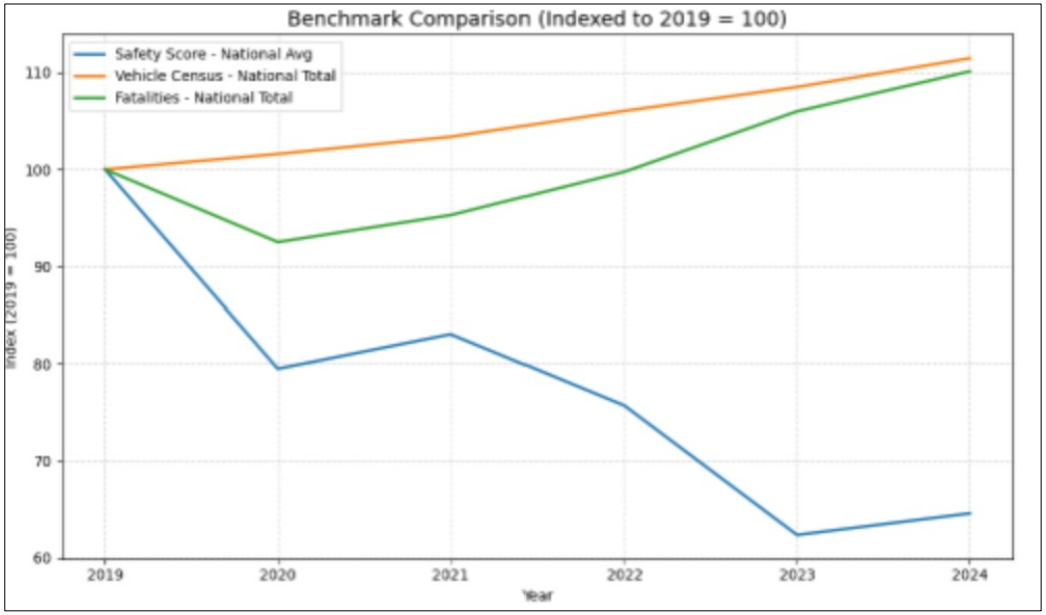
In contrast, during off-peak hours, reduced congestion leads to speeding becoming a larger contributor to risk. Interestingly, the poorest safety scores are recorded in the early morning hours, likely due to lower congestion levels and fewer distractions encouraging higher-risk driving behaviours.



Source: Euclidic Systems, FGA Database, 1 Jan 2019 – 31 Dec 2024

Safety Trends

Recent Performance



Comparisons - 2024	Safety Score	Fatalities **	Kms Driven
Inner Regional Australia	2.76	35.8%	24.2%
Major Cities of Australia	2.90	34.7%	52.3%
Outer Regional Australia	2.77	21.2%	18.4%
Remote Australia	4.06	4.5%	3.1%
Very Remote Australia	3.85	3.6%	1.9%

*** Unknown location coding means we substitute 2023 mix % for 2024*

Source: Euclidic Systems, FGA Database, 1 Jan 2019 – 31 Dec 2024

Over the past 6 years, Euclidic safety scores have trended down across all states & territories.

Fatalities have bumped upwards, while vehicles have grown similarly.

A majority 52% of kms driven are in the major city areas, which account for 35% of fatalities.

Remote areas account for 5% of kms driven, and 8% of fatalities.

These asymmetries follow Euclidic measured Behaviour Safety Score patterns.

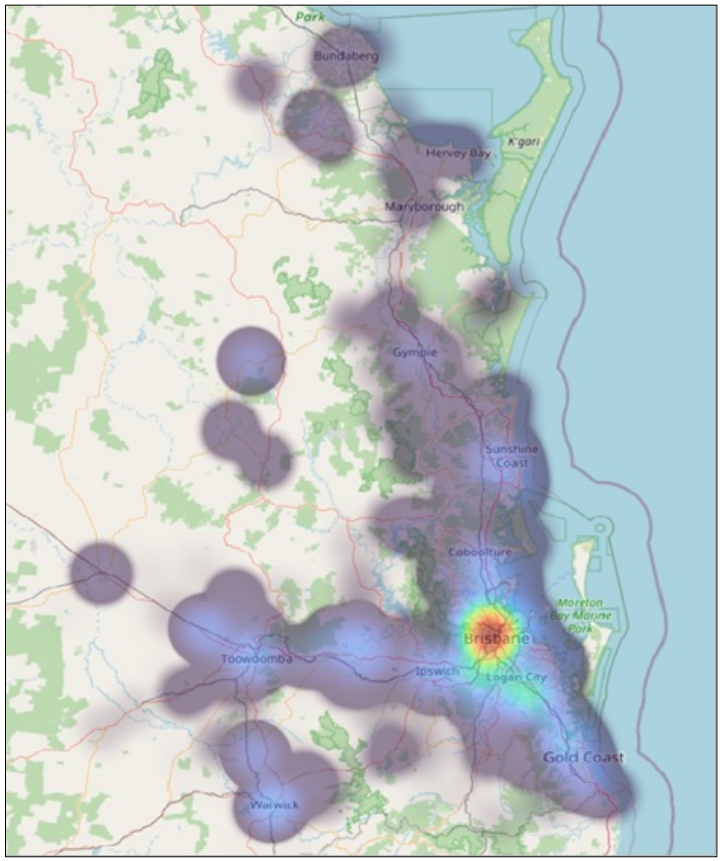
Heat Mapping Tools

A heat map of speeding events in QLD major cities and inner regional locations yields this picture.

Euclidic has the capability to plot alerts/events based on GPS coordinates and time stamps for any geo-granularity.

For example, this can provide a visual picture of risk event areas such as harsh braking, or high range speeding down to individual street level.

This then becomes a tool for road planners to rectify design flaws, or to direct enforcement attention.



Source: Euclidic Systems, FGA Database, 1 Jan 2024 – 31 Dec 2024

Insurance Industry Research

FACT: 50% of all insurance damage claims are caused by 15% of drivers!

Euclidic Systems is working with Fuse Insurance (underwritten by IAG), to identify primary causes of driver behaviour contributing to vehicle claims. This can be considered a proxy for road safety. Using micro-pattern Artificial Intelligence, measurements are captured every 10 seconds, and analytics can then identify predictive driving patterns which are linked to accidents (and claims).

Pattern recognition AI can generate a crash probability scoring for:

- Frontal crashes
- Parking Accidents
- All other incidents

Driving behavioural interventions that can reduce risk seek to develop better:

1. Focus – limiting distractions, weaving and pumping (side to side, front to back)
2. Anticipation – planning ahead, braking, acceleration, cornering skills
3. Speed Control – speed management relative to surrounding cars or terrain conditions

Data Ownership Issues

Significant legal and privacy concerns intersect with employer obligations in the areas of driver safety, public safety, and business liability.

Under Work Health and Safety legislation, employers are required to provide a "safe workplace", a definition that extends to vehicles used for work purposes.

However, this responsibility raises complex questions about employee privacy, particularly regarding individual driving styles and the right to autonomy.

Issues such as consent to data disclosure and surveillance introduce legal ambiguities, as principles from other areas of law are often inconsistently adapted to the telematics context.

An example of this is Chain of Responsibility practice, where compliance extends to non-employees such as contractors.

The New York Times | https://www.nytimes.com/2024/03/14/technology/gm-lexis-nexis-driving-data.html

Florida Man Sues G.M. and LexisNexis Over Sale of His Cadillac Data

Romeo Chicco's auto insurance rate doubled because of information about his speeding, braking and acceleration, according to his complaint.

By Kashmir Hill

March 14, 2024, 6:51 p.m. ET

When Romeo Chicco tried to get auto insurance in December, seven different companies rejected him. When he eventually obtained insurance, it was nearly double the rate he was previously paying. According to a federal complaint filed this week seeking class-action status, it was because his 2021 Cadillac XT6 had been spying on him.

Modern cars have been called "smartphones with wheels," because they are connected to the internet and packed with sensors and cameras. According to the complaint, an agent at Liberty Mutual told Mr. Chicco that he had been rejected because of information in his "LexisNexis report." LexisNexis Risk Solutions, a data broker, has traditionally kept tabs for insurers on drivers' moving violations, prior insurance coverage and accidents.

When Mr. Chicco requested his LexisNexis file, it contained details about 258 trips he had taken in his Cadillac over the past six months. His file included the distance he had driven, when the trips started and ended, and an accounting of any speeding and hard braking or accelerating. The data had been provided by General Motors – the manufacturer of his Cadillac.

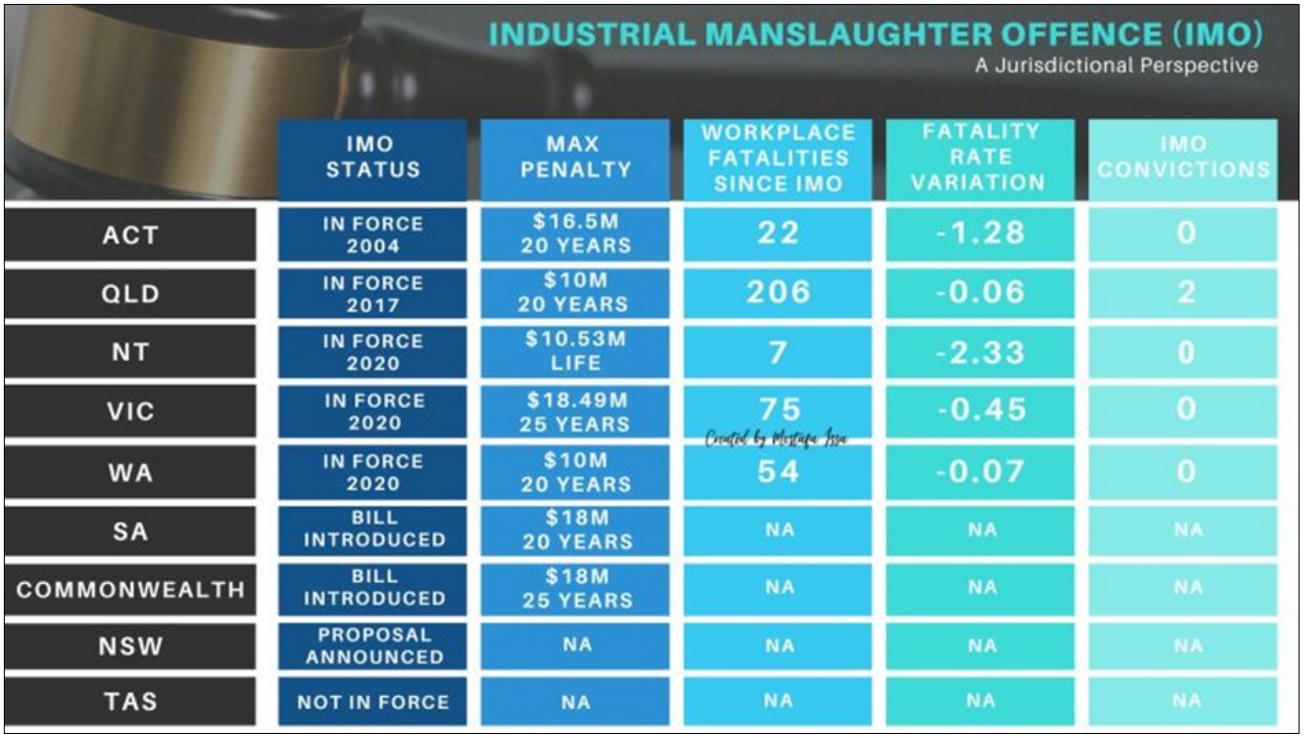
Source: New York Times, 14 March 2024

Industrial Manslaughter Offense (IMO)

IMO has been legislated state by state and introduces company Directors & Officer liability for non-compliant WHS implementation, where this is deemed to contribute to workplace deaths.

The initial action for all Directors and Executives with teams of vehicles and drivers – whether on road, or off road – is to have a written and communicated WHS policy. This should detail the essential features of the Company's approach to safety for its employees.

A section of this over-arching WHS policy should address fleet & driver safety expectations, performance reporting and training/support resources.



	IMO STATUS	MAX PENALTY	WORKPLACE FATALITIES SINCE IMO	FATALITY RATE VARIATION	IMO CONVICTIONS
ACT	IN FORCE 2004	$16.5M 20 YEARS	22	-1.28	0
QLD	IN FORCE 2017	$10M 20 YEARS	206	-0.06	2
NT	IN FORCE 2020	$10.53M LIFE	7	-2.33	0
VIC	IN FORCE 2020	$18.49M 25 YEARS	75	-0.45	0
WA	IN FORCE 2020	$10M 20 YEARS	54	-0.07	0
SA	BILL INTRODUCED	$18M 20 YEARS	NA	NA	NA
COMMONWEALTH	BILL INTRODUCED	$18M 25 YEARS	NA	NA	NA
NSW	PROPOSAL ANNOUNCED	NA	NA	NA	NA
TAS	NOT IN FORCE	NA	NA	NA	NA

Policy Focus Areas

A. Consider LCV Operation Regulations for vehicles above 3 tonnes

B. Fleet WHS Standards explicit requirement for basic level vehicle & driver supervision (a simpler version of heavy vehicle regulations)

C. Minimum standard should include hours of operations, accident reporting, performance interventions, training program requirements and black box functionality for data investigation in serious accidents with injuries

D. Revise driving license skill standards for GVM above 3 tons

E. Vehicle Safety Classifications report based on GVM variances

F. Safety Research Data Publicly released to include:
   - Vehicle GVM in fatalities
   - Locations of Pedestrian fatalities, Cyclists
   - Reporting top 100 Black Spot locations

G. Road remediation focus driven by Heat Mapped Risk Event locations

H. Road enforcement focus driven by actual black spots identified, rather than broad spectrum automated cameras to repair public trust

I. Roadside testing to increase focus on drug testing

Appendix

Data Definitions

Articulated Truck:
A motor vehicle primarily for load carrying, consisting of a prime mover that has no significant load carrying area but with a turntable device which can be linked to one or more trailers. A form of Heavy Rigid Truck of its own class

Crash:
Any apparently unpremeditated event reported to police, or other relevant authority, and resulting in death, injury or property damage attributable to the movement of a road vehicle on a public road

Death/Fatality:
A person who dies within 30 days of a crash as a result of injuries received in that crash

Fatal Crash:
A crash for which there is at least one death

Heavy Rigid Truck:
A motor vehicle of GVM greater than 4.5 tonnes constructed with a load carrying area. Includes a rigid truck with a tow bar, draw bar or other non-articulated coupling on the rear of the vehicle

Light Commercial Vehicle (LCV):
Light commercial vehicles such as utes, wagons, delivery vans, and removal trucks. These vehicles are rigid and under 4.5 tonnes, requiring a class C driver's license to operate. According to the ABS Survey of Road Vehicles, LCVs comprise 17.7% of all vehicles on Australian roads, or 3.9 million out of 19.8 million registered vehicles.

Data Definitions

Location:
The location for a vehicle is applied based on GPS coordinates at the time of Engine On detected.

Region Location:
The ABS National Remoteness Areas 2021 defines the Australian Statistical Geography Standard (ASGS Remoteness Structure); defined into Capital Cities, Inner Regional, Outer Regional, Remote, and Very Remote. Access to services is measured using the Accessibility/Remoteness Index of Australia Plus (ARIA+), produced by the Australian Centre for Housing Research (formerly the Hugo Centre for Population and Migration Studies) at the University of Adelaide. This is a standard for locational data assessment across various Census and ABS datasets.

Time Stamp:
All time stamps are localised for the time zone the vehicle is in.

Trip:
Defined as beginning with Engine On (detected by battery voltage) and ending with Engine Off (battery voltage). There are other Engine On sources including vibration and movement. The basket of raw data collected from every 10 second sample, is processed into a Trip Report, with all key outputs available in a standardised format for additional processing.

Trip Length:
Trips are segmented into 5 categories of length: Less than 200 metres; 200 metres to 2 Kms; 2-10 Kms; 10-50 Kms; and over 50 Kms.

National Road Safety Programs

Australia	New Zealand
Road Safety Program: The Australian National Road Safety Strategy 2021-30 was adopted in 2021 following consultation and review. The strategy continues Australia's commitment to the Safe System approach. The Federal Department of Infrastructure, Transport, Regional Development and Communications (through the Office of Road Safety) developed the strategy with the eight state and territory governments and the Australian Local Government Association. The Office of Road Safety also held targeted consultations with over 50 road safety stakeholders. The Australian National Road Safety Action Plan 2021-25 is currently under review and further consultation with stakeholders and state/territory jurisdictions. Links: *www.roadsafety.gov.au/nrss* **Targets:** • Reduce fatalies by 50% by 2030. • Reduce serious injuries by 30% by 2030. As part of demonstrating a commitment to the 2050 Vision Zero target, the strategy will target by 2030: • Zero deaths for children 7 years and under • Zero deaths in city central business district (CBD) areas • Zero deaths on National highways and on high speed roads covering 80% of travel across the network. There are no interim targets, however, the 2030 Target of a 30 per cent reduction in serious injuries by 2030 will be assessed as part of the mid term review of the Strategy.	**Road Safety Program:** New Zealand's road safety strategy for 2020-30 is titled Road to Zero and is based on Vision Zero and the Safe System approach. The Te Manatū Waka Ministry of Transport developed the strategy in close co-operation with the New Zealand Transport Agency and the New Zealand Police. It focuses on 15 priority areas: 1. Invest in safety treatments and infrastructure improvements 2. Introduce a new approach to tackling unsafe speeds 3. Review infrastructure standards and guidelines 4. Enhance safety and accessibility of footpaths, bike lanes and cycleways 5. Raise safety standards for vehicles entering the fleet 6. Increase understanding of vehicle safety 7. Implement mandatory anti-lock braking systems (ABS) for motorcycles 8. Support best practice for work-related travel 9. Strengthen the regulation of commercial transport services 10. Prioritise road policing 11. Enhance drug driver testing 12. Increase access to driver licensing and training 13. Support motorcycle safety 14. Review road safety penalties 15. Strengthen system leadership, support and co-ordination. Links: *www.transport.govt.nz/assets/Uploads/Report/Road-to-Zero-strategy_final.pdf* **Targets:** • A 40 % reduction in killed and serious injuries by 2030. The long term vision of the strategy is to achieve zero deaths and serious injuries on the roads by 2050.

Source: . ITF (2022), Road Safety Annual Report 2022, OECD Publishing, Paris

Publications & Websites

Australian Cycling Safety	View publication
National Road Safety Strategy	View publication
Austroads programme of road safety research	Visit website
Department of Infrastructure, Transport, Regional Development & Communications	Visit website
Office of Road Safety	Visit website
Bureau of Infrastructure, Transport & Regional Economics	Visit website
Road Safety Statistics	Visit website
Road Safety Performance	Visit website
2018 Inquiry into the National Road Safety Strategy	Visit website
2019 Review into National Road Safety Governance Arrangements	Visit website
Austroads	Visit website
ARRB (Australian Road Research Board)	Visit website
Monash University Accident Research Centre	Visit website