

Heavy vehicle standards – 2012 & beyond

The Australian Design Rules (ADRs)

ARTSA December 2011

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Topics

Standards in Australia

- *Background to the Australian Design Rules (ADRs):*
- *Harmonisation with international and global regulations (1958 Agreement and 1998 Agreement)*
- *Changes to the ADR consultative forums*

2012 ADR work plan

- *New ADRs and amended ADRs*
- *What else*



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New vehicles sold in Australia

Commonwealth legislation: Motor Vehicle Standards Act 1989

- *Uniform National Vehicle Standards*
 - *Australian Design Rules (ADRs) for road vehicles*
 - *safe to use;*
 - *control emissions;*
 - *secure from theft.*
- *Type approval*
 - *approval of a design rather than of each individually produced item*
 - *may be a complete vehicle or a component for fitting to a new vehicle*



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Meeting the ADRs

“The Compliance Plate”



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Vehicles “in-service”

- *States and territories legislate “in-service” requirements (vehicle registration, licensing, roadworthiness, continued compliance with ADRs etc)*
- *These are based on the model legislation – the Australian Vehicles Standard Rules (AVSRs)*
- *States and territory legislation takes over from Commonwealth after “supply to the market” (point of registration)*



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The United Nations Economic Commission for Europe

UNECE 1958 Agreement (“ECE regulations”)
UNECE 1998 Agreement (“GTRs”)



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1958 Agreement

Contracting Parties (currently 48)



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1958 Agreement cont.

- *Develops international UNECE regulations in a forum open to any country to join in.*
- *Allows these regulations to be adopted into national regulations (in our case the ADRs)*
- *Allows interested countries to approve products to the UNECE regulations; and so*
- *have other countries accept the products without further testing.*



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1998 Agreement

Contracting Parties (currently 31)



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1998 Agreement cont.

- *Develops “template” regulations in a forum open to any country to join in*
- *Includes detailed technical requirements, without any discretion for a test authority*
- *Requires any contracting party to review the case for adopting a new Global Technical Regulation (GTR) in its domestic regulations within a year (in our case the ADRs)*



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ADR consultative groups

- *Until recently, the Australian Motor Vehicle Certification Board (AMVCB) and the Technical Liaison Group (TLG) were the primary consultative groups for development and implementation of the ADRs*
 - *The AMVCB comprises state and territory governments and the Commonwealth*
 - *The TLG comprises the vehicle industry, road user groups, state and territory governments and the Commonwealth (including NTC and NHVR)*
- *ARTSA is a valued member of TLG*



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ADR consultative groups cont.

- *From mid 2010 a higher level strategic group was added, the Strategic Vehicle Safety and Environment Group (SVSEG)*
- *The SVSEG comprises senior officers from the vehicle industry, road user groups, state and territory governments and the Commonwealth (including NTC and NHVR):*



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ADR consultative groups cont.

- **SVSEG**
 - *Considers broader strategic vehicle safety issues such as those in line with the 2011-20 National Road Safety Strategy*
 - *Agrees on the national regulatory and non-regulatory program for vehicle safety*
 - *Includes environmental aspects where they cross-over with safety*
 - *Is a good opportunity for the vehicle industry to work with the decision makers in government*
- *ARTSA is a valued member of SVSEG*



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The changing ADRs

- *1970s – ADRs based on Society of Automotive Engineers (SAE) recommended test procedures and performance requirements*
 - *similar to the United States requirements*
- *1980s – policy of “harmonising” new ADRs with international requirements*
 - *United Nations Economic Commission for Europe (UNECE) regulations recognised as the peak international standards*
- *1990s to 2000s – review of existing ADRs*
 - *80% are now harmonised (or partially harmonised) with UNECE regulations and the recent UNECE Global technical regulations (GTRs). Expected to reach around 90% eventually*
- *2010 to 2020s – next generation of ADRs*
 - *New or revised passenger car occupant protection ADRs*
 - *New or revised heavy vehicle ADRs on braking and electronic safety systems*



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Heavy vehicle regulation

General characteristics of heavy vehicles

- *Heavy vehicles are different to light vehicles in a number of respects that are a factor when considering standards:*
 - *truck to trailer compatibility, both old and new (braking and coupling implications)*
 - *operation at the limit of infrastructure capacity regarding road pavement strength, road/lane widths, bridge/road furniture clearances (mass and dimension implications)*
 - *cost, mass and dimension critical (productivity implications)*



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Heavy vehicle regulation

Unique characteristics within Australia

- *Mixing of Australian, US, European and Japanese designs, design philosophies and regulatory requirements*
- *The use of multiple combinations*
- *Australia's road pavement strength, road/lane widths, bridge/road furniture clearances*



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Review of the ADR Work plan

- There has been an rapid expansion of safety research and available safety technology in recent years
- Each consultative group has its own viewpoint and set of priorities for future action
- The ADR work plan was reviewed by SVSEG towards an agreed set of priorities that would also align with the new National Road Safety Strategy 2011-20.
- This has been a major aspect of the work during 2010-11
- *Input from members of the consultative groups, such as ARTSA, has been invaluable in this*



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Review of the ADR Work plan cont.

- Much of the work plan will be to consider:
 - Allowing the latest UNECE regulations as alternative standards
 - Mandating the full requirements of the latest UNECE regulations
 - Adopting existing UNECE regulations not already in the ADR suite of standards
 - Increased contribution to the UNECE working parties for new and amended UNECE regulations.
 - Reviewing the remaining ADRs that have yet to be reviewed under the governments ongoing business review agenda
- As of mid 2009 this included 3 new ADRs, 12 major reviews, 3 major amendments, 51 minor amendments, 30 corrections, 50 out-of-date referenced UNECE alternative standards



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International Work plan

- *Ongoing work for heavy vehicles includes:*
 - *Noise – sound limit values being reviewed*
 - *Lighting – consolidation and minor adjustments to the requirements*
 - *Emissions – Euro 5, particle measurement, Gtr alignment, Hydrogen vehicles and environmentally friendly vehicles*
 - *Braking – LDW, P-eBA, stop signals, park brake tests, ESC, ITS*
 - *General Safety – bus structures and configuration, rollover, glazing, mirrors*



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Australian Work plan

- *Ongoing work for heavy vehicles includes:*
 - *National Heavy Vehicle Braking Strategy (NHVBS) (ADRs 35 and 38)*
 - *Phase I ABS/LP (2012)*
 - *Phase II ESC (2014+)*
 - *Lane Departure Warning (LDW) (2012 subject to UN progress)*
 - *Advanced Emergency Brake Systems (AEBS) (subject to UN progress)*
 - *Cabin Strength (ADR ??) (2013)*
 - *Vehicle Configuration & Dimensions, General Safety and Specific Purpose Vehicles (ADRs 42, 43, 44) (Review 2013)*
 - *Road Trains/B-doubles and Road Speed Limiting (ADRs 63, 64, 65) (Review 2013+)*
 - *Monitor developments in safety technology: ABS, EBS, ESC (DSC and RSC), BA, P-e BA, FCW, LDW, ISAssist, ISAdapt, ACC, SBR, DRLs*

Note: dates refer to the work being carried out, not the date that the regulation comes into force



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The Braking Rules ADRs 35 and 38

- ADR 35 for commercial vehicles was introduced in 1975
- ADR 38 for trailers followed in 1984
- Braking is gradually becoming internationally agreed, with UNECE Regulation No. 13 used for heavy trucks and trailers
- However, this is not the case in the US or Japan
- This makes regulation difficult in Australia because:
 - a large number of vehicles are imported from the US and Japan
 - heavy vehicles need to have compatible braking between trucks and trailers regardless of where they are built, and for both old and new



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Review of Braking

- Growing interest from governments and the community to mandate the latest safety technology on heavy vehicles
 - Antilock Brake Systems (ABS), Electronic Braking Systems (EBS) and Electronic Stability Control (ESC) are increasingly being mandated in overseas regulations
- In 2002, a review of ABS was requested
 - However, the issues were broader and a detailed report was commissioned. This then tied in with the direction of two reviews of ADRs 35 and 38; one in the mid 90s and one around 2005
- The project was called the National Heavy Vehicle Braking Strategy (NHVBS) and the Hart report was completed in late 2008



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National Heavy Vehicle Braking Strategy (NHVBS)

- Extensive consultation coordinated through the NTC
 - Two meetings with transport industry groups in Melbourne 2005
 - Discussion paper 2006 inviting comment
 - Three workshops to review proposals and provide feedback (Melbourne, Brisbane, Perth)
 - Meeting of twenty industry and road agency representatives
 - Discussions totalled around 200 representatives with about 40 making written submissions



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National Heavy Vehicle Braking Strategy (NHVBS) cont.

- *A Number of general recommendations in the Hart Report*
 - Specification of higher national stopping distances and control performance standards
 - Development of an Industry Brake Balance Code of Practice
 - Review alternative strategies, including mandatory regulations, to increase the uptake of electronically controlled braking systems



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National Heavy Vehicle Braking Strategy (NHVBS) cont.

- *A Number of ADR recommendations in the Hart Report*
- Amend the braking ADRs (35 and 38) where practical to align with UNECE Regulation No. 13
 - (Note: UNECE Regulation No. 13 is currently allowed as an alternative standard, *but* trailers must have spring brakes fitted and road train trucks and trailers must meet brake release times)
- *This means reviewing the case for mandating ABS on trucks, for ABS or load proportioning on trailers, for EBS requirements if fitted, and for Electronic Stability Control*
- *Proposed implementation phase between 2011 and 2020*



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National Heavy Vehicle Braking Strategy (NHVBS) cont.

- Phase I - 2011
 - Provision of ABS/variable load proportioning systems
 - provision of ABS electrical connectors and provision of certification information
- Phase II - 2015
 - Aligning system ABS and EBS performance requirements and overall vehicle performance requirements with UNECE R13
- Phase III - 2015-20
 - Provision of ESC systems



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National Heavy Vehicle Braking Strategy (NHVBS) cont.

Other amendments

| Increasing stringency | Decreasing stringency |
|--|---|
| (a) Trucks fitted with a tow coupling to provide an electrical ABS connector ¹ . | (h) No release times for circuits controlled by ABS modulation valves |
| (b) Trucks and trailers to have automatic brake adjusters if fitted with ABS | (i) No ABS for road train trucks or trailers |
| (c) Trailer test masses to be declared where UNECE approvals are used for compatibility tests ¹ . | (j) Allow ABS deactivation for use on gravel roads for trucks or trailers |
| (d) Truck foundation brake certification information must be provided | (k) No split mu capability for ABS on steerable axles |
| (e) Trucks to have “spring to off” trailer brake controls | (l) No EBS requirements for road train trucks and trailers. |
| (f) ABS on trucks to override auxiliary brakes | |
| (g) Stop lamps on trucks to illuminate when auxiliary brakes decelerate at a high level | |

1. Priority items



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National Heavy Vehicle Braking Strategy (NHVBS) cont.

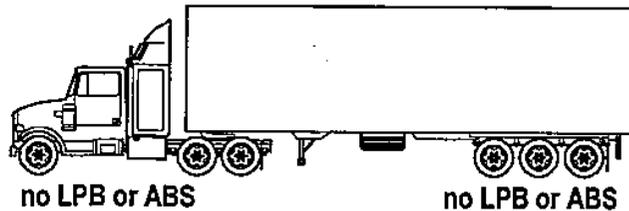
- Compatibility
 - Particular attention will be needed for the compatibility of new and old trucks and trailers when used in combination, given differences in the levels of technology fitted
 - A separate ADR amendment is being discussed that broadens the unladen “tramlines” slightly for trailers (Figure 2 of ADR 38/03) to allow better matching of some combinations (see next slide for examples)



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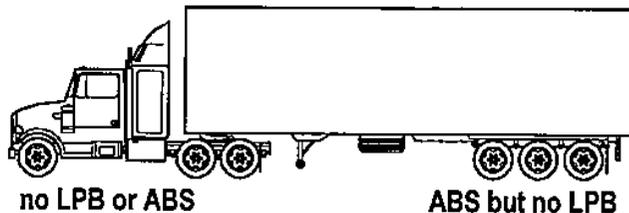
National Heavy Vehicle Braking Strategy (NHVBS) cont.



✗ MOST COMBINATIONS IN SERVICE NOW.

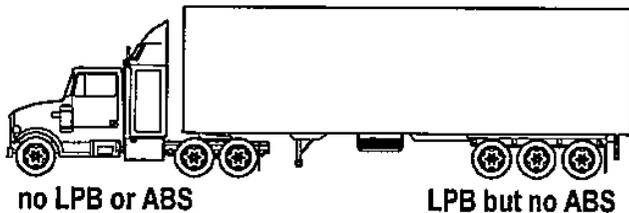
No load proportioned braking (LPB) on either towing vehicle or trailer means both are overbraked when empty. Trailer tends to be more overbraked due to higher laden/empty axle load ratio so is more likely to lock wheels and become unstable. Brake force and thus brake wear distribution between towing vehicle and trailer remains fixed.

POSSIBLE OUTCOMES ENFORCED BY 2011 NHVBS PROPOSAL...



✗ NHVBS outcome for old towing vehicles with new ABS trailers.

No better than most combinations in service now. No LPB on either means both are overbraked when empty, and ABS on trailer is not powered (because towing vehicle without ABS has no trailer ABS connector) so essentially same as most combinations now. Brake force same laden and empty so wear balance unaltered.



✗ NHVBS outcome for old towing vehicles with new LPB trailers.

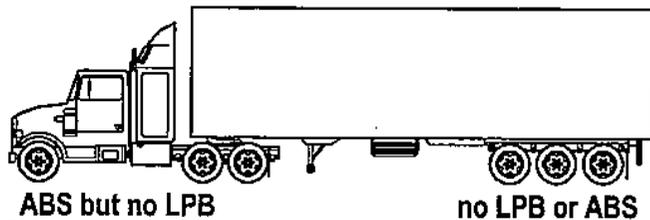
Worse than most combinations in service now. LPB on trailer only (if set for trailer axle load ratio) means towing vehicle is severely overbraked relative to trailer when empty, causing chronic wheel lock instability and high drive axle brake wear. (trailer LPB can be set higher to balance with non-LPB towing vehicle, but this is not enforced by ADR and compromises balance with LPB towing vehicles).



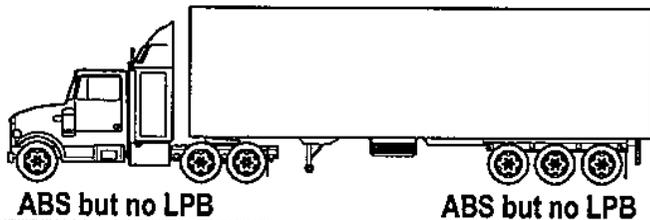
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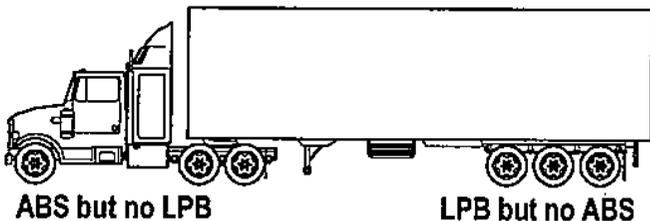
National Heavy Vehicle Braking Strategy (NHVBS) cont.



✓ NHVBS outcome for new US towing vehicles with old trailers. **Somewhat better than most combinations in service now.** No LPB on either means both are overbraked when empty, but ABS prevents wheel lock instability of towing vehicle, and trailer no worse than now (will lock wheels when empty, under heavy braking, and/or on slippery roads). Brake force same laden and empty so wear balance unaltered.



✓ NHVBS outcome for new US towing vehicles with new ABS trailers. **Better than most combinations in service now.** No LPB on either means both are overbraked when empty, but ABS on both prevents any wheel lock instability. Brake force same laden and empty so wear balance unaltered.



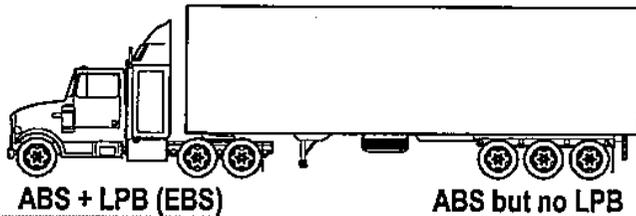
✗ NHVBS outcome for new US towing vehicles with new LPB trailers. **Potentially worse than most combinations in service now.** LPB on trailer only (if set for trailer axle load ratio) means towing vehicle is severely overbraked relative to trailer when empty, but ABS prevents drive wheel lock instability. Trailer brake force reduced so empty wheel lock less likely but still possible under heavy braking and/or on slippery roads. Drive axle brake wear likely increased. (trailer LPB can be set higher to balance with non-LPB towing vehicle, but this is not enforced by ADR and compromises balance with LPB towing vehicles).



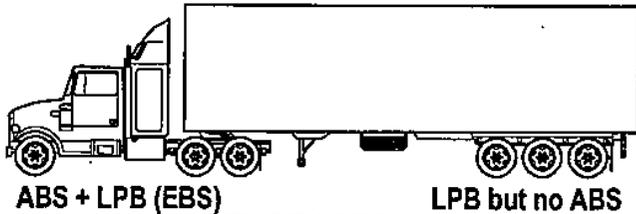
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National Heavy Vehicle Braking Strategy (NHVBS) cont.



✓ NHVBS outcome for new Euro towing vehicles with new ABS trailers.
Better than most combinations in service now. LPB only on towing vehicle means trailer overbraked when empty, but ABS on both prevents any wheel lock instability. Trailer brake wear likely increased.



✓ NHVBS outcome for new Euro towing vehicles with new LPB trailers.
Better than most combinations in service now. ABS on towing vehicle prevents wheel lock instability but trailer wheel lock still possible under heavy braking and/or on slippery roads. LPB on both balances wear.



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National Heavy Vehicle Braking Strategy (NHVBS) cont.

- Status of the project
 - A number of ADR amendments have been recommended by the Hart report under the NHVBS
 - A proposed timeline for implementing a number of these recommendations has been developed using a phased approach. There have been discussions through the primary ADR development forum, the TLG
 - CVIAA has made a submission through the TLG which generally supports the amendments
 - A Regulation Impact Statement for Phase I is expected to be completed during the first half of 2010



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Mass and dimensions

- Mass and dimension limits maintain safety with other road users and preserve the infrastructure
- They are not internationally agreed as they tend to depend on the infrastructure in each country or region
- prescriptive regulations (eg a set dimensional limit) are a crude mechanism, but:
 - are straightforward to understand and measure and thus compliance checking is relatively simple and cheap; and
 - allow mixing of combinations
- Increasing interest in performance-based standards (PBS) as an adjunct to dimensions and mass rules. Applied to combinations.



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Couplings

- *An ongoing balance between:*
 - *interchangeability for all combinations; and*
 - *dedicated designs suited to dedicated combinations (eg coupling types and installation heights)*
- *The Coupling ADR (62) was re-issued in 2007, accepting UNECE couplings, where compatible with Australian couplings*
- *Amendments for ADR 63 (road train trailers) are being considered regarding coupling D-ratings, heights and underhang requirements*



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Conclusions

- There has been an rapid expansion of safety research and available safety technology in recent years
- The ADR work plan was reviewed by the new peak consultative group SVSEG towards an agreed set of priorities that would also align with the new National Road Safety Strategy 2011-20.
- The major items for the 2012+ work program for heavy vehicles will be braking under the NHVBS, as well as LDW and AEBS (subject to UN timing)



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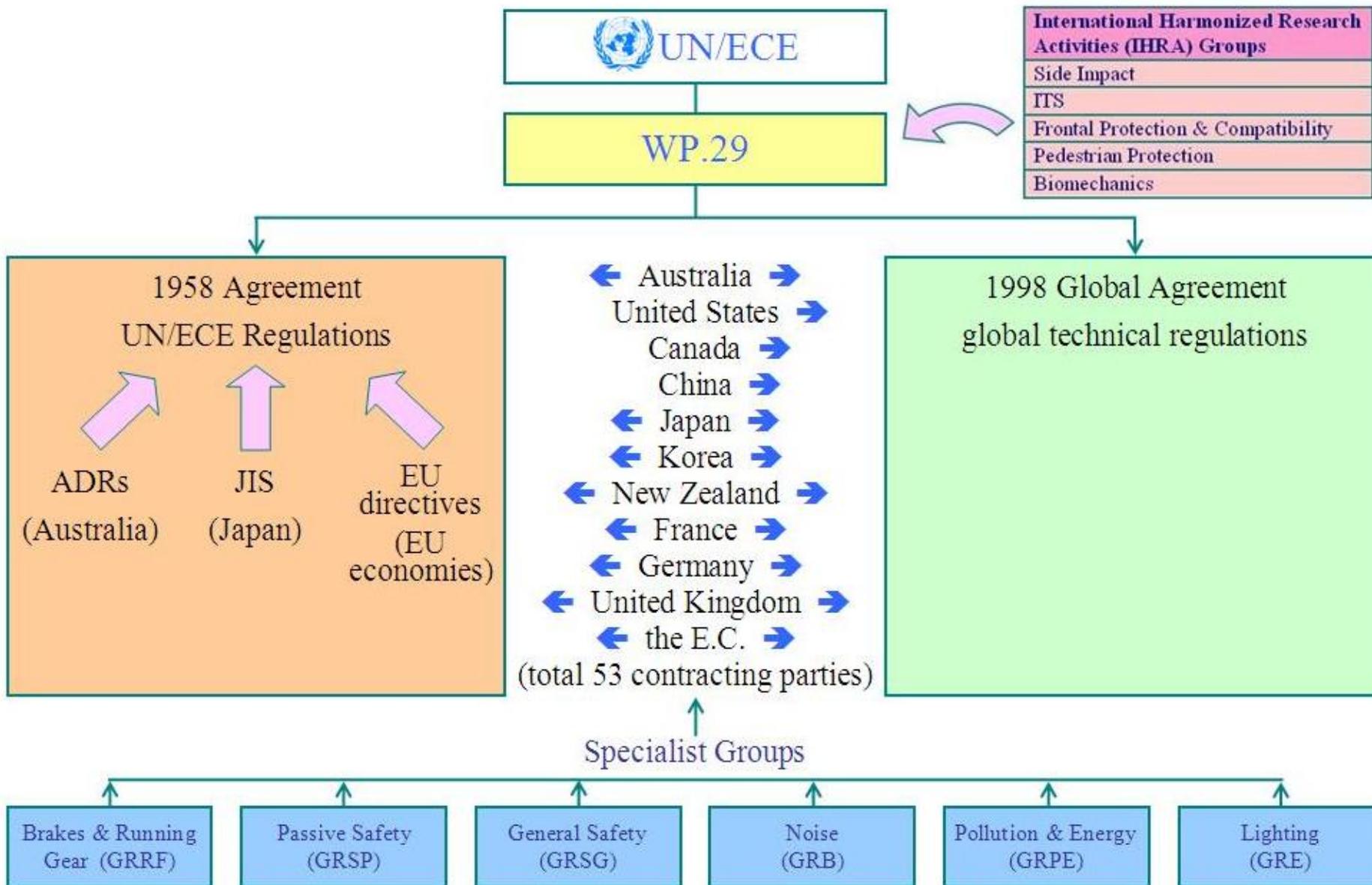
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Thank you



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WP 29 Sub Groups:

- *GRPE (Pollution and Energy)*
- *GRSG (General Safety)*
- *GRRF (Brakes and Running Gear)*
- *GRE (Lighting and Light Signalling)*
- *GRSP (Passive Safety)*
- *GRP (Noise)*
- *Informal groups formed under working groups to explore specific issues*



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Current GTRs

- *Current GTRs.*
 1. Door Locks
 2. Emissions for 2 wheeled vehicles
 3. Motor Cycle Brakes
 4. Emissions for vehicles up to 3.5 tonne GVM
 5. On-Board Diagnostic Systems for motor vehicles
 6. Safety Glazing
 7. Head Restraints
 8. Electronic Stability Control
 9. Pedestrian Protection



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Harmonisation status of ADRs

The current status of the harmonisation of the ADRs is:

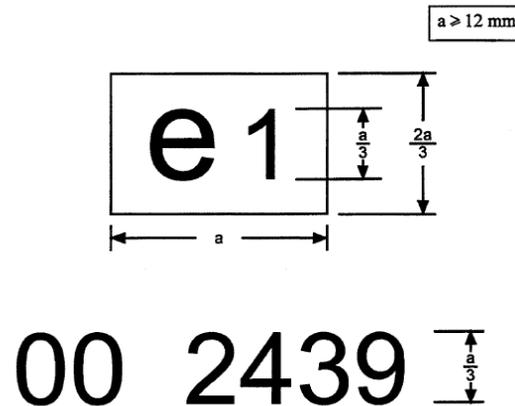
- There are 47 ADRs that have been fully harmonised with UNECE Regulations and 1 with a GTR as an alternative standard in ADR 2 – Side Door Latches and Hinges*
- Fully harmonised status allows a vehicle manufacturer to either provide a UNECE approval or test to the technical requirements of the UNECE Regulation in order to demonstrate compliance with the relevant ADR*
 - There are 7 ADRs that have been partially harmonised with the UNECE Regulations*
 - Partially harmonised status is similar to the fully harmonised status however, there are some additional Australian requirements that must be met*
 - There are 14 ADRs that are not harmonised.*



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Regional Approvals – e marking



The front underrun protective device bearing the above EC type-approval mark is a device which has been approved in Germany (e 1) under the base approval number 2439 on the basis of this Directive.

The figures used are only indicative.



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Heavy vehicle standards

particular issues

- *As heavy vehicles are mass and dimension critical, operators are very sensitive to added mass and cost of regulated safety features*
- *Regulatory issues particular to heavy vehicles mainly fall under:*
 - *Mass and dimensions*
 - *Braking*
 - *Couplings*



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“E” marking and “e” marking

What’s the difference?

- *“E” marking is an approval to the international UNECE regulations. Australia is a party to the 1958 Agreement for UNECE regulations and so can participate in development, voting and the dispute process for products approved with an E mark.*
- *“e” marking is an approval to European Union (EU or EC or EEC) regulations. Australia has no rights to any activities regarding these approvals and cannot do so as it is not part of the European Union.*



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“E” marking and “e” marking cont.

- *ECE (“E” mark) and EU (“e” mark) technical requirements are not the same, although they have gradually been aligning*

Note: There is no approval process for Global technical regulations so there is no “Gtr mark”



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Introduction cont.

- *In 1965, under questioning by Senator Robert Kennedy during US senate hearings, a major manufacturer revealed that only around 0.1% of that profit was being spent on safety research.*
- *By 1966 in the US, the National Traffic and Motor Vehicle Safety Act began to enact standards for vehicle design and performance.*
- *This was a major turning point for vehicle regulation, as it acknowledged that the freedom given by the motor car had come at a high price.*



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