



# The Potential of Performance-Based Standards

For example, the dividing vehicle length for Level 2 routes is < 26 m (Class A) and > 26 m (Class B). Classification of particular routes is to be done by the road owners, who are federal, state and local governments, working under supervision of the scheme administrator.

The nature of each of the standards is identified in the Table. There are different performance levels for most of the standards depending upon the route access level. The 'players' in the PBS scheme are:

- The vehicle owner, who identifies the opportunity and develops the concept.
- The engineer, who develops the design.
- The vehicle manufacturer, who defines what can be practically built.
- The assessor, who models or tests the vehicle and determines compliance with the standards.
- The scheme administrator, who considers the evidence of compliance with the PBS standards and can approve the application if the requested route is available and the vehicle meets the standards.
- The certifier, who checks the completed design against the approval.
- The road owner (including local governments, which control over 85% of the Australian road network), who issues the permit to use the route.

The PBS scheme has been running for about 5 years. There have been about 350 applications and about 1100 vehicles are on the road as a result. Over 60% of these are truck-trailers (involving a single dog or pig trailer). The NHVR's forecast is that PBS vehicles will make up 3.5% of the HV fleet by 2030 – as many as 25,000 vehicles!

For a novel vehicle gaining approval can be quite difficult. The design and assessment stages are involved. Applicants complain about the costs and have been frustrated at the delays involved in getting route

approval. There can also be difficulties in on-selling special equipment. You might think the difficulties will always restrict use of the PBS scheme to a very small group of operators with special freight applications and plenty of cash to peruse the applications. But this misses the bigger picture!

The real benefit of PBS is that it provides a means that can be used to challenge prescriptive regulations. This became clear at the ARTSA conference. There are three ways that this can happen.

Firstly, 'blueprint' vehicle plans can be developed. These define the range of dimensions that, if met on the truck and trailer(s), will satisfy the performance standards. Once the blueprint dimensions are approved (up to specified axle weights), any vehicle that meets the dimensions and weights will be approved. So why not move these vehicles into the regulations?

Secondly, the assessors' have built-up a domain of experience with applications of the same general type. For example, many applications have been for 4, 5 and 6-axle dog trailers. It should be possible for the assessors to identify dimensional and axle limits that will meet the standards. This wealth of experience needs to be tapped so that 'prescriptive' regulations can be drawn up that take most of the tipper and dog trailer vehicles out of the PBS scheme and into the mainstream. Industry needs to promote and fund this activity.

Thirdly, industry associations such as ARTSA, in consultation with like-minded associations and manufacturers, need to partner with the NTC to develop new blueprints. An obvious candidate is an A-double blueprint because there is great potential for productivity improvements on Level 2, Class B roads.

It is important for progress in our industry that 'blueprint' vehicles are moved into

general regulations. This will free the scheme of mundane applications and allow it to concentrate on truly innovative types. It will also take some pressure off the National Heavy Vehicle Regulator's Office, which could be overwhelmed by the PBS workload. There will also be significant productivity improvements for the broader industry because the uptake of blueprint vehicles will be spurred by certainty. The blueprint approach also allows truck and trailer manufacturers to independently certify vehicle parts. So the bigger picture is that PBS provides a pathway for novel vehicle types that can be 'blueprinted' to be moved in to the regulations. This is a political stage and it is mainly about road access. State road agencies and local government road owners need to have confidence that these

vehicles will provide community benefits. The benefits will be fewer trucks for a given task and trucks that meet higher safety and environment standards than unrestricted vehicles. The 'political climate' is changing because the advent of the National Heavy Vehicle Regulator is altering the political power balance and because significant effort is being made to assist road owners to classify their road assets. The Australian Road Research Board (ARRB Group) has recently released a software tool called the Route Assessment Tool (RAT) that is easy to use and makes the task practical for local councils. The remaining problem is assessment of bridge load limits, which remains a specialist task. The National Transport Commission deserves industry's thanks for developing

the PBS scheme. It also deserves praise for developing the blueprint vehicles. Note that the NTC blueprints are at <http://www.ntc.gov.au/viewpage.aspx?documentid=1235>, and that a 20 m long semi-trailer blueprint will be added shortly. The PBS Review Panel, which has administered the scheme for the past five years, also deserves credit for being effective, responsive and pragmatic. The NHVR will struggle to cope with the administrative demands of PBS. It is now our industry's time to push for these blueprints to be moved into the normal permit domain and out of PBS. The end-game is reform of prescriptive regulations.

Peter Hart  
ARTSA Chairman

**A**RTSA has just held a major conference about the Performance Based Standards (PBS) Scheme. Our aim was to assist the National Heavy-Vehicle Regulator, who has taken over administration of the PBS Scheme, to review the operation of PBS. So why is this important? Isn't PBS a fringe scheme that allows a small number of unusual types of vehicles to get registered? No. Firstly, let's define what PBS is. Over the past decade the National Transport Commission has developed the Performance-Based Standards scheme to provide a pathway for innovative vehicles to be approved. The motivation is to promote greater productivity whilst safeguarding safety and environmental performance. Vehicles are assessed against 16 safety standards and 4 infrastructure standards. Four different road access levels are defined:

- Level 1 – General Access – equivalent to semi-trailer routes.
- Level 2, equivalent to B-double routes.
- Level 3, equivalent to double road-train routes and super freight routes.
- Level 4, equivalent to triple road train (and higher) routes.

(see <http://www.ntc.gov.au/DocView.aspx?DocumentId=1731>) Additionally, Levels 2, 3 and 4 routes are sub-divided into Class A and Class B for shorter and longer vehicles respectively.

STANDARD	TYPE	FACTORS	PARTICULARLY RELEVANT TO
A1 Pavement Vertical Loading	Infrastructure – road wear.	Axle group loads.	Heavy vehicles. PBS recognizes the existing mass-limit schemes GML, CML and HML.
A2 Pavement Horizontal Loading	Infrastructure – road wear.	GCM according to number of driven axles, axle group spreads and steerable axles.	Heavy vehicles. Level dependent.
A3 Tyre Contact Pressure Distribution	Infrastructure – road wear.	Weight on a single tyre or dual tyres.	Vehicles with high axle loads. Not Level dependent.
A4 Bridge Loading	Infrastructure – bridge capability.	Distribution of weight on a bridge. Bridge formulae must be met that relate weight and axle spacings.	Heavy trucks. Different bridge formulae are specified for different levels.
C1 Start-ability	Safety – ability to get the loaded vehicle moving on a grade	Effectively specifies minimum drive-train torque capability in low gear.	Heavy vehicles. Different starting grades are specified for the different Levels.
C2 Grade-ability	Safety – ability to hold a minimum speed on a specified grade and weight.	Minimum drive-train power in higher gears.	Heavy vehicles. Different speed-holding requirements apply for different Levels. Level 1 = 80 km/h
C3 Acceleration Capability	Safety – ability to move through intersections in a reasonable time.	Requires well-chosen low-gear ranges and a suitable engine torque.	Heavy vehicles. Different intersection clearing times for the different Levels.
C4 Overtaking Provision	Safety – ability of other road users to pass a long vehicle.	Total vehicle length.	Long vehicles. Limits total length according to Level and Class specification. Maximum length = 60m
C5 Tracking Ability on a Straight Path	Safety – ability to stay within a lane on a straight path.	Requires suitable dimensions and suspension and tyre performance.	Long vehicles. Requires suitable mechanical design. Level dependent.
C6 Ride Quality	Safety – driver comfort.	This standard is yet to be finalized. The intention is to specify maximum whole-body vibration dose limits.	All motor vehicles. Not Level dependent.
C7 Low-Speed Swept Path	Safety – ability to negotiate intersection corners.	Vehicle dimensions and coupling locations.	Long vehicles. Level dependent.
C8 Frontal Swing	Safety – ability to negotiate a tight turn.	Frontal projection dimension.	Vehicles with long frontal projections. Not Level dependent.
C9 Tail Swing	Safety – ability to negotiate a tight turn.	Maximum excursion out of a lane when making a turn.	Vehicles with long rear protrusions. Level dependent.
C10 Steer Tyre Friction Demand	Safety – understeer performance on a tight turn.	Maximum horizontal steering force according to weight (i.e. friction utilization) of the steer tyres.	Load distribution on the motive vehicle. Note Level dependent.
C11 Static Roll-Over Threshold	Safety – limits tendency to roll-over when cornering.	Maximum height of the centre of mass of each of the loaded vehicle parts.	Load distribution and dimensions of each vehicle part. Not Level dependent.
C12 Rearward Amplification	Safety – limits build-up on tail swing resulting from a sudden change of steered direction.	Dimensions, coupling locations, suspension characteristics and tyre characteristics.	Combinations with drawbar couplings. Not Level dependent.
C13 High-Speed Transient Off-Tracking	Safety – limits excursion from path during avoidance manoeuvre.	Dimensions, coupling locations, suspension characteristics and tyre characteristics.	Combinations with drawbar couplings. Level dependent.
C14 Yaw Damping Co-Efficient	Safety – limits time taken from a 'sway' mode to stop.	Dimensions, coupling locations, suspension characteristics and tyre characteristics.	Long multi-combination vehicles. Level dependent.
C15 Handling Quality	Safety – specifies adequate steering control	This standard is yet to be finalized.	Design of the motive vehicle steering system.
C16 Directional Stability Under Braking	Safety – limits wheel lock-up on the unladen vehicle under heavy braking.	Features of the brake system. Requires either an adaptive brake system or Antilock Brakes	Brake system design. Not Level dependent.

Table 1: Overview of the PBS Standards

Ref: <http://www.ntc.gov.au/viewpage.aspx?documentid=1283>