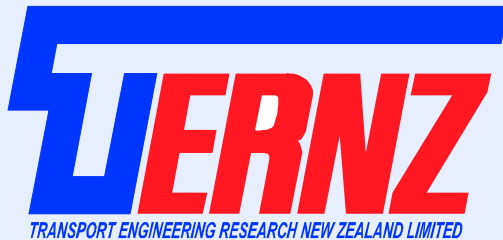




**2006 MOVING FORWARD**

**PBS, ALIVE AND WELL  
IN NEW ZEALAND**

**John de Pont**





## Definitions

- ③ **Performance Measure – some quantity that is measured or calculated during a prescribed test**
- ③ **Performance-Based Standard = Performance Measure with an acceptability level**



## **Example – Braking Requirements**

- ③ **Performance Measure -  
Stopping distance from 30km/h  
on a flat dry surface**
- ③ **Performance-Based Standard –  
Stopping distance must be less  
than 7m**



## **Brief Historical Context**

- ⊗ **Some Performance Measures have been used for a long time**
- ⊗ **RTAC Study in Canada in mid 1980s expanded use of PMs**
- ⊗ **NRTC (now NTC) in Australia currently developing an alternative compliance regime based on PBS**



## **PBS in New Zealand**

- ③ **Performance measures have been used in NZ since late 1980s as a guide for size and weight policy**
- ③ **PBS has been used to evaluate vehicles outside prescriptive requirements for permit operations**
- ③ **Presentation gives examples of the use of PBS in NZ and shows how this has changed over the years**



## **44-tonne A-trains**

- ⊗ **Increase in GCW from 39 to 44 tonnes for B-trains and some truck-trailers but not A-trains**
- ⊗ **Dairy Company wanted increased manoeuvrability of A-train**
- ⊗ **LTSA agreed to allow 44-tonne A-trains provided  $SRT > 0.45g$ ,  $DLTR < 0.6$  and  $HSTO < 0.5m$**
- ⊗ **About 12 vehicles were approved in early 1990s**



## **44-tonne A-trains Today**

- ⊗ **Approved vehicles have operated successfully for a number of years**
- ⊗ **Most are now retired but at least two have been recertified with new tractors in recent years**
- ⊗ **Truck-trailers were found to be a suitable alternative without cost of permit approval**
- ⊗ **No new 44-tonne A-trains since**



## **22m Log Trucks**

- ⊗ **Log trucks had a relatively high rollover rate**
- ⊗ **For shorter logs multi-bolster trailers reduce load height and improve stability**
- ⊗ **Maximum log length for two-packet trailer loads ~4.2m**
- ⊗ **Increasing overall length of vehicle to 22m allows two-packet loads for up to 5.2m logs**





## **22m Log Trucks Approval Process**

- ⊗ **Computer simulations and analysis of crash data showed potential safety gains**
- ⊗ **Limited trial with seven vehicles for one month was approved**
- ⊗ **Independent observations and assessment of actual performance**
- ⊗ **Extended trial of 20 vehicles spread around NZ**
- ⊗ **Simultaneously stakeholder consultation including politicians, road controlling authorities, safety advisors and AA**

# 22m Log Trucks Rear view



# 22m Log Trucks Side View





## **22m Log Trucks - Operations**

- ⊗ **22m log trucks allowed under permit**
- ⊗ **Maximum load height 3.2m and subject to category 1 OD vehicle requirements**
- ⊗ **LTSC required to maintain crash database and undertake surveys of speed through curves**
- ⊗ **Recent survey indicates that about 11% of log loads are carried in 22m configuration**
- ⊗ **Log truck rollover crash rate is now less than 1/3 of what it was eight year ago (other initiatives by LTSC also contributed to this).**



## **Dimensions and Mass Rule**

- ③ **Size and weight regulations rationalised and consolidated into a Rule (2002)**
- ③ **No significant size and weight increases**
- ③ **Some changes based on PBS assessment**
  - ③ **Truck-trailer mass ratio**
  - ③ **Hitch offset limits**
- ③ **Inclusion of minimum SRT requirement for most large heavy vehicles (world-first)**
- ③ **Only possible through development of the SRT Calculator**



## **Longer Quad Semi Tanker for Fuel Transport**

- ⊗ **VDM Rule allowed for quad semis**
- ⊗ **With 4-axle tractor can have 44 tonne GCW**
- ⊗ **Bridge formula restricts axle position variations (1<sup>st</sup> to last > 16m)**
- ⊗ **Dangerous goods regs require rear impact protection system. Leaves maximum front overhang of tractor at 1.15m**
- ⊗ **Tractors with FUPS and other safety systems have front overhangs > 1.35m**
- ⊗ **Only option within Rule is to use tractors without additional safety features**



## **Longer Quad Semi Tanker for Fuel Transport**

- ③ **To enable the use of safer tractors there are two options:**
  - ③ **Extra length (18.3m) with extra rear overhang (4.2)**
  - ③ **Violating bridge formula (15.75m spread for 44 tonne)**
- ③ **Assessment based on NZTS not just safety**
- ③ **Option 1 preferred over 2 by regulators**
- ③ **Permit issued subject to tractor having a FUPS fitted**
- ③ **One now operating – two more being built**



## **Longer Buses and Coaches**

- ⊗ **VDM Rule limits coaches to 12.6m length and 4.25m rear overhang**
- ⊗ **With ~50 passengers this results in relatively low seat spacing**
- ⊗ **Other countries including Australia allow longer buses**
- ⊗ **Tourists find NZ buses cramped by comparison**





## **Longer Buses and Coaches**

- ⊗ **Bus and Coach Association proposed 14.5m buses with 5.1m rear overhang**
- ⊗ **Option of 13.5m with current rear overhang**
- ⊗ **Main performance issues are off-tracking and tail swing which trade-off against each other**
- ⊗ **Computer modelling showed changes in performance. In terms of NTC PBS performance acceptable**
- ⊗ **Physical trial undertaken to demonstrate validity of computer modelling and to illustrate practical implications of changes**



## Simulated 14.5m Coach





## Validating Tail Swing Results







## **Longer Buses and Coaches**

- ⊗ **Assessment against NZTS objectives**
- ⊗ **13.5m coaches approved under permit subject to various safety features**
- ⊗ **14.5m coaches approved under permit with Road Controlling Authority support**
- ⊗ **Several 13.5m coaches now operating**



# Conclusions

- ③ **NZ early adopter of PBS approach**
- ③ **Initially used primarily for assessing permit applications - main criteria was improved safety**
- ③ **Generally approved vehicles are expected to have better than minimum safety**
- ③ **Performance measures used to develop prescriptive requirements in VDM Rule**
- ③ **PBS for rollover stability included in Rule**
- ③ **Currently PBS used to assess vehicles outside Rule. Applications assessed in terms of all NZTS objectives not just safety**