HARMONISATION OF VEHICLE STANDARDS REGULATIONS

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ABSTRACT

Harmonisation of motor vehicle design and construction requirements with that of the ECE Regulations has been a high priority in the implementation of new requirements in Australia for a number of years. This paper provides an overview of the world scene with regards to harmonisation of motor vehicle regulations in the context of the developments within the ECE and EEC frameworks.

Australia has now adopted many of the ECE Regulations as part of their National requirements. This paper focuses on two issues, heavy vehicle braking and bus safety, where Australia has had to achieve a balance between the benefits and drawbacks of International harmonisation.

INTRODUCTION

By way of introduction, a brief overview of the Australian Design Rule system may be useful for those not familiar with it.

The Australian Design Rules (ADRs) set down the performance and design requirements for motor vehicle safety which are broadly similar to those applying in other western countries.

The ADRs take force nationally under the Federal Motor Vehicle Standards Act which is administered by the Federal Office of Road Safety. The ADRs are approved as "National Standards" by the Federal Minister for Land Transport.

The Act applies to vehicles prior to first supply to the Australian Market. Vehicles which are already in service are the responsibility of the States and Territories.

Development of the ADRs involves a consultative process within committees of the Australian Transport Advisory Council which is made up of the State and Territory Ministers responsible for Transport.

It is the policy of the Australian Transport Advisory Council (ATAC) to harmonise, wherever possible, with international standards unless there are significant safety grounds to do otherwise. At present, over 60% of the ADRs are aligned with international standards, predominantly the Economic Commission for Europe (ECE) regulations.

The Vehicle Standards Advisory Committee (VSAC) and the Advisory Committee on Vehicle Emissions and Noise (ACVEN) have responsibilities for the safety and environmental Design Rules respectively.

These committees consist of representatives from Federal, State and Territory governments, industry, consumer groups and vehicle safety experts. Both the Australian Bus and Coach Association and the Commercial Vehicle Industry Association of Australia are represented on VSAC.

Draft ADRs are circulated widely for public comment before they are finalised.

National Road Transport Commission

A Special Premiers' Conference comprising heads of Government of the Commonwealth, States and Territories of Australia, held in July 1991 agreed to the establishment of a nationally uniform regime for the regulation and operation of heavy vehicles in Australia. To facilitate this agreement, a National Road Transport Commission is being established, with powers to set road user charges and oversee the regulatory framework for heavy vehicle transport.

The coverage of the Commission in terms of road safety and vehicle regulation is to include the following:

- heavy vehicle construction requirements (new construction and in-service modification), including dimension and weight limits and vehicle emission standards;
- aspects of traffic codes relating to heavy vehicles;
- vehicle roadworthiness and inspection standards;
- driver licensing standards and procedures;
- special codes of practice covering heavy vehicles (e.g. loading codes, permit conditions);
- enforcement levels and sanctions for breaches of regulations, noting the need to provide a meaningful deterrent and maintain consistency of penalties in this area between all jurisdictions; and
- aspects of operator controls, paticularly affecting heavy vehicles (e.g. freight and public passenger vehicle licensing) but excluding economic regulation.

Although, at present, the Commission's resposibilities are limited to vehicles greater than 4.5 tonne gross vehicle mass it is anticipated that this will be expanded to include virtually all aspects of vehicle and road user standards, including traffic codes, for all classes of road transport.

Under this scheme the Federal Office of Road Safety retains responsibility for the Australian Design Rules under the Motor Vehicle Standards Act and is working closely with the Commission in the formulation of the new operating procedures.

INTERNATIONAL HARMONISATION

Almost every country has its own domestic vehicle regulations. These regulations have evolved over the years with regard to vehicle performance, traffic conditions and road safety, but often with little regard for legislation in other countries. The ensuing variety of construction and performance requirements has been a significant obstacle for exporting vehicle manufacturers.

The Australian Scene

Initially only a few Australian Design Rules corresponded technically to ECE Regulations. In the late 1960's and early 1970's vehicle regulatory requirements were much simpler than at present, and the cost of having unique Australian requirements was less than the benefit achieved from harmonisation.

As regulatory requirements around the world have become more complex and as vehicle manufacturers increasingly wish to build vehicles for world markets,

the relative cost of a country having unique vehicle requirements has increased. This is particularly so in a country like Australia where the total number of new vehicles sold each year is small in coparison with world production.

As a consequence of such factors, in 1983 ATAC Ministers agreed

> "that international vehicle safety standards harmonisation be actively pursued and that the Technical Committees should continue to give close attention to the alignment of Australian standards with international (United Nations Economic Commission for Europe (ECE)) standards unless there is sufficient evidence to justify unique Australian or other requirements"

Currently more than two thirds of Australian Design Rules are aligned with United Nations ECE Standards, and a number of other rules are aligned with US Standards.

Benefits of Harmonisation

The benefits of harmonisation arise mainly because the use of proven technology and the economics of larger volume production allow the provision of a particular feature at minimum cost.

The difference in total cost between the use of an international standard and the use of a unique national standard can mean that the former is cost effective and the latter is not.

Whilst the use of an international standard may involve some compromises with national requirements, the overall benefit, to both the consumer and the industry, of using the international standard can therefore be greater.

The Australian policy of international harmonisation means that we will generally tend to harmonise with ECE Regulations unless there are good and justified reasons to do otherwise.

Harmonisation with a particular requirement may not provide an overall benefit to a country, for example if the international requirement is much more stringent or much less stringent than the needs of that country.

Meaning of International Harmonisation

From the viewpoint of Australia harmonisation is not simply a matter of accepting, without question, international regulations. In each instance the requirements adopted must be warranted for Australia, although at the same time thought is given to the effects internationally of using or not using a particular requirement.

From our perspective the essential elements of harmonisation are the adoption of uniform test procedures together with the design or regulatory limits to be achieved; ie the factors which affect the vehicle and production processes. Full alignment of administrative procedures is not necessarily part of this.

Where vehicle standards in countries are currently not aligned with ECE, there may be benefit in transitional arrangements whereby elements of an international regulation are adopted progressively.

The Australian approach within our Australian Design Rules has the capacity to adopt either wholly or partially the technical requirements of international regulations or standards.

Methods of Harmonisation Used by Australia

There are a number of methods used within Australian Design Rules so that the benefits of harmonisation are achieved. Whilst Australia uses a type approval system which corresponds to the type approval system used for ECE Regulations, harmonisation is not dependent upon all countries using smilar regulatory systems. Australian Design Rules incorporate international recognized requirements from several regulatory systems.

The process of harmonisation used by Australia include the following:

- Adoption of the technical requirements of an international regualtion (such as ECE Regulation).
- Allowing the use of various alternative requirements for the same feature, where the alternatives are different national and international requirements.
- Adoption of the technical requirements of an international regulation or standard, but with additional requirements for Australia.
- In those cases where Australia is unable (for whatever reason) to move to full harmonisation we have, as an interim measure, adopted some of the technical requirements of an international regulation or standard, or adopted internationally recognised test procedures even if the performance limits are not identical.

The European Scene

This situation has improved considerably during the last twenty years with the advent of international technical regulations for road vehicles and the associated reciprocal approval schemes of the ECE and EEC.

Figure 1 shows the current status of membership for both ECE and EEC. Figures 2 and 3 illustrate the committee structure and representation for ECE and EEC respectively.

For more than 30 years, the United Nations "Economic Commission for Europe" (ECE) has progressively harmonised the individual European regulations despite numerous national, political and social differences existing throughout Europe - and different languages!

The establishment of the Common Market "European Economic Community" (EEC) has accelerated the recognition and adoption of uniform vehicle regulations within the member states and it is now possible to satisfy the majority of European national regulations via compliance with the corresponding ECE or EEC regulations.

The next greatest impact on the path to international harmonisation of vehicle regulations will unboubtedtly arise from the coming into force of the Single European Act as of 1 January 1993. Much of what happens in this arena will also set the scene for future harmonization in the context of

ECE-American-Japanese markets. It is useful therefore to look at the Proposal before the Community.

Background and Objectives of the Proposal

The Directive 70/156/EEC on the Approximation of the laws of the Member States relating to the Type-Approval of motor vehicles and their trailers was first issued in February 1970 (1).

The central objective was to establish a system whereby a vehicle type which was approved in one Member State of the EEC as being in conformity with a complete set of uniform technical requirements should be eligible for free trade throughout the Community without further testing. The Directive laid down the basic principles and the administrative procedures of the EEC Type-Approval. It also contained a complete list of the various characteristics, systems and components of a vehicle which were to be covered by the requirements of the 44 separate Directives.

As all of the 44 separate Directives were not available special transition provisions were developed to allow the use of the separate Directives already in existence. This allowed member countries to gain experience with the growing number of EEC requirements.

Now, as the last of the 44 separate Directives - those on tyres, safety glass and weights and dimensions are at an advanced stage (refer Table 1) it became apparent that the administrative procedures laid down in Directive 70/156 needed to be improved before the EEC Type-Approval system could become fully operational. To this end an amending proposal has been developed and is currently under consideration by the Community.

Main Features of the Future Procedure

The main features which the proposed amending Directive incorporates are:

- As a logical consequence of the forthcoming Single Market, the new Directive is based on "total harmonisation", i.e. the EEC type-approval requirements and procedures should be mandatory, and hence replace the national type-approval systems requirements which up to now have co-existed as an alternative option.
- The EEC type-approval procedure is, by definition, limited to the harmonisation of the national type-approval systems i.e. vehicles reproduced and marketed in significant numbers and does not cover the national procedures for individual approvals, i.e vehicles produced in very small numbers or as a unique product.
- The new procedure allows for approval of vehicles, systems, components and separate technical units according to the relevant separate Directives.
- The new procedures allows for the type-approval of a whole vehicle to be achieved by the compilation of approvals of its constituent systems, components and separate technical units according to the relevant separate Directives, even when these separate approvals have been granted in different Member States.
- For the purpose of achieving the type-approval of a whole vehicle, it is possible to make use of international regulations issued on the basis of the 1958 agreement on mutual recognition of approvals of automotive parts of the United Nations Economic Commission for Europe (ECE Regulations) in place of the corresponding separate Directives, if these Regulations are recognised by the Community as being equivalent (refer Table 2).

Transitional Arrangements

To allow for an adequate transition, both from the technical and administrative points of view, from the present optional regime of requirements to the mandatory type-approval procedure, manufacturers have been given the option of applying the new requirements for a period of three years. Approvals granted under the present system during this transition period shall remain valid until 31 December 1997.

These new arrangements only apply to passenger cars (Category M1 vehicles) until the specific provisions necessary for granting all other vehicle categories an EEC type-approval have been introduced. In the meantime this allows manufacturers of such vehicles to take advantage of the relevant separate Directives as at present, in order to obtain national type-approvals.

Harmonization Outside of the Single European Community

The major force influencing international harmonisation is and will continue to be the ECE Regulations under the United Nations 1958 Agreement. This represents the only real forum for International Harmonisation and the advent of the Single European Community will only serve to strengthen this position. Figures 4 and 5 (2) indicate the extent of coverage that the current ECE Regulations have to heavy vehicles.

HEAVY VEHICLE BRAKING

International Developments

The ECE-American harmonised braking Rule has so far only been progressed in the passenger car area (3). A further meeting of the Experts was held on 6-7th February this year where it was expected that resolution of some of the outstanding technical issues would be resolved. Although significant progress has already been made with both sides giving considerable ground there still remains a number of areas to be agreed upon. A comparison of the performance requirements between the American and European drafts, for passenger cars, is provided at Table 3.

Australian Developments

The existing braking requirements for heavy vehicles are contained in two Australian Design Rules ADR35 and ADR38(4).

ADR 35 applies to heavy vehicles including drawing vehicles. It was based on the United States Federal Motor Vehicle Safety Standard 121 (FMVSS 121) and has now been in place since 1979 remaining relatively

unchanged. It has been recognised that ADR 35 does not;

specify drawing vehicle deceleration levels in relation to control signal provided to trailer coupling;
specify axle adhesion utilization requirements;
prohibit axle lock-up during service brake tests and;
specify service brake upper performance limits.

Despite this, ADR 35 produced a significant improvement in heavy vehicle braking in the 1980's. Compatability problems have been largely overcome by the vehicle manufacturers who have formulated solutions which have greatly alleviated the severity of the earlier problems. Research conducted by a joint Government/industry committee provided valuable information in this regard [5].

ADR 38 which applies to Heavy Trailers came into force during 1984 and was largely influenced by ECE R13 in its requirements. Therefore it does not suffer the same problems as ADR 35. The main differences between ADR 38 and ECE R13 are that ADR 38 does not take load transfer of the trailer into account and does not require service brake effectiveness tests to be conducted in the unladen condition.

Draft Proposals for ADR35 and ADR38

The main change from the existing requirements has been to include a requirement for anti-lock brakes to be fitted. The draft proposal for ADR 35 requires anti-lock brakes to be fitted to all buses over 14.5 tonne GVM and to all heavy trucks whose GCM exceeds its GVM by more than 7 tonne and the draft proposal for ADR 38 requires anti-lock brakes to be fitted to all trailers with an Aggregate Trailer Mass exceeding 7 tonne.

The anti-lock requirements proposed are very much simplified from those contained in ECE R 13. The draft specifies that at least one axle in each axle group be fitted with anti-lock; all tests are to be conducted on a high co-efficient of friction surface and at both laden and unladen mass conditions. A single steer axle would have to be fitted with anti-lock.

A service brake performance band, which is the same as contained in ADR 38 for trailers, has been included in draft ADR 35 which is referenced to the control signal at the coupling head on the truck.

Therefore the main deficiencies in the existing braking rules have been addressed in the proposed drafts as well as including the anti-lock provisions. This makes Australia the first country to mandate anti-lock over such a wide range of vehicles.

BUS SAFETY

Accident statistics, in Australia, indicate that buses are one of the safest forms of travel, with bus occupants being around five times less likely to be injured than occupants of passenger cars (in terms of passenger-km of travel)[6]. The predominant reason for bus travel displaying such a safety record is the inherent inertia of buses and the fact that in a bus collision, the most commonly impacted object is a car which has far less inertia than a bus and consequently, is subject to correspondingly higher deceleration levels. Thus the injury record of bus accidents appears to be dependent upon the physical nature of the vehicle rather than the designed crashworthiness [7].

Notwithstanding the above Australia has experienced a number of serious bus crashes over recent years which have resulted in significant numbers of injuries and fatalities. Even before these accidents the Federal Office of Road Safety had been requested by the Federal Government as a matter of priority to review bus safety. Further attention has been focussed on this review as a result of the accidents.

The review of bus safety has led to a considerable number of amendments and new Australian Design Rules as well as further matters under consideration. In line with the Australian Government's policy of harmonisation with ECE Regulations most of the new requirements are based on ECE Regulations.

International Developments

Over recent years several ECE Regulations have been developed which cover aspects of bus safety. Brief descriptions of the three main Regulations concerning bus safety are provided below:

ECE R36 - Construction of Public Service Vehicles - This Regulation contains requirements for emergency exits, gangways, position and construction of hand-rails and hand-holds, fire protection, interior lighting and service doors.

ECE R66 - Strength of Superstructure - This Regulation ensures that in the event of a rollover crash sufficient survival space is afforded to the occupants.

ECE R80 - Strength of the Seats and their Anchorages - This Regulation covers the requirements for the strength of seats and their anchorages and allows for either static or dynamic testing procedures.

A number of other areas of bus safety are currently under investigation by the expert groups. They include:

- R36 Improvements
- R80 Improvements
- Safety of Driver's Compartment
- Fire Reduction
- Transport of Handicapped and Disabled

Australian Developments

As mentioned above Australia has been working intensively on bus safety issues for several years. The result of this work has been the issuing of several new and amended Australian Design Rules (refer Figure 6). Included in these are the following:

ADR 59 - Omnibus Rollover Strength - This Rule aims to provide adequate occupant survival space in the case of a vehicle rollover. The technical requirements have been entirely based on ECE R66 which makes Australia one of the first countries to adopt this requirement.

In recognition of the relatively large number of bus manufacturers building a relatively small number of buses a National Code of Practice has been developed in order to facilitate implementation of the new Rule. The Code of Practice, which was developed in close consultation with industry,

contains the design parameters necessary for compliance with ADR 59 by setting down a simple set of rules for construction of a limited range of bus structures [8].

To form the basis for a Code the following steps were carried out:

- Build a generic two axle, approximately 9 tonne tare mass, bus having a frame that included a rollover protection cage, generally in a manner that has been found satisfactory in the United Kingdom.
- Carry out a computer analysis of the test bus frame, using a suitable programme.
- Roll the test bus in accordance with ADR 59.
- Compare the observed results of the roll test with those predicted by computer analysis, so that the application of the proposed Code could be made sufficiently wide to be suitable for a reasonably wide range of buses.

Clearly it was unlikely that one configuration of bus could be made to truly represent all the possibilities in heavy buses. However, it was decided that the configuration chosen represented a significant proportion of the 50 to 58 seating position buses that are used for:

School runs.
Local and district route runs in suburbs and country towns.
Charter and tourist work other than long distance work.
Some city route runs.

A bus body of the type outlined above has now been built and roll tested. The bus met the requirements of ADR 59 successfully and an initial computer simulation is being conducted. It is anticipated that the results of this computer simulation will allow for the wider application of the Code to different bus shapes, sizes and configurations. Also it is expected to allow for the manufacturers to conduct suitable inexpensive tests in order to validate such variants of the roll cage beyond those defined in the Code.

ADR 58 - Requirements for Omnibuses Designed for Hire and Reward - This Design Rule covers such areas as aisle requirements, access steps, handstraps, rails, grips, emergency exits and interior lighting and is largely based on ECE R36.

ADR 66 - Seat Strength, Seat Anchorage Strength and Padding in Omnibuses - This Design Rule adopts all of the requirements contained in ECE R80 as well as additional requirements for the strength and padding of armrests and unprotected seats are required to be provided with seat belts or other protection as afforded by padded modesty panels.

ADR 65 - Maximum Road Speed Limiting for Heavy Goods Vehicles and Heavy Omnibuses - This Design Rule specifies devices or systems used to limit the maximum road speed by either gearing or by road speed governor.

Future Improvements

Apart from the improvement to be made to the braking requirements previously discussed there is two other areas where proposals for new or amended Rules have been formulated. They are improvements to the emergency exit provisions which brings ADR 58 more closely into line with the requirements of ECE R36 and the fitting of lap/sash seat belts to all seating positions in coaches.

This latter proposal arose from public concern about passenger safety in buses not currently equipped with seat belts. The public perception seems to be that they expect to be afforded with at least the same level of protection as they are in a passenger car. The Office of Road Safety was requested by the Federal Government to investigate the technical feasibility of installing three point belts to each seating position in coaches.

During the course of this investigation one manufacturer developed a coach seat which incorporated three point seat belts. This seat along with other seats currently available were tested both statically and dynamically to the requirements of ECE R80.

The first stage of the test programme was to statically test ten different dual occupant coach seats to the requirements of ECE R80. The results of these tests were that all ten seats tested failed to meet the requirements of ECE R80[9].

One seat marginally failed and the nine conclusive failures were divided evenly between three modes of failure. The three modes of failure were;

1) collapse of the seat squab;
2) penetration of the seat squab;
3) separation of the seat structure at the floor anchorage points.

The collapse of the seat squabs lead to failure through excessive displacement of the upper loading blocks.

The separation of the lower anchorage structure resulted in forward rotation of the seat assembly and failure by excessive displacement of the upper loading blocks.

Penetration of the seat squab by the body block lead to failure from the squab's inability to sustain the test load.

The failure of the seats by squab collapse and anchorage separation demonstrated real flaws in the performance of the seats which would be hazardous in an accident situation. The results obtained from the seats which failed by squab penetration were not a conclusive indication as to how the seats would perform in an accident situation as the seat anchorages were not subjected to the full test loads.

The second stage of the test programme was to dynamically test six of the dual occupant coach seats using uninstrumented dummies to determine the correlation between the correlation between the static and dynamic tests specified in ECE R80[10].

The results of these tests indicated that all of the six seats tested were successful in restricting the forward movement of the manikins. One of the seat assemblies, however, failed the dynamic strength criteria due to separation of its anchorage attachments.

Therefore the results produced in the dynamic tests indicate that this test is not as severe as the static test. The results also indicate that the static and dynamic tests give a poor correlation of the expected

performance of the seats.
The third and final stage of the test programme was conducted to establish if a prototype seat would be able to safely restrain its occupants, by means of integral lap/sash belts, and the unrestrained occupants behind it[11].
The result of this test demonstrated that in the configuration supplied the prototype seat did not demonstrate full compliance to the dynamic test requirements of ECE R80. Examination of the test results indicated that with some modification seats of this design could prevent serious injury to unrestrained occupants.
When tested to the nominal 20 G impact the prototype seat was successful in arresting the forward motion of the two restrained and two unrestrained test manikins.
As a consequence of the seat test programme a draft design rule has been written which mandates the fitting of lap/sash seat belts to all seating positions of coaches. In conjuction with the issuing of the draft rule for public comment a survey was conducted of anticipated seat belt usage. The results of this survey indicated that the anticipated level of seat belt wearing ranged from 82% if usage was completely voluntary to 97% if usage was compulsory by law[12].
The results of this survey will be used as part of the input for the conduct of a benefit/cost study which is currently under way. After completion of the benefit/cost analysis and review of the public comment a proposal will be submitted by the Federal Office of Road Safety for Ministerial consideration and a decision will be made whether or not the draft rule will be implemented.

CONCLUSION

The main thrust for international harmonisation of vehicle standards regulations has thus far been in the area of passenger cars. This is highlighted by the progress made by the Single European Community and the efforts made so far to arrive at a harmonised European and American braking regulation.
This is not to say that International harmonization is not taking place in the area of heavy vehicle regulations as evidenced by the two examples presented in this paper of heavy vehicle braking and bus safety where Australia has recognised the potential benefits of harmonisation.
Australia like other countries outside the European-American-Japanese market imports a majority of their heavy vehicle fleet. International harmonisation offers potential benefits for such countries in simplifying regulations and minimising costs. The challenge for these countries is to maximise the benefits to be gained and minimise the drawbacks. This often leads to a conflict with purely national priorities which can only be resolved by careful balancing of costs and benefits.
Two specific areas where Australia is addressing the issues above have been detailed in this paper. Public concerns about heavy vehicle safety has led to considerable attention being paid to these areas. The conclusions reached reflect the balance noted above and there could be benefit in a higher level of liaison in this areas between Australia and New Zealand.

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Table 1
LIST OF REQUIREMENTS
FOR THE PURPOSE OF VEHICLE TYPE APPROVAL

Subject	List of Separate Directives Directive	Applicability M1	M2	M3	N1	N2	N3	O1	O2	O3	O4
1. Sound levels	70/157	x	x	x	x	x	x				
2. Emissions	70/220	x	x	x	x	x	x				
3. Fuel tanks/rear protective devices	70/221	x	x	x	x	x	x	x	x	x	x
4. Rear registration plate space	70/222	x	x	x	x	x	x	x	x	x	x
5. Steering effort	70/311	x	x	x	x	x	x	x	x	x	x
6. Door latches and hinges	70/387	x	x	x	x	x	x	x	x	x	x
7. Audible warning	70/388	x	x	x	x	x	x				
8. Rear visibility	71/127	x	x	x	x	x	x				
9. Braking	71/320	x	x	x	x	x	x	x	x	x	x
10. Suppression (radio)	72/245	x	x	x	x	x	x				
11. Diesel smoke	72/306	x	x	x	x	x	x				
12. Interior fittings	74/60	x									
13. Anti-theft	74/61	x	x	x	x	x	x				
14. Protective Steering	74/297	x									
15. Seat strength	74/408	x	x	x	x	x	x				
16. Exterior projections	74/483	x									
17. Speedometer and reverse gear	75/443	x	x	x	x	x	x				
18. Plates (statutory)	76/114	x	x	x	x	x	x	x	x	x	x
19. Seat belt anchorages	76/115	x	x	x	x	x	x				
20. Lighting installations	76/756	x	x	x	x	x	x	x	x	x	x
21. Reflex reflectors	76/757	x	x	x	x	x	x	x	x	x	x
22. Lamps (side, rear, stop)	76/758	x	x	x	x	x	x	x	x	x	x
23. Direction indicators	76/759	x	x	x	x	x	x	x	x	x	x
24. Lamps (number plate)	76/760	x	x	x	x	x	x	x	x	x	x
25. Headlamps(inc. bulbs)	76/761	x	x	x	x	x	x				
26. Fog lamps (front)	76/762	x	x	x	x	x	x				
27. Towing Hooks	77/389	x	x	x	x	x	x				
28. Fog lamps (rear)	77/538	x	x	x	x	x	x	x	x	x	x
29. Lamps (reversing)	77/539	x	x	x	x	x	x	x	x	x	x
30. Lamps (parking)	77/540	x	x	x	x	x	x				
31. Seat belts	77/541	x	x	x	x	x	x				
32. Forward vision	77/649	x									
33. Identification of controls	78/316	x	x	x	x	x	x				
34. Defrost/demist	78/317	x									
35. Wash/wipe	78/318	x									
36. Heating systems	78/548	x									
37. Wheel guards	78/549	x									
38. Head restraint	78/932	x									
39. Fuel consumption	80/1268	x									
40. Engine power	80/1269	x	x	x	x	x	x				
41. Diesel emissions	88/77	x	x	x	x	x	x				
42. Lateral protection	89/297			x	x	x	x				
43. Safety glass	91/???	x	x	x	x	x	x				
44. Masses and dimensions (cars)	91/???	x									
45. Tyres	91/???	x	x	x	x	x	x	x	x	x	x
46. Couplings	91/???	x	x	x	x	x	x	x	x	x	x
47. Anti-spray devices	91/???					x	x			x	x
48. Masses and dimensions(goods)	91/???		x	x	x	x	x	x	x	x	x
49. Flammability	91/???			x							
50. External projections of cabs	91/???		x	x	x						
51. Speed limiters	91/???		x	x	x	x	x				
52. Public service vehicles	91/???		x	x							

Table 2

An approval to the following ECE regulation (taking into account of the scope and latest amendment) shall be deemed equivalent to an approval to the separate Directives specified for the relevant subject in table 1.

Subject	ECE Regulation No.
1. Sound levels	51/59
3. Fuel tanks/rear protective devices	58
5. Steering effort	79
6. Door latches and hinges	11
7. Audible warning	28
8. Rear visibility	46
9. Braking	13
10. Suppression (radio)	10
11. Diesel smoke	24
12. Interior fittings	21
13. Anti-theft	18
14. Protective Steering	12
15. Seat strength	17
16. Exterior projections	26
17. Speedometer and reverse gear	39
19. Seat belt anchorages	14
20. Lighting installations	48
21. Reflex reflectors	3
22. Lamps (side, rear, stop)	7
23. Direction indicators	6
24. Lamps (number plate)	4
25. Headlamps(inc. bulbs)	1/8/20/37
26. Fog lamps (front)	19
28. Fog lamps (rear)	38
29. Lamps (reversing)	23
30. Lamps (parking)	77
31. Seat belts	16
38. Head restraint	25
39. Fuel consumption	84
40. Engine power	85
42. Lateral protection	73
43. Safety glass	43
45. Tyres	30/54/64
46. Couplings	55
50. External projections of cabs	61

Table 3

PERFORMANCE COMPARISION TABLE

Perforamance Comparision	FMVSS .135 (Notice 5)		ECE R.13-H (Draft 3)	
	SD *	MFDD **	SD *	MFDD **
Cold effective	70 m	6.43 m/sec^2	73 m	61 m/sec^2
High-speed effective	77	5.76	80	5.5
Engine-off	73	6.13	73	6.1
Failed ABS	85	5.15	168	2.45
Failed LSV	110	3.86	168	2.45
Circuit failure	168	2.44	168	2.45
Power/assist failure	168	2.44	168	2.45
Park brake - static		20%		20%
- dynamic		a) 80 km/h & 1.5 m/sec^2 b) 60 km/h & 2.0/1.5 m/sec^2		do do
Hot performance		a) 60% of best cold & same PE b) 76% of prescribed & 500 N		do do
Recovery performance		70% -150% of best cold and up to 500 N?		do. but at best cold PE

* Stopping Distance
** Mean Fully Developed Deceleration

Figure 1

ECE & EEC AFFILIATIONS

	E.C.E.		E.E.C.
	Contracting Parties	Member of WP29	Member States
Australia		x	
Austria	x	x	
Belgium	x	x	√
Canada		x	
Czechoslovakia	x	x	
Denmark	x	x	√
Finland	x	x	
France	x	x	√
Germany	x	x	√
Greece			√
Hungary	x	x	
Ireland			√
Italy	x	x	√
Japan		x	
Luxemburg	x		√
Netherlands	x	x	√
Norway	x	x	
Poland	x	x	
Portugal	x		√
Romania	x		
Spain	x	x	√
Sweden	x	x	
Switzerland	x	x	
UK	x	x	√
U.S.A.		x	
U.S.S.R. (C.I.S.)	x	x	
Yugoslavia	x	x	

Figure 2

ECE COMMITTEE STRUCTURE & REPRESENTATION

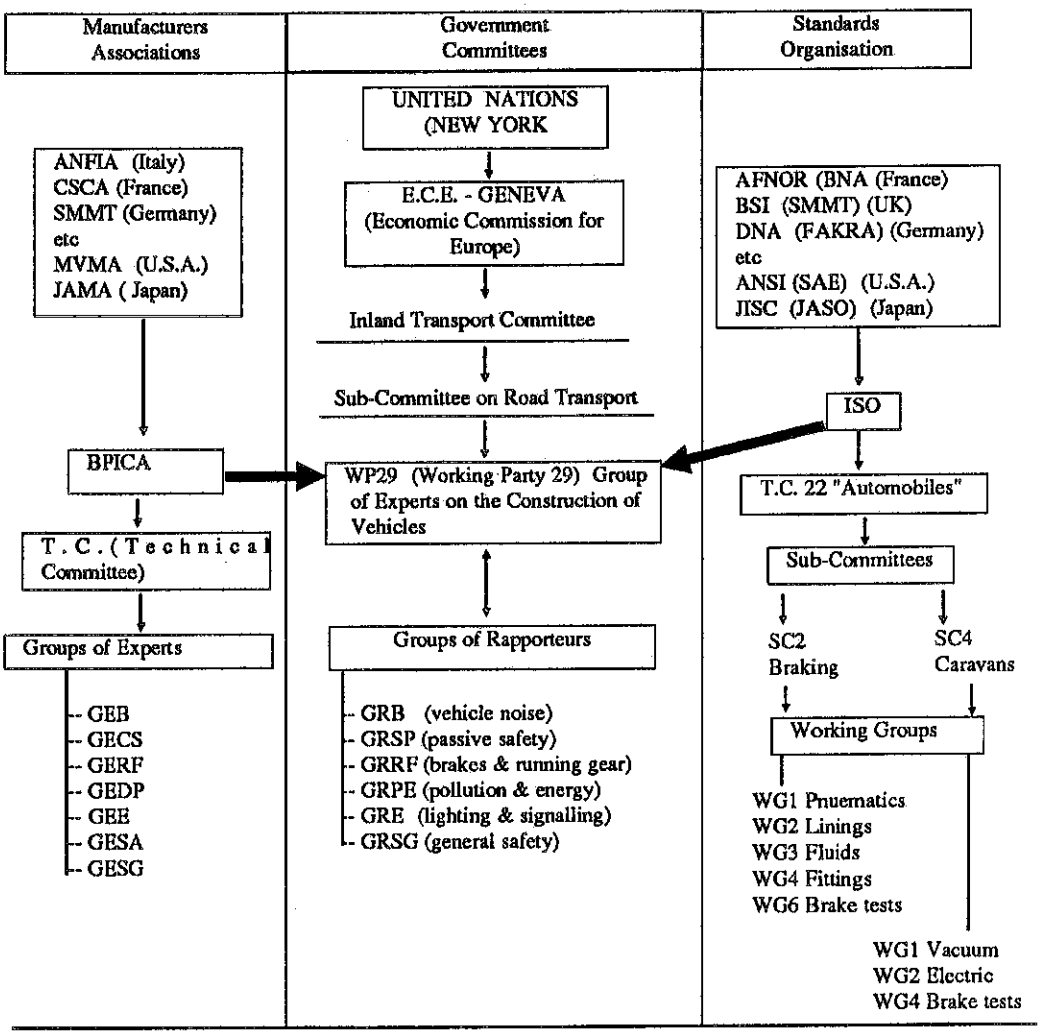


Figure 3

EEC COMMITTEE STRUCTURE & REPRESENTATION

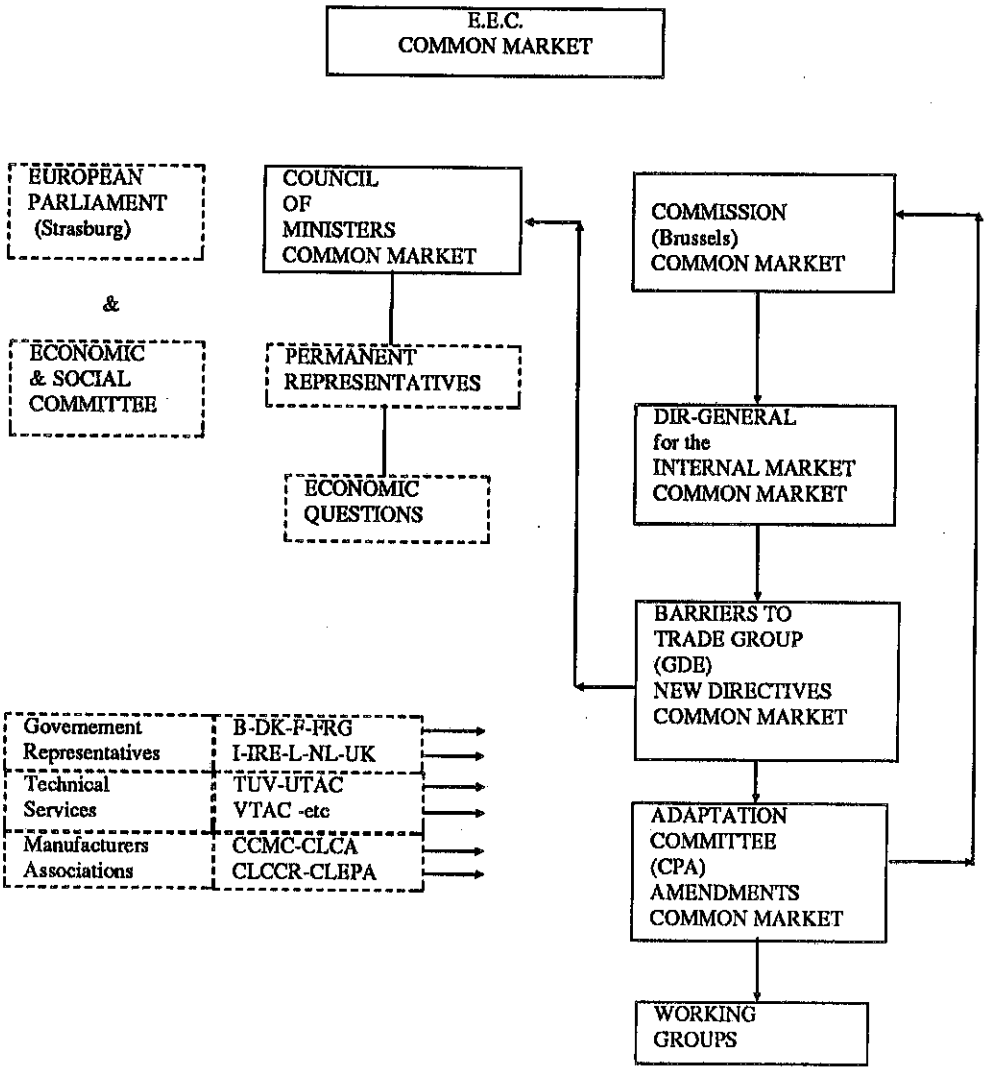


Figure 4.

INTERNATIONAL HARMONIZATION
UN ECE
MOTOR VEHICLE CONSTRUCTION REGULATIONS

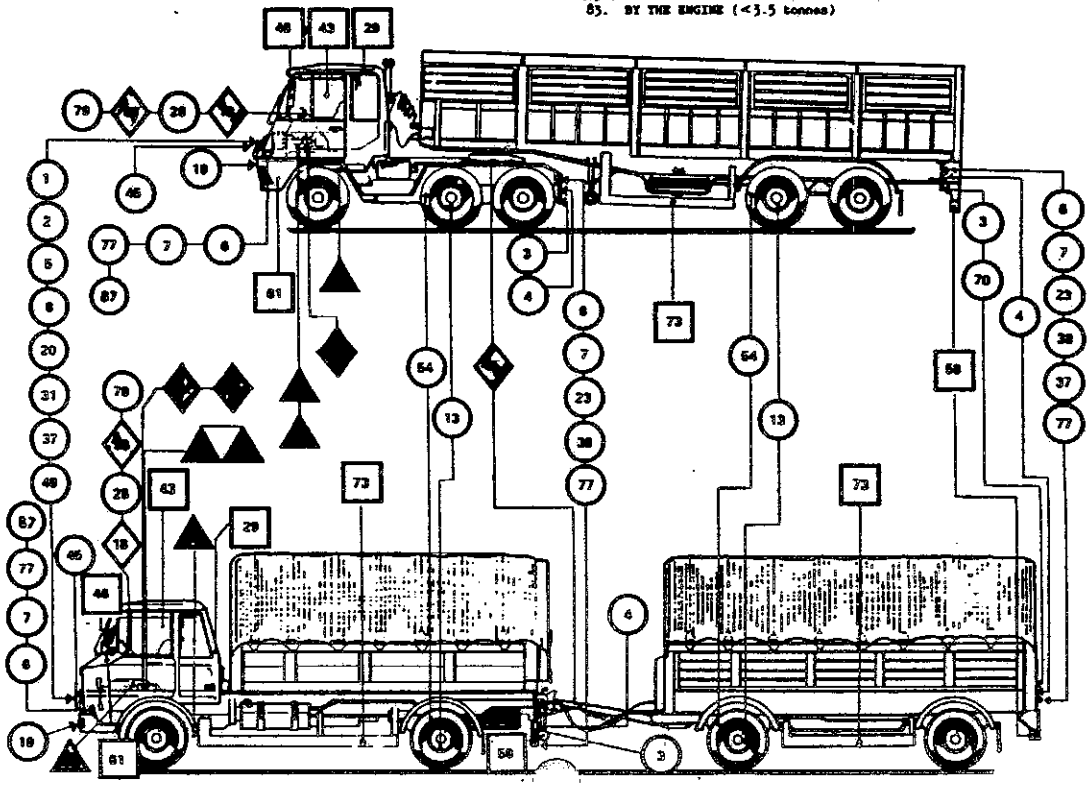
COMMERCIAL VEHICLES AND THEIR TRAILERS

○ *ACTIVE SAFETY**

1. HEADLAMPS EQUIPPED WITH FILAMENT LAMPS OF CATEGORY R2
2. R2 INCANDESCENT LAMPS FOR HEADLAMPS
3. REFLEX REFLECTING DEVICES
4. ILLUMINATION OF REAR REGISTRATION PLATES
5. SEALED BEAM HEADLAMPS
6. DIRECTION INDICATORS
7. POSITION LAMPS, STOP LAMPS AND END-OUTLINE MARKER LAMPS
8. HEADLAMPS EQUIPPED WITH HALOGEN LAMPS
19. FRONT FOG LAMPS
20. HEADLAMPS EQUIPPED WITH HALOGEN FILAMENT LAMPS (H4)
23. REVERSING LAMPS
31. HALOGEN SEALED BEAM HEADLAMPS
37. FILAMENT LAMPS
38. REAR FOG LAMPS
45. HEADLAMP CLEANERS
48. INSTALLATION OF LIGHTING AND LIGHT-SIGNALLING DEVICES
77. PARKING LAMPS
13. BRAKING
54. PNEUMATIC TYRES FOR COMMERCIAL VEHICLES AND THEIR TRAILERS
79. STEERING EQUIPMENT
28. AUDIBLE SIGNALS
70. REAR MARKING PLATES FOR HEAVY AND LONG VEHICLES
87. DAYLIGHT RUNNING LIGHTS

▲ *PROTECTION OF ENVIRONMENT*

10. RADIO INTERFERENCE SUPPRESSION IN THE IGNITION CIRCUIT
24. SMOKE EMISSION BY DIESEL ENGINED VEHICLES
49. EMISSION OF GASEOUS POLLUTANTS BY HEAVY DIESEL ENGINED VEHICLES
51. NOISE EMISSIONS OF VEHICLES HAVING AT LEAST FOUR WHEELS OR MORE
(15.) EMISSION OF THE GASEOUS POLLUTANTS
83. BY THE ENGINE (<3.5 tonnes)



□ *PASSIVE SAFETY***

29. PROTECTION OF OCCUPANTS OF COMMERCIAL VEHICLE CABS
43. SAFETY GLAZING
46. REAR-VIEW MIRRORS AND THEIR INSTALLATION
58. REAR UNDERRUN PROTECTION
61. EXTERNAL PROJECTIONS OF COMMERCIAL VEHICLE CABS
73. LATERAL PROTECTION OF COMMERCIAL VEHICLES

◆ *OTHER QUESTIONS*

18. PROTECTION AGAINST UNAUTHORISED USE
39. SPEEDOMETER EQUIPMENT
55. MECHANICAL COUPLING COMPONENTS OF VEHICLE COMBINATION
84. MEASUREMENT OF FUEL CONSUMPTION (<2.0 tonnes)
85. MEASUREMENT OF THE ENGINE NET POWER

*/ *Prevention of motor vehicle accidents*
**/ *Reduction of consequences resulting from motor vehicle accidents*

Figure 5.

INTERNATIONAL HARMONIZATION
UN ECE
MOTOR VEHICLE CONSTRUCTION REGULATIONS

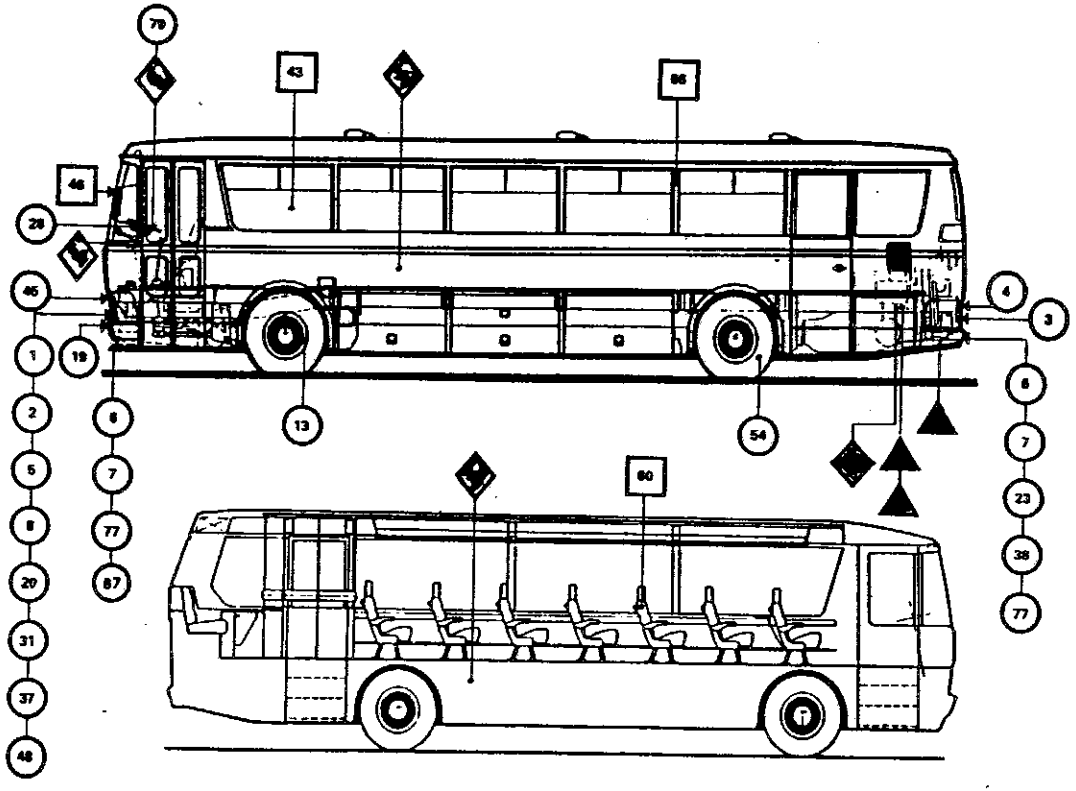
PUBLIC SERVICE VEHICLES

○ *ACTIVE SAFETY* *

1. HEADLAMPS EQUIPPED WITH FILAMENT LAMPS OF CATEGORY R2
2. R2 INCANDESCENT LAMPS FOR HEADLAMPS
3. REFLEX REFLECTING DEVICES
4. ILLUMINATION OF REAR REGISTRATION PLATES
5. SEALED BEAM HEADLAMPS
6. DIRECTION INDICATORS
7. POSITION LAMPS, STOP LAMPS AND END-OUTLINE MARKER LAMPS
8. HEADLAMPS EQUIPPED WITH HALOGEN LAMPS
19. FRONT FOG LAMPS
20. HEADLAMPS EQUIPPED WITH HALOGEN FILAMENT LAMPS (H4)
23. REVERSING LAMPS
31. HALOGEN SEALED BEAM HEADLAMPS
37. FILAMENT LAMPS
38. REAR FOG LAMPS
45. HEADLAMP CLEANERS
48. INSTALLATION OF LIGHTING AND LIGHT-SIGNALLING DEVICES
77. PARKING LAMPS
13. BRAKING
54. PNEUMATIC TYRES FOR COMMERCIAL VEHICLES AND THEIR TRAILERS
79. STEERING EQUIPMENT
28. AUDIBLE SIGNALS
87. DAYLIGHT RUNNING LIGHTS

▲ *PROTECTION OF ENVIRONMENT*

24. SMOKE EMISSION BY DIESEL ENGINED VEHICLES
49. EMISSION OF GASEOUS POLLUTANTS BY HEAVY DIESEL ENGINED VEHICLES
51. NOISE EMISSIONS OF VEHICLES HAVING AT LEAST FOUR WHEELS OR MORE



□ *PASSIVE SAFETY* **

43. SAFETY GLAZING
46. REAR-VIEW MIRRORS AND THEIR INSTALLATION
66. STRENGTH OF THE SUPERSTRUCTURE OF PUBLIC SERVICE VEHICLES
80. STRENGTH OF SEATS OF PUBLIC TRANSPORT VEHICLES

◆ *OTHER QUESTIONS*

36. CONSTRUCTION OF PUBLIC SERVICE VEHICLES
18. PROTECTION AGAINST UNAUTHORISED USE
39. SPEEDOMETER EQUIPMENT
52. CONSTRUCTION OF SMALL CAPACITY PUBLIC SERVICE VEHICLES
85. MEASUREMENT OF THE ENGINE NET POWER

*/ *Prevention of motor vehicle accidents*
**/ *Reduction of consequences resulting from motor vehicle accidents*

HARMONISATION OF VEHICLE STANDARDS REGULATIONS

Figure 6

ADRs & ADR ADMENDMENT PROPOSALS
FOR OMNIBUSES & COACHES - as at 22nd January 1992

PART A ADRs Applicable to Medium & Heavy Omnibuses & Coaches [1](MD3, [2] MD4 & ME only)

1/00	Reversing Lamps
3/01	Seat Anchorages
4/01	Seat Belts[3] (1 July 1992 - seat belt required on "exposed" seats; improved driver's seat belt)
5/01	Anchorages for Seat Belts & Child Restraints
5/02	Anchorages for Seat Belts & Child Restraints (1 July 1992 - s/b anchorages required for driver's seat and for non-"protected seats")
6/00	Direction Indicator Lamps for other than L-Group vehicles
7/00	Hydraulic Brake Hoses
8/00	Safety Glazing Material
11/00	Internal Sun Visors (MD3 only)
12/00	Glare Reduction in Field of View
13/00	Installation of Lighting & Light-signalling devices on other than L-Group Vehicles
14/00	Rear Vision Mirror
14/01	Rear Vision Mirror (minor changes including permitting convex mirrors, from 1 July 1991)
15/00	Demisting of Windscreen
16/00	Windscreen Wipers & Washers
18/00	Instrumentation
24/01	Tyre & Rim Selection (extensive new requirements from 1 July 1990)
28/00	External Noise of Motor Vehicles other than L-Group Vehicles
28/01	External Noise of Motor Vehicles other than L-Group Vehicles (stricter Rule- between 1 July 1992 and 1 July 1993)
30/00	Diesel Engine Exhaust Smoke Emissions
35/00	Commercial Vehicle Brake Systems
36/00	Exhaust Emission Control for Heavy Duty vehicles
41/00	Mandatory Operation on Unleaded Petrol
42/00	General Safety Requirements
43/01	Vehicle Configuration & Marking
43/02	Vehicle Configuration & Dimensions (1 July 1991 - admin. changes only; no significant change in requirements)
45/00	Lighting & Light-signalling Devices not covered by ECE Regulations
46/00	Headlamps for other than L-Group vehicles
47/00	Reflex Reflectors
48/00	Rear Registration Plate Illuminating Devices for other than L-Group Vehicles
49/00	Front and Rear Position (Side) Lamps, Stop Lamps and End-outline Marker Lamps for other than L-Group Vehicles
50/00	Front Fog Lamps (optional fitment)
51/00	Filament Globes
52/00	Rear Fog Lamps (optional fitment)
58/00	Requirements for Omnibuses Designed for Hire and Reward (but see Part B, Item (2)
59/00	Omnibus Rollover Strength (1 July 1992 for ME; 1 July 1993 for MD2, MD3 & MD4)
61/00	Vehicle Marking (1 July 1991 - admin. changes only; no significant change in requirements)
62/00	Mechanical Connections between Vehicles (same as for ADR 61/00)
65/00	Maximum Road Speed Limiting for Heavy Goods Vehicles & Heavy Omnibuses (from 1 Jan 1991 (>14.5 t); and 1 Jul 1991 (5 to 14.5 t).
66/00	Seat Strength, Seat Anchorage Strength & Padding seats of new medium & large coaches to have seats with improved strength, including their anchoring to the vehicle; also to protect occupants by padding and improved fittings such as armrests to come into force from 1 Jul 1992 for heavy coaches; and 1 Jan 1993 for medium coaches.

PART B Amendments At Present Under Consideration by the Vehicle Standards Advisory Committee of the Australian Transport Advisory Council

(1) Extension of ADR 59 to all omnibuses & coaches (i.e. 1 1/2 & double-decker and vehicles with greater than 9 seat capacity)
1 Jul 1992 for heavy; 1 Jul 1993 others.

(2) Major revision of ADR 58; proposal suggested to come into force 1 Jul 1994
- improved Emergency Exit provisions
- eliminate the present distinction between public & private vehicles
- adopt ADR 66 requirements for seat anchorage strength for vehicles not covered by ADR 66/00;
- improve mirrors; plus several other minor changes.

(3) Requirement for omnibuses over 14.5 tonnes to be fitted with anti-lock brakes (1 Jul 1993)

(4) General review of Australian Omnibus/Coach requirements - to align with international standards ECE 36/52 where appropriate.

PART C Proposals At Present Under Consideration by the Vehicle Standards Advisory Committee of the Australian Transport Advisory Council

(1) Increase strength of seat, seat anchorages.

(2) Installation of lap/sash seat-mounted seat belts in all coach seats (possibly Jul 1993 for heavy; Jul 1995 others.)

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1 A "coach" is a special designation of omnibus (i.e. a passenger vehicle designed with over 9 seats) which is distinguished by not having spaces for standing passengers.

2 MD3 = over 3.5 tonnes GVM; MD4 = between 4.5 & 5.0 tonnes; ME = over 5.0 tonnes.

3 Bold text indicates that new requirements will come into force for omnibuses & coaches from the date shown in brackets.