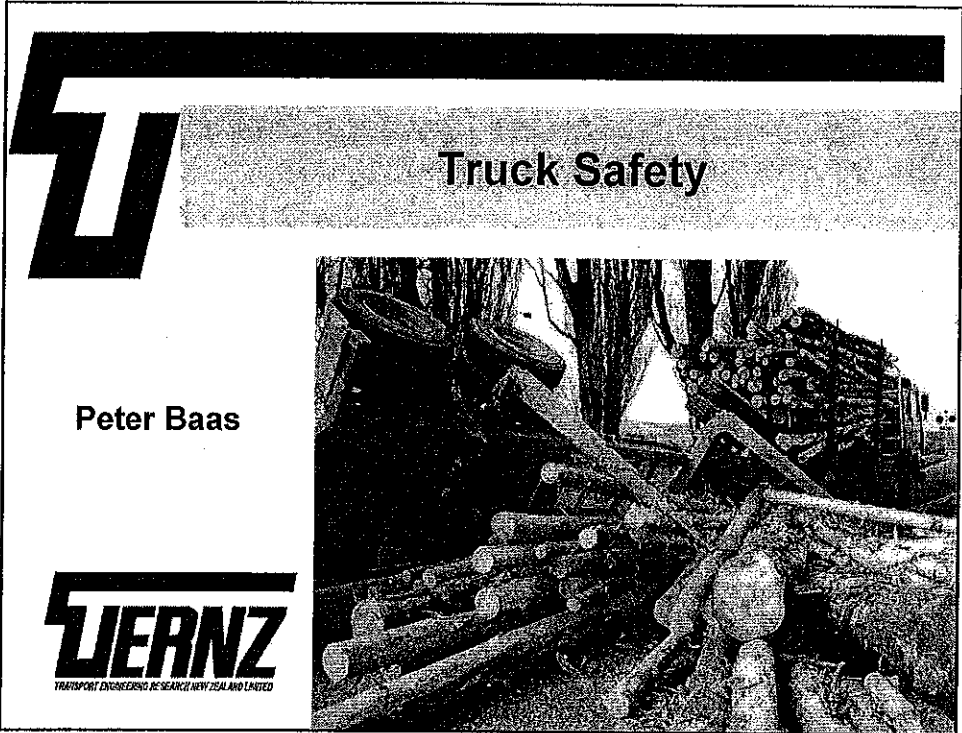


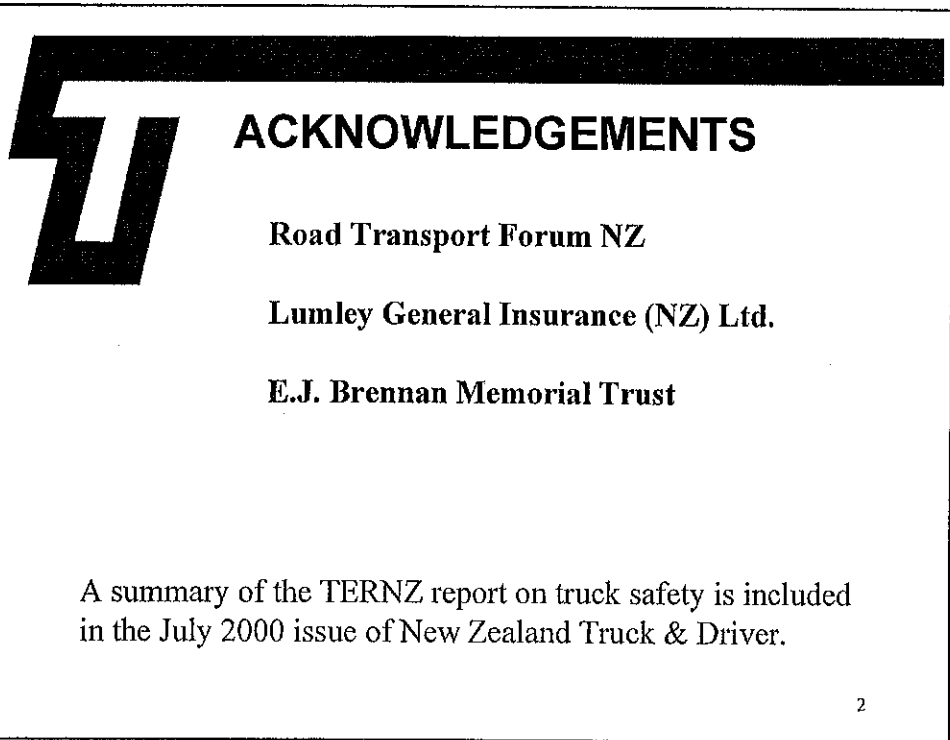
PETER BAAS  
REVIEW OF TRUCK SAFETY



## Truck Safety

Peter Baas

**TERNZ**  
TRANSPORT ENGINEERING RESEARCH NEW ZEALAND LIMITED



## ACKNOWLEDGEMENTS

Road Transport Forum NZ

Lumley General Insurance (NZ) Ltd.

E.J. Brennan Memorial Trust

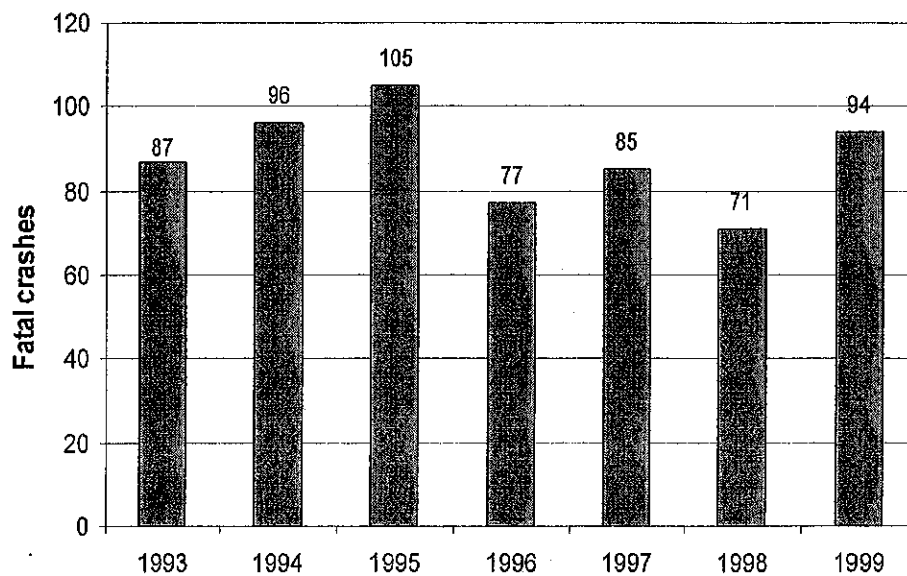
A summary of the TERNZ report on truck safety is included in the July 2000 issue of New Zealand Truck & Driver.



- 94 fatal crashes involving trucks in 1999 resulting in 117 deaths
- 14 truck occupants killed
- 22 percent of all fatal crashes involved a truck
- Trucks account for 6.2% of distance travelled
- Truck at fault in approx. 1/3 of fatal crashes and 1/2 of injury crashes.

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**Fatal crashes Involving Trucks**



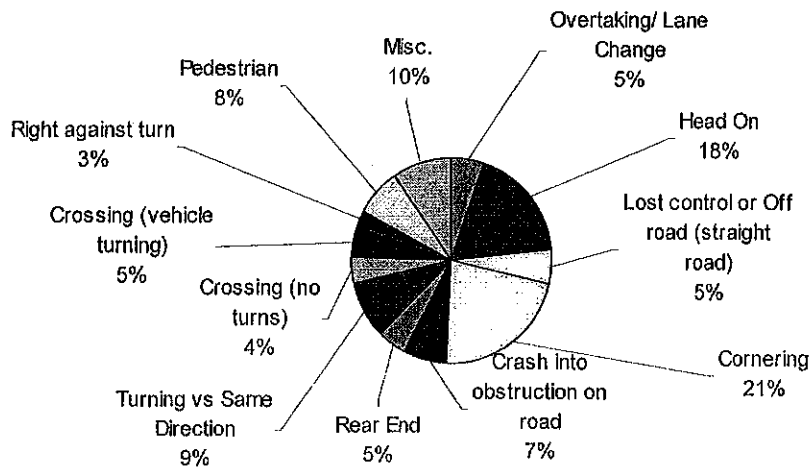


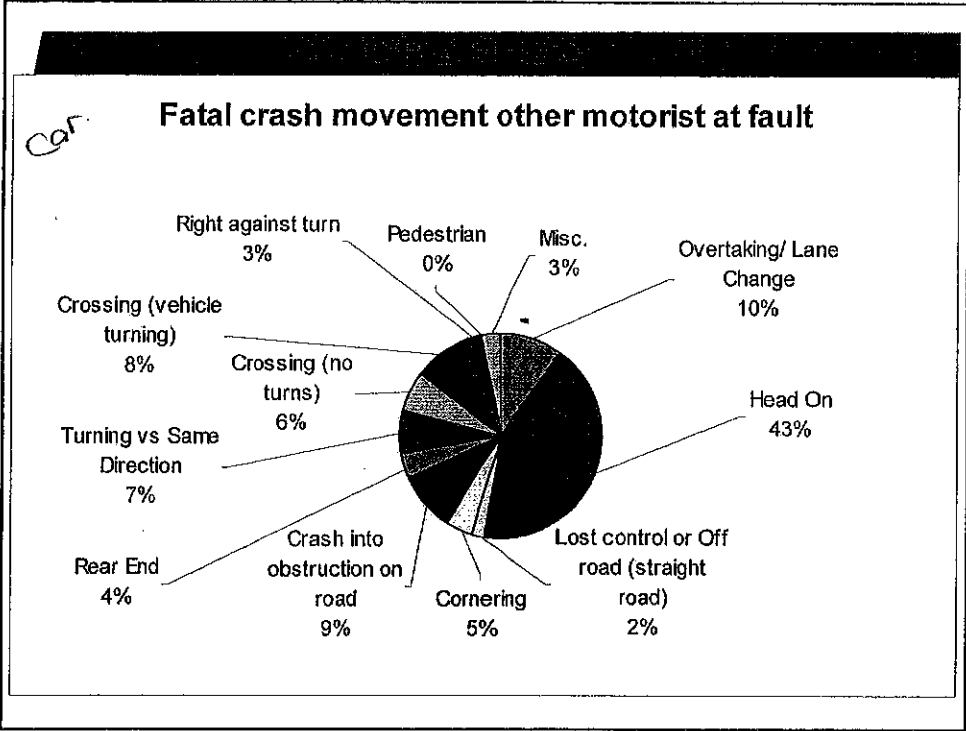
## Crash movements

- Over 55% of crashes due to other road users were associated with overtaking, head-on and lost control movements and only 5% due to cornering.
- For trucks at fault crashes cornering was associated with 21% of the crashes, the single largest category followed by head-on at 18%.

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### Fatal crash movements truck at fault

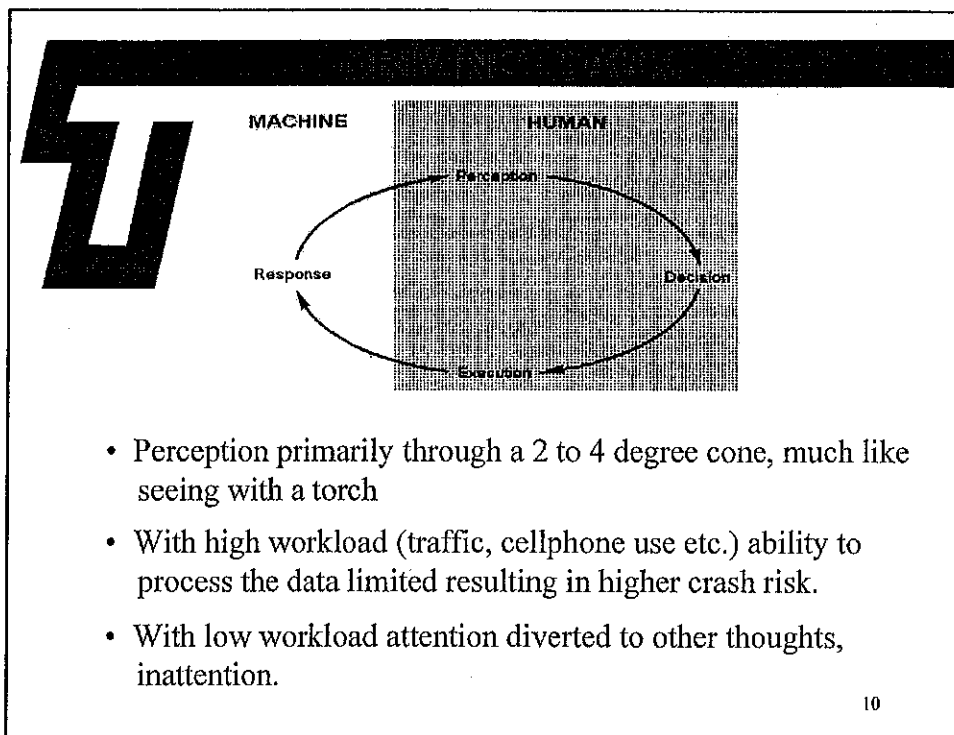
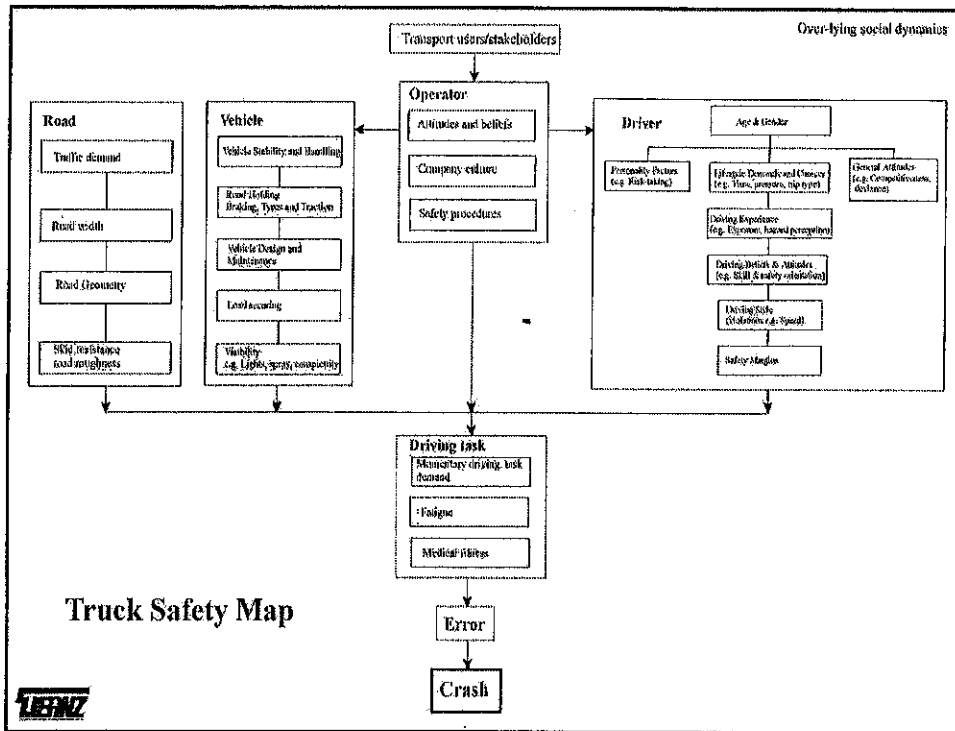




## Head-on crashes

- Nearly 75% of all fatal crashes involving trucks were head-on (including overtaking, lost control and straight head-on).
- This high proportion of head-on crashes is consistent with having a high proportion of two-way rural roads.

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- Perception primarily through a 2 to 4 degree cone, much like seeing with a torch
- With high workload (traffic, cellphone use etc.) ability to process the data limited resulting in higher crash risk.
- With low workload attention diverted to other thoughts, inattention.



## **Fatigue and fitness for duty**

The main effect of fatigue is a progressive **involuntary** withdrawal of attention from road and traffic demands.

- Switching attention to inner thoughts -- DWA
- Fixation shifted too close to front of vehicle --  
Empty Field Myopia
- Microsleeps & nodding off

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- **Fatigue a factor in 7% to 18% of fatal and injury crashes.**
- **Most important factor is the lack of sleep**
- **Average person needs 8 hours sleep. Most drivers obtain less than this.**
- **Time of day affects ability to sleep.**
- **Drugs, alcohol and medical fitness all affect ability to drive**

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- 22 percent of State Highway on mountainous terrain
- State Highways have curves of 750m or less every 2 km.
- 1/2 of these are 250m or less.
- Road geometry, seal width and shoulder treatments of concern

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**NZ**

- Divided highways primarily urban
- Estimate 2 to 5 percent travel on divided highways


**Divided  
Highways**

**USA**

- 62 percent of multi-trailer vehicle travel on divided highways
- 53 percent for single trailer combinations
- 29 percent for single unit vehicles

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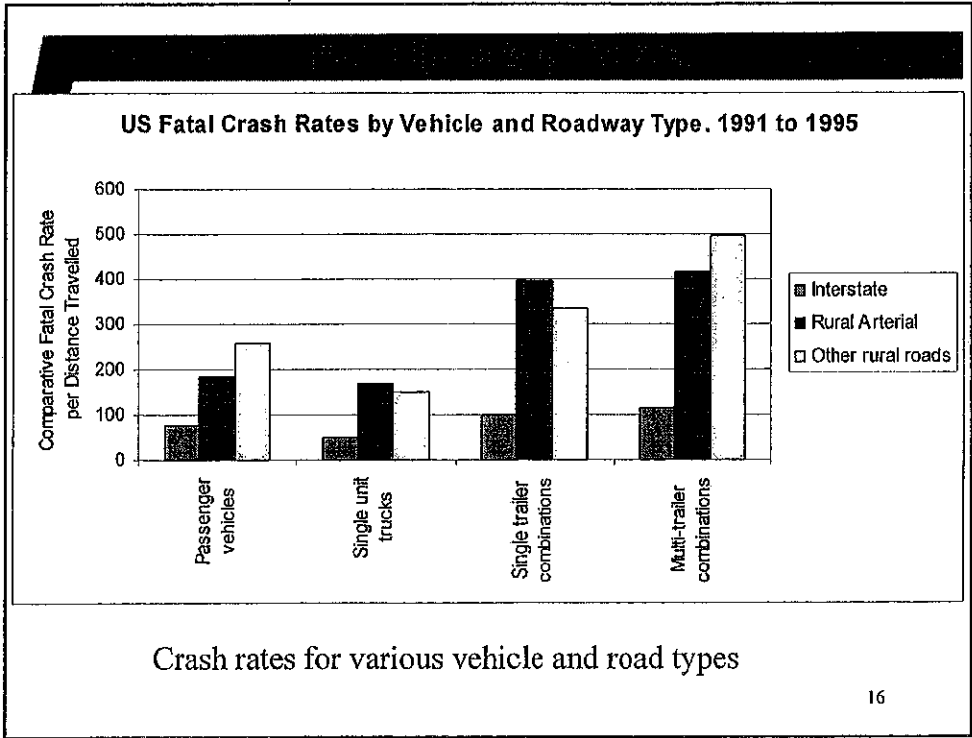


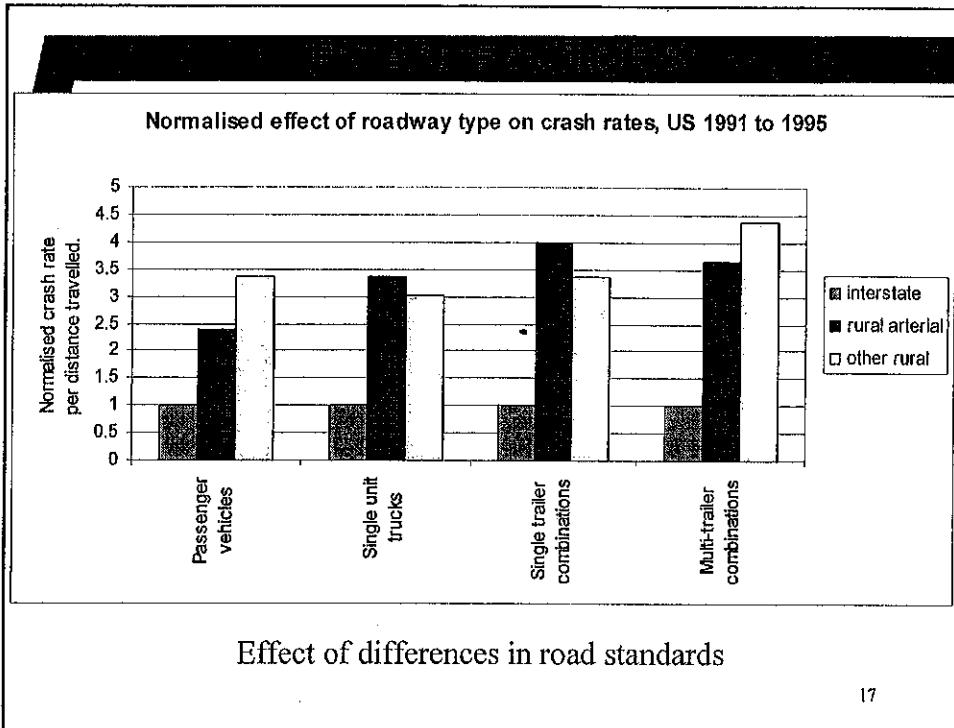
**Overall fatal crash rates per distance travelled are 1/4 to 1/3 on divided highways compared to other roadway types.**

**The greatest difference is with combination vehicles**

(Based on US and Australian experience)

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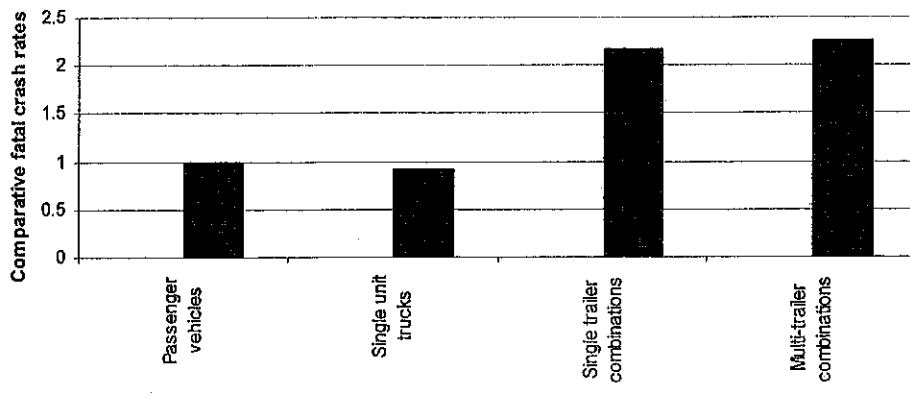


- Seal and lane width**
- NZ roads 3m to 3.5m lane width.
  - Significant variations in lane width
  - Increase of 1m in seal width for 3.7m lane width roads resulted in 20% reduction in crashes in Australia.
  - Shoulders greater than 1.8m to 2.4m can be detrimental to safety however
- 18

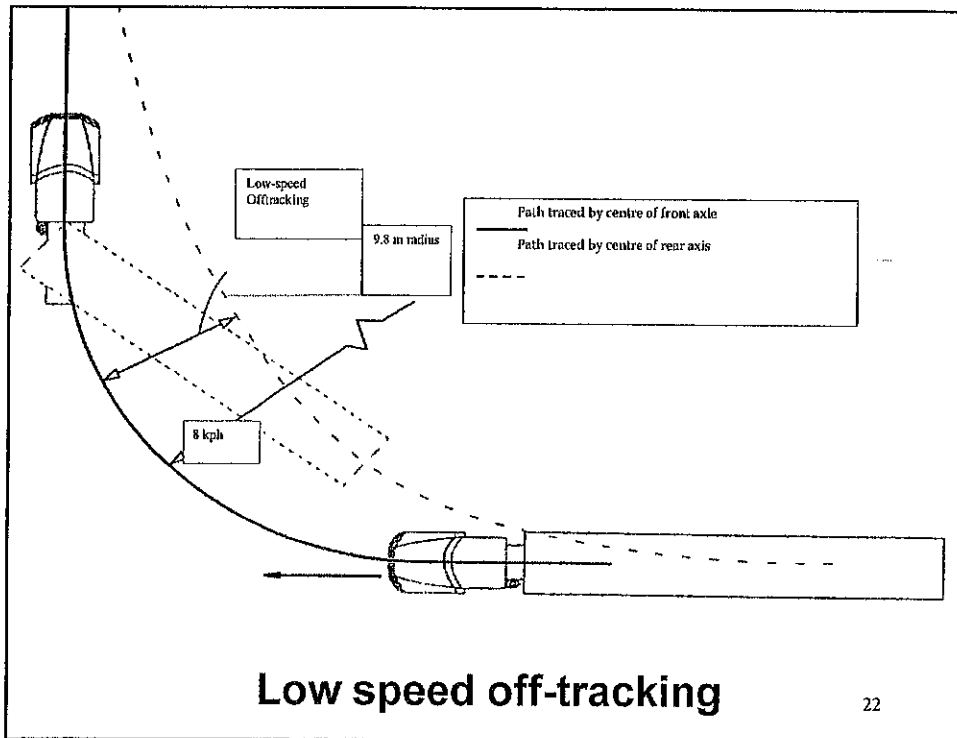
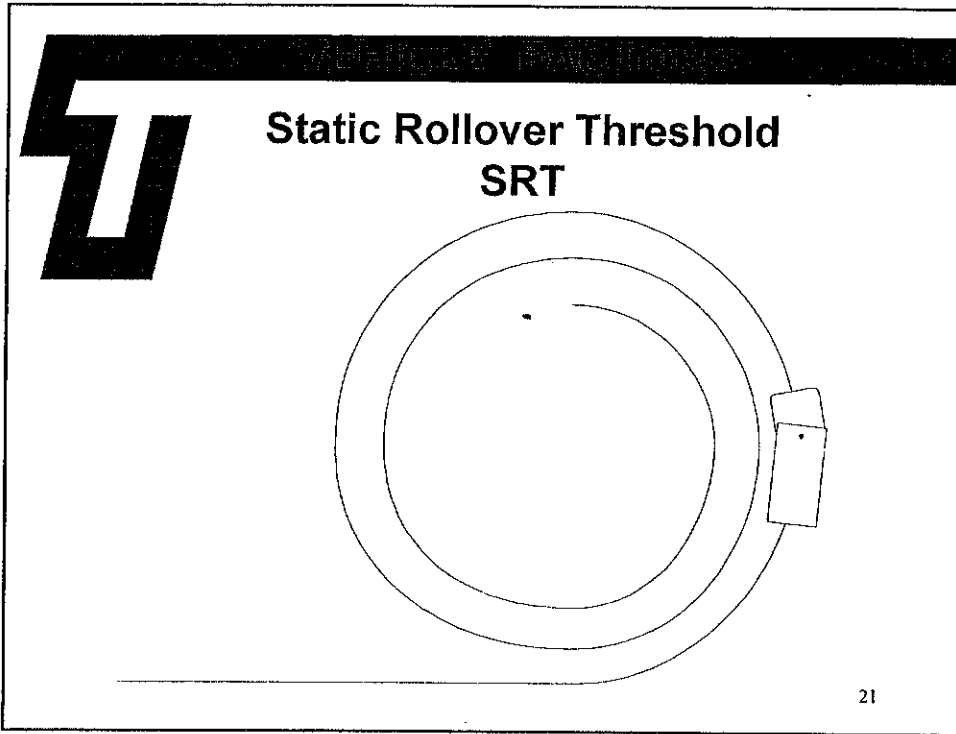


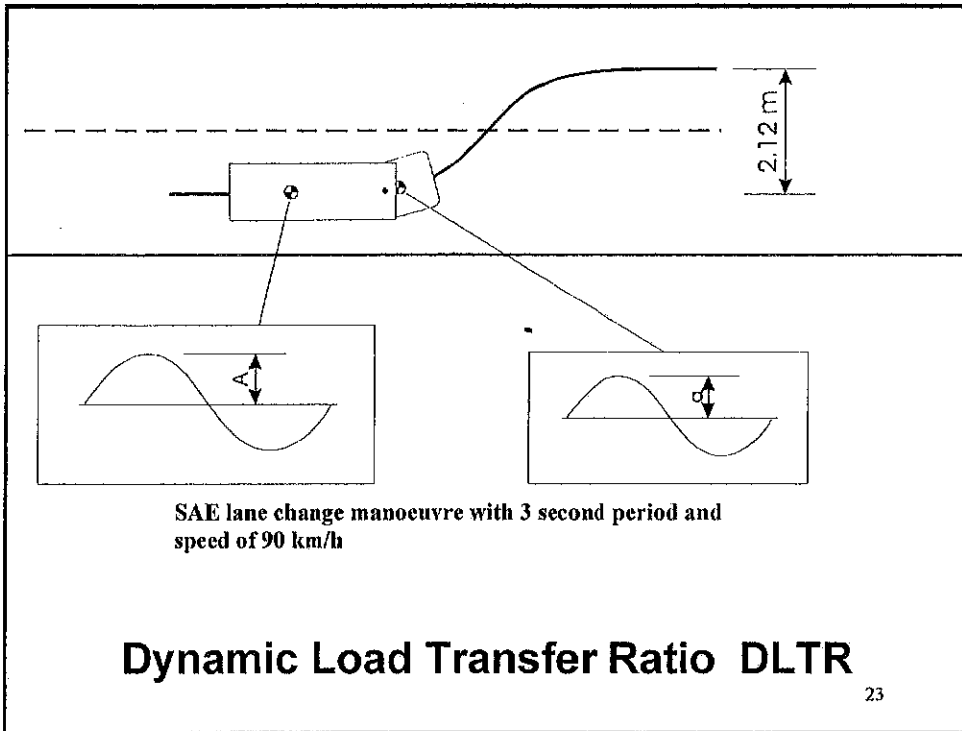
- Vehicle stability and handling
- Road holding (Braking, tyres, traction)
- Vehicle design and manufacture
- Maintenance
- Load securing
- Visibility (Lights, spray, conspicuity)

**Normalised Fatal Crash Rates  
Rural Arterial Roads. USA 1991-1995**



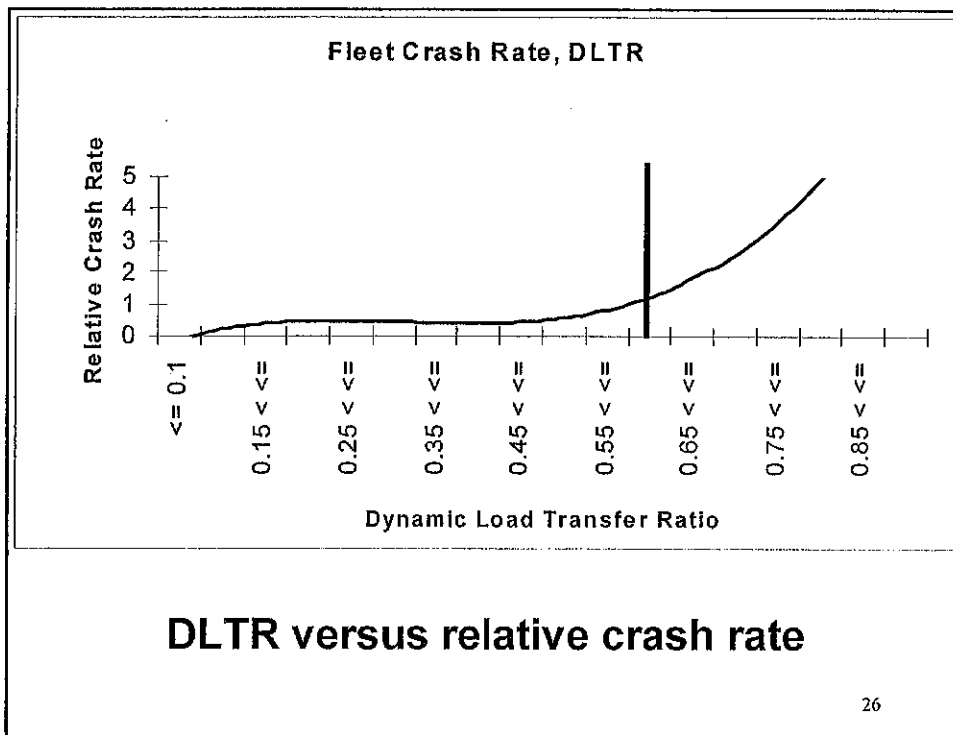
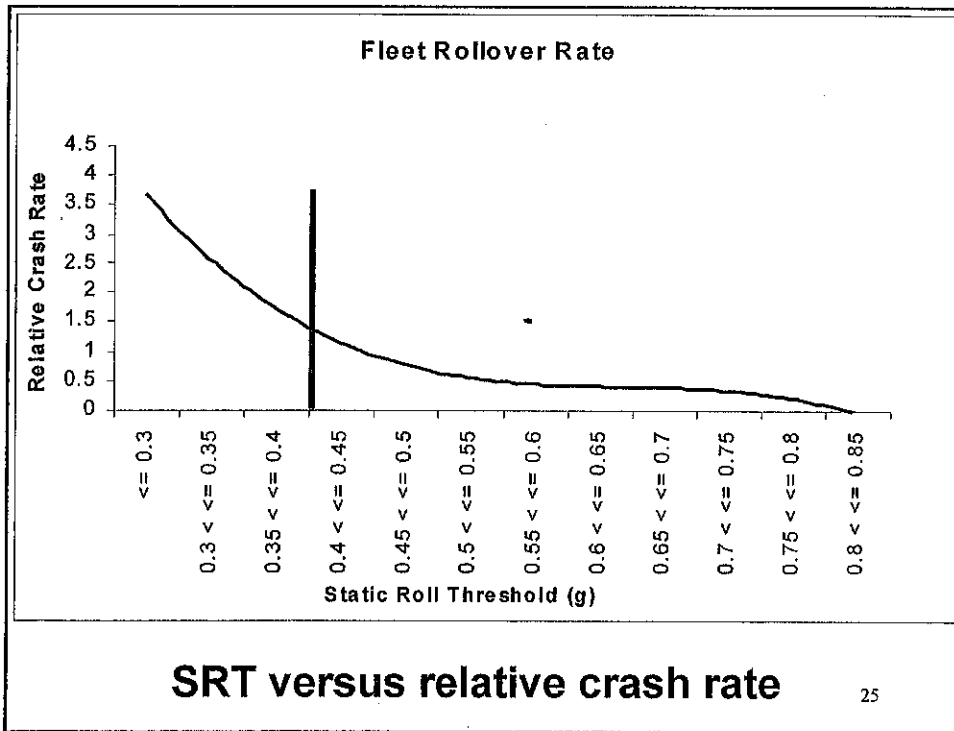
**Effect of configuration on crash rates for main rural roads**





- 85% of fleet better than 0.35g SRT
- the 15% of rigs with SRT worse than 0.35g involved in 40% of rollover and loss of control crashes
- the 35% of rigs with DLTR worse than 0.6 involved in 58% of rollover and loss of control crashes.

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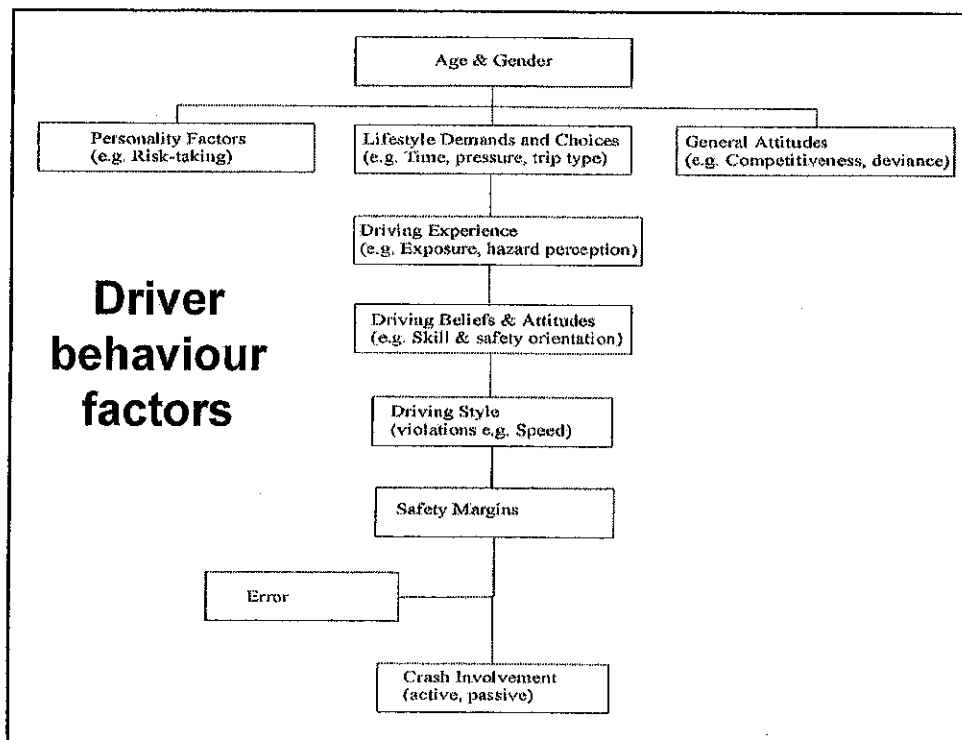




## Brakes and roadworthiness

- Brakes estimated to be a contributing factor in 6% to 11% of crashes
- Mechanical faults (other than brakes) a factor in 2% of crashes but probably under reported

27



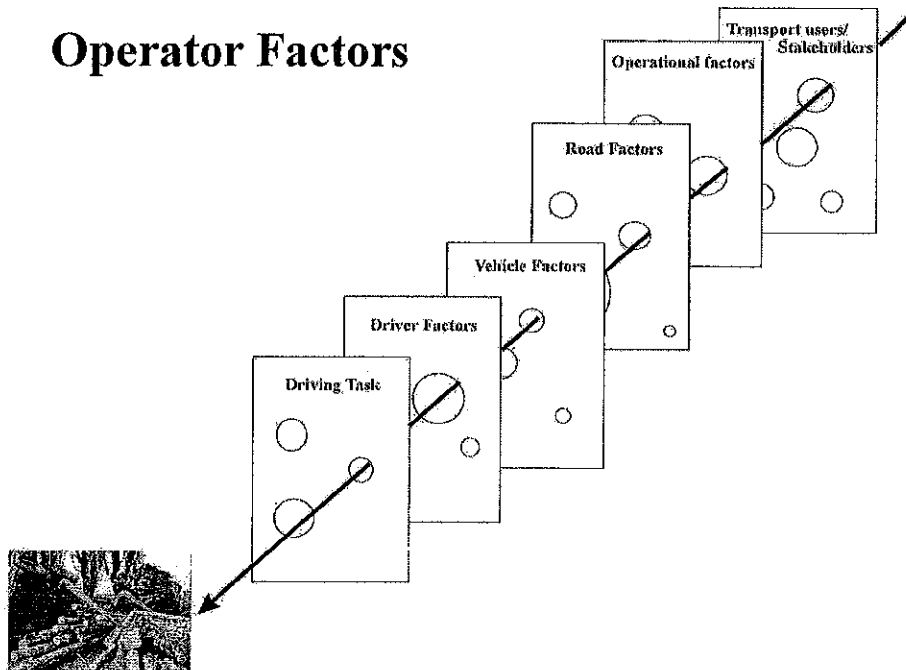


## Speed

- Speed a contributing factor in 1/4 of crashes attended by Police CVIU
- Mean free-running speed 93 km/h.
- 15% exceed 100km/h.
- Speed around curves of particular concern as rollover occurred in 29% of crashes attended by CVIU

29

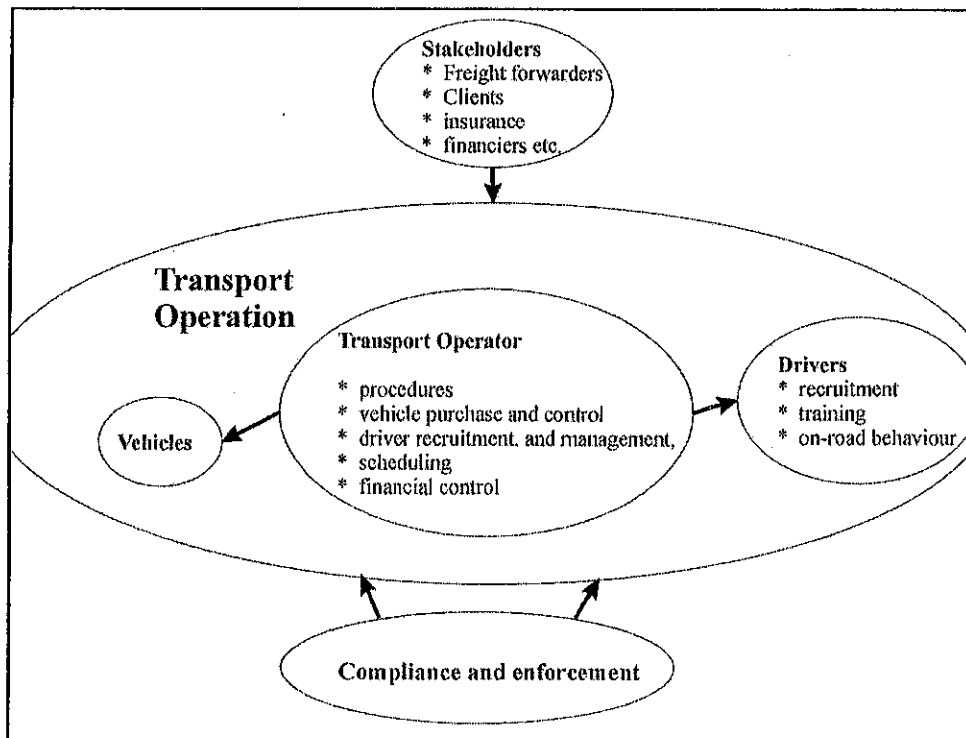
## Operator Factors








- Operators control driver recruitment, training, schedules, vehicle purchase and maintenance
- Operators are responsible for the safety of their operation.
- Safety management approach consistent with OSH and overseas trends (including in the US, Australia and the UK)




**TRAINING OPERATIONS**



- Operators that do not investigate crashes and take no action were found to have <sup>had</sup> 9 times crash rate of those that do.
- Those unfamiliar with driving hours and kept no records had crash rates 30% higher than those that did. (Moses and Savage)

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**TRAINING OPERATIONS**



**Quality of operations vary**

- Financial viability
- Knowledge and experience
- Attitude towards safety
- New entrants
- Unrealistic demands
- Safety management systems

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- **22% of all fatal crashes involve a truck**
- **Trucks at fault in 7% of all fatal crashes**
- **Trucks account for 6.2% of distance travelled**
- **Trucks at fault in 50% of injury crashes.**
- **Growth of 4 to 5% p.a. (GDP ~ 2%)**

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- **Society view is that anything less than perfect is not acceptable (e.g. media focus on medical profession, education and transport)**
- **Recent log truck crash and earlier High Court rulings have stated that a higher standard is expected of commercial drivers than average drivers**

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- **There is considerable room for improvement**
- **There is no single, simple solution**
- **You all have a role to play in improving safety and are not exempt from the media spotlight should you not take your role seriously.**