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# An analysis of work vehicle safety in South Australia and the effect that purchasing decisions have on crash risk

# The report

- Sponsored by SafeWork SA
- Focus on light vehicles
- Work-related road safety in general but highly relevant to fleet safety
- Available at: casr.adelaide.edu.au

# Report chapters

- Review of literature regarding work-related road safety

- Analysis of work-related road safety in South Australia
  - How often do work-related crashes occur?
  - What do they look like?
  - How do they differ from crashes in general?

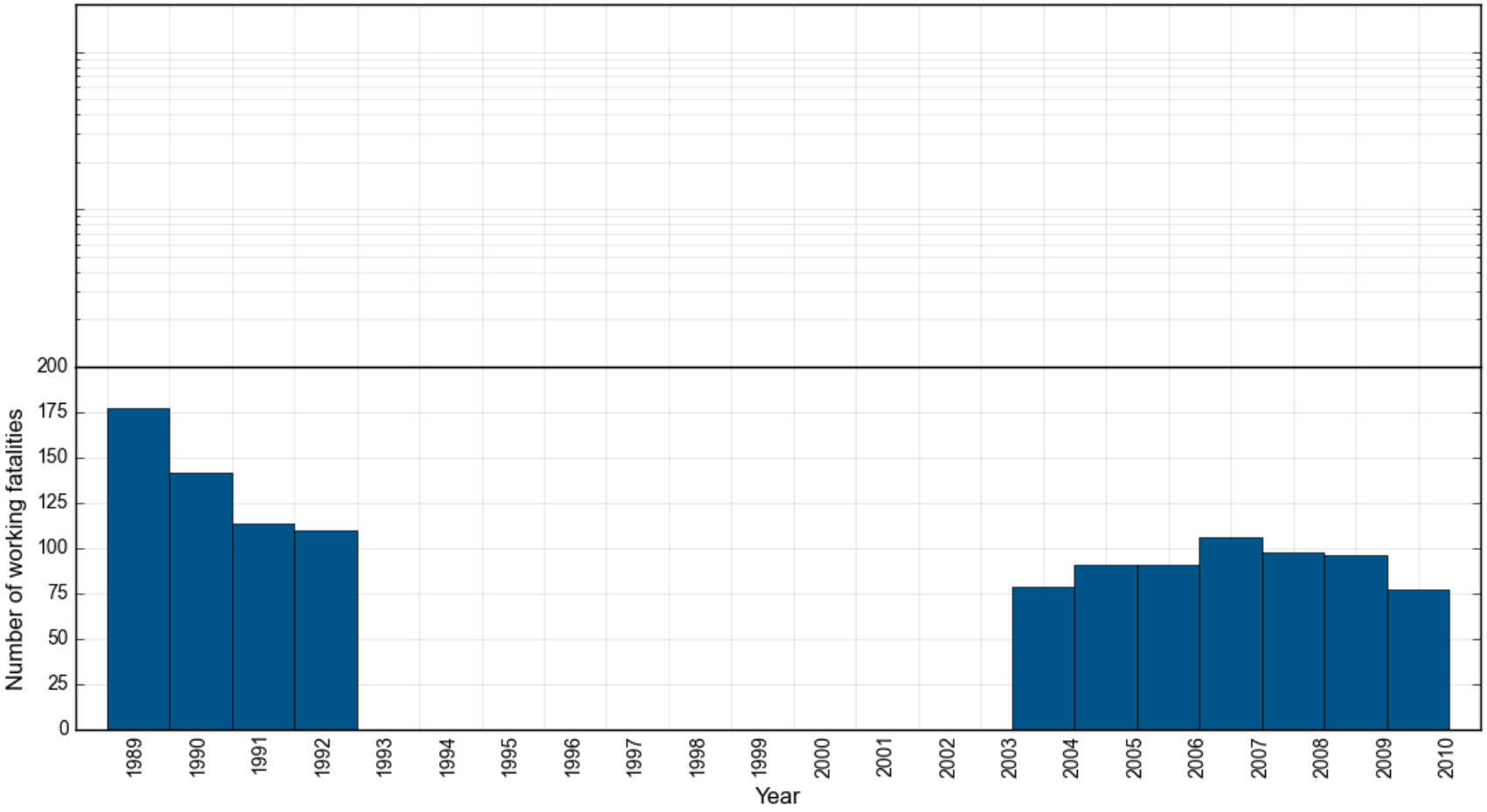
- Analysis of a large South Australia fleet
  - What is the crash experience of the fleet?
  - To what extent are safety features installed?
  - What effect do these safety features have on crashes?

# Work-related road safety data is scarce

- Work-related driving exists with a WHS and road safety framework
- Historically considered a road safety issue
  - Police will investigate
  - Roads authorities will monitor
  - Roads authorities will pursue preventative measures

- Fortunately can still find data sources:
  - Worker compensation
  - Coroners files
  - Registration data
  - Purchasing records

# Work-related road fatalities in Australia



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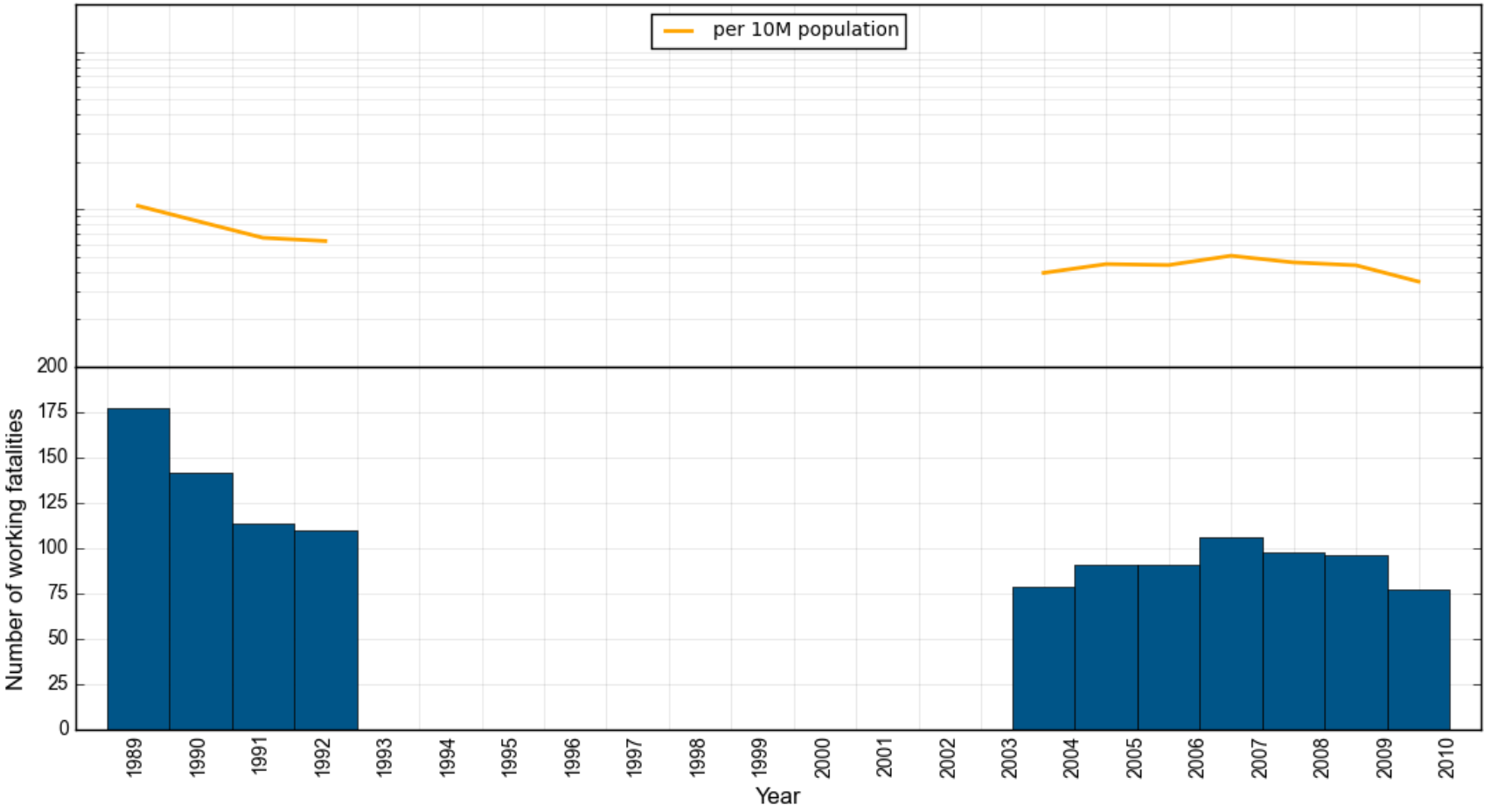

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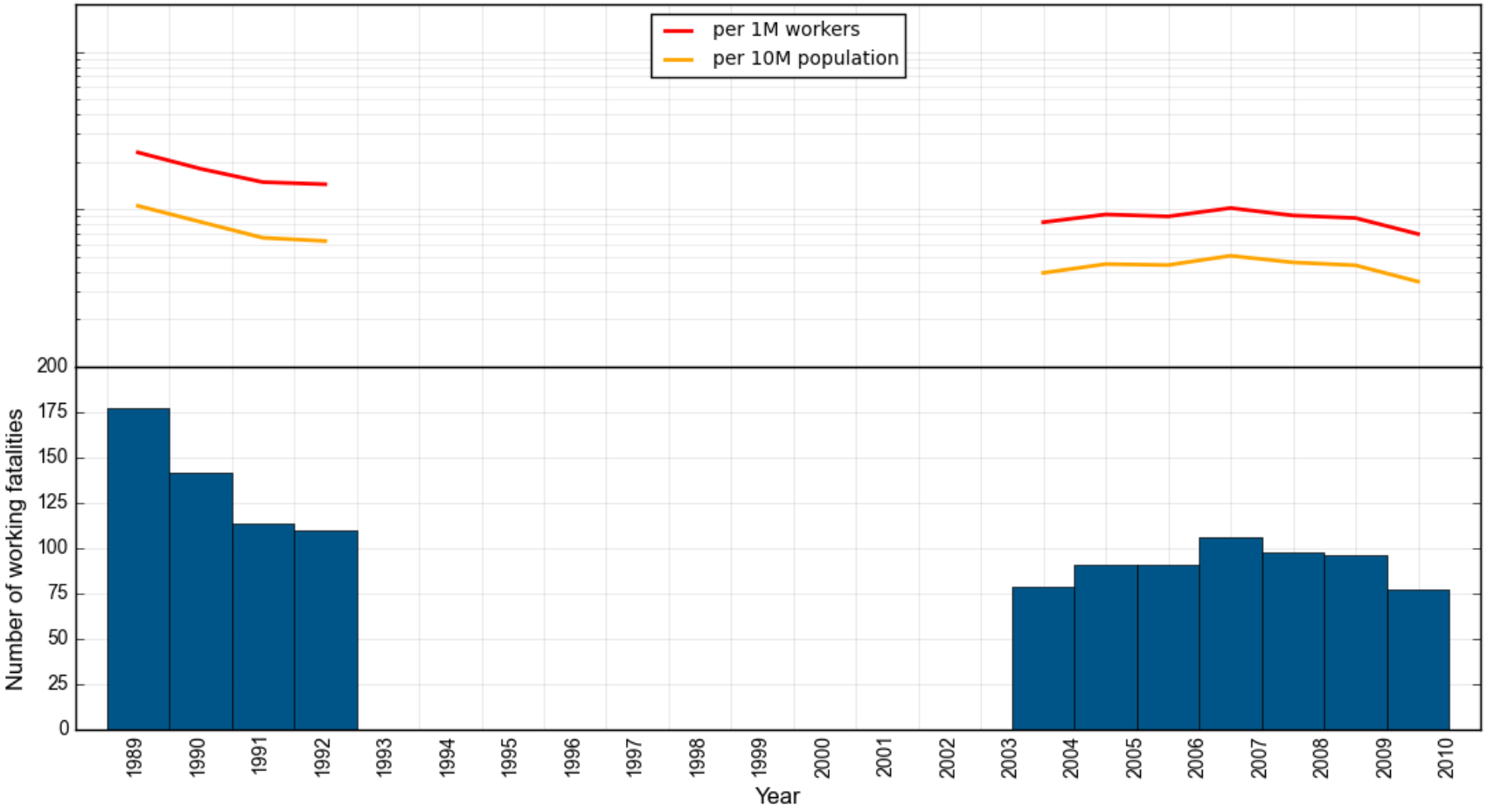

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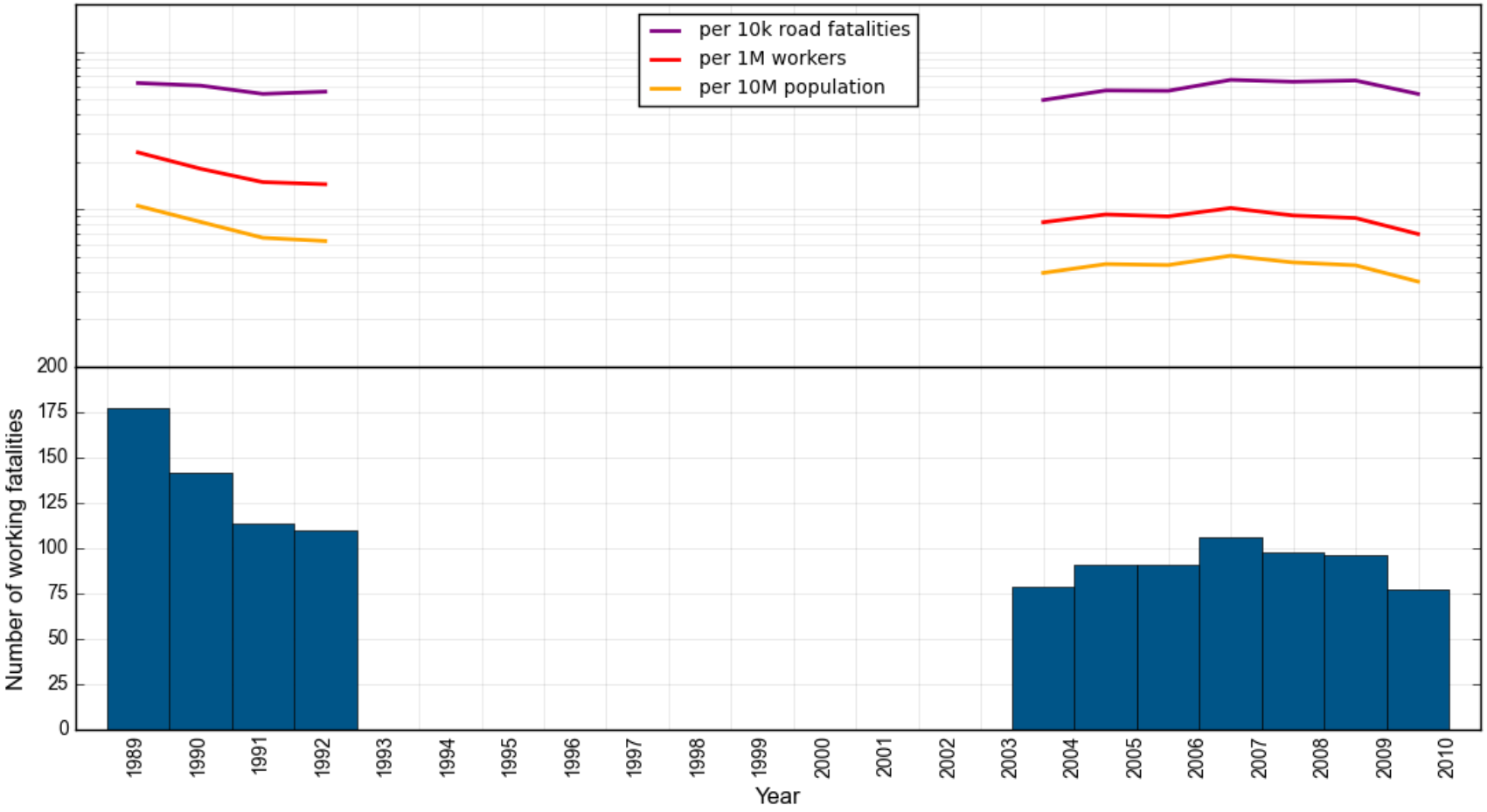

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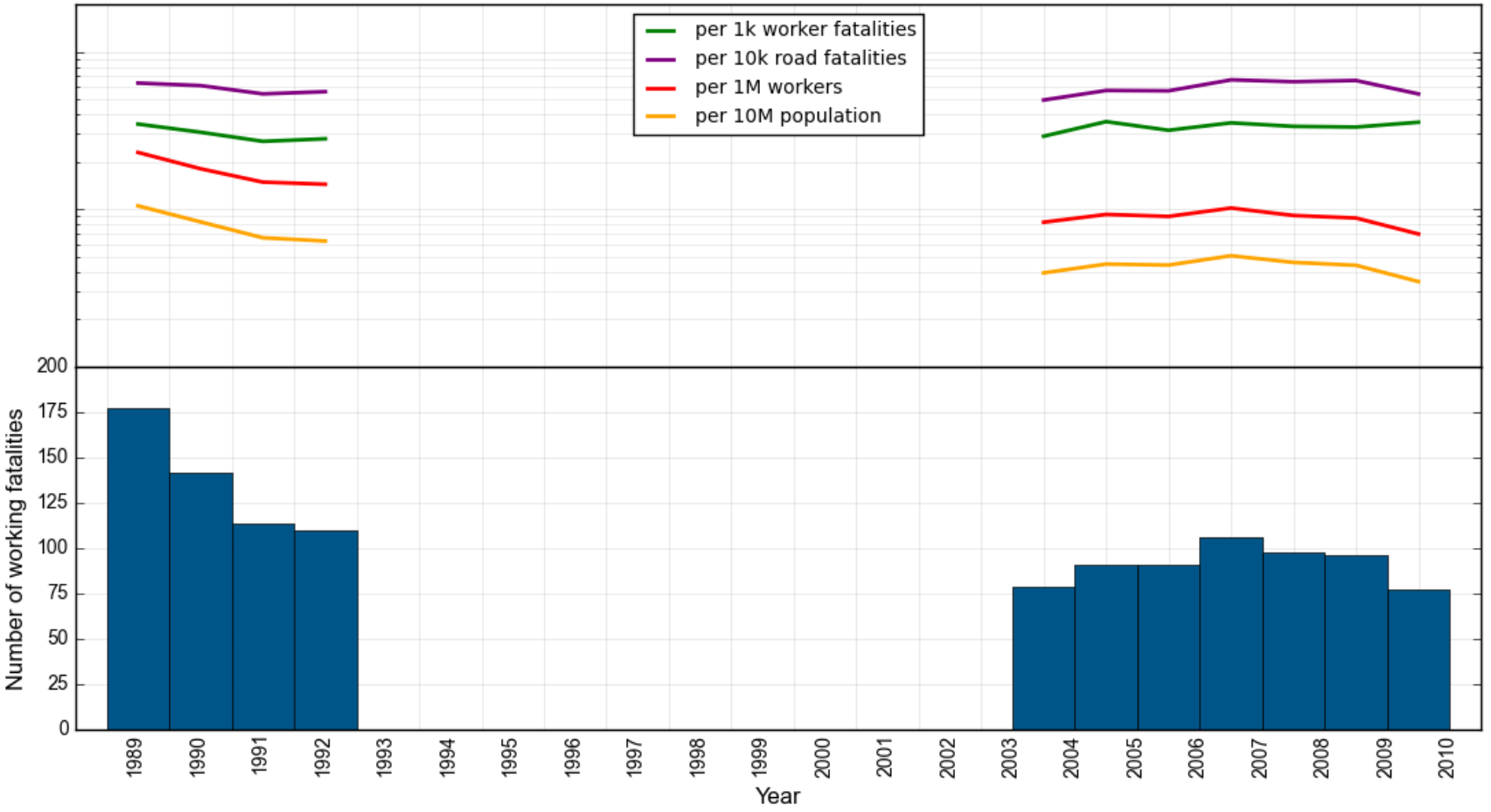
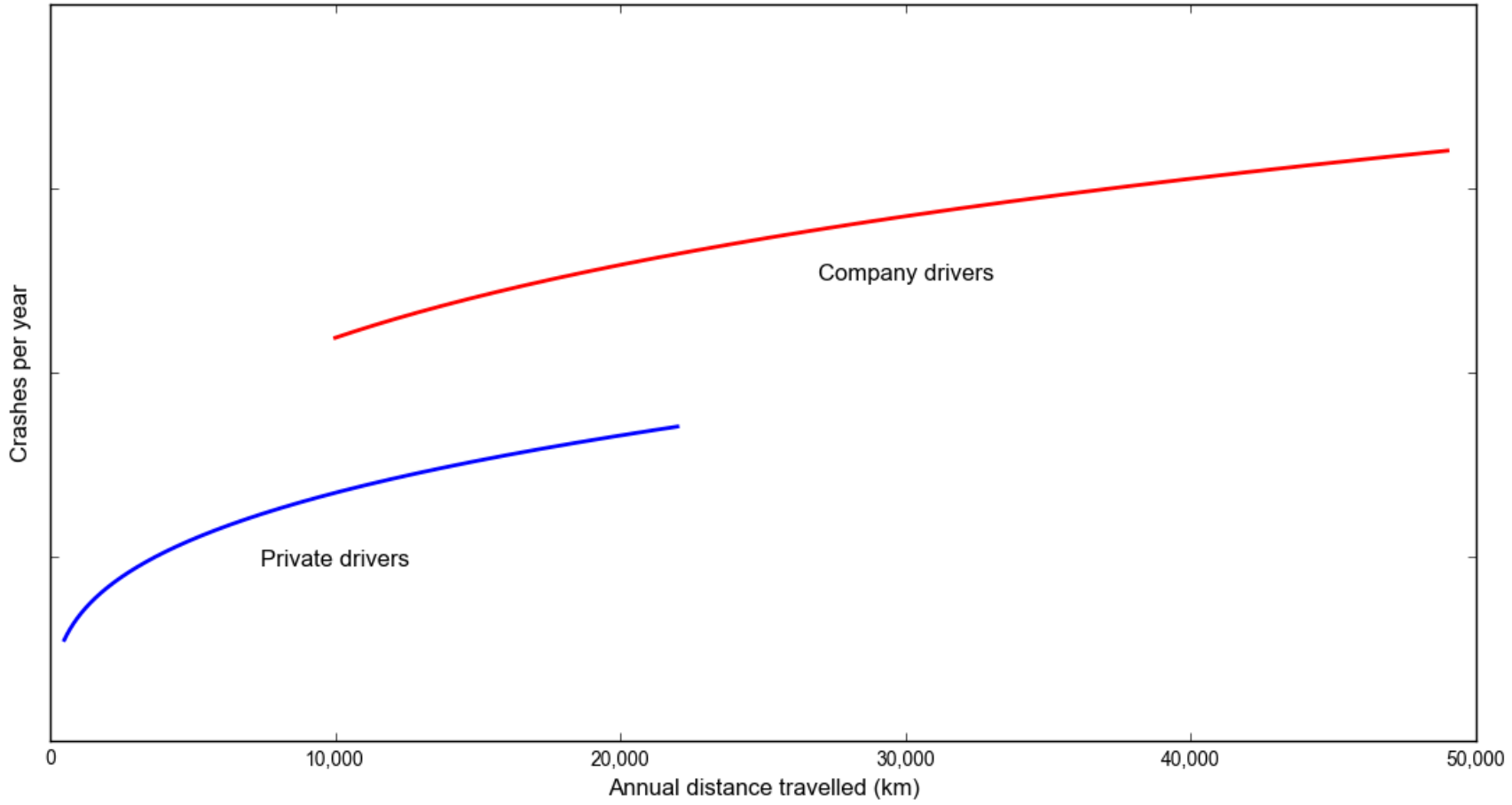


# The work driver effect



# Analysis of work-related road safety in SA

- During the period 2006 to 2010 there were 29,172 crashes involving 48,884 light vehicles in South Australia.
- Unfortunately it is not possible to directly identify which of these vehicles were being used for work at the time they were involved in a crash.

# Methods and analysis

- Two methods of identifying work-related crashes in SA
  - Fleet vehicles identified using VFACTS purchasing data
  - Work vehicles identified using WorkCover claims data

- Analysis
  - Vehicle characteristics
  - Crash characteristics
  - Crash rate

# Identifying fleet vehicles

- We assumed that any vehicle that crashed 3 years or less after being purchased by a fleet buyer was operating as a fleet vehicle

- Using this method we managed to identify 295 fleet vehicles that were involved in a serious or fatal crash

- Comparison group of non-fleet vehicles that were 3 years old or newer and were involved in a serious or fatal crash

# Fleet vehicle characteristics

- Vehicle type
  - Around 50% sedans and 25% utes
  - The prevalence of vans and utes was higher compared to non-fleet vehicles

- Safety features
  - High fitment rates of ABS and driver airbags
  - Fitment rates of other features were lower but similar compared to non-fleet vehicles
  - This was not true of front curtain airbags which had a lower fitment rate compared to non-fleet vehicles

# Fleet vehicle crash characteristics

- Fleet vehicles were more likely to:
  - Crash during working hours
  - Be driven by a person of working age
  - Be driven by a male
  - Crash in 50-60 km/h speed zones
- Injury propensity and responsibility in multiple vehicle crashes:
  - 32.1% chance that a fleet vehicle occupant was one of the most injured casualties
  - 40.1% chance that a fleet vehicle driver was responsible

# Fleet vehicle crash rate

- Driving exposure was unknown
  - Therefore it was estimated by counting the number of rear end struck crashes

| Group | All crashes | Exposure crashes | Crash rate | Crash rate ratio (CRR) |
|---|---|---|---|---|
| South Australia | | | | |
| Non-fleet | 206 | 39 | 5.28 | |
| Fleet | 174 | 31 | 5.61 | 1.06 |
| Adelaide | | | | |
| Non-fleet | 151 | 37 | 4.08 | |
| Fleet | 107 | 26 | 4.12 | 1.01 |

# Identifying work vehicles

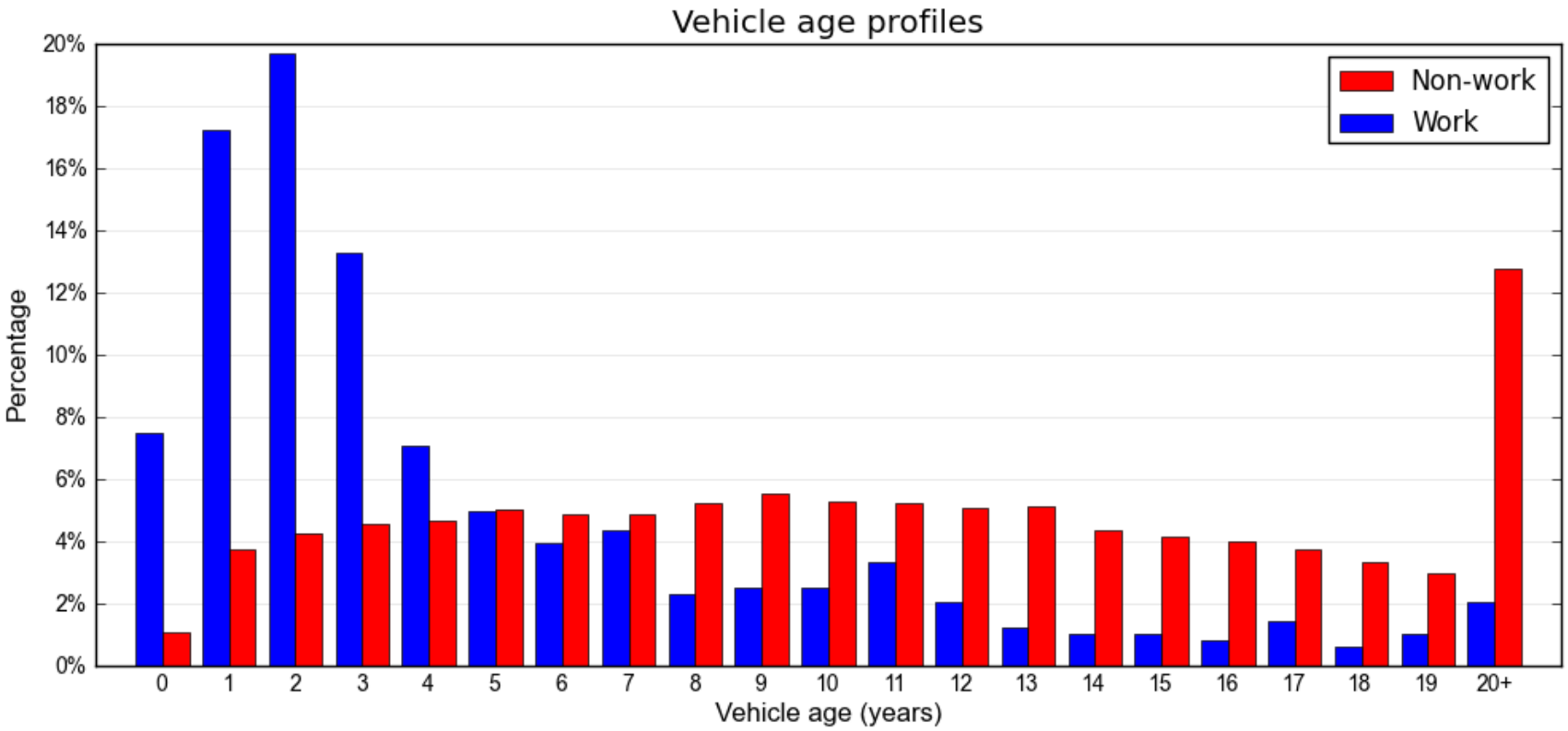
- WorkCover claims resulting from ‘vehicle accident’
  - Date of incident
  - Time of incident
  - Worker sex
  - Worker age
- Matched to crash records based on commonalities
- Managed to identify 491 vehicles being used for work when involved in a casualty crash

# Work vehicle characteristics

- Vehicle type
  - Around 50% sedans and 19% utes
  - Vans and utes were much more prevalent in work vehicles compared to non-work vehicles
  - Station wagons were slightly more prevalent

- Safety features
  - Low fitment rates for all technologies apart from driver airbags (73%) and ABS (48%)
  - Not possible to compare to non-work vehicles

# Work vehicle characteristics



# Work vehicle crash characteristics

- Work vehicles were more likely to:
  - Crash during working hours
  - Crash during weekdays
  - Be driven by a person of working age
  - Be driven by a male
  - Crash in rural locations
  - Crash in 70-110 km/h speed zones
  - Be involved in multiple vehicle crashes

# Work vehicle crash rate

- Used induced exposure again and weighted non-work vehicle crashes to compensate for age differences

| Group | Crash count | Exposure count | Crash rate | Crash rate ratio (CRR) |
|---|---|---|---|---|
| South Australia | | | | |
| Non-work (weighted) | 654.98 | 273.89 | 2.39 | |
| Work | 428 | 138 | 3.10 | 1.30** |
| Adelaide | | | | |
| Non-work (weighted) | 553.37 | 263.56 | 2.10 | |
| Work | 313 | 124 | 2.52 | 1.20* |

* $p < 0.05$, ** $p < 0.001$

- Largest differences in crash rate were for right angle and side swipe type crashes

# Work vehicle crash rate

- Differences in occupancy?
- Differences in levels of reporting?
- Reason for higher crash risk is unknown, but we can speculate:
  - Drivers under stress or time pressures?
  - Drivers in unfamiliar vehicles?
  - Drivers in unfamiliar locations?

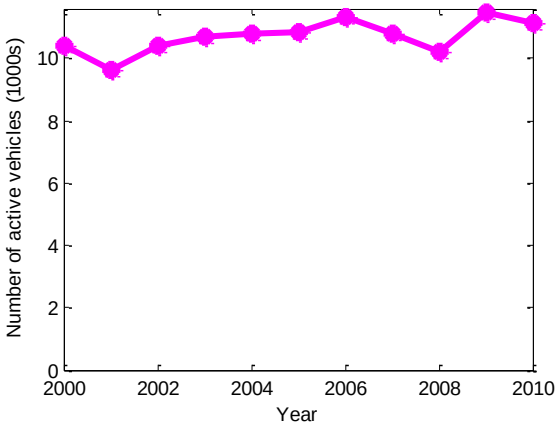
# Analysis of a large SA based fleet

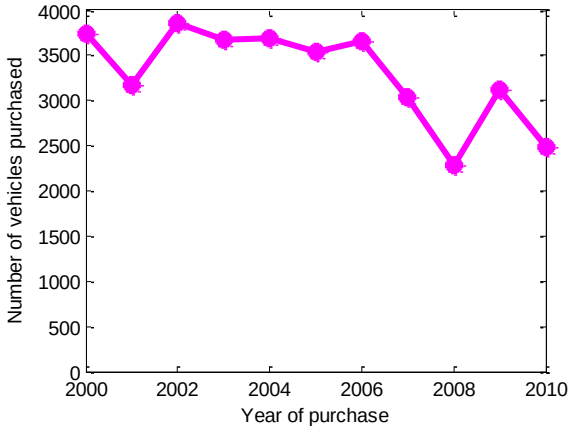
- Data on all vehicles purchased by Fleet SA during the period 1998 to 2010, plus details on:
  - The crashes they were involved in
  - The number of kilometres driven

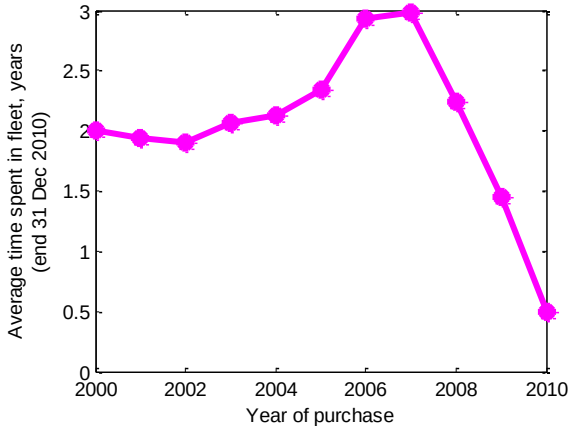
- Investigated:
  - The fleet
  - The crashes
  - The installation of vehicle safety technologies
  - The effect that safety technologies had on crash rate

# The fleet

- 42,899 vehicles (emergency vehicles were removed from the analysis)

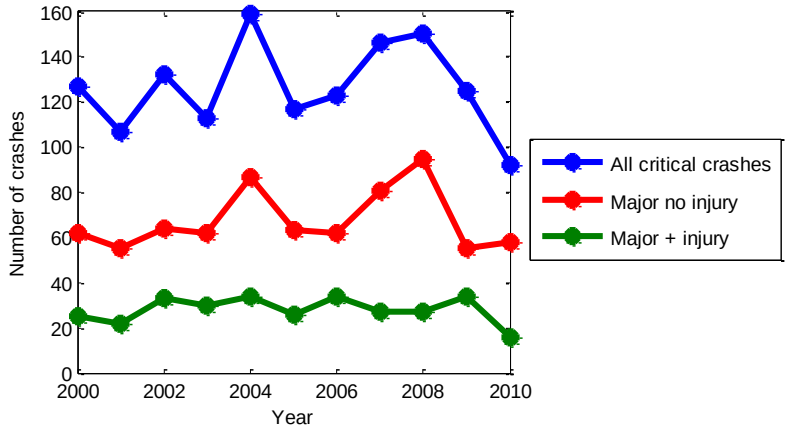


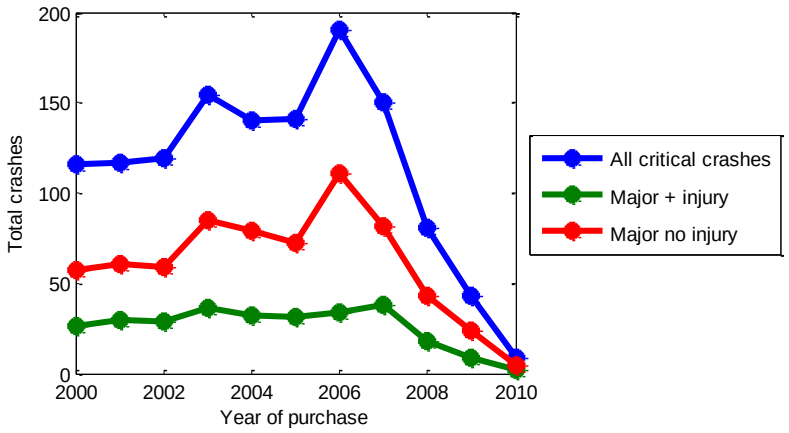



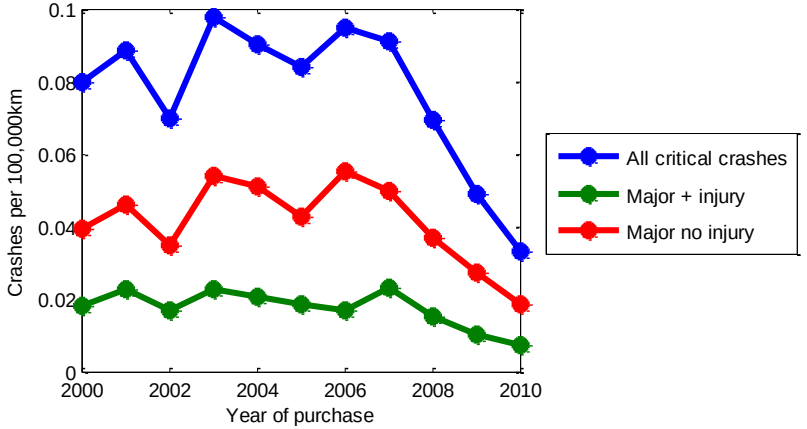



# The crashes

- 18,527 crashes (of which 647 resulted in an injury)

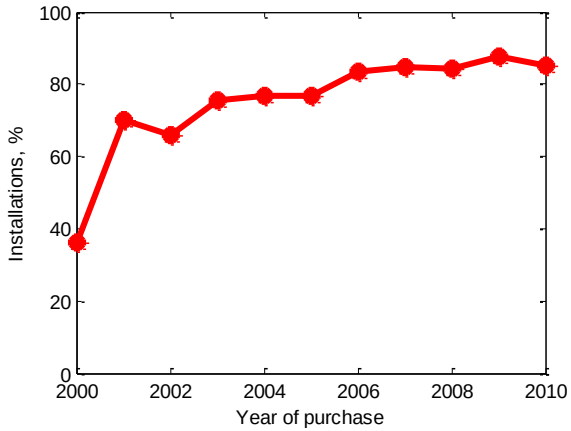


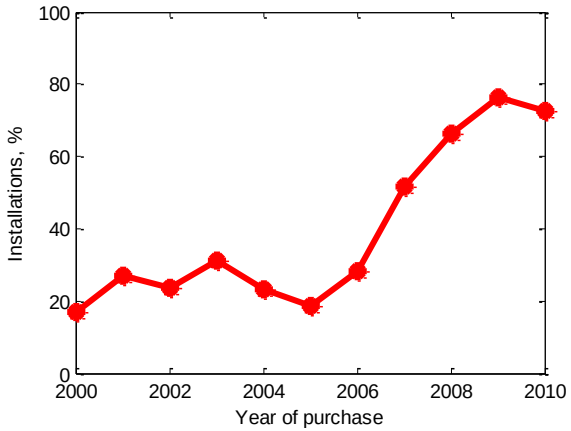



# Primary safety technologies

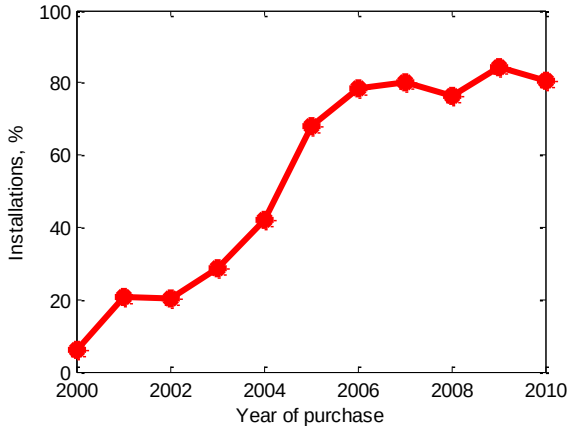
ABS



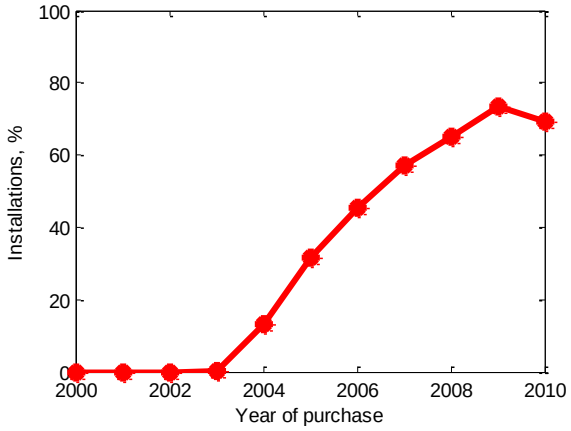

TCS



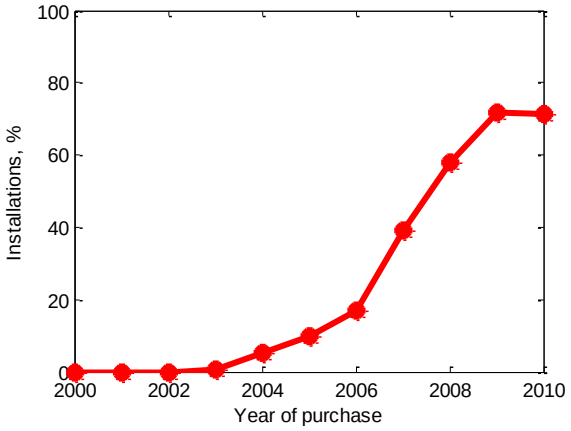

EBD




BAS

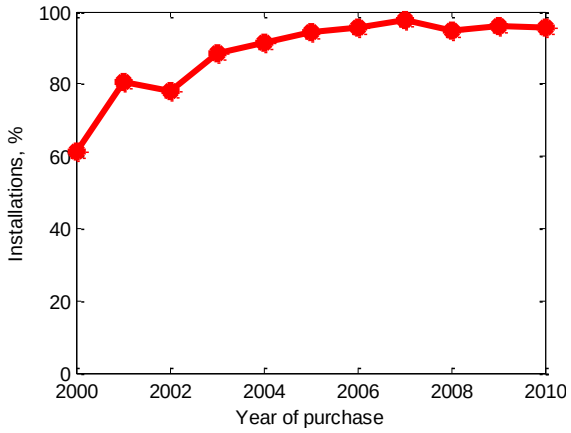



ESC

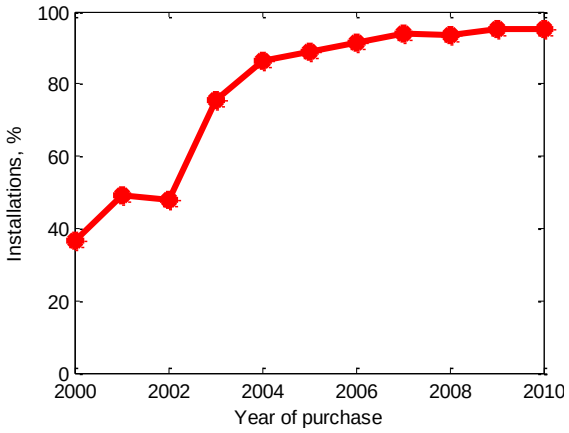


# Secondary safety technologies

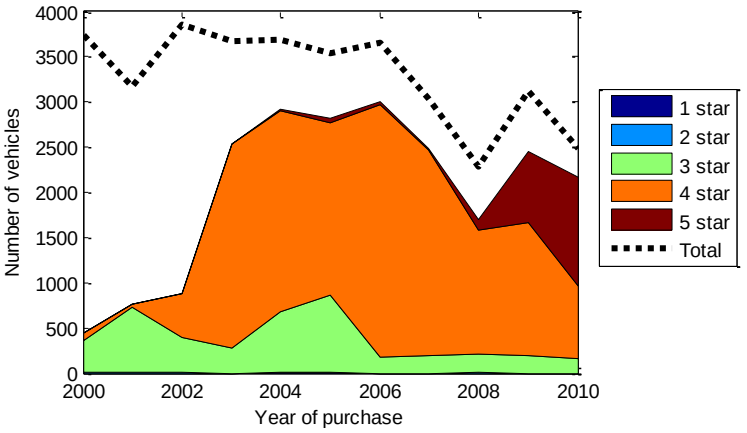
## Driver airbag



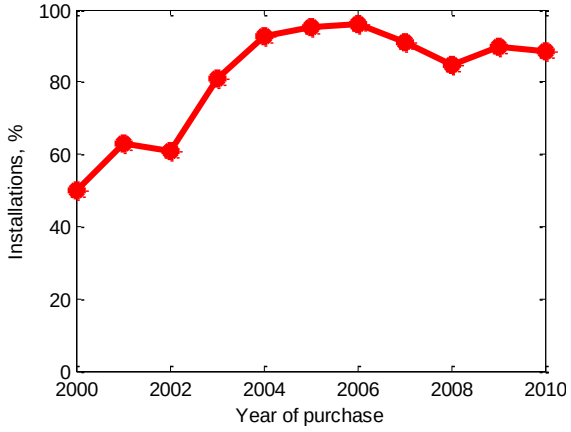

## Passenger airbag



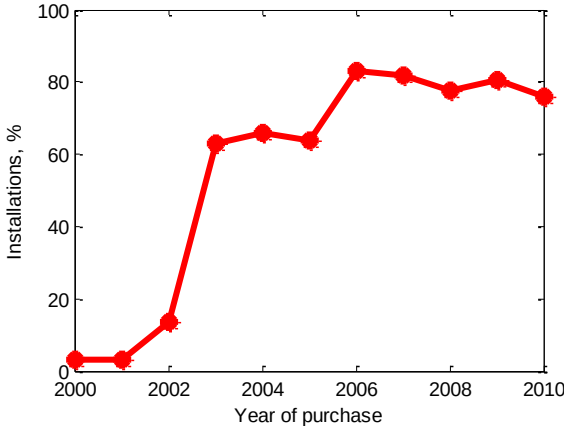

## Occupant star rating



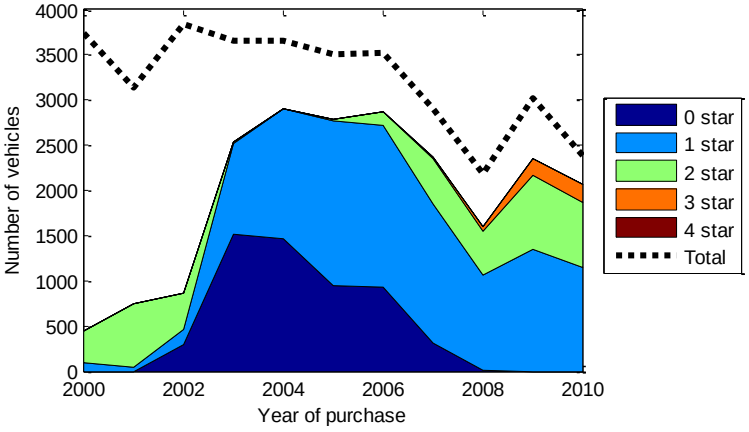

## Seat belt pretensioner




## Seat belt force limiter




## Pedestrian star rating



# Technology effect on crash rate

- Isolating the analysis of each technology on crash rate is tricky

- The significant findings were:
  - ESC was associated with a decreased crash rate
  - Five star ANCAP rating was associated with a decreased crash rate

# Summary

- Fleet/work vehicles have a higher prevalence of vans, utes, and station wagons
- Fleet/work vehicles tend to be newer and the installation rate of safety technologies is good
  - Though sometimes limited by vehicle type
- There is some indication that work vehicles have a higher crash rate but the reasons for this are unknown
  - Driven by right angle and side swipe
- Safety technologies have been shown to effectively reduce crash rates

# Discussion

- Employers (including fleet managers) have an opportunity to greatly influence work-related driving safety
  - Dictate vehicle safety
  - Influence driving attitudes and behaviours

- Should therefore be aiming to have greater safety performance than the public and influence general road safety too
  - Pass on safer vehicles
  - Pass on safer behaviours

# Acknowledgements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- The views expressed in this report are those of the authors and do not necessarily represent those of the University of Adelaide or the funding organisations.



Government of South Australia

Department of Planning, Transport and Infrastructure