ANCAP Demystified

An overview of the ANCAP Vehicle testing and rating process.

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July 2011

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ANCAP - Demystified.

Introduction.

One of the most important features of any car is the level of protection offered to its occupants in a crash. It is therefore essential that car buyers are able to make an informed choice about the levels of protection offered by cars on the market.

Through its involvement in the Australian New Car Assessment Program (ANCAP), RACV has been conducting vehicle crash testing and publishing the results for over ten years.

New cars cannot be sold in Australia without demonstrating a minimum level of occupant protection. This is governed by the Australian Design Rules (ADRs) and all car-makers must perform their own crash testing to prove compliance. However improvements in vehicle design and developments in safety technologies such as airbags mean that most cars now provide levels of protection well above this required minimum.

For this reason ANCAP conducts more severe crash tests and assessments than required by the ADRs. For example, ANCAP frontal offset tests are conducted at 64 km/h, compared with 56 km/h for the ADR.

An ANCAP crash is a highly complex and technical test, so to make the results easy to interpret ANCAP assigns a star rating as an overall assessment of a vehicle's occupant protection. This rating is based on numerous measurements to crash test dummies in three separate types of crash test for each vehicle. These are the 'offset frontal', 'side impact' and the optional 'pole impact' crash tests. Measurements of vehicle deformation are also taken in account. A vehicle that complied only with the minimum ADR requirements would receive a low ANCAP rating.

The Tests.

Frontal Offset

The frontal test involves the test vehicle being driven into a static barrier at 64km/h. The barrier is a deformable aluminium that simulates the front end structure of another vehicle. The test simulates hitting another vehicle of the same mass travelling at the same speed. However, instead of hitting head on, the test represents a more common type of crash, an offset collision. It does this by having the front of the car overlap the barrier by only 40%, which aside from making it more realistic makes it significantly more severe since the energy is spread over a much smaller area of the vehicle structure. Seated in the vehicle are two adult dummies in the front seat; whilst in the rear are an 18 month old child dummy and a three year old child dummy, both in the correct restraint for a child of their respective sizes. A maximum of 16 points can be awarded for the frontal offset to go toward the final ANCAP star rating.

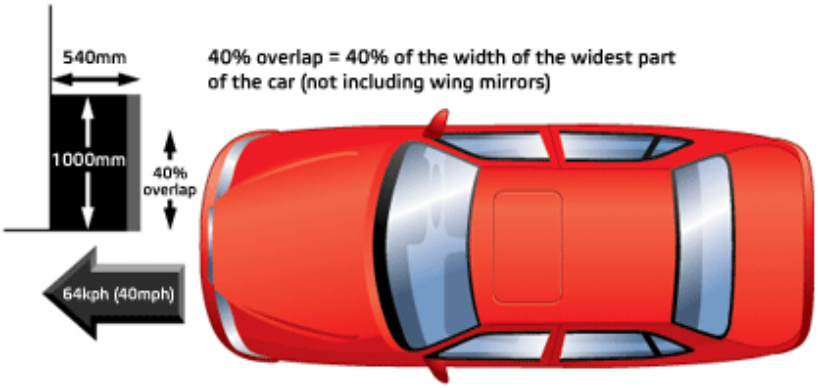

Figure 1 Frontal Offset Test

Side Impact

The second test called the 'Side impact' this time involves a static vehicle which is impacted by a 950kg trolley travelling at 50km/h. The impact is aimed at the driver's side. Attached to the front of the impacter trolley is a crushable impact structure designed to replicate the structural behaviour of a typical vehicle front end. The reason for this is that a) it is repeatable b) it is representative of another vehicle and c) it enables the same trolley hardware to be used for multiple crashes. Like the Frontal offset, the Side impact can contribute up to 16 points towards the car's final ANCAP score.

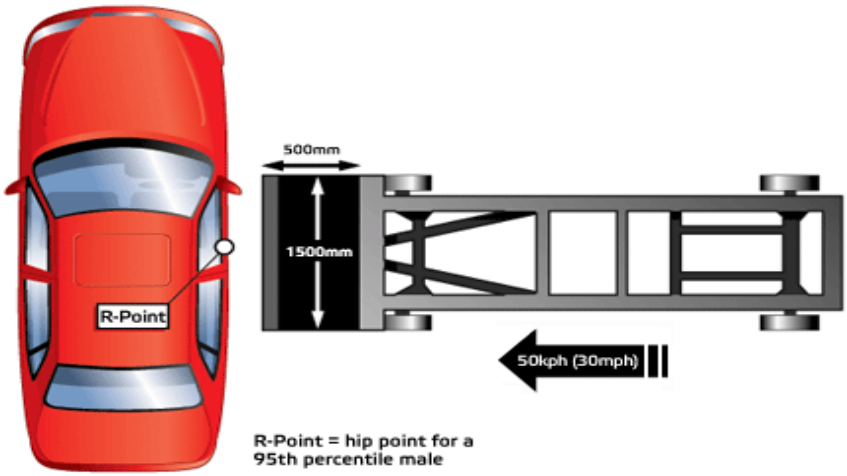

Figure 2 Side Impact Test

Pole test

Cars that perform sufficiently well in both the frontal offset and the side impact test will be eligible to take the optional pole test at the discretional of the manufacturer or importer. A vehicle can obtain an additional two points in this test and it is a requirement for a 5 Star rating. The test is a severe one and involves propelling the car sideways at 29km/h into a

rigid steel pole, aimed at the driver's head. Since the pole is narrow, there is usually major intrusion. However a vehicle with curtain airbags will usually be well equipped to protect the driver from major head injuries in this test.

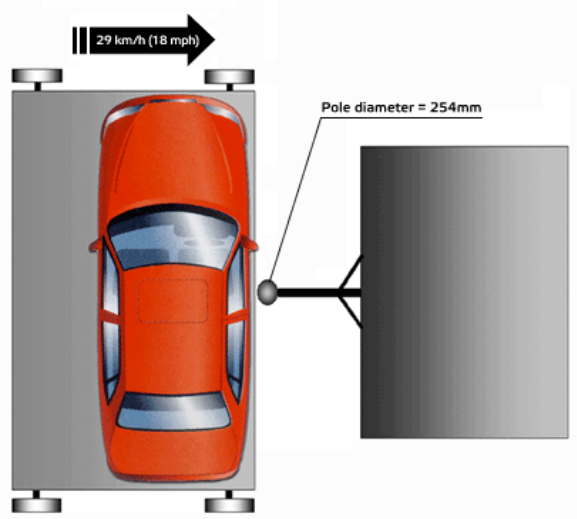

Figure 3 Pole Test

Pedestrian test

The pedestrian impact tests are carried out to estimate head and leg injuries to pedestrians struck by the test vehicle at 40km/h. These crashes represent about 15% of fatal crashes in Australia and New Zealand. Currently a vehicle's performance in this test does not affect the overall star rating of the car.

Calculating the Score.

Adding together the score for Frontal Offset, the Side Impact and the Pole test, plus the three bonus points awarded for seat belt reminders that meet the ANCAP requirement, gives a total score out of 37 points. From this score is also deducted any points lost to modifiers, where upon inspection the vehicle is in breach of a technical clause in the ANCAP protocol. For instance this could include a door opening or allowing parts of the body to hit hard parts of the interior.

The table below illustrates that it is not sufficient simply to attain the aggregate score to attain the star rating. There is a minimum score in each test and a minimum overall before a star rating can be applied to a vehicle.

Star Rating	Min. Offset	Min. Side Imp	Min. O'all#
★	-	-	0.5
★★	1.5	1.5	8.5
★★★	4.5	4.5	16.5
★★★★	8.5	8.5	24.5
★★★★★	12.5	12.5	32.5

Table 1 Star rating thresholds

Crash Test Dummies.

Biofidelic crash test dummies are the foot soldiers of the ANCAP testing process. Their function is to act as an human surrogate to help provide vital clues to what happens in a crash.

Two main types of dummy are used in ANCAP testing. They are the Hybrid III Which is used for the frontal impact and EuroSID II which is used in the side impact test. Additionally non-biofidelic child dummies are also used.

Figure 4 Hybrid III Dummy

Figure 5 EuroSID II Dummy

Since the Hybrid III and the EuroSID II are designed with different crash tests in mind, the instrumentation in each is specialised to that type of test. Crash test dummies are not jack-of-all trades.

This differentiation of dummy types is vital to give a complete picture of likely injuries in a crash.

The Future of ANCAP

Most cars tested by ANCAP now receive at least three stars, with an ever increasing number of five star ratings awarded to those models at the forefront of crash protection.

However it is important that ANCAP continues to drive improvement in car design to avoid complacency.

To do this ANCAP will introduce a new testing and assessment regime for the awarding of star rating. This is known as the 'Road Map'.

Between 2011 and 2015 the bar for star ratings will be progressively raised. This will be reviewed every year so that the plan covers a rolling five year period.

Over this period additional tests will be included. These are the whiplash protection test from 2012, which is intended to rate the rear impact performance of a car, and the roof crush test from 2014 which is a measure of protection in the event of a vehicle roll over.

In addition the pedestrian test from 2012 will also be included in the overall test. The threshold for this will raise from 'Marginal' to 'Acceptable' by 2015 in order for the car to be considered for a 5 star rating.

As well as additional tests, a 5 star vehicle will also have to include Safety Assist Technologies (SATs) both mandatory ones, and ones from an approved list of additional features.

By 2015 a 5 Star car will have to include Head Protecting Technology for all seat (usually meaning an airbag), Seat Belt reminders for all positions, Emergency Brake Assist, plus five other SATs from the approved list.

Conclusion

While the best vehicles are performing better than ever, the difference between best and worst is still large. RACV advises motorists to choose a vehicle with at least a four, or preferably five star rating.

Not only does the testing help buyers compare occupant protection when deciding on a new car it also encourages manufacturers to design their cars to maximise crash performance since an obviously safer car is a considerable commercial advantage.

For more information on ANCAP crash test results and how the tests are conducted, visit the *My Car -> Car Safety* section of RACV's website, at www.racv.com.au.