Determining the Efficacy of Different Types of Bull Bars Fitted to Different Types of Light Vehicles

Dan Leavy, Basuki Suratno, David Black

Centre for Road Safety, Transport for NSW

Abstract

Under NSW regulations, bull bars must comply with AS 4876.1. The Standard provides illustrations of "acceptable" and "not acceptable" bull bars. Some bull bars, typically fitted to 4WDs in rural regions, resemble the "not acceptable" bull bars. The different bull bars became a matter of contention following a campaign targeting "non-complying" bull bars in 2014. To inform this matter, the Centre for Road Safety undertook research to compare the performance of different types of bull bars. This found that bull bars provide no additional occupant protection in a crash, but they may have some road safety and cost benefits.

Background

There are two general categories of bull bars: "Urban bull bars" resemble the "acceptable" examples given in AS 4876.1, a mandatory standard in NSW; while "rural bull bars", typically fitted to 4WDs in rural regions, resemble the "not acceptable" examples. Rural bull bar advocates claim that they provide better protection in an animal strike; while their detractors maintain that "urban bull bars" are just as effective, and that rural bull bars adversely affect the vehicle's crashworthiness.

The legality of rural bull bars became a matter of contention in 2014 when some vehicle owners received infringement notices for rural bull bars fitted to their vehicles. In response, the Centre for Road Safety undertook research at the RMS Crashlab facility to compare the performance of the different bull bars; and the effect a rural bull bar has on 4WDs' crashworthiness.

Method

These tests were the first of their kind, so there were no established standards to use. Test protocols were developed to replicate a large kangaroo impacting low and high points on a bull bar in a high-speed crash. A sedan and a 4WD, with and without bull bars, were crashed into a kangaroo crash-test dummy positioned at different heights above the testbed (see Figure 1). After each test, the vehicle was examined to determine the damage, if it was driveable and the cost of repairing it to a roadworthy condition.

Additionally, two 4WDs were subjected to the ANCAP frontal offset test, and the results compared to the ANCAP results.

Results

In a high speed crash with a kangaroo –

- vehicles fitted with bull bars provide no safety benefits to their occupants;
- bull bars can better protect a vehicle against damage; and
- rural bull bars provide better protection to 4WDs, but can increase the damage to sedans.

A rural bull bar does not affect the crashworthiness of a 4WD.

Discussion

Although bull bars provide no direct benefit to vehicle occupants in a high-speed crash with a kangaroo, there are some road safety benefits if a vehicle is fitted with a bull bar that reduces the damage to the vehicle so it remains driveable and its occupants are not stranded on high-speed country roads. The reduced damage also reduces the cost of repairing a vehicle to a roadworthy condition. 4WDs are able to accommodate heavier rural bull bars and they receive more protection from them than from urban bull bars. In contrast, the weight of the rural bull bars can exacerbate the damage to a sedan to the extent that the vehicle becomes undriveable.

Conclusions

The conclusions are:

- Bull bars provide no direct benefit to vehicle occupants in a high-speed crash with a kangaroo.
- A 4WD with any bull bar fitted and a sedan with an urban bull bar are more likely to remain driveable after such a crash.
- Rural bull bars are unsuitable for sedans.
- There may be some cost benefits in fitting an appropriate bull bar to a vehicle.
- Rural bull bars do not affect the crashworthiness of a 4WD.

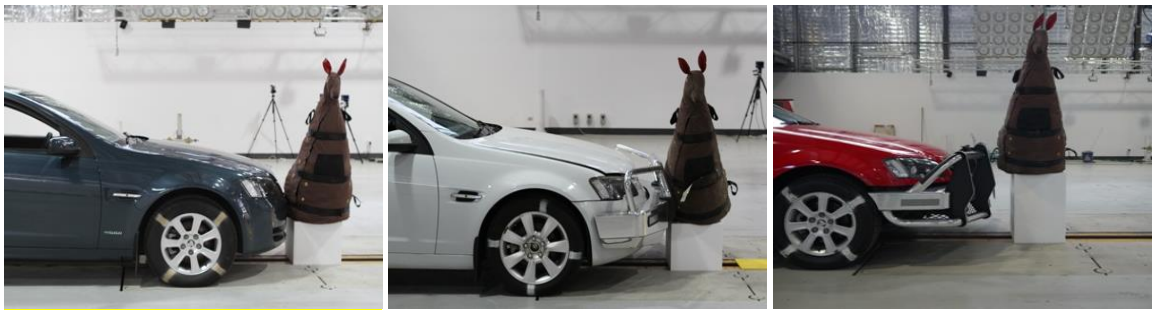

Figure 1.1 Sedan with (L-R): no bull bar, low dummy; urban bull bar, low dummy; rural bull bar, high dummy

Figure 1.2 4WD with (L-R): no bull bar, high dummy; urban bull bar, high dummy; rural bull bar, low dummy

Figure 1. Test configurations for the first part of the research