



Sweeping changes

Dr Paul Nordengen describes the shortcomings in car-carrier trailer design.

THE CHALLENGE WITH designing and operating trucks and trailers is that the objective is to maximise productivity. While truck OEMs, trailer manufacturers, and transport operators all want maximum productivity, there are safety and infrastructure protection constraints. These constraints are dealt with through prescriptive regulations. Authorities put these regulations in place to ensure that trucks and other vehicles are safe on the road, don't cause undue damage to infrastructure, and don't put drivers and other road users at risk.

However, researchers and various people involved in transport have found that the prescriptive approach contains loopholes and weaknesses. So, there are vehicles on the road today that comply with prescriptive regulations but are not that safe on the road and/or cause damage to infrastructure.

Performance-based Standards

The University of Michigan has done a lot of work in developing what's become the basis for Performance-based Standards (PBS), which attempts to develop a performance envelope that takes the constraints (mentioned above) into account.

PBS vehicles may not necessarily comply with prescriptive regulations, but are checked against acceptable safety and infrastructure standards. The prescriptive approach is all about defining the size and mass of vehicles, whereas a PBS approach looks at how vehicles perform on the road. PBS also tries to define certain manoeuvres and then set appropriate limits.

The prescriptive approach to managing the off-tracking of a vehicle is to limit the overall length and wheelbase, while the PBS approach is to limit the maximum swept path. There are 22 m vehicles in South Africa with a much higher swept path than 25 m or even 30 m long vehicles, because of the way they've been designed. Trailer manufacturers and OEMs involved in PBS are learning new things

about design. We had a baseline vehicle that was operating under an abnormal load permit and, although it wasn't illegal, it failed three of the performance standard tests. A couple of years ago, the abnormal loads committee wanted to stop abnormal loads permits for car carriers, which have been running under permit for about 30 years. The reason they were initially allowed to operate under permit was purely from an economic point of view; there'd be fewer car carriers on the road if it were possible for them to carry more vehicles.

The new abnormal

The committee wanted to stop the permits because vehicles are not indivisible loads. We went into a period of discussion and the new road map for car carriers was approved just over a year ago by the abnormal loads committee. We agreed that all car carriers wanting to operate over-height and -length must be RTMS certified and PBS compliant.

We conducted a study and found that the rear overhangs of car carriers are very large. While the prescriptive regulation allows for up to a 70% rear overhang of the wheelbase, there's no absolute limit. Because of the nature of the load, you have car carriers in South Africa with rear overhangs of up to 7 m.

Under a PBS regime, the maximum tail swing allowed is 300 mm. In South Africa, with different types of car carrier combinations, the rear overhang often varies between 5 m and 7 m. In Australia, they have similar regulations, but have an absolute limit of 3.7 m, which is limited by the percentage of the wheelbase.

Their car carrier tail swings don't exceed 0.3 m; whereas, in South Africa, we have carriers with tail swings of up to 1.25 m – that's not very good for going through intersections or for manoeuvring at depots. New, longer, bigger car carriers, as of 1 April 2014, have to be PBS compliant, while permits were issued for older carriers up to 23 April 2015. **35**

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