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Welcome

Welcome to Edition 20 of Testing Times.

The range of topics in this issue includes: convex RHS mirrors, unsafe projections on vehicles, heavy vehicle chassis issues, steering wheels and supplementary restraint concerns. If you have comments on any of the articles here please e-mail to:

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Convex RHS Mirrors

In the previous issue of Testing Times we pointed out that one of the benefits of audits was helping you keep up with current standards. Well, one of the standards that has changed relates to external mirrors. You can now have a convex rear view mirror on the driver's side. Because Australia only makes up a very small part of the world car market it needs to align its standards with those of the rest of the world wherever possible. It is often said that if it is good enough for the nearly 300 million people in the USA or for Europe's 200 million then it should be good enough for Australia.

There are a number of exceptions to this saying where Australia clearly leads the world but this is not necessary reflected [joke!] in the area of convex side mirrors.

While one group argues that you lose some ability to judge distance accurately, the other group argues that the increased field of view from curved mirrors more than offsets this.

Whatever, the right answer is, Australia has now amended the ADRs to align with overseas standards.

A convex passenger's side mirror has been allowed for quite a while, and now, a convex driver's side mirror is also allowed as it has been for some time in Europe and America.

It should be noted that, while the maximum allowable curvature for the driver's side mirror is not as great as the maximum allowable curvature for the passenger's side one, the manufacturer may choose to provide mirrors with less than the maximum allowable curvature for one or both mirrors.

Essential Projections?

When it comes to looking at projections from vehicles [both inside and out] it is first necessary to decide if that projection is "technically essential". This is because the ADRs make a big distinction between technically essential projections and other projections.

A technically essential projection must be designed, constructed and fixed in a way that it reduces to a minimum the risk of bodily injury to any person. Examples of things that might be considered technically essential projections that must be designed to minimise the risk they present can be seen in VSI 1 which covers bull bars, VSI 8 which covers bonnet scoops and other projections, VSI 28 for roll bars and roll cages and VSI 29 which covers radio aerials and roof rack supports.

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On the other hand, a projection that is not technically essential must not increase the risk of bodily injury to any person.

Put simply, this means that if the projection is technically essential it can make the vehicle less safe in some ways but this must be kept to a minimum. If it is not technically essential it cannot make the vehicle less safe in any way whatsoever.

The ADRs also have a blanket ban on any objects or fittings which are pointed or have a sharp edge likely to increase the risk of injury.

A technically essential projection is one that is required for the vehicle to safely operate or to safely fulfil a particular function. Brakes scoops, radiator scoops, intercoolers, racks or frames for supporting loads and vertical exhaust pipes might be considered technically essential in certain circumstances. However, when things like front and rear wings, bonnet mounted gauges, bonnet scoops and fishing rod holders are added to an otherwise standard vehicle then it is clear that they are not needed for the vehicle to operate safely. These items are therefore NOT technically essential and therefore must NOT reduce the safety of the vehicle in any way.

Rear Wings

These are clearly not technically essential on most vehicles [except perhaps on a race track] and this means that if fitted, they cannot make the vehicle less safe to any road user. This includes unfortunate pedestrians who may be struck by the vehicle or other roads users who may collide with the vehicle. So how do we judge whether a wing makes a vehicle less safe? Well, wings are fitted to some models by OE manufacturers and the manufacturer has had to go through the process of demonstrating ADR compliance.

Therefore, the OEM examples provide a good guide as to what is acceptable and how they must be made and fitted so that they do not reduce the safety of the vehicle in any way.

You will see from the examples that they do not project sideways beyond the profile of the vehicle, all edges are thick and well rounded and they are usually shaped to closely follow the contours of the vehicle so that it is unlikely that a person's limb could get caught between the vehicle body and the wing.

Acceptable Wings

Some wings are also fixed in a way that would allow them to break off without producing sharp edges in a serious impact.

Aftermarket wings that do not have these features would certainly increase the risk of injury in a crash and must be removed before a RWC can be issued. Also, any holes left by the removal of the wing that could allow exhaust gases to get into the vehicle interior must be sealed off.

Un-acceptable Wings

The sharp rigid aluminium and carbon fibre wings pictured above are examples of an unacceptable design.

Fishing Rod Holders

When fitted to a bull bar in the manner pictured, fishing rod holders break all the protrusion rules. They are not technically essential to operate the vehicle. They have sharp edges that protrude and they will cause a great deal of injury to anyone they hit.

A redesign of this item so that it was completely behind the bull bar would probably resolve the safety issues. Interestingly the rod holders sighted at several retailers have a 'not for highway use' label on them. It is a concern that they seem to have become a fashion item.

Chassis Cracks

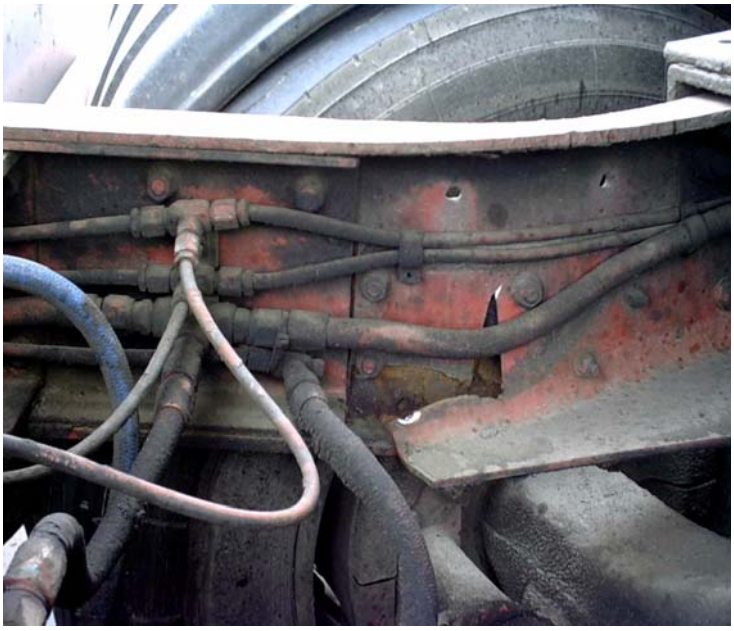
There is an old saying, "They don't build them like they used to!" Well, in many cases this is a good thing but sometimes it is not. Take truck chassis for example. Years ago, truck designers tended to be very conservative and if the strength of a component was at all in doubt they simply made it bigger and stronger [and heavier]. But not so in modern times!! The road freight industry is now highly competitive and every kilogram of tare mass means one less kilogram of paying mass. Consequently, even when special high strength, low mass materials are used it is still considered important to only put sufficient material into a component to ensure it does its job. But that is where the problem comes in. Just exactly what is its job and how close to the limit can the designers safely go?

Computer aided design has certainly helped but nevertheless, there will always be instances where the real world reveals that the design was too close to the limits.

Aggravating the design limitations are the effects of abuse or overloading or being used in a way that was never intended. Constant vibration and load cycling will eventually cause cracks to start in most truck chassis but this will normally take many years. However, if for some reason the chassis is working too close to its design limit, the time might be measured in months and even the smallest crack can become a serious problem very quickly. This is a particular issue with high tensile chassis materials. Remember that even small cracks create a point of stress concentration and reduce the area of the chassis carrying the load and therefore aggravate the problem.

It has to be said that there appears to be some designs around that are close to the limit. In at least one example, a B-Double trailer chassis has broken in two within a week or so of a small crack being detected. This means that truck fleets need to keep up a very high standard of routine inspections.

But more importantly from your point of view, it also means that you should not issue a RWC for a modern truck or trailer that has even the smallest crack in any structural part of the chassis.



You can never tell just how soon that small crack will become a massive problem!!!!

Aftermarket Steering Wheels

Vehicles complying with ADR 69 (post 1995 vehicles) must not be fitted with an aftermarket steering wheel.

Steering wheels are an important part of the safety system built into modern motor cars. The latest and most obvious incarnation of this is the airbag or Supplementary Restraint System [SRS] equipped steering wheel.

However steering wheel design and construction have been important for a long time, incorporating features controlling aggressivity, cushioning, collapse rate and even material to prevent splintering in an accident, hence no more wooden wheels.

It is therefore vital that non genuine steering wheels do not reduce the “designed in” safety provided by the genuine product. The only way to be sure of this is to only fit replacement steering wheels that have been identified as being suitable for that model vehicle by the steering wheel manufacturer.

SRS Sensors

Speaking of steering wheels with an inbuilt airbag, we all need to be aware that there are numerous SRS sensors fitted around the vehicle to tell the computer what’s happening in a crash so it knows when to trigger air bags, seatbelt pretensions, etc. Fitting non-standard intercoolers, bull bars, driving light mounts and modifying grilles or front bumpers are all things that can interfere with the operation of sensors. It is crucial that any modification that affects a SRS sensor is rejected.

Intercoolers

Turbochargers and superchargers are devices that compress air so that more of it can be squeezed into the engine. More air means more oxygen to support combustion and with a suitable fuel delivery, it means more power for a given engine size. You don’t get anything for nothing however and a major issue created by squeezing the air is that it makes it hot. Hot air, as well as being less dense than cold air, introduces heat load inside the engine which reduces efficiency and may lead to pre ignition and detonation.

One way to reduce the temperature is to pass the heated air through a heat exchanger. Heat exchangers can be air to water or air to air. In cars we usually see air to air types and we know them as intercoolers.

Manufacturers design vehicles for many situations and sometimes the intercoolers they provide are not the most efficient ones available. Changing to a larger or better quality unit or re-mounting one into a more effective air stream can assist temperature control at or near full power. (None of this stuff really matters at part throttle as you are not developing high boost pressure)

Is it an issue for roadworthiness? Yes and No, depending on what has been done. Because cooling the air more effectively is the same as driving on a colder day, and the manufacturer has already calibrated the vehicle for a wide range of operating temperatures, fitting a more efficient intercooler alone should not affect the emissions compliance of the vehicle. However, if the more effective cooling of the air has been gained by relocating or fitting a larger intercooler, it should not create a dangerous protrusion or compromise ground clearance or affect any SRS sensor.

However modifying the front structure of the vehicle as above to fit that larger unit will definitely affect the compliance of the vehicle as well as making it potentially unsafe and this will attract a defect notice.