



The Hunter Valley Bus Crash

11 June 2023, 11:30pm

The Crash, the Aftermath and the need for
Bus Safety Reform

Presentation by John Gaffney,
AITPM Webinar 7 November 2024

**Paradigm shifts are needed
when traditional science fails**



agenda

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6 Slides

The Aftermath
5 slides

Paradigm Shifts needed
when traditional science fails
5 slides

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15slides

Conclusion
2 slides

**Paradigm shifts are needed
when traditional science fails**



The Bus Crash

**Paradigm shifts needed
when traditional science fails**



Prior to crash the bus was speeding on damp, windy, dark country roads... in court the driver admitted using cruise control as the reason for being over the limit –Whilst using cruise control is legal, he was obviously not driving to conditions which was terrifying for passengers

35 Passengers
10 Fatalities
9 Seriously Injured
25 injured ferried to 4 hospitals in Newcastle and Sydney
25+ psychologically injured for life

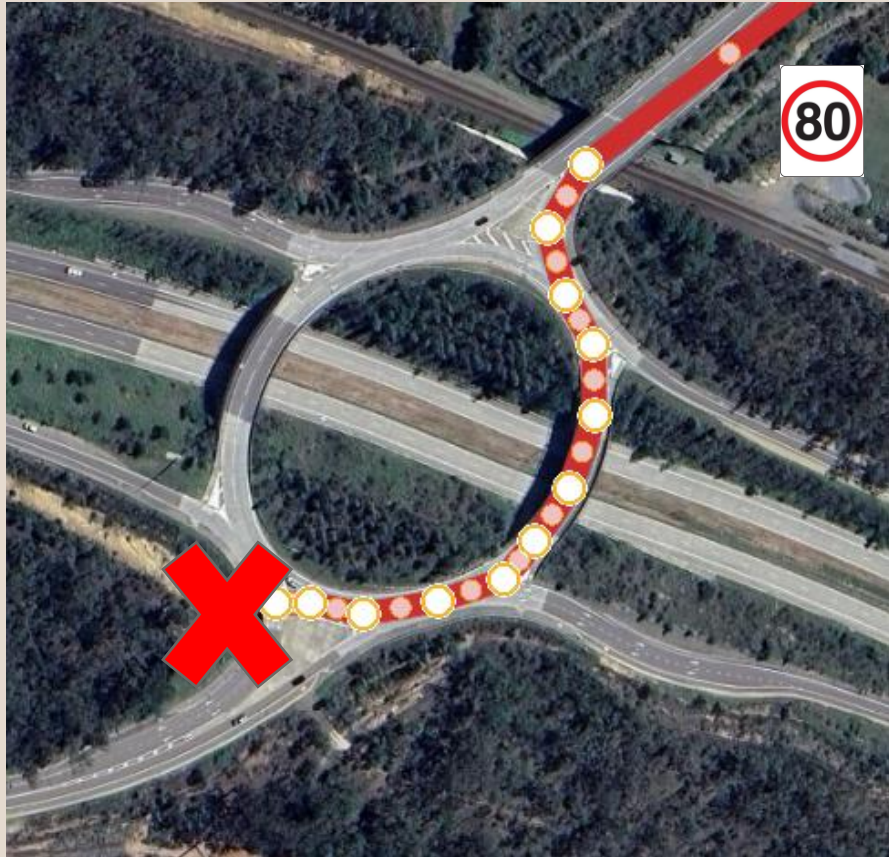
The Location of the Crash



The Location of the Crash



The Location of the Crash



80km/h speed limit is typical for rural diamond interchange

Comfortable driving on this leg of the interchange is:
15 km/h for heavy vehicles
30-35 km/h for cars

No part of the interchange is appropriate for 80km/h

Should the design of this interchange have passed a Road Safety Audit?

We need a review of that audit

Comment:

Crash data indicates site had a no crash history — *(note: property damage crashes not reported)*

“Compass IoT” connected vehicle data shows this is a very high “near-miss” location and with very high g-forces generated by vehicles

Begs the question, what other data sources may best inform us on the relative safety of the road system or do we wait for the very limited crash data to expose a problem?

1. Tight radius egg-about - decreasing radius as you enter curve
2. There is a 80km/h speed sign on approach road to roundabout
3. Adverse crossfall – for drainage
4. Pavement friction - very high standard
5. Barrier type kerb – not ideal but likely not a contributing factor?



The Location of the Crash



**Ten beautiful
lives lost**

The Location of the Crash



1. **Driver apparently took racing line through curve – accelerating and did not brake or back off** - likely expected tyres to slip and drift and give passengers a “roller coaster ride” – the bus driver could not comprehend how the bus rolled
2. **Bus tyres gripped as pavement friction was extra good - tyre marks interesting – (Yawl marks? – need to see official police report also ~3 tonne of dynamic load) with 35 adult passengers which changes bus dynamics**
3. **Estimated rollover (tipping) speed for bus 31km/h – measured bus speed around 56.5km/h and accelerating**

Comment:

If this bus was equipped with the latest safety systems it likely would have shut down well before the bus reach a tipping point

The higher road toll especially since 2022 should not surprise us, as several decades of tardiness in relation to best practice Australian Design Rules is having long-term consequences

In recent years there has been a spate of serious bus crashes especially in eastern Australia. This was a bus crash waiting to happen and sadly many more will follow....



The Aftermath

**Paradigm shifts needed
when traditional science fails**

The Aftermath



- Became aware of the crash around midnight with the sound of sirens, helicopters overhead and phone calls etc. We knew many people had lost their lives – long night
- Passengers comprised a mix of people from Melbourne Victoria (relatives, school mates and Warrandyte Cricket Club) and from Singleton NSW (Singleton Roosters AFL FC)
- Identification was difficult as survivor's phones and possessions were lost and people were separated who could have identified their friends - **“unaccounted for” !!!**
- Horrific injuries, requiring emergency surgery and a number in intensive care for a considerable period. A number have had multiple surgeries since
- 15 months on, a number of survivors have not been able to return to work. Many others work part-time due to their injuries

In Memory of

Zach Bray

Darcy Bulman

Tori Cowburn

Angus Craig

Kyah McBride

Nadene McBride

Bec Mullen

Andrew Scott

Lynan Scott

Kane Symons



The Aftermath - The Sentencing

30+ Victim Impact Statements read aloud in court over 2 days

Many others submitted although some victims were mentally not up to reading in court or unable to attend

Victim Impact statement read by parents, partners, siblings, uncles and aunts, cousins, grandparents and other support people

- Raw heartfelt emotion
- Surreal pin-drop silence as each victim spoke
- Words were often labored accented by emotional pain, anguish and tears
- Lots of tissues, hugs and embraces required
- Many spoke about the comparison of life before and after the crash. Their new normal was quite distant from their previous life

Three of the hardest days I have ever had to experience

Victim Impact Statements had many common threads:

- unrelenting emotional pain, enduring grief
- daily tears & dread, regular outburst of grief & anger
- insomnia, nightmares, fatigue, constantly tired, not able to get out of bed
- no motivation, unable to concentrate,
- not able to work or continue careers
- withdrawing from the public eye
- black dog, depression, empty, numb
- daily routine of appointments to medical professionals, psychologists and physiotherapists

The Verdict - there are no winners

Brett Andrew Button, pleaded guilty to 35 charges (**avoiding a trial!!!**). Charges related to: dangerous driving occasioning death; dangerous driving occasioning grievous bodily harm; driving furiously; and causing bodily harm to survivors.



Judge Ellis

- “In his 50 years in the justice system he had never dealt with a case that contained anywhere near the devastation”...
- Ellis to Button - *“Why did you think the doctor was limiting the amount of Tramadol (opioid) you were to*

The legal process focused heavily on the opiate addiction in order to force a guilty plea... - many-times the prescribed limit for driving

Eventually risky, reckless, & hooning behaviour catches up with you with devastating consequences - A trial would likely have also exposed a long-term pattern of behaviour which was excluded from the “Statement of Agreed Facts”

The two independent Inquiries must explore beyond the legal process as this will lead to significant reforms

Putting this Bus Crash into perspective

10 Fatalities and 25+ injured physically and psychologically

It represents just:

- **3 days of the Annual Australian Road Deaths** (1266 deaths in 2023)
- **6 hours of the Annual Australian Serious Injuries**

~3.5 fatalities each day and ~105 serious injuries each day (38,000pa)

Little change in the 35,000-38,000 serious injuries p.a. in 30 years

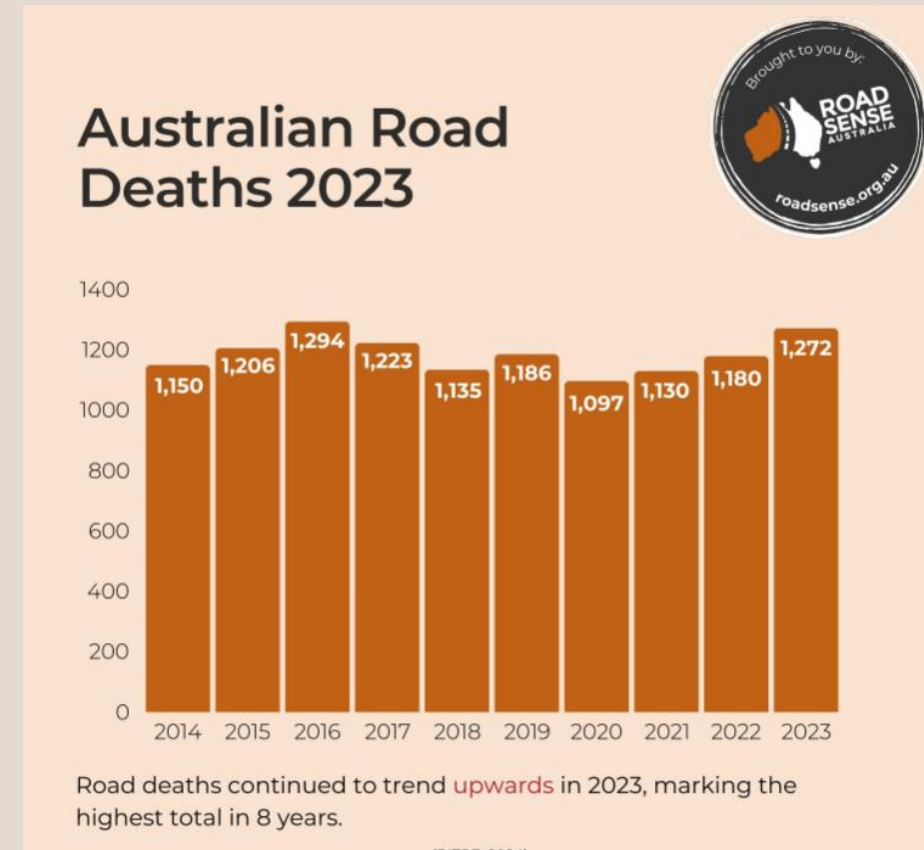
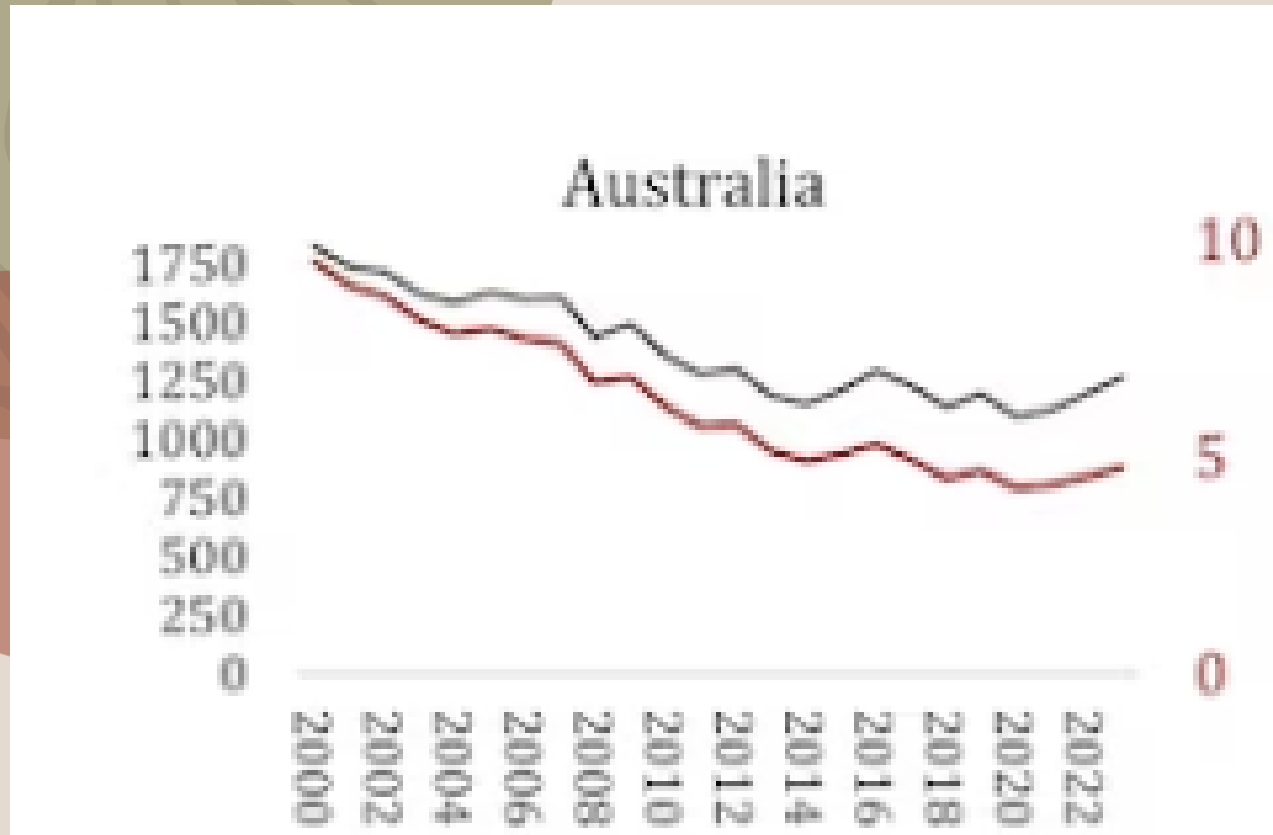
BITRE predicts these numbers will continue to grow...

We are not currently on the path to zero



Paradigm shifts needed
when traditional science fails

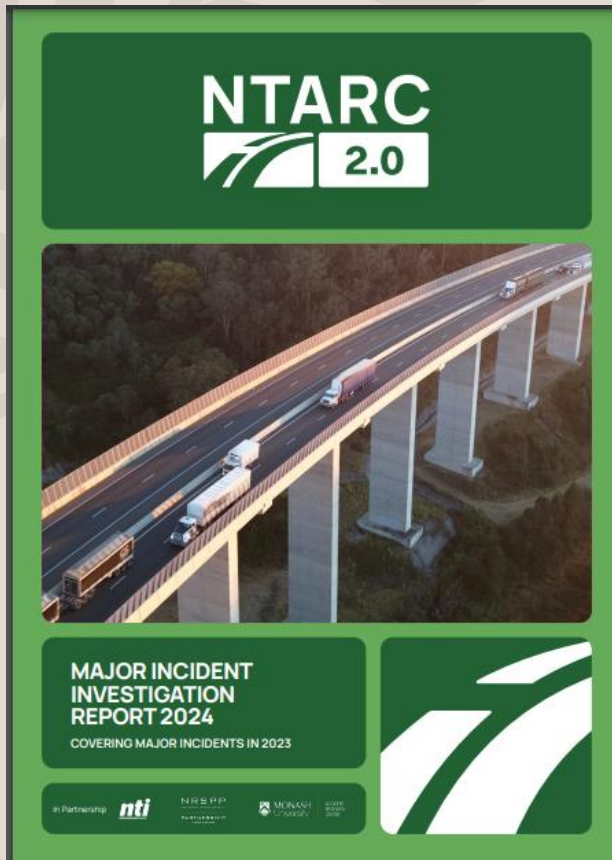
Road Deaths are heading the wrong way in Australia



1,266* people tragically lost their lives on Australian roads in 2023, marking a 7.3 per cent increase from the 12-month period ending December 2022. The rate of annual road fatalities per 100,000 people currently stands at 4.8, which is a 4.8 per cent year-on-year increase

Key Findings - NTARC - 2023

From Heavy Vehicle Insurance Data



We have a Problem

01

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

02

Losses have risen across almost all cause codes, with crashes related to **Human Factors seeing a 42% increase since 2022**.

03

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.

04

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.

05

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.

Road Deaths heading the wrong way

Social Cost of Road Crashes

Report for the Bureau of Infrastructure and
Transport Research Economics

Final report September 2022

BITRE

The Australian National University

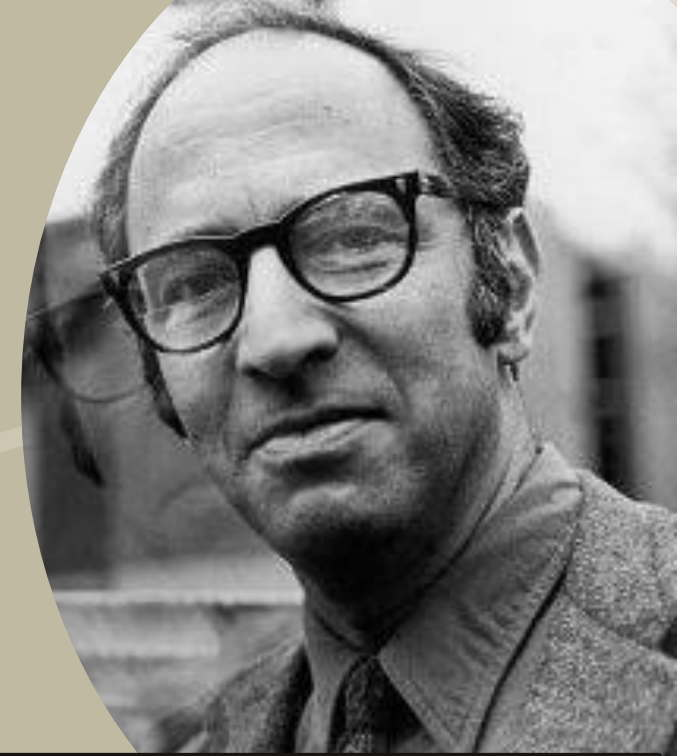
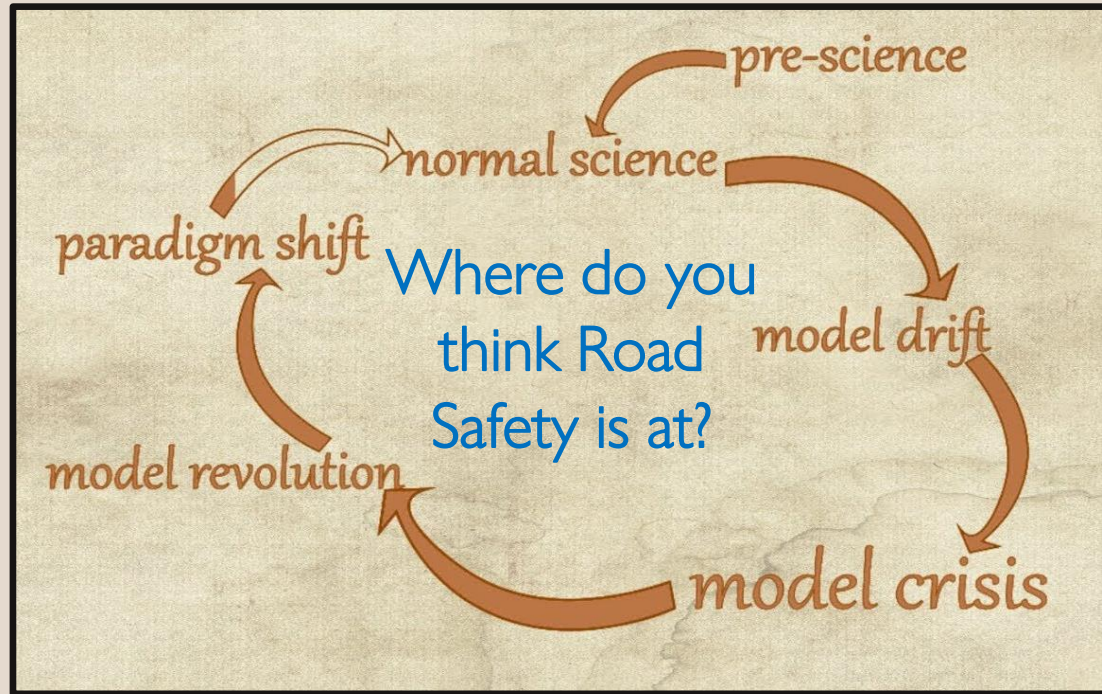
Focusing on dangerous situations, and near misses like the aviation industry is the key to improving safety

Table 0.1: Estimated number of road crashes by level of severity

Level of severity (of worst injury in crash)	Total	Proportion of all crashes (per cent)
Fatal	1,096	0.1
Hospitalised injury	33,103	3.4
Non-hospitalised injury	81,909	8.5
Property damage only	849,567	88.0
Total	965,676	100

- Australia had an estimated 965,000 road crashes in an average year involving 1.7 million vehicles (btw 2015 & 2000)
- With 21 million registered vehicles - 1 in 12 vehicles is involved in a crash each year
- Many crashes are likely minor low speed dints and scratches showing that humans have trouble judging speed and distance even at low speeds – loosely coined the phrase “human error” has no definition or metrics of what it is. Many crashes are caused by human limitations
- Focusing primarily on fatalities (0.1% of crashes) has likely been a costly mistake for Australia - Bottom-up strategies leads to additional insights and new solutions

Thomas Kuhn coined the phrase Paradigm Shift (1962)



Many context changes have occurred over the past 30 years, requiring a revolution of science to address them

1. When normal science fails, models are often tweaked to meet current views (not necessarily science) – slowly drifting away from being effective (Research often lacks understanding of confounding factors, sample sizes are often too small for statistical analysis, fast tracking is code for guessing, lack of independent controls makes some research meaningless – no shortage of opinions)
2. The biggest barrier to model revolution is “the establishment” – those who are trained by and work in the institutions and who believe in the old models as science despite evidence to the contrary, that the science is not working – typically a 30-year lag before things begin to change



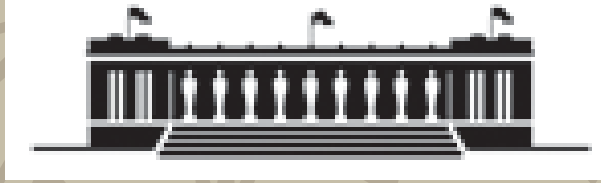
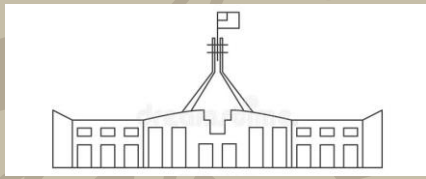
The need for Bus Safety Reform

**Paradigm shifts needed
when traditional science fails**

Timeline of some key activities

1. The NSW Bus industry Taskforce terms-of-reference extended to include bus safety June 2023 – (3 reports now available)
2. The NSW government announced that Office of Transport Safety Investigation (OTSI) will undertake an independent investigation (June 2023)
3. A petition with 10,000 signatures on seatbelt reform sent to the federal parliament (September 2023)
4. Senator Brown chairs a Bus Industry Roundtable in Melbourne with Melissa Cashman from the Vehicle Safety Policy and Partnerships Department (September 2023) – several meetings since
5. Submission sent to the Bus Industry Taskforce prepared by Dr Anthony Ockwell and John Gaffney October 2023 and also sent to OTSI and NSW Coroner January 2024
6. Various meetings held with Federal and State Ministers in Victoria and NSW, NHVR, NTC, Bus Industry Confederation and various bus industry representatives
7. The NSW coroner will report on the crash investigation likely commencing investigation in 2025

Bus Safety reform is urgently needed in Australia



Institutions (State and Federal)



Vehicle Standards



Drivers

This crash reveals three
“archetypes” or paradigmatic
problem areas requiring urgent
reform in Australia

**Paradigm shifts needed
when traditional science fails**

The Submission - Safety Reform

ECONOMIC CONNECTIONS (P/L)

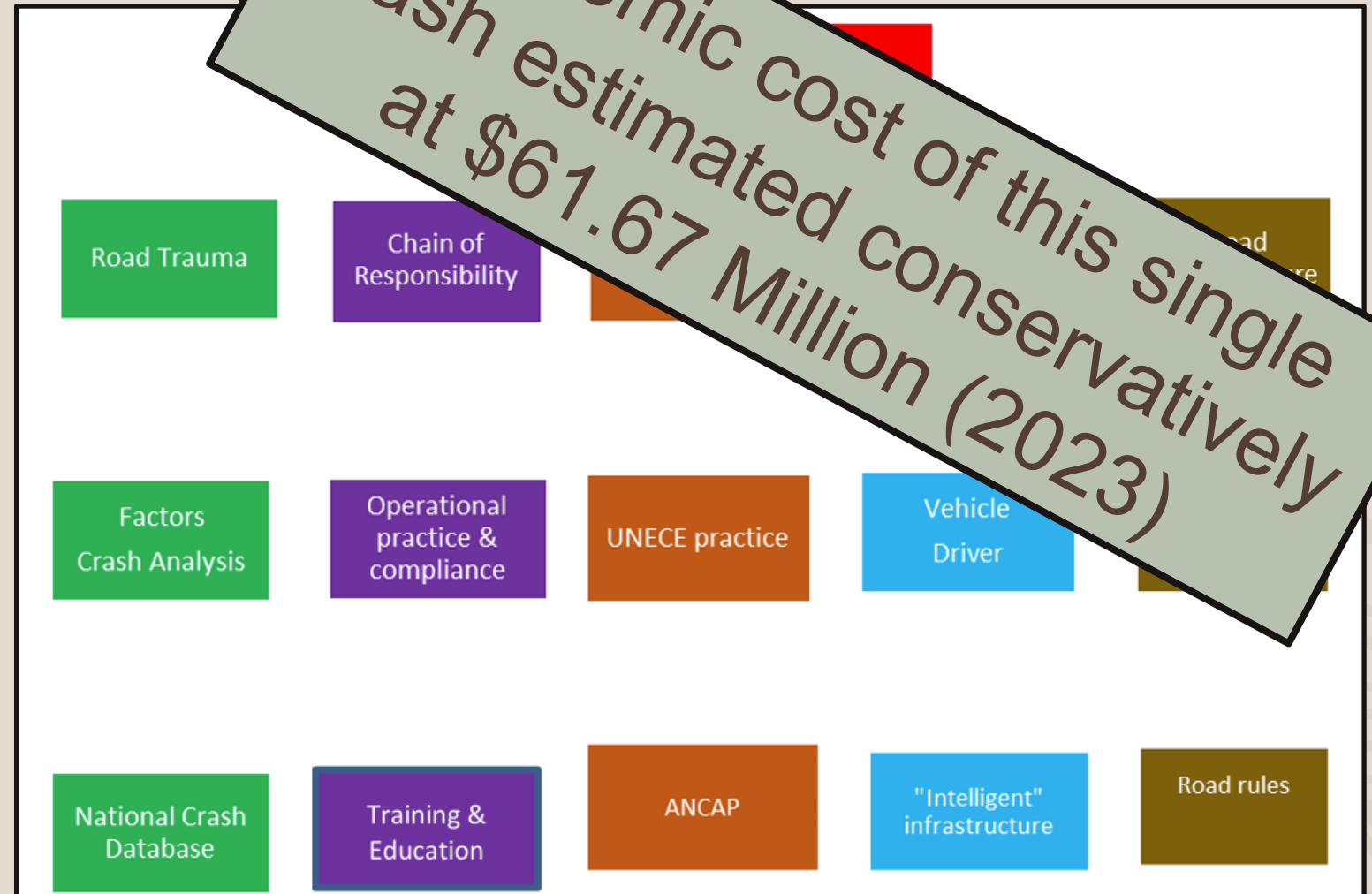
Submission to the Transport for NSW Inquiry to improve bus safety

Anthony Ockwell and John Gaffney

18 Recommendations covering 5 key areas

https://www.econconnections.com/_files/ugd/63f24b_131c55c757af40e889d91244de5a5f25.pdf

Economic cost of this single crash estimated conservatively at \$61.67 Million (2023)



Any objective investigation of this crash will identify system failures at multiple levels and the need for Bus Safety Reform

NSW Government Bus Industry Taskforce



The most significant report in a generation for bus safety and requires a regulatory transformation program. – team established with two-year timeline to implement recommendations

Other states should adopt a similar program given the recent spate of bus crashes

Many of the recommendations are relevant to heavy vehicles and road safety generally

3 reports now available

<https://www.transport.nsw.gov.au/industry/independent-reviews/bus-industry-taskforce>

Who is asleep at the wheel?

Hunter Bus Crash Driver's schedule

Driver was a daytime school bus driver with some charter work

1. left home around ~10:30 am
2. picked up bus at depot
3. drove to Singleton for 1:30pm pick up of wedding guests
4. arrived at wedding venue around 2:30pm and stayed with bus at venue
5. wedding guests commenced loading bus after 11:00 pm for return trip to Singleton
6. bus leaves venue around ~11:20pm
7. bus crashes at ~11:30pm
8. driver was expected to complete trip, return bus to depot then drive home arriving around ~2:00 am
9. driver had another charter at 10:00am the next day - potentially having to clean bus before next service

1. **59-year-old driver on the job for 13.5 hours whether driving or not**
2. **This schedule would be legal under driving hour regulations – e.g. 8.5hr break waiting for quests**
3. **Most people are tired late at night regardless of driving hours**
4. **Driver fatigue and driving hours are not strongly corelated as it depends.....**

**Have we prioritised
Productivity and Profit ahead
of Personal Safety?**

Heavy Vehicle driving hours don't pass the pub test

1. Australian heavy vehicle driving hours are 144 hours in a fortnight, compared to Europe 94 hours (50 hours more)
2. We currently have a driver shortage and long driving hours is likely a barrier to attracting new drivers (chicken and egg) - Work-Life balance is not just about money
3. Driver fatigue is said to be a big problem in Australia – but data is too limited to justify any change such as Compulsory Fatigue and Distraction Monitoring Systems
4. Electronic diaries are not a robust response to driver fatigue that can occur at anytime of the day by any driver. Put simply it is a device for ensuring compliance with regulations

Commonsense can be a substitute for poor data

Long driving hours leads to fatigue

So don't try it

We should at least have real-time back to base monitoring of all long distance HV drivers for speed, fatigue and distraction as per EU

Fitting Seatbelts to school buses is proving elusive

- The public expects seatbelts to be fitted to all buses
- NSW is leading the nation with >95% of school buses fitted
- States are quoting "**low risk**" as the reason not to fit seatbelts on all buses— we need more transparency on how risk is assessed. **retired service bus, stored on a farm near a country town, with 30+ year old seats. A risk analysis in Queensland is unknown yet they have done a risk analysis**
- We legislated to install seatbelts in cars more than 10 years old – children travelling on a school bus must be given a seatbelt
- This goal won't occur without public pressure

Speed of buses should be restricted when people are standing – if the bus stops suddenly even at 30km/h humans cannot physically hang on to handles or straps



**At a minimum all new school bus contracts should mandate seatbelts
All school buses without seatbelts should be retired ASAP**

Simple changes can save lives

Partial ejection from the bus was a major issue with the Hunter Valley bus crash – resulting in numerous fatalities and dismembered bodies and horrific injuries to survivors

In the event of a rollover crash passengers should be fully contained within the bus

When glass windows break, passengers were fully or partially ejected from the bus the seatbelt alone will not keep the head, limbs, and torso inside the bus



Need Australian Design Rules changes to seatbelts standards, mandating of seatbelt monitoring systems and improved window glazing



As a minimum “Everyone who rides in a bus should have access to a seatbelt”



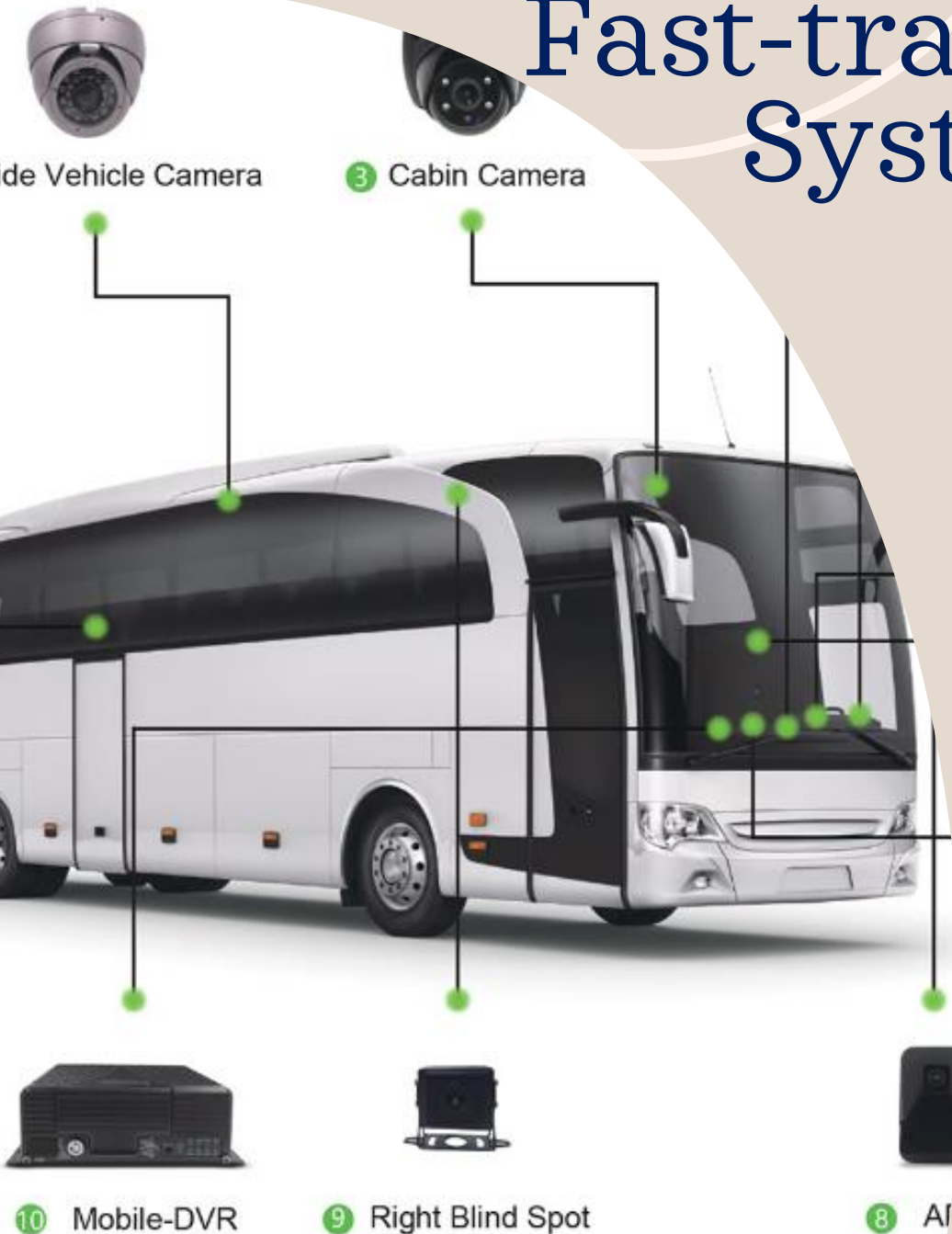
Australian Bus Safety Regulations lag best International Practice



1. Bus regulations advance slowly through state government contracts – varying State to State
2. Coaches fall through the cracks of State and Federal governments regulations.
3. Relatively old fleet with 23% of NSW buses being 17 – 26 years old – e.g. don't meet current vehicle design standards
4. Australian Design Rules lag many UNECE regulations. Many EU regulations have not been appropriately considered
5. World best practice bus safety standards are associated with EURO NCAP standards for truck and buses, with different technical standards for urban vs rural conditions as the risks are different
6. With over 100,000 registered buses in Australia, with almost half carrying regular passenger services it is timely Australia establishes a **permanent government/industry peak body** to

We need a dedicated peak government/industry body to oversee Bus Safety, Regulations and Standards in Australia “a bus is not a truck” hence buses needs a separate focus of effort

Fast-tracking the EU Bus Safety Systems in Australia (2022)



The current bus safety reforms came into effect in July 2022, for every new truck and bus registered from July 2024.

1. Emergency stop signal:
2. Tyre pressure monitoring system:
3. Blind spot information system:
4. Reversing information system:.
5. Moving off information system:
6. Alcohol Interlock Facilitation Installation:
7. Advanced Driver Distraction Warning (ADDW)
8. Driver Attention Detection (DAD)
9. Intelligent speed assistance: (ISA)

Fast-tracking the EU Bus Safety Systems in Australia (2026-2030)



1. Driver assist
2. Advanced emergency braking (AEB) systems
3. Intelligent speed assistance (ISA).
4. Improved direct and indirect vision
5. Pedal application error
6. Runaway bus prevention

Ongoing development 2030+

1. Partner assist
2. Acoustic vehicle alerting system (AVAS)
3. Partner protection

Australia requires a dedicated peak government/industry body assessing the data, doing the research, making recommendations on best practice and to develop a bus safety strategy (roadmap) for Australia

Chain-of-Responsibility and Compliance with Regulations

1. Vagaries in compliance – open to interpretation- Need to publish 'acceptable means of compliance' with Chain-of-Responsibility laws
2. Allocation of risk currently is more academic than pragmatic – strengthen on-road real-time compliance together with road rules and regulations - speed, fatigue, distraction, alcohol and drugs
3. Drivers need to be included within the chain-of-responsibility framework – they are the weakest link
4. Privacy can get in the way of passenger safety - national access to driver history, performance and medical records are essential ingredients for safety
5. Operators prefer friendly auditors who make life easy to achieve compliance (independent auditors required)



Outsourcing responsibility and accountability puts blame at arms length
Governments and industry must share responsibility and accountability

Are Australian Buses really safe?

Australian buses are not as safe as they could be

Heavy Vehicles comprise ~5% of registered vehicles - involved in 18% of fatal crashes

248 bus drivers have become incapacitated in the past decade (OTSI) - begs the question that medical checks alone do not predict strokes, heart attacks, fits and diabetic coma etc. It is possible to monitor health of a driver remotely in real-time e.g., smart watch

Buses must have the best onboard safety systems that assist in avoiding crashes

Bus drivers must manage their space, speed and headways better in built-up areas

1. Buses are considered to be a safe mode of travel and this is true if we consider passenger kilometers of travel
2. Buses represent around 0.5% of registered vehicles (104,000) yet their involvement in fatal crashes is 1.6% (a multiplier of 3)
3. Route Services bus are about 6 times more likely to be involved in a crash than all other vehicles. Or 3.5 times if based on exposure (Vic)
4. Heavy vehicles and buses tend to kill other road users, pedestrians, cyclists and occupants of other vehicles
5. NHVR report states that some >70% HV and bus crashes are the faults of other road users. (**considered through a legal lens only**)
6. This has been a copout as getting to Zero requires every fatal crash to be eliminated even if other road users make mistakes
7. Differential size, weight, braking distance and lower maneuverability is the responsibility of the HV driver when mixing with other road users - Heavy vehicles must have the best onboard compensating safety systems

NSW Coroner Inquest

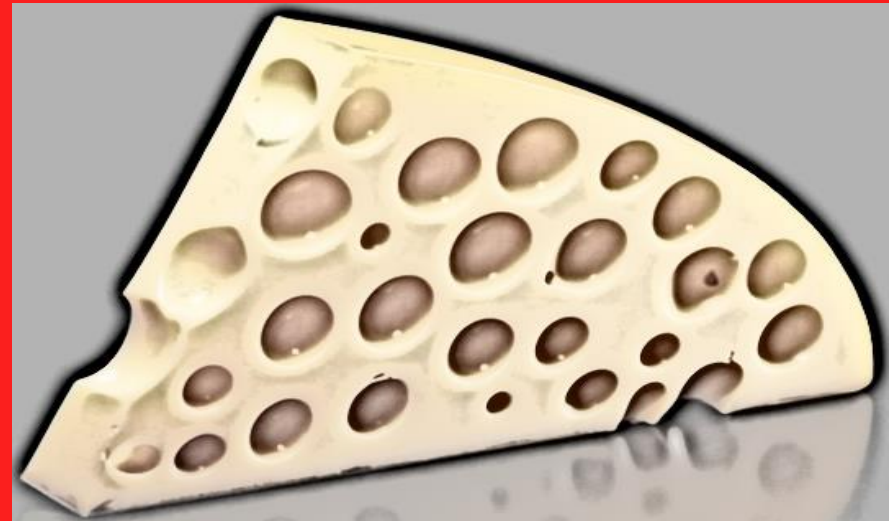
Should utilise their full powers to establish a thorough process to get to the bottom of the many system failures and shortcomings that preceded this crash:

Such as understanding:

1. how the driver was able to regularly drive a school bus and avoid being detected for an opiate addiction by the authorities such as NHVR and police
2. why multiple previous employers had not notified authorities when they knew the driver had an addiction and previous driving indiscretions
3. why the medical profession knowing about the addiction did not report it to Authorities
4. why the driver was prescribed significant dosages of opiates knowing the driver was employed as a bus driver
5. why medical guidelines associated with opiate addiction were not followed
6. the limitations of Austroads guidelines Assessing Fitness to Drive
7. the Department of Transport NSW short fall in regulations in regards to bus safety as indicated in the Bus Industry Taskforce Report
8. best practice bus safety standards and regulations from the Bus Industry Confederation and why are there so many barriers to adopting best international practice.....

Many more holes to address

Too often practitioners have oversimplified the Swiss Cheese Model in its application to road safety



There are many holes we are yet to identify and address, every hole left untreated is potentially a fatal crash or serious injury

The Aviation Industry's approach to safety is bottom-up starting with dangerous situations and near misses/

Our data sets are missing for many of these holes



Conclusions

**Paradigm shifts needed
when traditional science fails**

Where to from here?

**Paradigm shifts are needed
when traditional science fails**

1. **We need a permanent bus government/ industry safety working group**

A bus is not a truck - currently inadequately covered by the NHVR, NHVL and NTC

2. **Chain of responsibility legislation/practice needs major reform**

A narrow academic approach to risk is letting Australians down

3. **Broken and disconnected systems need repair and integration**

Medical conditions such as addiction and other specific illnesses should be reportable to authorities and employers – dynamic systems can monitor driver health when driving

4. **Fast-tracking UNECE and EURO NCAP standards for buses and coaches**

Australia currently has a minimalist approach to deploying onboard vehicle safety systems combined with a relatively old bus fleet means many buses comply only with outdated standards



Final Remarks

**Paradigm shifts are needed
when traditional science fails**

1. **Australian state and federal governments have for too long taken a backseat on bus and coach safety, regulations, standards and operations - “the forgotten mode”**
2. **Premier Minn’s** and the NSW Transport Minister have made a “good start” on the journey to improved bus safety. The Bus Industry Taskforce Report is a once in a generation step forward for bus safety. **Victoria, Queensland and other States we need you on board too with a louder voice?**
3. **Senator Brown** has supported our cause chairing a Bus/Industry Roundtable and establishing a government/bus Industry Working Group which is making progress we have not seen for many decades. **However, given what has come to light through the Hunter Valley Bus Crash legal proceedings, the working group’s 12-month tenure needs to become a permanent body**
4. Best Practice Bus Safety is alive and well in some Australian bus fleets, although not reflected across the majority of the bus fleet, nor is it reflected in our Australian regulations and practices – Hence it can be done, however, we have a great deal more work to do to make bus safety ubiquitous
5. Australia has the capability and resources to lead the world in bus safety standards and operations
6. **If we work together nothing can stop us!**





thank you

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