How Safe are the Cars on our Roads? Data Visualisations to Analyse NSW Light Vehicle Fleet Safety at a Glance

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Abstract

The NSW Centre for Road Safety (CRS) has developed two vehicle fleet safety visualisation tools to provide insights into the safety of the light vehicle fleet and its relationship to road trauma. The visualisations present a snapshot of the safety specifications of a subset of NSW registered light vehicles, and their involvement rates in crashes. To our knowledge, this is the first application of visualisation tools to match vehicle safety specifications data with crash data. The visualisations assist CRS policy-makers in research and policy analyses by allowing users to filter data and present queries in simple graphical displays.

Background

Improvements in the safety of the vehicle fleet have the potential to drive major reductions in road trauma. Detailed vehicle fleet safety specifications data, however, are typically difficult and labour-intensive to obtain and compile.

CRS has developed two vehicle visualisations to make NSW vehicle fleet safety specifications data routinely available to policy-makers in a user-friendly way. The first contains a snapshot of the NSW registered light vehicle fleet. The second contains a snapshot of NSW-registered and written-off light vehicles that were involved in a crash.

Both visualisations are designed using the readily available software 'Tableau Desktop', which easily allows customisation of data queries. The visualisations aim to refine analyses and assist informed decision-making on policies and strategies to promote the purchase of safer vehicles.

Visualisation 1: NSW Vehicle Fleet Safety Specifications

This visualisation currently has data for more than 4.5 million NSW registered motorised light vehicles (excluding plant vehicles and motorcycles) with compliance plate years 2000−2016. The information is derived from registration data maintained by NSW Roads and Maritime Services, matched to vehicle manufacturer data through a Vehicle Identification Number (VIN) decoding process. The database is updated annually and the decoding process is performed annually. Quarterly data update is currently being considered.

The vehicle data includes age, ANCAP rating, market class, segment, make, model, vehicle type, colour, garaging location, and safety features fitted. For example, Figure 1a displays a query for ANCAP ratings and electronic stability control (ESC) install rates for light pick-up or cab chassis commercial vehicles. It shows that 99.9% of 5-star ANCAP-rated vehicles in this category had ESC installed, compared to 34% overall. The visualisation is able to show ESC install rates for each vehicle compliance year. Should uptake be slow, this information would inform programs to encourage faster uptake of commercial vehicles fitted with ESC.
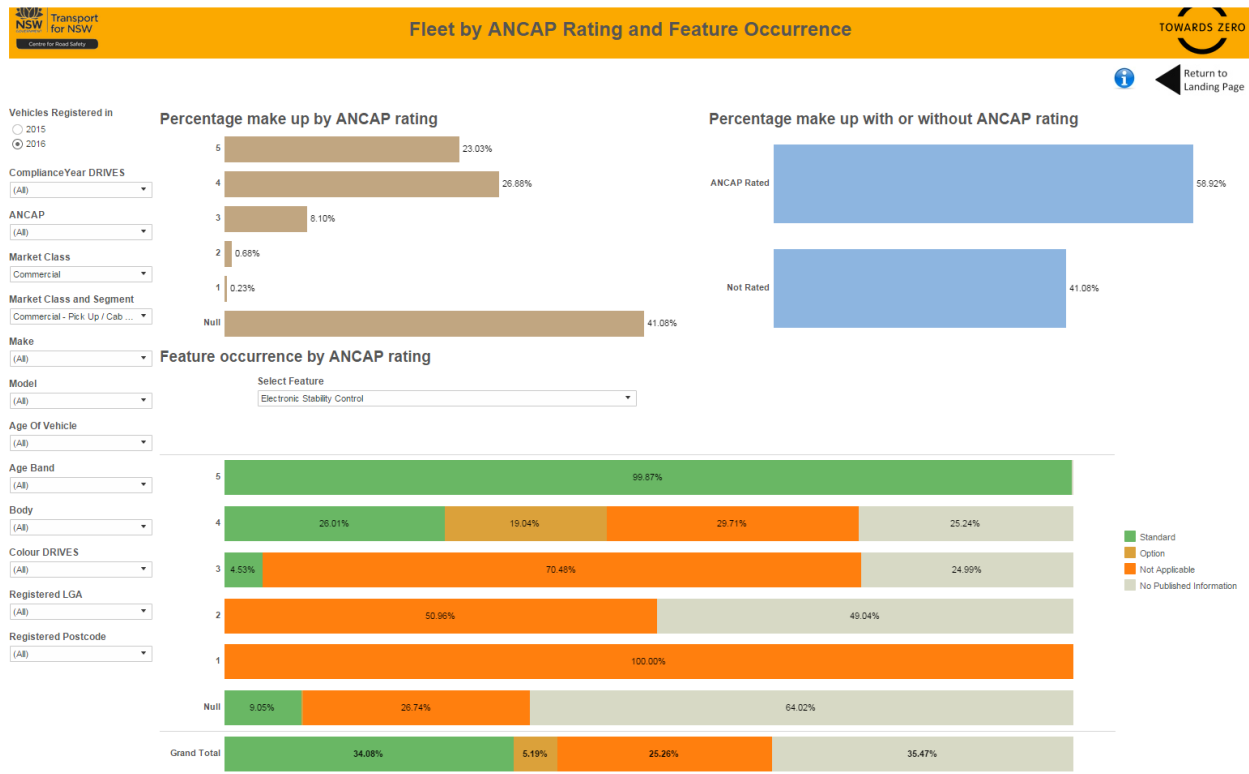
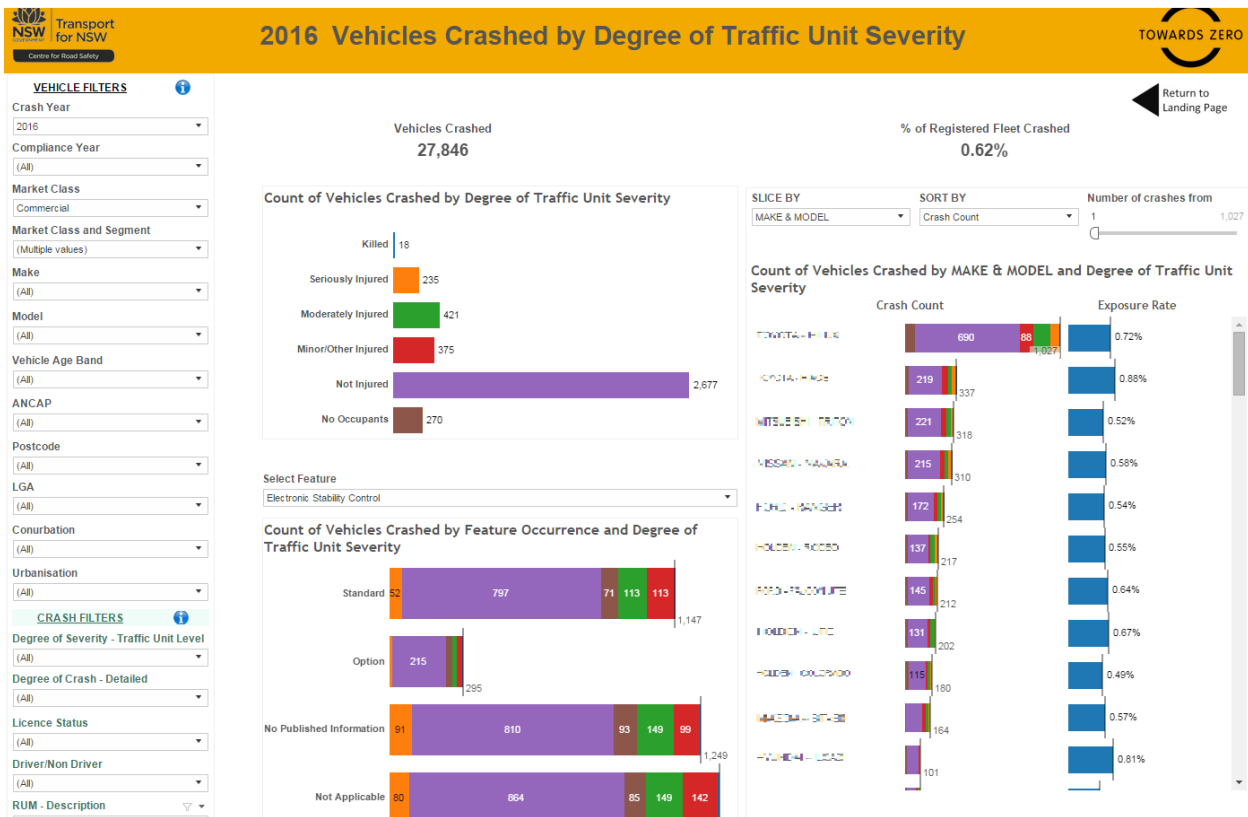***Figure 1a. Example of NSW Fleet Safety Specification query display***

Figure 1b. Example of NSW Crashed Vehicle Specification query display

Visualisation 2: NSW Crashed Vehicle Specifications

This visualisation currently has data for over 58,000 NSW-registered and written-off motorised light vehicles (excluding plant vehicles and motorcycles) that were involved in a crash in 2015 and/or 2016, with compliance plate years 2000–2016. The information is derived from the Vehicle Fleet Safety Specifications database, matched to NSW crash data.

This visualisation is useful in establishing crash trends and levels of safety specifications for those vehicles, filtered using aspects such as vehicle age, vehicle types, controllers' licence types, crash locations and severity of the crash. For example, Figure 1b displays a query for injury severity for commercial vehicles that crashed in 2016. These results can be further filtered to show fatal crashes only, indicating that one commercial vehicle with ESC resulted in a fatality, compared to 14 fatalities for crashes for commercial vehicles without ESC. This data could inform strategies to promote purchase of commercial vehicles with ESC.

This visualisation required complex programming, and there are limitations to how 'Tableau Desktop' is able to display information, however the background matched data has been very valuable in assisting CRS with more in-depth data to refine policy and strategy analyses.

Conclusion

The vehicle fleet visualisation tools have proven useful in assisting policy-makers to quickly and simply analyse and present vehicle safety data. For example, they have been used to help influence stakeholders in decision-making about safety features such as autonomous emergency braking, and to assist in providing advice on selecting safer vehicles for government fleet purchasers. Examples will be provided in the presentation.