



Time for new dimension limits

ECE Regulations. Australia has been busy liberalising its combination vehicle length laws but the basic dimensional limits have not been reviewed. Let's start with rear overhang, which is limited by Australian Design Rule (ADR) 43/04 to 60 per cent of the wheelbase, or 3,700mm. Overseas countries have more liberal rules. Load weight that is applied behind the rear-axle group line unloads the front axle, whilst load weight applied in front of the rear-axle group line increases the weight on the front axle. So the smaller the rear overhang length, the greater the weight is on the front axle. This can often result in Australian truck operators struggling to keep the weight

Australia has been 'harmonising' its design rules with the UN ECE Regulations, in line with international harmonisation. But, vehicle dimensions or axle mass limits are not stated in the

on the front axle to six tonnes, while a more liberal rear-overhang limit would take the load off the front axle. Whilst the design rule limits the rear overhang to 60 per cent for standard vehicles, special purpose vehicles, which can't carry loads, can have a rear overhang up to 90 per cent of the wheelbase, or 4,000mm. Why is there a difference between standard and special vehicles?

I recently studied the swept path of a truck with fixed total length, a fixed wheelbase and variable rear overhang to find out how sensitive the swept path is to rear overhang. The study showed me that the swept path of a rigid truck does not vary significantly with rear overhang. The first illustration (Figure A) shows the swept paths of a truck with a five-metre wheelbase and two different overhangs. The swept path width is unchanged for rear overhangs of 60 per cent and 90 per cent of the wheelbase.

The second illustration (Figure B) shows the change of the swept path when the forward projection is changed. Changing the forward projection from 40 per cent of the wheelbase to 90 per cent of the wheelbase significantly increases the swept path width. Despite the greater importance of forward projection compared to rear overhang on the swept path, forward projection is not regulated in the design rules.

A forward projection rule would be challenging for bonneted trucks and many buses to meet. But forward projection is the main factor in the difficulty of making a right-hand turn. There are safety problems that arise because there is no forward projection rule, such as for route-service buses who might strike waiting passengers. Whilst I have only presented results for a rigid truck, the conclusions will apply to a semi-trailer combination because the trailer cuts in and does not determine the

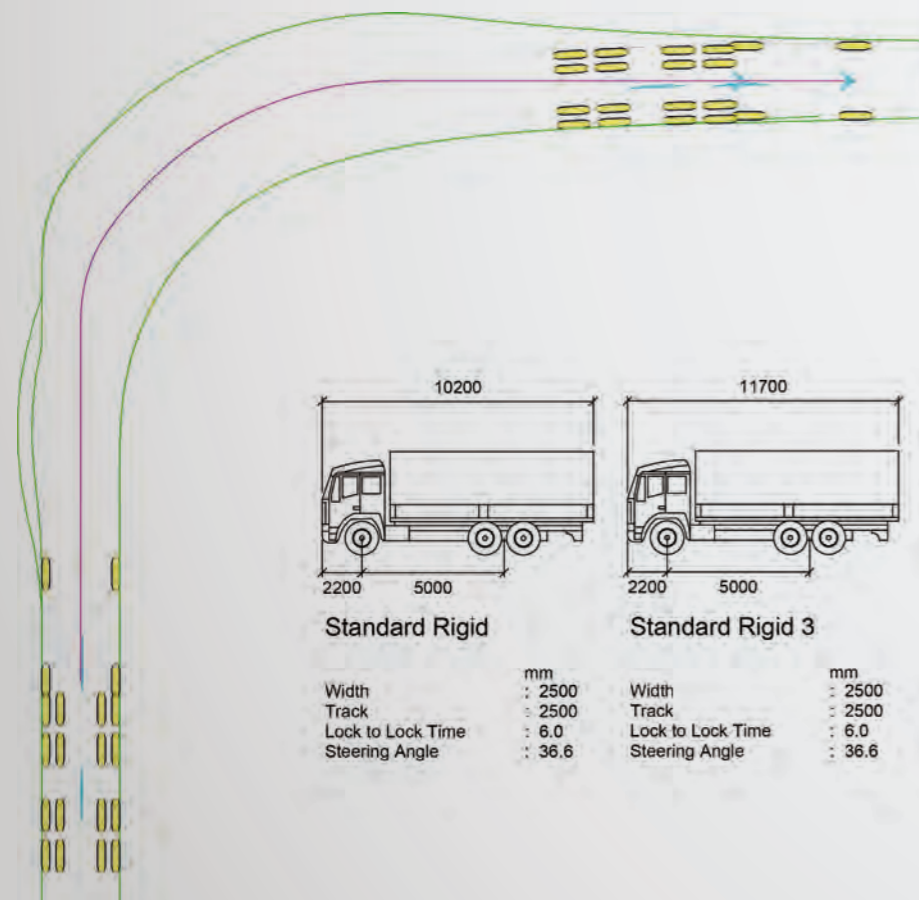


Figure A: Swept path variation due to changes of rear overhang. First case has rear overhang = 60 per cent wheelbase. Second case has rear overhang = 90 per cent wheelbase. (AutoTURN Pro 10). Only very minor differences in the swept path occur. These changes do not affect the difficulty involved in making a tight right-hand turn

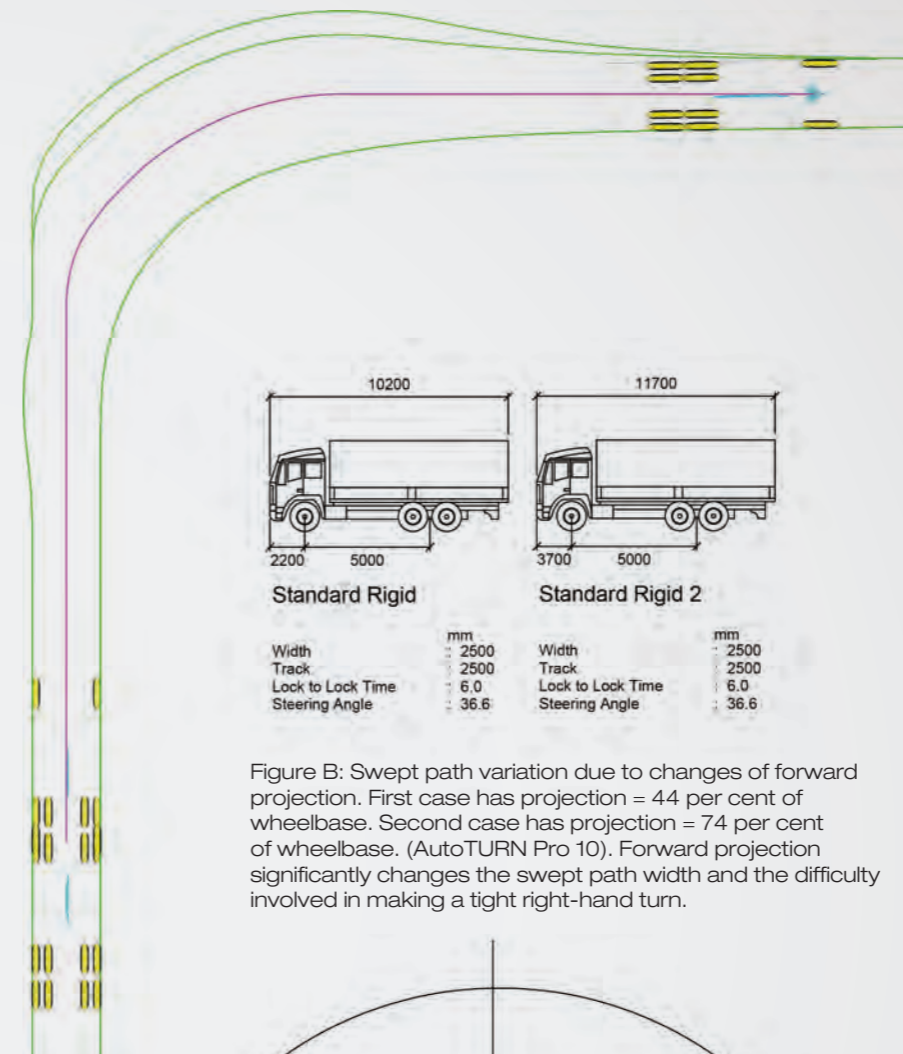


Figure B: Swept path variation due to changes of forward projection. First case has projection = 44 per cent of wheelbase. Second case has projection = 74 per cent of wheelbase. (AutoTURN Pro 10). Forward projection significantly changes the swept path width and the difficulty involved in making a tight right-hand turn.

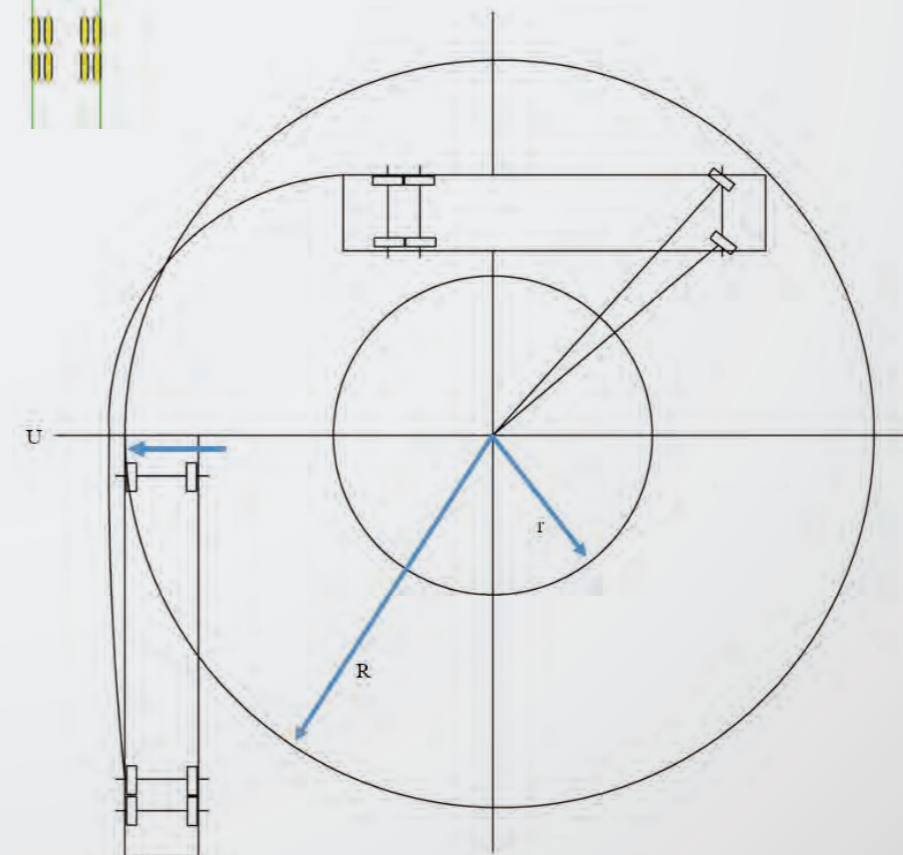


Figure C: The manoeuvrability requirement that is in European Union Directive 1230 / 2012.

outer path boundary. The Europeans have a very sensible approach to limiting swept path. The European rule requires that a vehicle or a semi-trailer combination must be able to manoeuvre inside a 'donut ring' (Figure C) with an outer radius of 12.5m and an inner radius of 5.3m without any of the vehicle's outermost parts projecting outside the donut. This allows the vehicle designer to vary the forward projection, rear overhang and wheelbase to get acceptable axle weights. This performance-based approach allows flexibility that we also need in Australia, so I believe ADR 43/04 should be amended to adopt the European approach.

Another difference between European and Australian dimensional rules concerns vehicle width. The Europeans allow a maximum width of 2,550mm for standard trucks and 2,600mm for insulated refrigeration vans. These widths are slightly greater than Australia's 2,500mm width limit. Both Europe and Australia have comparable highway lane widths of 3,500mm. Europe is not known for wide-open spaces. Incidentally, the US also allows 2,600mm wide vehicles on highways. There is no obvious reason why Australian vehicle widths should be less than in Europe. Australian road agencies have assiduously resisted allowing vehicle width to increase beyond 2,500mm. Whilst there is no 'international' guidance on vehicle dimensions, the European practice provides a sensible guide for Australia. It is time for Australia to review the vehicle limits that exist in the Australian Design Rules, as there are productivity and axle-weight advantages to be gained without any evident challenge to road safety.

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