

VEHICLE SAFETY WITHOUT REGULATION - A NON-REGULATORY APPROACH TO IMPROVING VEHICLE SAFETY IN NEW ZEALAND

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ABSTRACT

Consumer information has become the primary means of improving the safety of New Zealand's light vehicle fleet in recent years. With the rapid pace of vehicle technology improvements, and the difficulties associated with introducing new legislation in this area, there are potentially greater benefits to be had from implementing a sound non-regulatory approach than are possible from regulation alone.

The primary objectives of New Zealand's non-regulatory approach are to improve the safety of vehicles entering the fleet by increasing consumer demand for vehicles with high safety ratings, and also to influence the composition of the existing fleet through reduced demand for less-safe used vehicles.

In order to effectively bring this about, it is recognised that there is a need to disseminate credible and relevant safety information through a wide range of different channels. At the heart of the New Zealand approach is a website (www.rightcar.govt.nz) and an associated individual-vehicle-level database of safety ratings and specification data. This provides opportunities to extend the reach of safety information to a level where it is effectively unmissable by the vehicle buyer.

This paper presents a case study of the processes and systems that have enabled the NZ Transport Agency to put in place a consumer-driven programme for positively influencing the composition of the vehicle fleet. It describes how safety data is gathered from a diverse range of sources, how that data is collated and presented to vehicle buyers, and also the consumer education and information activities that support this programme.

INTRODUCTION

The question of how to improve the safety of the New Zealand vehicle fleet is one with no simple

solution. Making gains in this area involves using a diverse mixture of tools over a long period of time, ranging from strict regulation in some areas to subtle promotional activities in others.

In the foreseeable future, the most significant gains will be made without regulation. This means getting vehicle buyers in all sectors of the market to understand the value of safe vehicles, to recognise safe vehicles, and to demand safe vehicles (i.e. a shift towards a culture that understands and values safety). The NZTA has a key role to play in influencing all three of these areas, and maximising this influence requires a carefully considered approach that includes a good deal of innovation.

An innovative approach is especially important in light of the need to get the most out of limited financial resources, and there are certainly opportunities for making a substantial impact at relatively low cost. These include:

- Capitalising on the unique capabilities of the Rightcar database to provide a suite of data "products" that can be used by the industry while at the same time greatly enhancing the reach and visibility of vehicle safety information.
- Engaging with current and future industry partners to get vehicle safety ratings in front of vehicle buyers at all stages of the buying process. The aim is for safety ratings to be present wherever a prospective buyer researches or views a vehicle, whether it is online or on a dealer's yard.
- Enhancing and better targeting promotional activities to raise awareness of vehicle safety, also making use of industry and regional partners to extend the reach of key messages.

This area is one where a non-regulatory approach can be fully embraced and exploited to its full potential. There are relatively few limitations or constraints, and there is a genuine opportunity to take a fresh and different approach with low risk and at relatively modest cost.

Vehicle Safety Ratings

The cornerstone around which virtually all non-regulatory vehicle safety activities are built are independent vehicle safety ratings. These provide consumers with a simple, easily understood guide to the safety of vehicles they may be considering.

The primary vehicle safety rating system in place in Australasia is the Australasian New Car Assessment Programme (ANCAP) which is an independent organisation funded by national and state governments, motoring clubs and insurance

companies in Australia and New Zealand. ANCAP carries out crash testing on a number of vehicle models sold in the two countries, and also republishes the results of tests carried out by its sister organisation, EuroNCAP. ANCAP has been around since the mid 1990s, with New Zealand becoming a full member in 2002.

Complimentary to ANCAP is the Used Car Safety Rating programme (UCSR), which provides safety ratings for used vehicles based on a statistical analysis of real-world crashes. Used Car Safety Ratings are produced by the Monash University Accident Research Centre (MUARC) for the Vehicle Safety Research Group, which is comprised of many of the same members that fund ANCAP.

The NZ Vehicle Fleet

New Zealand has an unusual and highly diverse vehicle fleet, with vehicles from a range of source markets such as Australia, Europe, Japan, and the USA. A large proportion of the fleet is made up of Japanese Domestic market vehicles that are imported used.

At present, approximately 80% of new cars sold each month have a 5 star ANCAP rating, and around 80-85% are equipped with Side Curtain Airbags and/or Electronic Stability Control. For Light Commercial, the figures are much lower, with only around 30% having a 5 star rating, and between 30-35% with ESC and Side Curtain Airbags.

The overall proportion of 5 star vehicles in the fleet is obviously considerably lower, at around 7.5%. Approximately 14% have 4 star ratings, 3.4% have 3 star ratings and around 0.6% have a 1 or 2 star rating. These figures only include vehicles that have ANCAP ratings so they exclude vehicles manufactured prior to 2000, and unrated vehicles manufactured after that date. ANCAP ratings are available for about 25% of the overall light vehicle fleet.

The safety of the vehicles in the fleet can be measured in a general sense by considering average crashworthiness ratings for vehicles of a particular year of manufacture¹. A crashworthiness rating is a statistical measure of the likelihood of the occupant of the vehicle being killed or seriously injured in a crash, with a lower number indicating a safer vehicle. As the *figure 1* below shows, crashworthiness is considerably better for newer cars, with the occupant of a 2007/2008 vehicle around half as likely to be killed or seriously injured than the occupant of a car from the early-mid 1990s.

Overlaid on this chart is a graph showing the fleet age profile (i.e. the number of vehicles by year of manufacture)

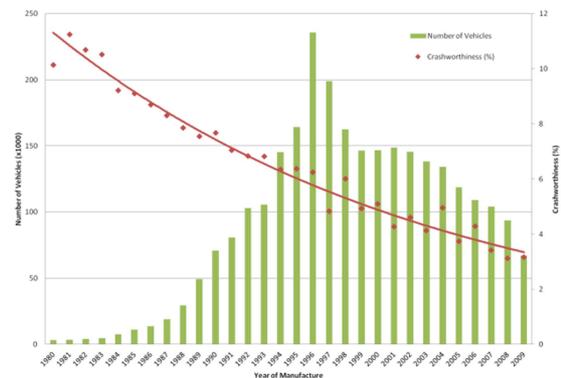


Figure 1: NZ Fleet Profile and Crashworthiness.

This graph shows that there is a disproportionate number of 1996/1997 model year vehicles in the fleet, which poses a particular challenge to increasing the overall level of vehicle safety.

Altering the composition of this portion of the fleet through the provision of vehicle safety information alone is likely to be a relatively slow process and may not yield significant benefits in the short term. It relies on buyers of older, less expensive cars putting a value on safety to the extent that less-safe vehicles have a lower financial value, and are therefore likely to be scrapped earlier.

Despite the lack of immediate benefits, activities in this area are important for bringing about a cultural change in the longer term and this sector of the market should not be ignored. It is important to dispel the myth that vehicle safety is only applicable to new or expensive cars and convey the message that there are safe and less safe choices at almost any price point.

A way of improving the overall level of safety without altering the composition of the vehicle fleet is to encourage those that have a higher risk of crashing to drive vehicles with higher safety ratings. An example of this is young and inexperienced drivers who are considerably more likely to crash than older drivers. Young drivers typically drive old vehicles that provide little protection in the event of a crash.

THE RIGHTCAR DATABASE

Purpose

In order to support a government requirement for mandatory Fuel Economy labelling, a website for

displaying fuel economy information and printing physical labels was established.

It was soon realised that the database underpinning this website would be capable of also delivering safety information. The database was accordingly upgraded and an associated front-end website, www.rightcar.govt.nz, was developed and launched in 2007.

Structure

Essentially, the database is a copy of a portion of the Motor Vehicle Register (MVR) to which additional linked data fields are added. The MVR itself is not used as it lacks the required flexibility and ease of access, and there are certain legislative constraints that limit its suitability for use in a web-based environment.

The database is in SQL Server format and consists of a number of data tables including vehicle model attributes, fuel consumption data, safety ratings and safety specifications. It is structured as per *figure 2* below:

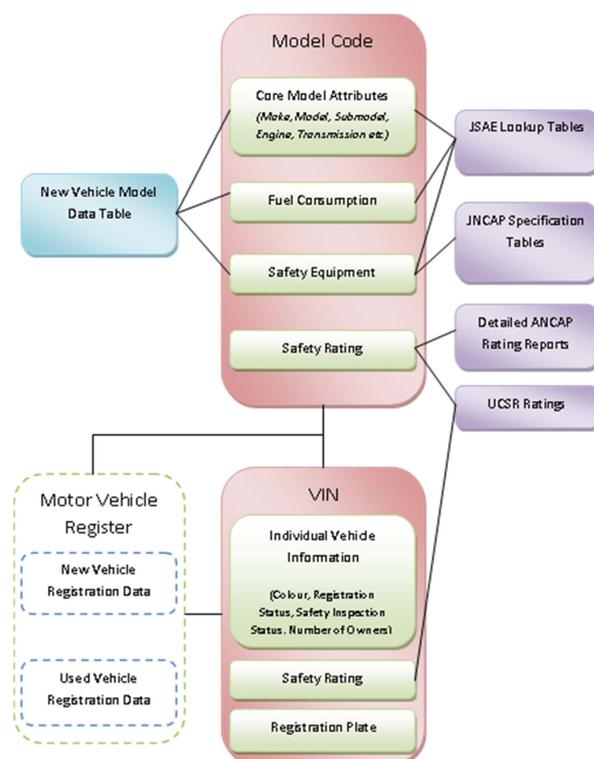


Figure 2: Structure of Rightcar Database.

Vehicle data is stored at two levels: Static data at model code level, and dynamic data (and some static data) at VIN level. Most vehicle data is linked to model codes, which are in turn linked to VIN through data from the Motor Vehicle Register. Many vehicles do not have model codes and are identified through individual VIN only.

The result is a database that allows a full set of vehicle attributes, including safety information and fuel consumption, to be returned from a search for an individual vehicle (by registration plate or VIN) or from a more general search using make, model, model code or virtually any other attribute.

This database forms the “back-end” of several websites that provide a user-friendly way of accessing vehicle data. The structure of the database allows data to be presented in many different ways via a range of channels.

Data Sources

The Rightcar database draws vehicles data from a multitude of sources and uses a mixture of manual and automated matching to establish links between vehicle models (or individual vehicles) and their attributes.

The flow of data can be described by the (simplified) *figure 3* below:

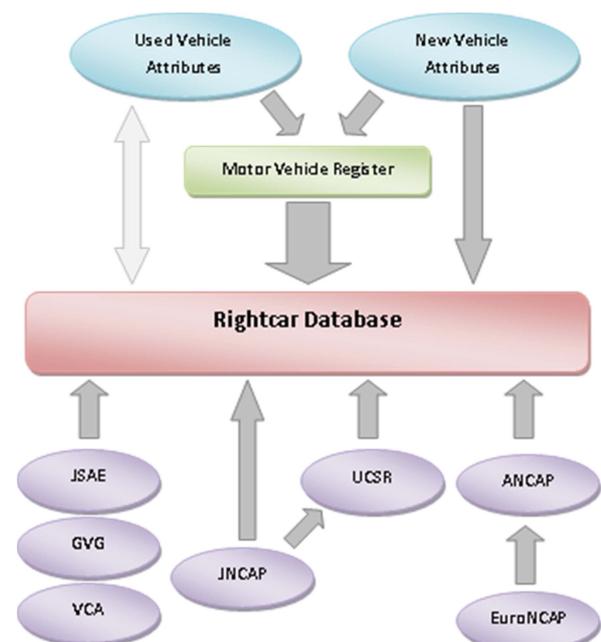


Figure 3: Rightcar Data Sources.

The two primary sources of safety ratings are ANCAP and Used Car Safety Ratings. ANCAP test reports are manually entered into the database and are then automatically or manually linked to the appropriate model codes from the MVR. Similarly, Used Car Safety Ratings are uploaded to the database and are automatically matched to vehicles by make, model and year range. There is capability to allow automated matching to be manually checked and corrected if needed.

As a subset of the Used Car Safety Ratings, Monash University produces a small set of UCSR ratings that have been derived from JNCAP test data.¹¹ These incorporated into the Rightcar database and linked to the appropriate used Japanese imported vehicles. Doing this greatly enhances the coverage of the Japanese Domestic Market vehicles that are in the fleet and that are imported in considerable numbers.

Vehicle specification data for models is generally obtained directly from the vehicle manufacturer's agents at the time new model attribute data is loaded into the MVR. Only core model data is legally required to be entered in the MVR, and additional safety specification data is neither required nor able to be accepted by the MVR system. In order to obtain accurate specification data, a streamlined system was set up to allow a full dataset to be loaded directly into the Rightcar database.

By combining the input systems for mandatory data required by the MVR (i.e. core model attributes) with that for non mandatory data (such as safety specification data), we get a high degree of willing compliance with our request for the latter. The level of compliance is further aided by an agreement for the NZTA to provide collated statistical information back to the vehicle manufacturer's industry body, the Motor Industry Association (MIA).

Safety specification data for used Japanese vehicles is obtained from the vehicle specification tables that are published by JNCAP in their annual reports. Fuel consumption and other core attribute data is obtained from data tables that are produced annually by the Japan Society of Automotive Engineers (JSAE). These tables also contain some useful fitment data (such as airbag type) that can also be incorporated into the Rightcar dataset.

Fuel economy data is sourced from a number of different places, most notably the JSAE tables, the UK VCA CarFuelData website and the Australian Green Vehicle Guide (GVG).

Much of the matching of this data to actual vehicles is automated, primarily through the matching of model codes (either those entered by the NZ new vehicle distributors or the Japanese domestic model codes), or by make/model/year where this is appropriate (Used Car Safety Ratings are an example of this).

The core model attributes and dynamic data from the MVR are fed into the Rightcar database via a daily data extract from the MVR mainframe. This means that the data in the Rightcar database is not

“real-time,” but is at most 24 hours old. This is considered adequate by users.

COMMUNICATING SAFETY INFORMATION

Rightcar Desktop Website

The primary outlet for communicating vehicle safety information is the NZTA's Rightcar website, which is the main public interface to the Rightcar database. The website allows searches by vehicle make and model or by registration plate, and presents the user with a vehicle detail page that provides a summary of all of the static information that is available for that vehicle. This includes:

- Core Vehicle Attributes
- Safety Rating
- Safety Equipment
- Fuel Consumption (with annual fuel costs)
- Exhaust Emissions
- CO2 output.

The primary focus of the site is to convey safety ratings in a way that is accessible to the general public, and it also contains additional information to support the safe vehicle messages that are put forward in advertising. The intended end-point of each search path is the “vehicle detail page,” shown below as *figure 4*

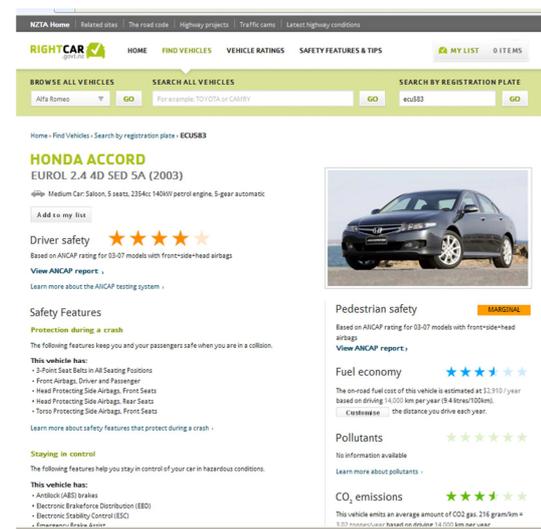


Figure 4: Rightcar Vehicle Detail Page.

Rightcar Mobile Website

In addition to the primary desktop site, a mobile version has also been developed that allows users to input a registration plate into a smartphone and access the safety information that is held for that vehicle. This is intended to be used by vehicle buyers when physically viewing a vehicle, so it is

structured in a way that emphasises the safety rating.

The mobile site, like all websites, can also be accessed via a QR code. The advantage of this approach is that a QR code relating to a particular vehicle (identified by registration plate) can be created and placed on the vehicle in a sales yard. This provides an easily accessible link between the vehicle the buyer has in front of them and the safety rating of that vehicle. A screen capture of the mobile site is shown below as *figure 5*.

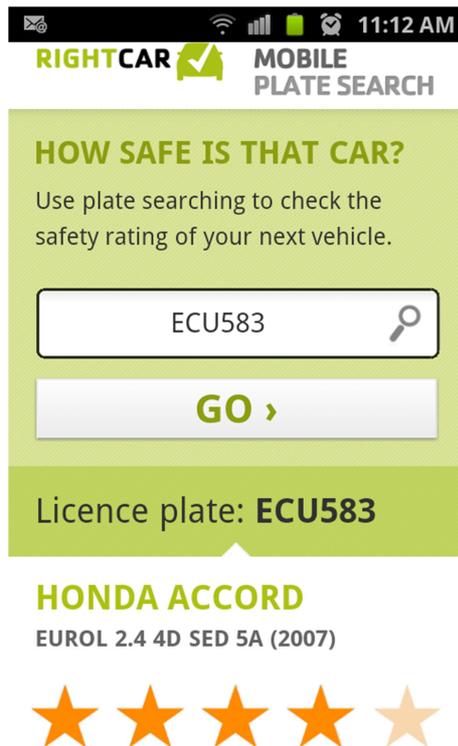


Figure 5: Rightcar mobile site screen capture.

Partner Websites

The drawback with the Rightcar desktop and mobile sites is that it requires the vehicle buyer to make a conscious decision to visit the site. This in turn requires them to be aware of the site, where to access it, and they must have an interest in the content of the site.

In order to bring about a change to buying habits, significantly greater exposure to safety information is needed. The ideal situation is for safety information to be displayed in the places that vehicle buyers normally view when they are searching for vehicles to buy or background information on those vehicles.

To achieve such exposure, it is necessary to enter into partnerships with the organisations that buyers currently use as part of their vehicle purchase

process. However, budgetary restraints preclude any significant financial expenditure on this, such as paid placement of safety ratings.

The Rightcar database provides a simple and inexpensive solution to this. A number of the organisations consumers use when buying and selling cars are also users and resellers of bulk vehicle data. These organisations draw both static and dynamic information from the NZTA's Motor Vehicle Register, package it, and provide it to the public in a number of different ways. The system architecture the MVR itself is based on means that extracting this kind of data on a per-vehicle basis is costly, and users are accordingly charged a fee for every vehicle record that they request. For some bulk users, this is a very considerable cost.

The Rightcar database is, unlike the MVR, based on architecture that is optimised for handling large numbers of requests at extremely low cost. As the database mirrors the data on the MVR that users access the most, it is a relatively simple matter to provide a webservice to bulk users so that they can access the same data they were previously obtaining from the MVR. Furthermore, the low cost of providing access to the data in this way allows the NZTA to provide it free of charge at considerable savings to the industry. This also provides an opportunity for the NZTA to influence how the information is used.

With a view to increasing exposure of safety and fuel economy information, the NZTA has put in place, as a condition of access to the free webservice, a requirement that safety and fuel economy ratings be displayed alongside core vehicle data. This means that wherever vehicle attributes from the Rightcar database are displayed on a third-party website, the safety rating must also be prominently displayed.

The majority of existing users of bulk data have been more than willing to accept this in exchange for access to this valuable data source, and are in the process of incorporating this information into their websites.

Users include:

www.trademe.co.nz – New Zealand's largest online auction site, which contains listings for the majority of used vehicles on sale in New Zealand (both private and dealers)

www.carjam.co.nz - A vehicle information source and producer/seller of pre-sale vehicle information reports.

The NZ Automobile Association (NZAA) – New Zealand’s largest independent motoring organisation. The NZAA website has vehicle sale listings, pre-sale reports and pre-purchase inspections

www.autotrader.co.nz – A large vehicle sales site with both private and dealer listings

www.motorweb.co.nz – A major supplier of vehicle information reports to the public, and a producer of window cards to dealers.

An example of how this type of data will appear to the user is the below mock-up from the Trademe online auction website (*figure 6*)

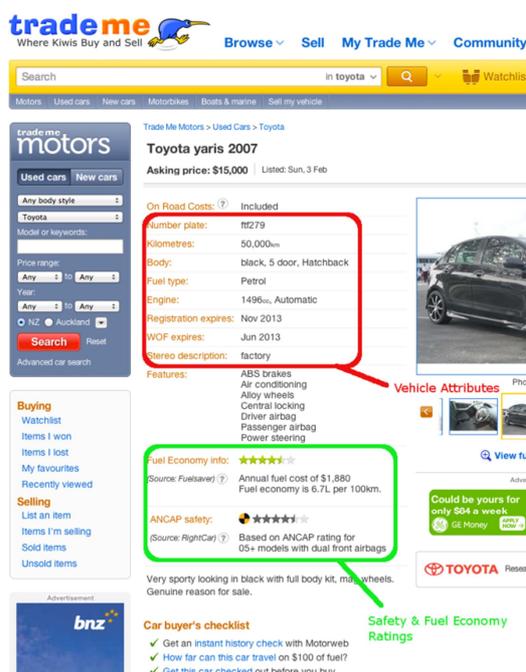


Figure 6: Mockup of Trademe Vehicle Listing.

The sites listed above cover a very significant proportion of the market. For example, the “Trademe Motors” site alone has in the order of 680,000 unique visitors per month, with the NZ Automobile Association website having around 240,000 unique visitors per month.ⁱⁱⁱ For reference, the population of New Zealand is around 4.4 million people.

This initiative is perhaps the most important and significant use of the Rightcar database, and it is likely to raise the profile and awareness of safety ratings considerably. This in turn is likely to help achieve the NZTA’s objective of influencing the demand for safe vehicles in all sectors of the market.

Physical

New Zealand has mandatory fuel economy labelling regulations that require that all vehicles offered for sale by dealers must display a physical fuel economy label at point of sale. Labels are printed by individual dealers using a system that draws data from the Rightcar database. Although there is no comparable regulation relating to the display of safety ratings, there is no reason why this mechanism could not be used to produce a safety rating label at the same time the fuel economy label is produced. Such a system is capable of enabling a voluntary “Stars on Cars” scheme to be introduced at very low cost.

There is also considerable scope for partnerships with companies that produce vehicle information cards for car dealers using the same mechanism described above for partner websites.

Advertising Strategies

The vehicle safety advertising campaign aims to encourage New Zealanders to buy the safest vehicle they can afford. While the campaign promotes safe vehicles in general, it currently has a specific focus on highlighting the benefits of side curtain airbags and electronic stability control (ESC). It aims to increase awareness of these and other safety features in vehicles, so that people consider them a priority in their next vehicle purchase.

All aspects of the campaign drive people through the www.rightcar.govt.nz for further information on the safety features of vehicles. Our strategy is not simply about driving people through to the Rightcar website, it’s also about driving engagement with the various aspects of the website and getting people to spend time on the site.

We’ve achieved this through different mechanisms: firstly by using large performance networks such as Stuff and Google Display Network. These portals reach a high percentage of NZ’s internet audience so this ensures we have a large amount of reach due to the broad target audience.

Secondly we behaviourally target and environmentally target consumers to ensure the advertising appears in relevant content amongst highly qualified eyeballs. This activity drives highly engaged traffic through to the rightcar site.

And finally we utilise Facebook to ensure we can cost efficiently target certain demographics and optimise toward the strong performing areas. Facebook also has a very high time on site so this tends to provide highly engaged traffic.

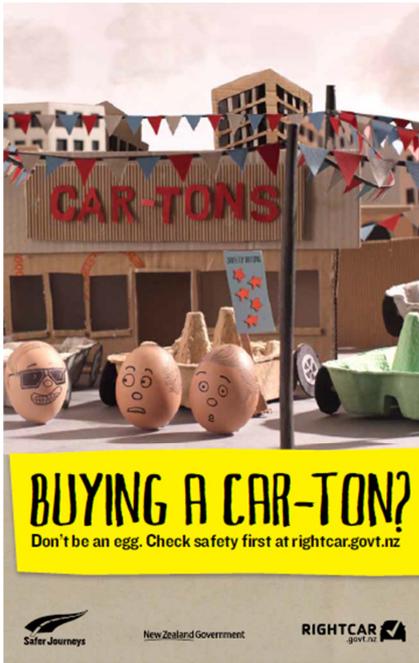


Figure 7: Example of Rightcar Advertising.

OUTCOMES

Due to the fact that parts of this project are still in the early implementation phase, there is little that can be done to gauge the effects it is having on the market. Of the information that is available, new vehicle sales data and website traffic are perhaps the most useful metrics to consider.

Changes in Fitment Rates

It is difficult to properly monitor the effect that promotion of safety ratings has on vehicle purchase behaviour, as upwards trends in safety ratings and safety specifications occur naturally in response to worldwide trends in vehicle design and marketing. However, it is instructive to examine trends in a few key areas and consider the overall outcome on the vehicle market.

The below graphs (figures 8 & 9) plot the percentage of cars and Light Commercial Vehicles (LCV) that have a 5 star ANCAP rating, are fitted with Side Curtain Airbags and/or that are equipped with Electronic Stability Control, and were registered in the period from August 2009 to February 2013.

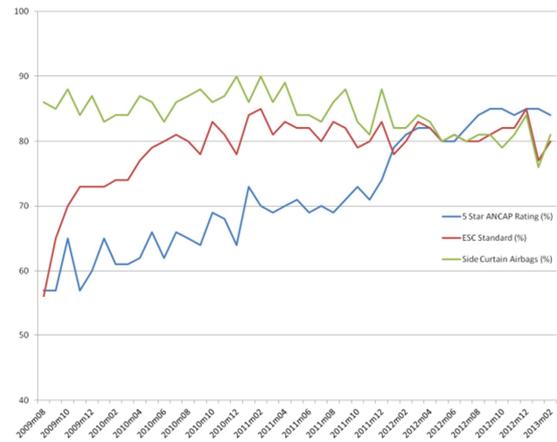


Figure 8: Safety Equipment Fitment Rates, Cars.

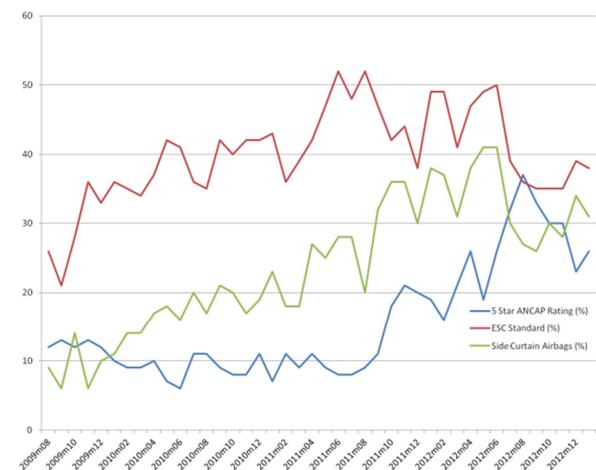


Figure 9: Safety Equipment Fitment Rates, LCV.

These graphs show an early upward trend in 5 star ratings and ESC fitment, and a steady (but high) Side Curtain Airbag fitment rate. It should be noted that there will be some margin for error in equipment specifications due to reporting rates, and there is also considerable month-month variation due to the relatively low numbers of vehicles sold.

The proportion of 5 star vehicle and ESC/Side Curtain airbag fitment rates are significantly lower for light commercials than for passenger cars, but there is an overall upward trend for these vehicles.

Website Traffic

Traffic to the Rightcar site provides some indication of the level of demand for safety information, and the effects of advertising on creating interest in the topic of vehicle safety. A summary of overall traffic is shown below (figure 10)

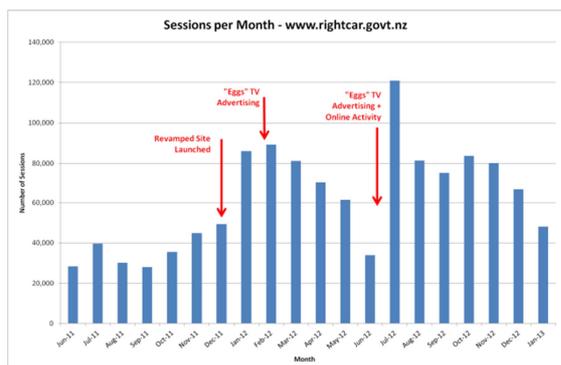


Figure 10: Rightcar Sessions.

The above graph shows considerable variation in the number of monthly sessions recorded for www.rightcar.govt.nz, with some apparent correlation between hits and significant advertising campaigns (such as TV advertising). On average, there are around 75,000 sessions per month on the website.

In the 4 months from 1 October 2012 to 31 January 2013, there were

- 1,821,648 visits to a “vehicle detail” page
- 93,222 searches for ANCAP rating matches (where the user searches for vehicles that match a particular ANCAP report).
- 75,922 visits to the user’s comparison list (this allows users to compare core features of several selected vehicles)
- 25,434 visits to the Used Car Safety Ratings page
- 22,678 visits to the general ANCAP rating make/model page.

This shows that there is considerable consumer interest in obtaining in-depth vehicle information and that the users are utilising the site to compare vehicles with one another. There also appears to be some interest in accessing ANCAP and Used Car Safety Ratings without searching for particular makes/models.

REVIEW OF PROJECT

Strengths

Despite its apparent complexity, the underlying systems and processes that enable the RightCar database to exist are fairly simple. Using flexible, web-based database architecture allows new data to be incorporated and matched relatively easily, which means that many diverse data sources can be used. This is very important in an open vehicle market like New Zealand.

However, the key enabler of this project is access to the New Zealand Motor Vehicle Register. This allows the service to be extended beyond a generic source of vehicle model information to become a source of vehicle-specific data. This is of significantly greater value to vehicle buyers and opens up a number of opportunities for disseminating information in a highly targeted manner.

Furthermore incorporating MVR data into the database has resulted in a product that is of considerable value to third parties. Instead of commercialising this, the value of the database can be used as leverage to dramatically increase exposure and awareness of safety ratings and vehicle safety in general. The advantage of this approach is that it requires very little financial outlay: systems changes to enable the webservice have cost less than USD\$10,000. Costs associated with incorporating safety ratings into partner websites are met by the partners themselves.

Another important factor has been the relationship between the NZTA and the new vehicle distributors. This has made it possible to obtain reliable vehicle specification information directly for new vehicle models at very low cost.

The overall cost of developing the database and associated websites has also been relatively modest – in the order of US\$400,000 over 5 years.

Website traffic indicates an increasing awareness of the Rightcar website and of vehicle safety ratings, and crucially it shows that there is interest in, and demand for, this information. This demonstrates that is value in further expanding the reach of safety ratings.

Difficulties

The main difficulties experienced in the development of this database are:

- Difficulties extracting data from the MVR – until recently, extracting vehicle data from the MVR for use in the Rightcar database was time consuming and complex, which limited data feeds to 2-weekly. A recent system update has alleviated this problem and enabled daily data extractions.
- Managing the manual and automated matching of vehicle attributes to model code/VIN – There are potential sources of error in both methods, and the volume of data can make it difficult to detect such errors.
- Controlling data quality – the database is reliant on quality source data, and there are

sometimes inaccuracies in information it receives.

- Providing meaningful data for a significant proportion of the vehicle fleet – the diverse range of vehicles in New Zealand requires the use of many different data sources, which adds complexity.

An ongoing challenge is influencing purchase decisions at the “lower” end of the market where decisions are strongly influenced by price. The level of interest in Used Car Safety Ratings shown by the Rightcar traffic data shows that there is some interest in safety in this sector of the market, so there is scope to increase promotional activities in this area.

CONCLUSIONS

The approach to vehicle safety promotion taken by New Zealand in recent years has been highly reliant on non-regulatory activities, with a strong emphasis on the promotion of safety ratings and associated information to the vehicle buyers.

In order for such a strategy to be successful, the systems in place for delivering that information must be flexible, reliable, consistent and able to work across a range of different applications. The Rightcar database has, to date, been capable of meeting these requirements.

The development of the database has demonstrated that an easily accessible, registration-linked database of safety information is achievable and does have value in the area of vehicle safety promotion.

How this information is then used is also of considerable importance. The approach the NZTA has taken to communicating safety data is to use a combination of the NZTA-run Rightcar website (with an associated advertising campaign) and external partner websites to communicate safety ratings to prospective buyers in a targeted manner.

In the near future, a project will be started to implement a physical safety rating labelling system that builds on the work done in communicating ratings via online channels. This is likely to bring about further positive changes in consumer behaviour.

REFERENCES

ⁱ Newstead, Watson & Cameron; *Trends in Crashworthiness of The New Zealand Vehicle Fleet by Year of Manufacture: 1964 to 2010* (MUARC Report 313, 2012).

ⁱⁱ Newstead, S. & Scully, J; *Predicting the used car safety ratings crashworthiness rating from ANCAP scores* (MUARC Report 309, 2012).

ⁱⁱⁱ *Website traffic data provided by Trademe.*