CRITICAL SAFETY FEATURES OF VEHICLES

PRESENTATION AT IRF WORKSHOP

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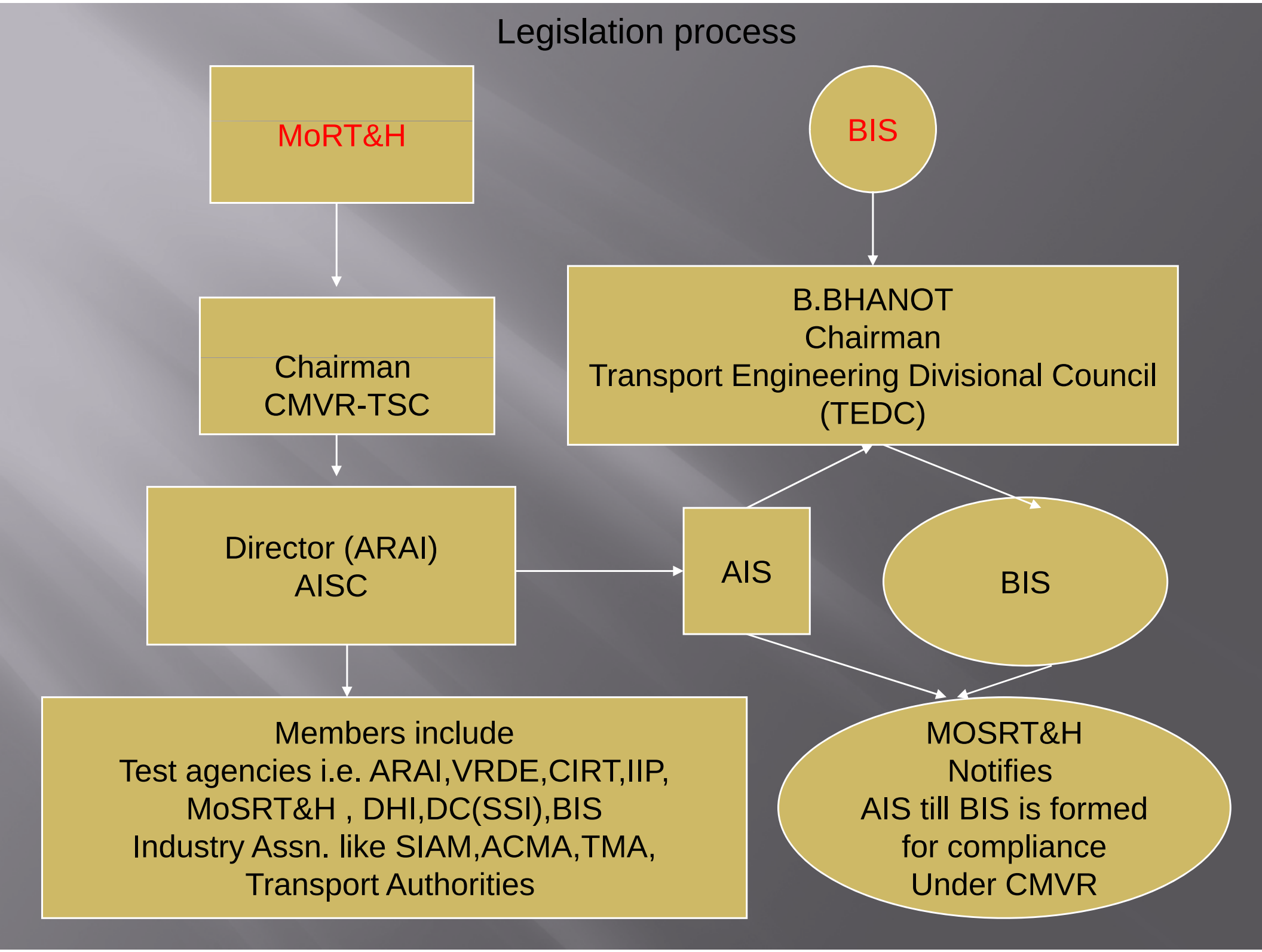
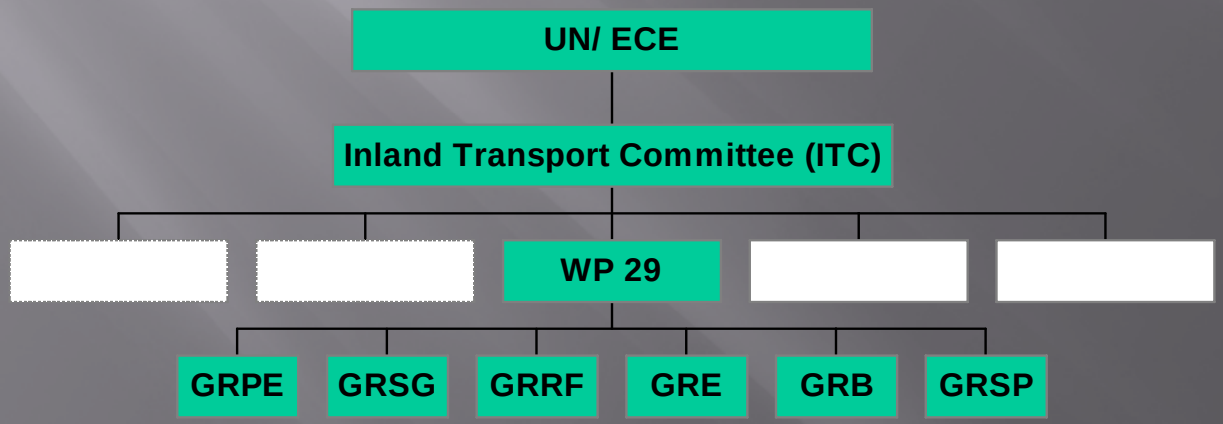
Legislation process



Harmonization of Automotive Regulations

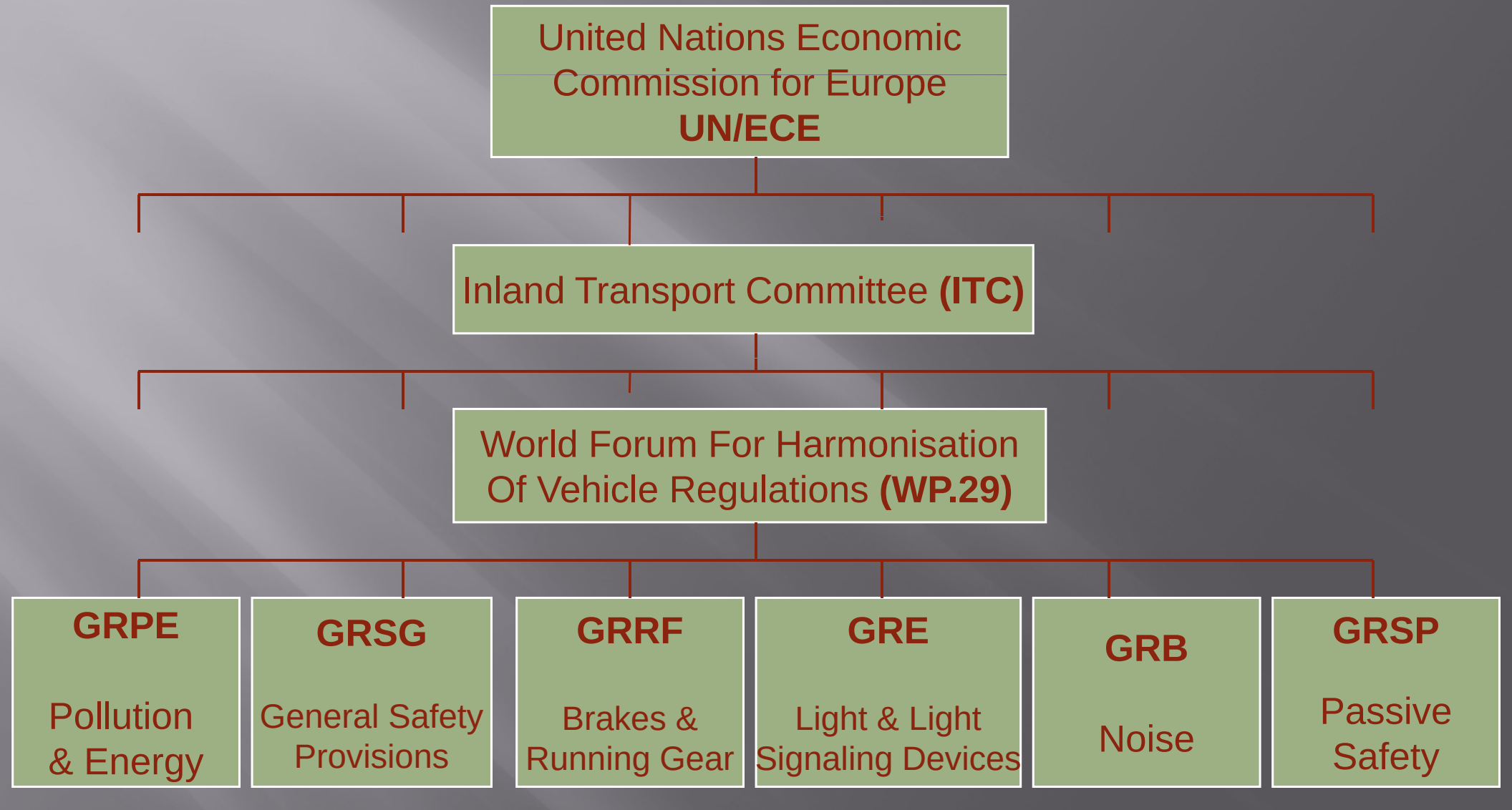
- Approval of vehicle/ component is required according to the law of nation
- Different countries adopt different technical regulations
- With globalization of trade, efforts are made to harmonize vehicular regulations world-wide
- Major role is played by WP.29 under UNECE

Organization of WP 29



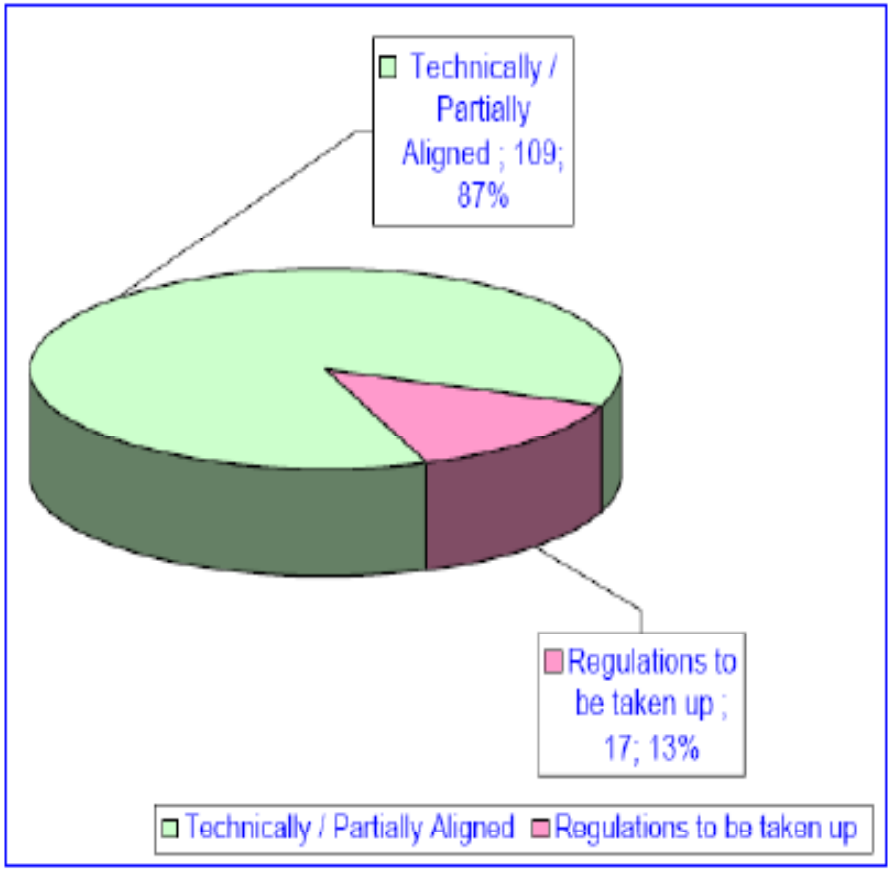
Participation in WP29 Session

WP.29

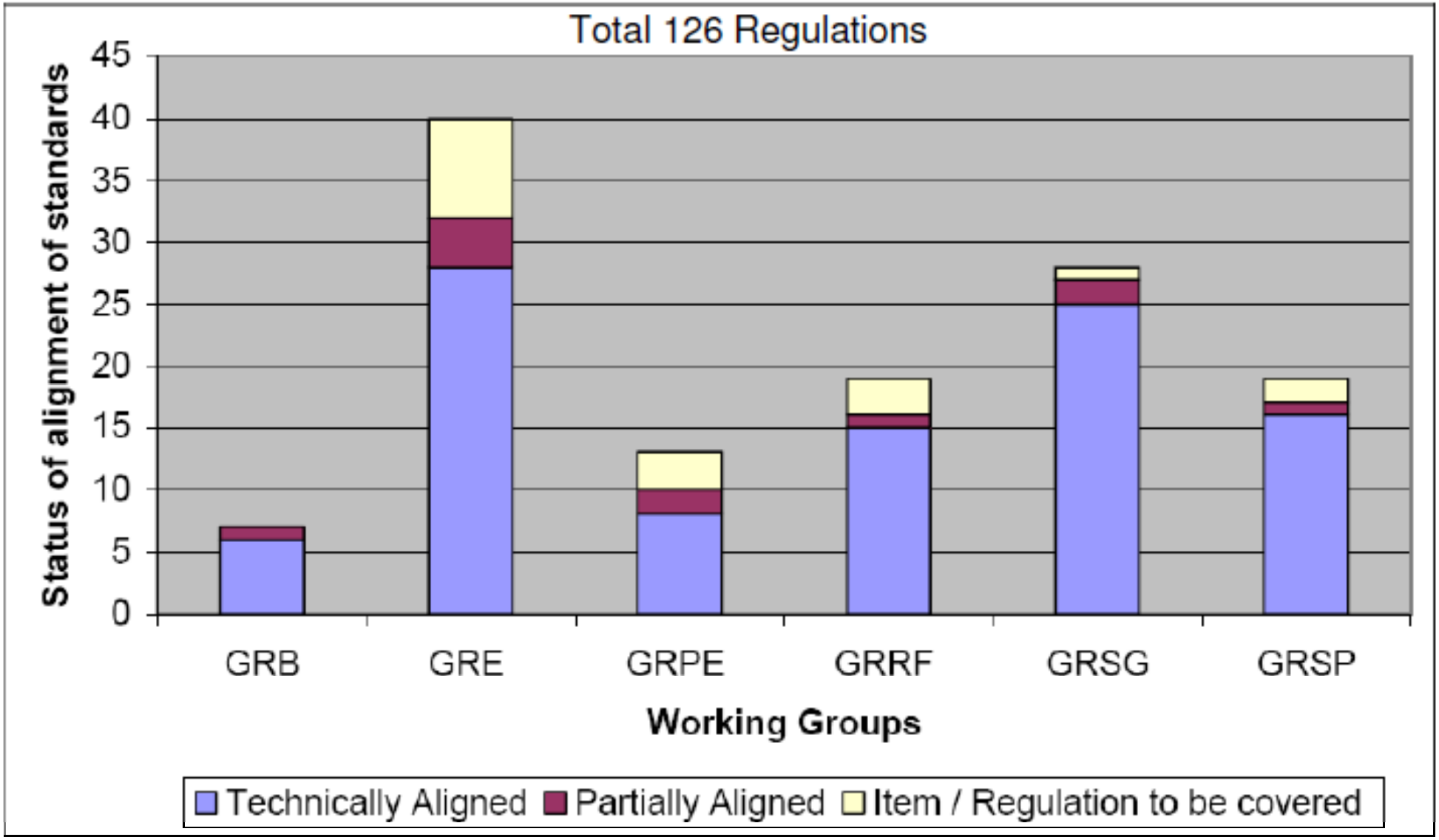

United Nations Economic Commission for Europe
UN/ECE
Inland Transport Committee (ITC)
World Forum For Harmonisation Of Vehicle Regulations (WP.29)
GRPE
Pollution & Energy
GRSG
General Safety Provisions
GRRF
Brakes & Running Gear
GRE
Light & Light Signaling Devices
GRB
Noise
GRSP
Passive Safety

Harmonisation of Indian Regulations with ECE Standards

Status of Indian Regulations	
Technically / Partially Aligned	109
Regulations to be taken up	17
Total	126



Groupwise status of alignment with ECE as on October,2010



ACTIVE SAFETY DEVICES

The devices which are designed and positioned in the vehicle to ensure safety of occupants while driving, in order to prevent accidents.

Examples are brakes, steering, visibility equipment, lighting and signaling systems.

PASSIVE SAFETY DEVICES

The devices which are designed and positioned in a vehicle to protect the occupants in an accident.

Examples are seat belts, airbags, pretensioners, load limiters and knee bolsters.

Evolution of Regulations - Passive Safety

1993 — Safety belt fitment

1997 — Side door impact

2002 — Safety belt upgrade (ECE Alignment)

2003 — Seat & Seat Anchorages

Rear under run protection device

Side under run Protection device

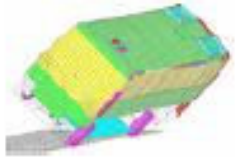
2006/2007 — Bumper for M1

Interior fittings for M1

Seat, seat anchorages For other than M1

2008/2009 — Survival space

Bus rollover



Front Under run Protection device

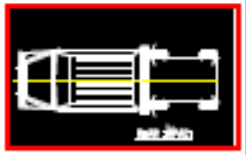
2011/2012 — Child restrain system

Head-on collision

Offset frontal collision

Lateral collision

Rear collision



Evolution of Regulations - Passive Safety

Safety belt fitment

Side door impact

Safety belt upgrade (ECE Alignment)

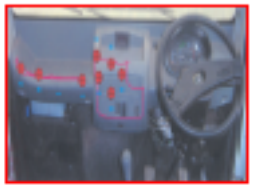
Seat & Seat Anchorages

Rear under run protection device

Side under run Protection device

Bumper for M1

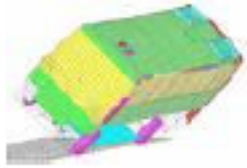
Interior fittings for M1



Seat, seat anchorages For other than M1

Survival space

Bus rollover

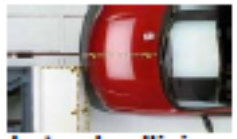


Front Under run Protection device

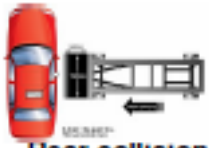
Child restrain system

Head-on collision

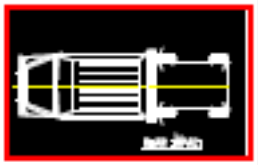
Offset frontal collision



Lateral collision



Rear collision



1993 1997 2002 2003 2006/2007 2008/2009 2011/2012

AIS:031 - Strength of Superstructure of Large Passenger Vehicles

(Type II & III Buses with more than 22 Passengers)

The Strength of superstructure of the vehicle shall be verified according to one of the following methods -

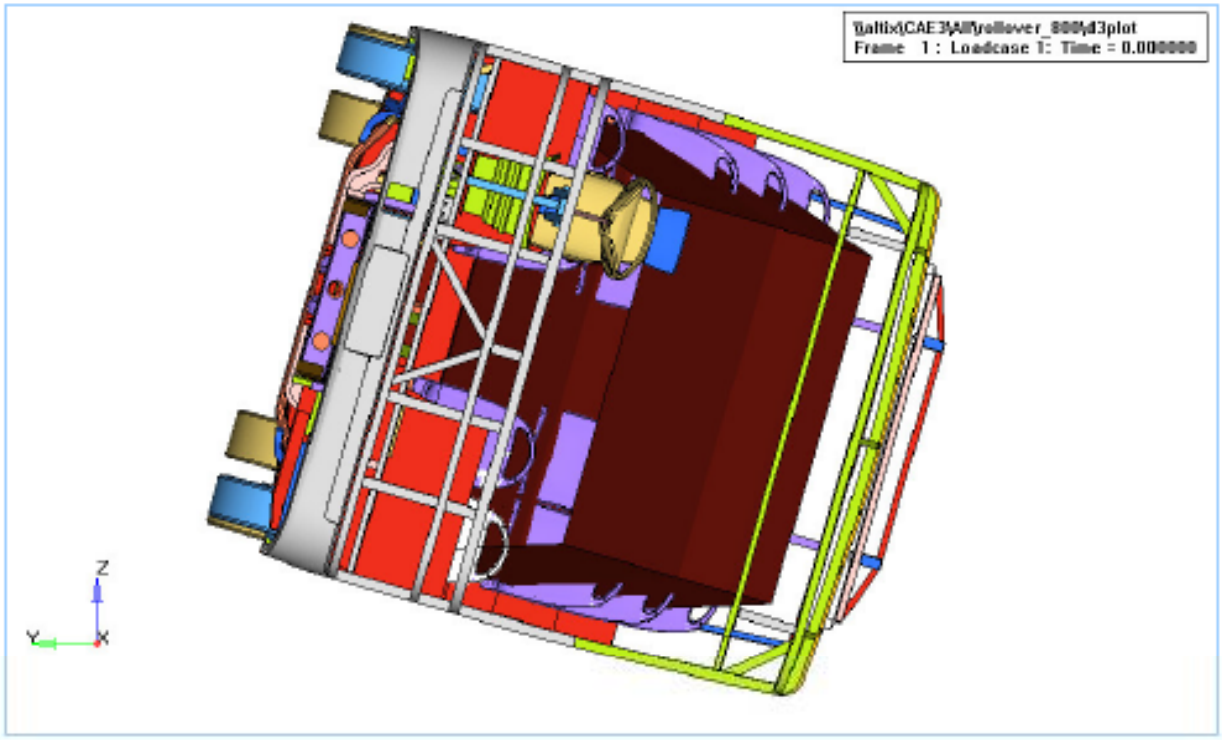
- **A roll-over test on a complete vehicle**
- **A roll-over test on a body section or sections representative of a complete vehicle**
- **A pendulum test on a body section or sections**
- **A verification of strength of superstructure by calculation**

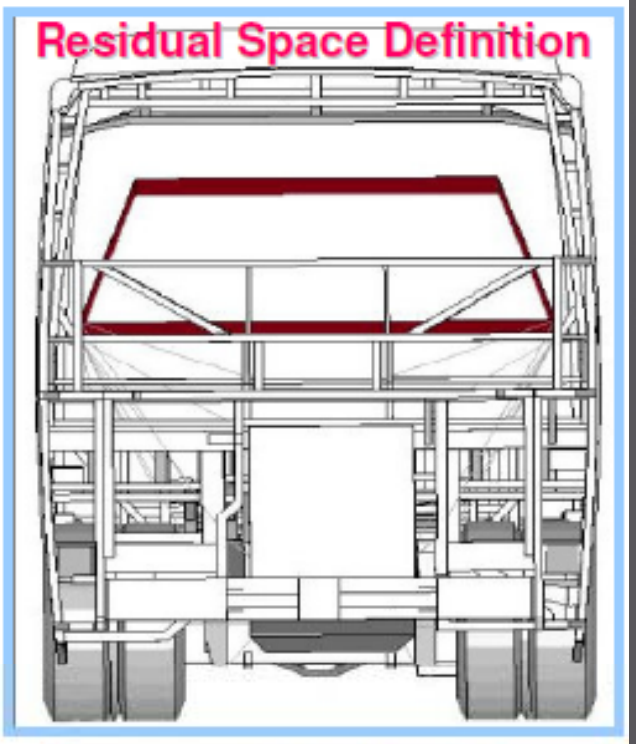
A **Roll-over** event is one of the most crucial hazards for the safety of passengers and the crew riding in a bus.

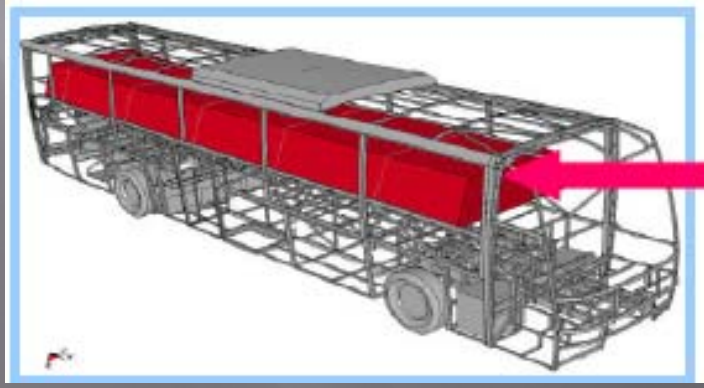
COLLAPSED ROOF STRUCTURE

AIS:031 - Strength of Superstructure of Large Passenger Vehicles

(Type II & III Buses with more than 22 Passengers) Contd…

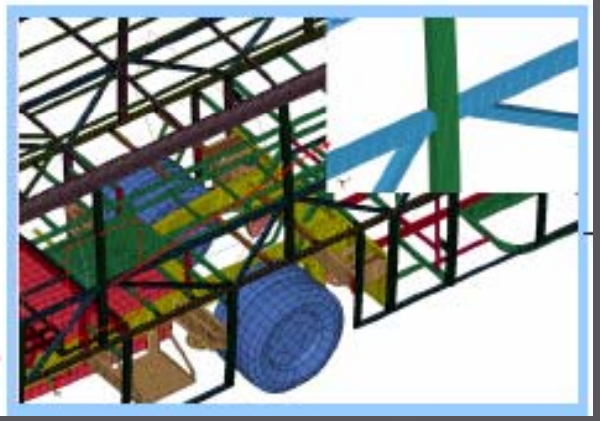






Residual Space

Finite Element Model



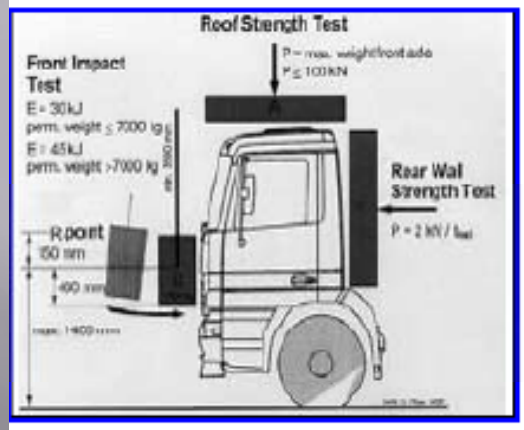
AIS:046- Requirements for Hand-holds in Motor Vehicles

This standard specifies following requirements for hand-holds for occupants in 3, 4 and more than 4 wheeled motor vehicles

- **Dimensional Requirements**
- **Strength Requirements**

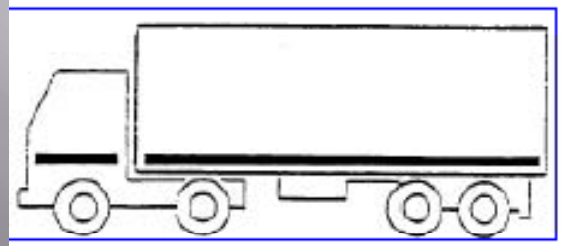
AIS:029 - Requirements of Survival Space for the Protection of the Occupants of the Cab of a Commercial Vehicle of N Cat.

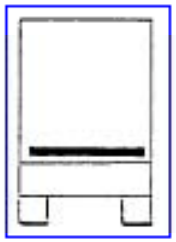
The **cab of the vehicle** shall be so designed and so attached to the vehicle as to eliminate to the greatest possible extent the risk of injury to the occupants in the event of an accident.



AIS:090- Retro-Reflective Markings for Heavy & Long Vehicles

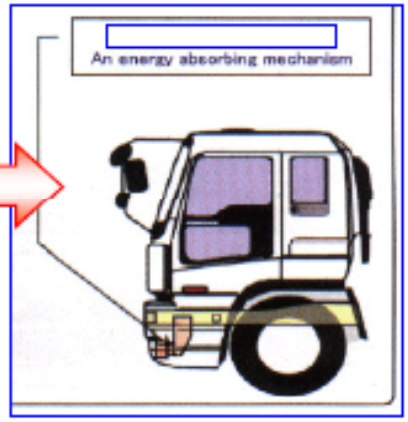
- **Covers provisions for retro-reflective markings used to increase the visibility and recognition for heavy and long vehicles, their trailers and semi-trailers.**
- Applicable to –
  - N2 vehicles, with a maximum mass > 7.5 tonnes
  - N3 vehicles
  - T3 and T4 - Trailers and semi-trailers

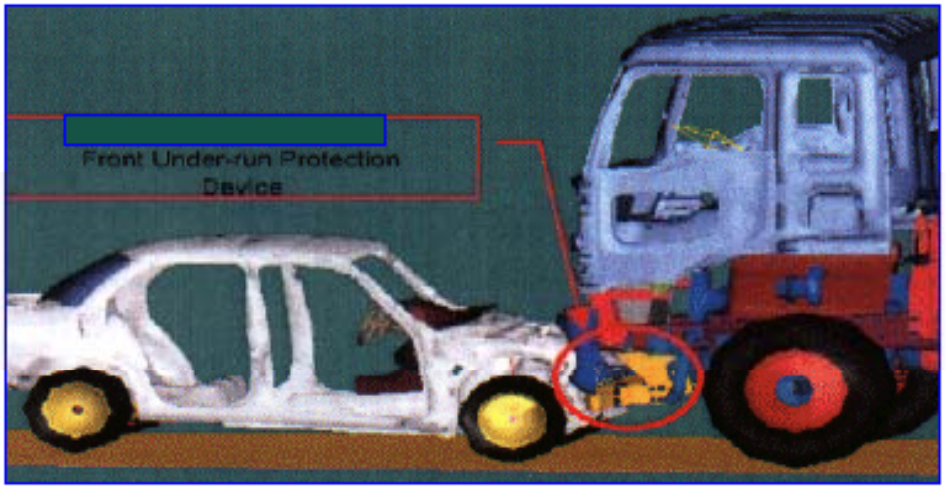


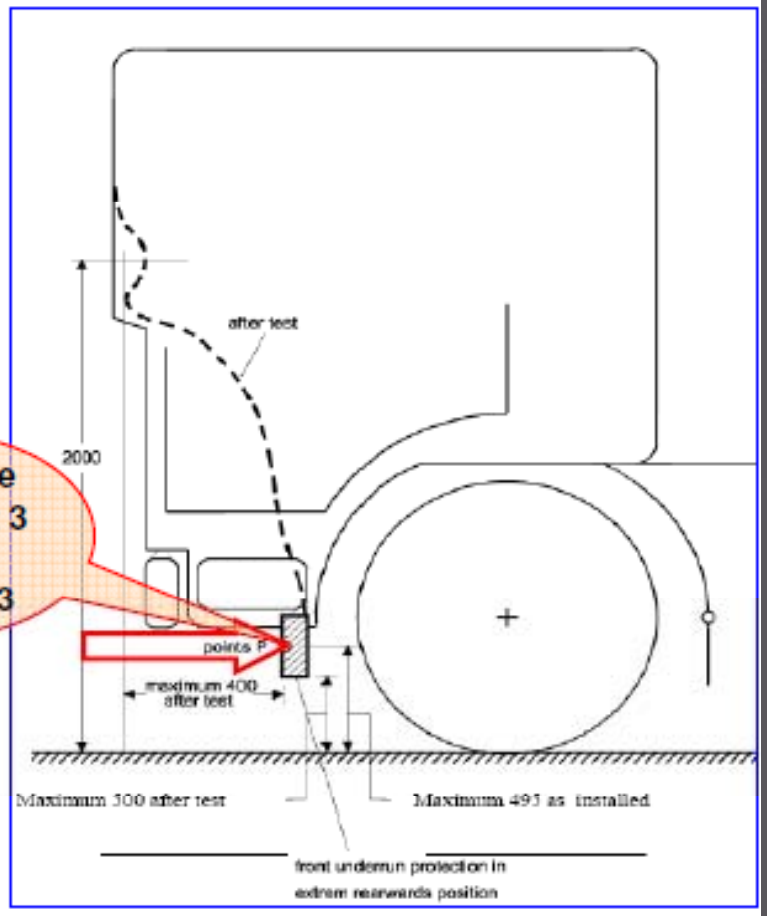


AIS:069- Front Underrun Protective Devices (FUPDs)

The purpose of this standard is to offer effective protection against front underrunning of vehicles of category M1 or N1 in the event of front collision with vehicles of categories N2 and N3



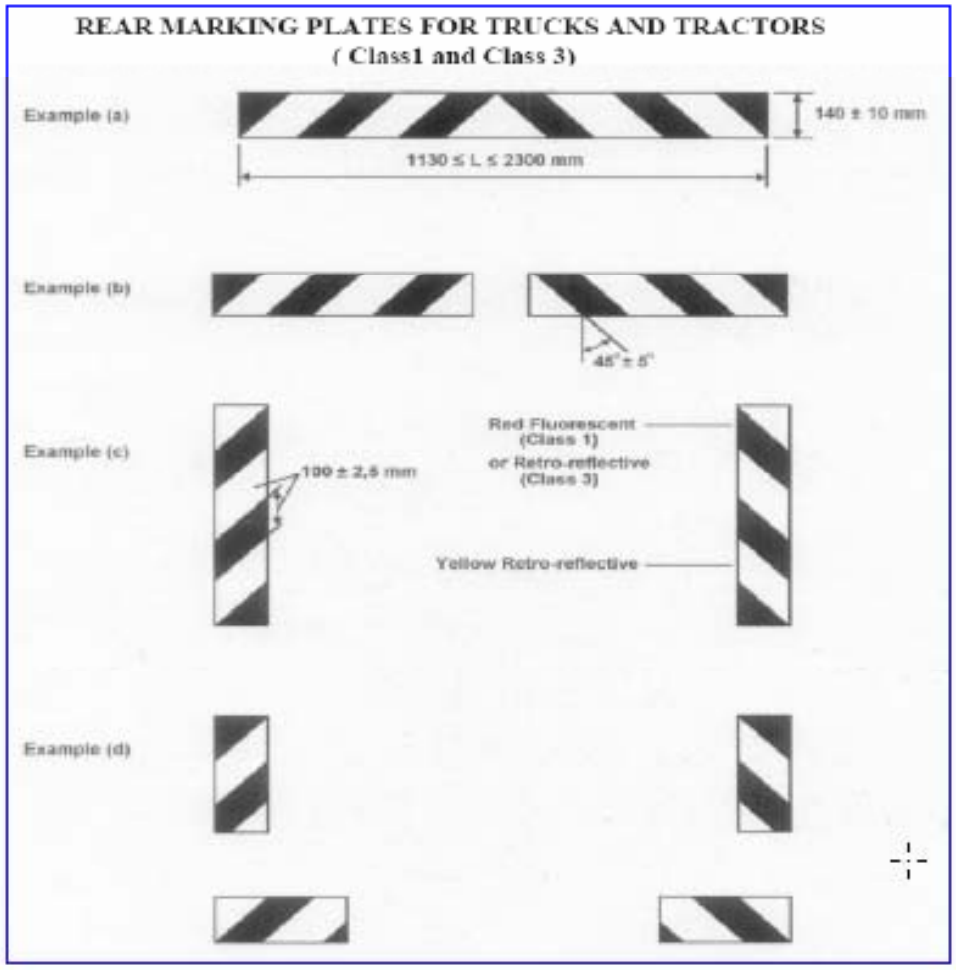




AIS:089 - Approval of Rear Marking Plates for Heavy and Long Vehicles

- **Purpose :** This is **to enhance visibility of vehicles, even in darkness**. It will aid the trailing / following vehicles **to judge the length of this vehicle and thus facilitate right decisions while overtaking**
- **Covers provisions for approval of Rear Marking Plates** of certain heavy and long motor vehicles and their trailers and semi trailers.
- Applicable to –
  - N2 Vehicles with a maximum mass > 7.5 tonnes
  - N3 Vehicles
  - Category T1, T2 and T3 exceeding 8m length (including the draw bar)
  - Category T4
  - Articulated buses

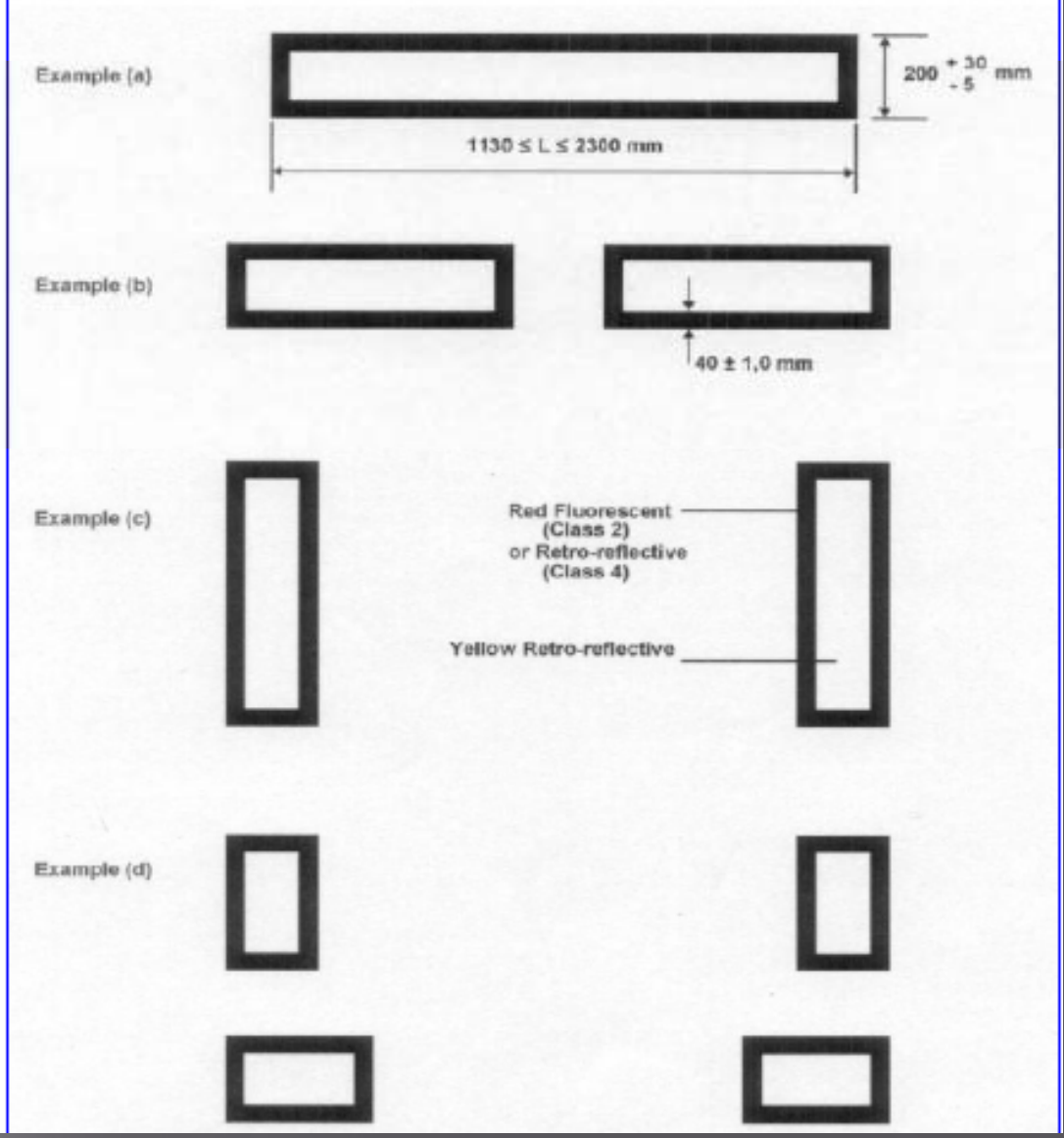
Rear Marking Plates for Trucks & Tractors (Class 1 & Class 2)



AIS:089
Approval of Rear Marking Plates for Heavy and Long Vehicles

Contd...

REAR MARKING PLATES FOR TRAILERS AND SEMI-TRAILERS
(Class 2 and Class 4)



AIS:047 – Interior Fittings
(Specifications for other than M1 Category Vehicles)

- In order to specify the **requirements of interior fittings for vehicles other than M1 category** in order **to ensure safety of the traveling passengers**
- Interior fittings covers –
  - The interior parts (other than rear view mirrors) which are contactable by the seated occupants in the front (First) row of forward facing seats when **likely to be impacted during frontal impacts** only.
  - The protrusions of controls.
- **Requirements covered are for following areas –**
  - **Forward Interior Parts above the Level of the Instrument Panel** in front of the Front Seat R point, excluding the Side Doors
  - **Forward Interior Parts below the level of the Instrument Panel** in the front of the Front Seat R point, excluding the side Doors and the Pedals



AIS:047 – Interior Fittings
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  - **Forward Interior Parts above the Level of the Instrument Panel** in front of the Front Seat R point, excluding the Side Doors
  - **Forward Interior Parts below the level of the Instrument Panel** in the front of the Front Seat R point, excluding the side Doors and the Pedals



AIS:083 - Headlamp Cleaners and their fitment on Power-Driven Vehicles

- Covers provisions for the approval of headlamp cleaners & approval of type of vehicle with regard their fitment
- Applicable to dipped beam headlamps with a light source having an objective luminous flux value exceeds 2000 lumens
- Tests covered –
  - Photometry Test
  - Temperature Test
  - Head Lamp Cleaner Performance Test

AIS:083 - Headlamp Cleaners and their fitment on Power-Driven Vehicles

- **Covers provisions for the approval of headlamp cleaners & approval of type of vehicle with regard their fitment**
- **Applicable to dipped beam headlamps with a light source having an objective luminous flux value exceeds 2000 lumens**
- Tests covered –
  - Photometry Test
  - Temperature Test
  - Head Lamp Cleaner Performance Test

CMV Rule 62
Certificate of Fitness in respect of Transport Vehicles

Safety devices to be checked on the vehicle for validity of fitness:

1. Spark plug / suppressor cap/ high tension cables
2. Lighting and light signalling devices (Retro-Reflectors, Tapes, Bulbs etc.)
3. Rear view mirrors
4. Safety glass
5. Horn
6. Silencer
7. Dashboard equipments
8. Widescreen wiping systems
9. Exhaust emission
10. Braking systems
11. Speedometer
12. Steering gear

Safety Devices for Retro-Fitment on In-Use Transport Vehicles

- Retro-reflective Tapes
- Rear Underrun Protection Device (RUPD)
- Lateral Underrun Protection Devices (LUPD)
- Lighting and Light-signalling devices.
- (Headlamps, Rear/front position lamps, stop lamps, end out marker lamps, side-marker lamps, front, rear and side retro-reflectors)
- Spray Suppression Devices (4w).
- Chocks for Traction

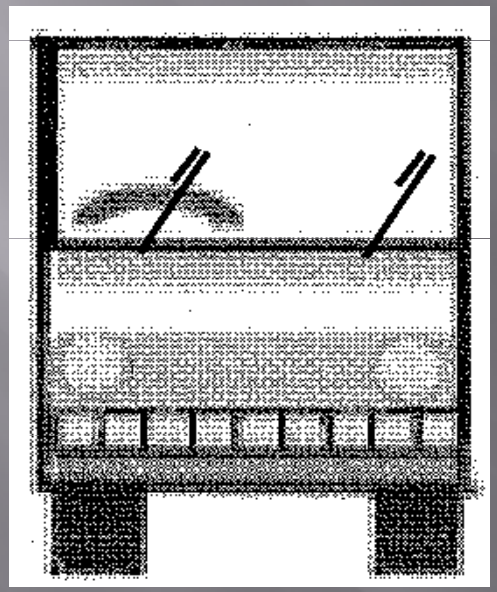
CMV Rule 62

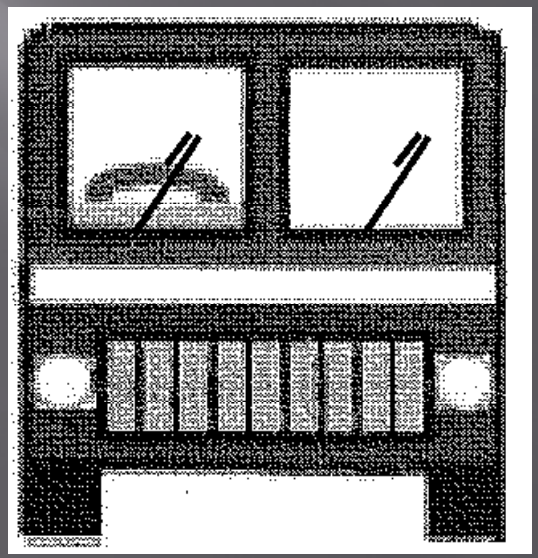
Windscreen Wiping System

1. **Check Fitment:**

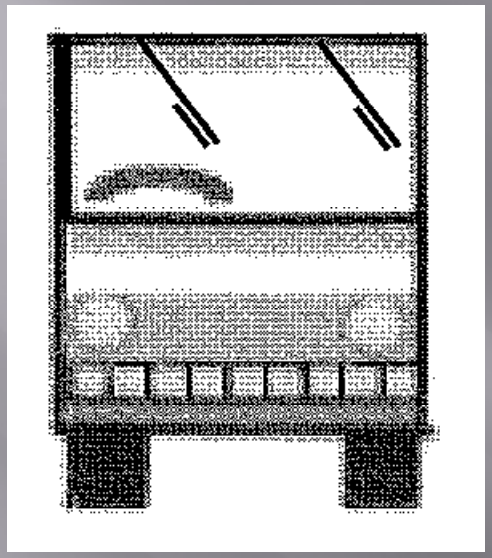
   On Transport Vehicles: Passenger and Goods

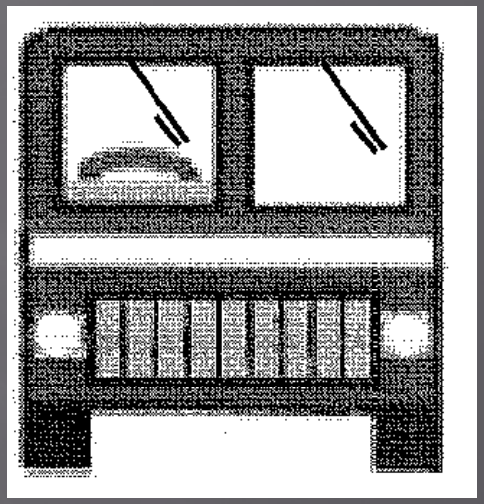
   Examples

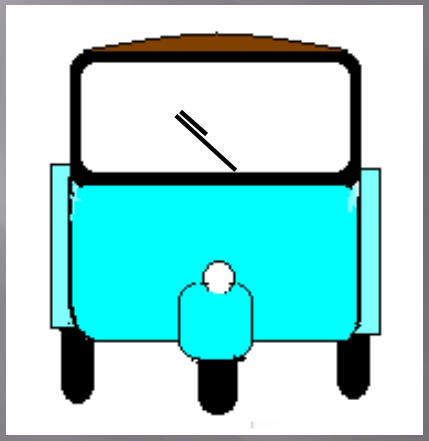




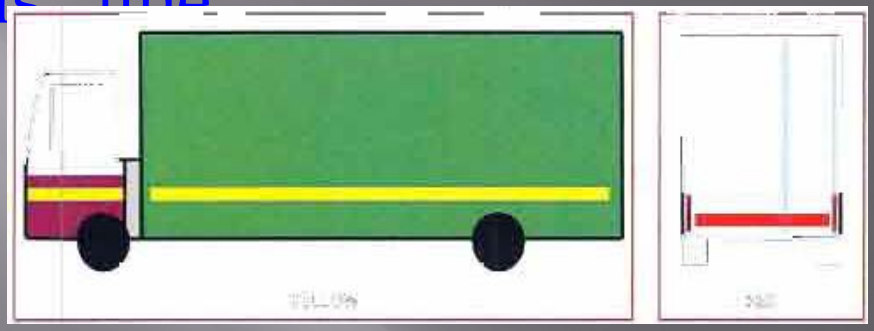
Examples



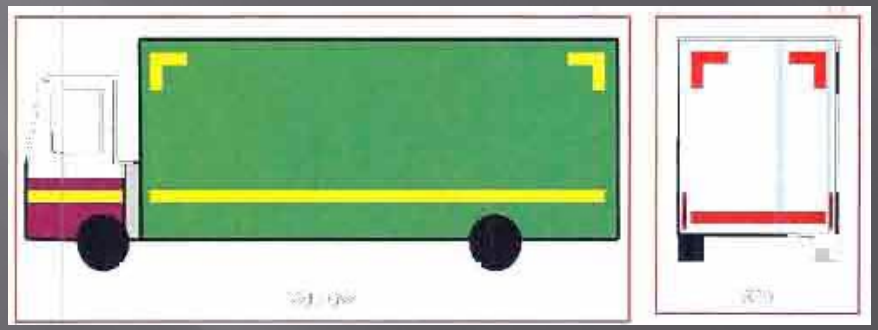




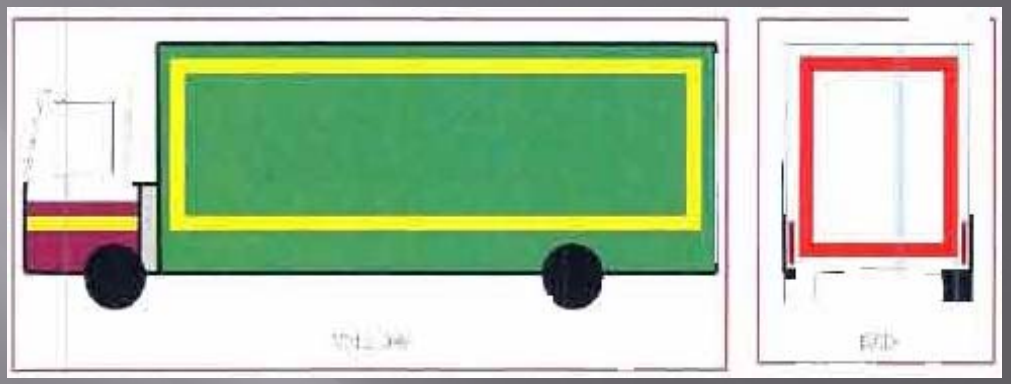
- **Line Marking** : means a conspicuity marking intended to indicate the horizontal dimensions (length and width)of a vehicle by continuous line



- **Partial Counter Marking**: Means a counter marking that indicates the horizontal dimension of the vehicle by continuous line and the vertical dimension by marking the upper corners.



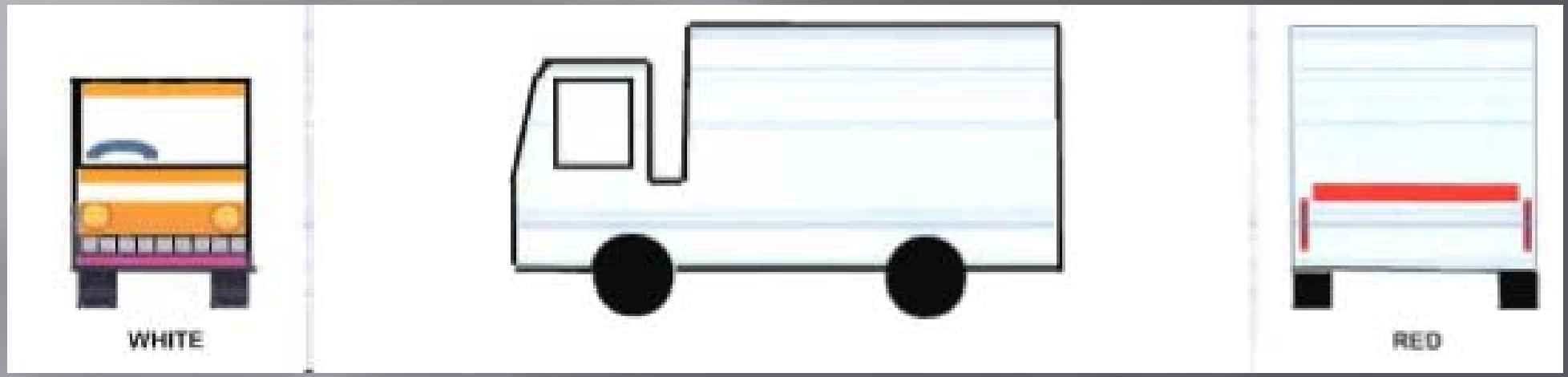
- **Full Counter Marking**: Means a counter marking that indicates the outline of the vehicle by a continuous line.



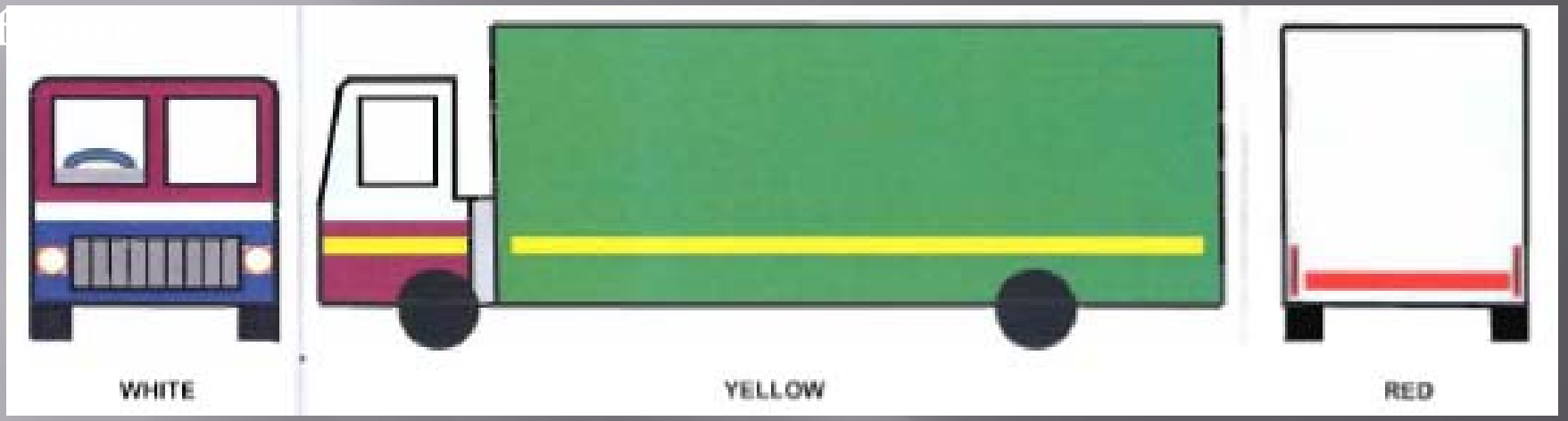
- **Distinctive Markings, Graphics**: Means additional markings intended to be placed within the counter marking, whose co-efficient of retro-reflection is essentially lower than the co-efficient of retro-reflective material used for conspicuity markings.

Goods Vehicles : For N1 and N2 (Below 7.5 tonnes) Vehicles –

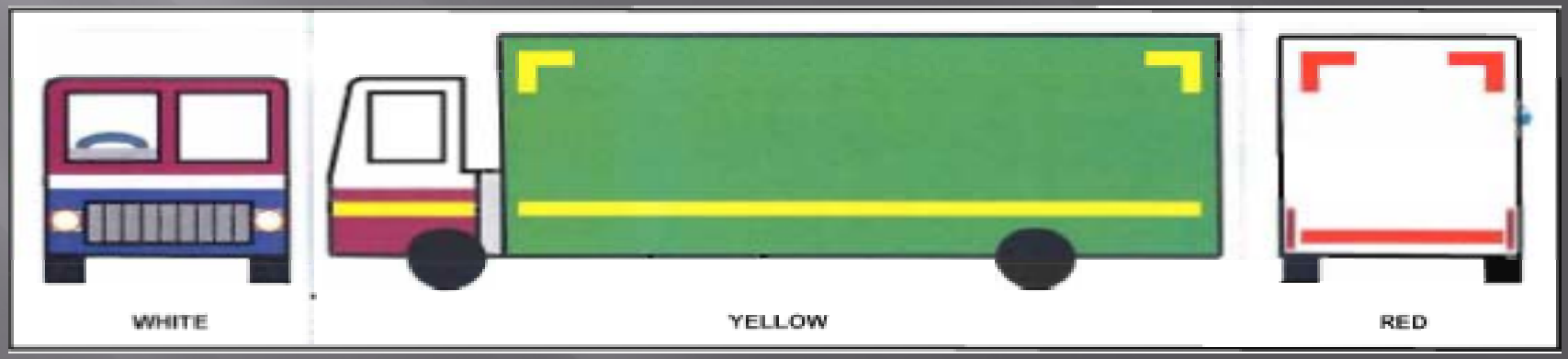
a line marking of 20 mm width tape at front (white) and rear(red) as shown in figure.



Goods Vehicles : For N2 (above 7.5 tonnes) & N3 vehicles – A line marking of 50 mm width tape at front (white) and full contour marking of 50 mm width tape at sides (yellow) and rear (red)as shown in f

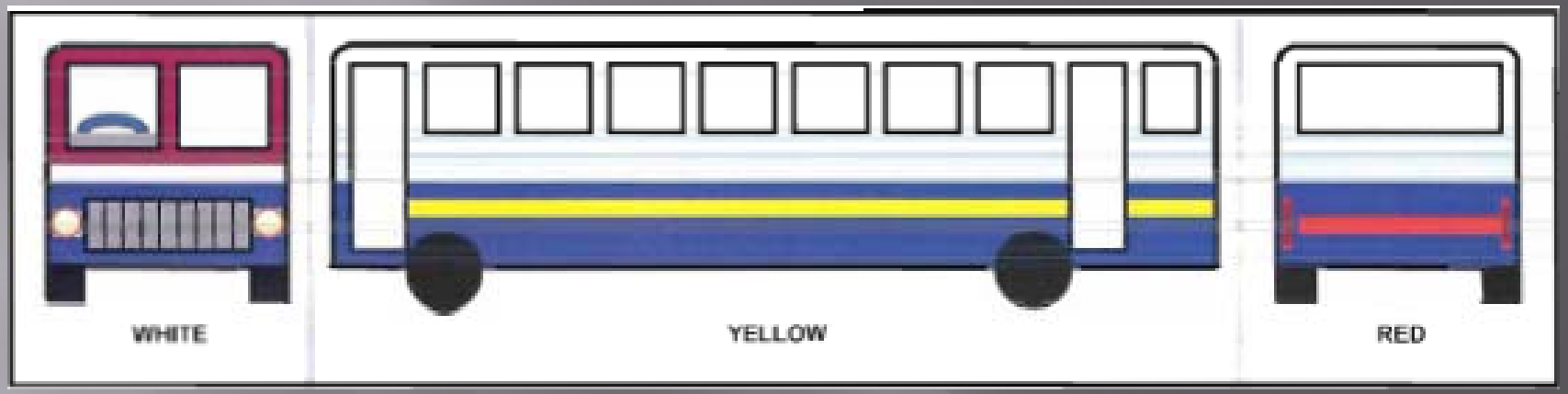


Goods Vehicles : For N2 (above 7.5 tonnes), & N3 vehicles – A line marking of 50 mm width tape at front (white) and partial contour marking of 50 mm width tape at sides (yellow) and rear (red) as shown in figure



Goods Vehicles : For N2 (Above 7.5 tonnes), & N3 vehicles – A line marking of 50 mm width tape at front (white) and full contour marking of 50 mm width tape at sides (yellow) and rear (red) as shown in figure

Passenger Vehicles : For M2 and M3 Vehicles – A line marking of 50 mm width tape across the width and the length of the vehicle at front (white), sides (yellow) & rear (red) as shown in figure.



TATA 407

Rear Under-run Protection Device

TATA 909

Lateral Under-run Protection Device

TATA 909

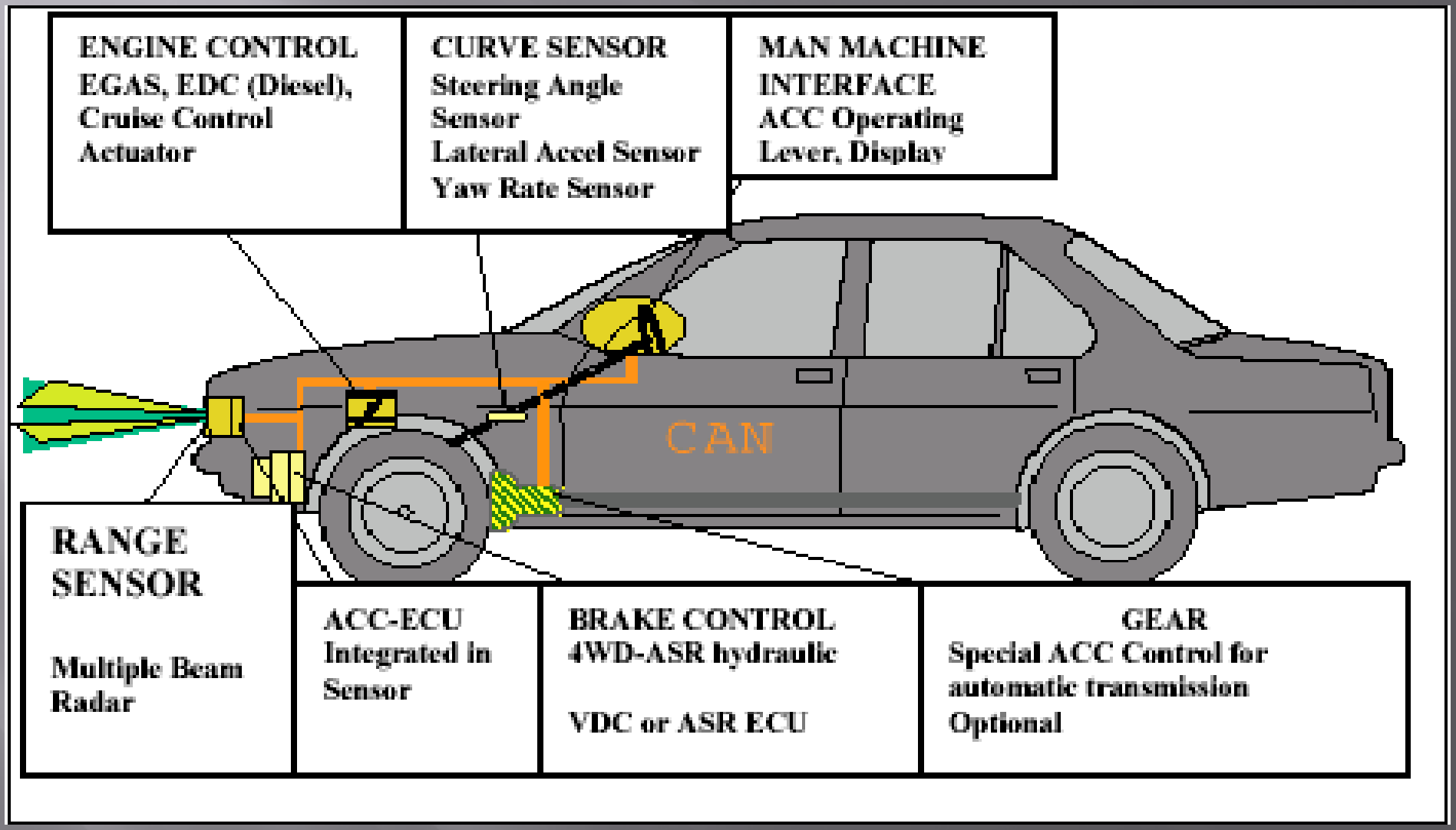
Rear Under-run Protection Device

TATA 909

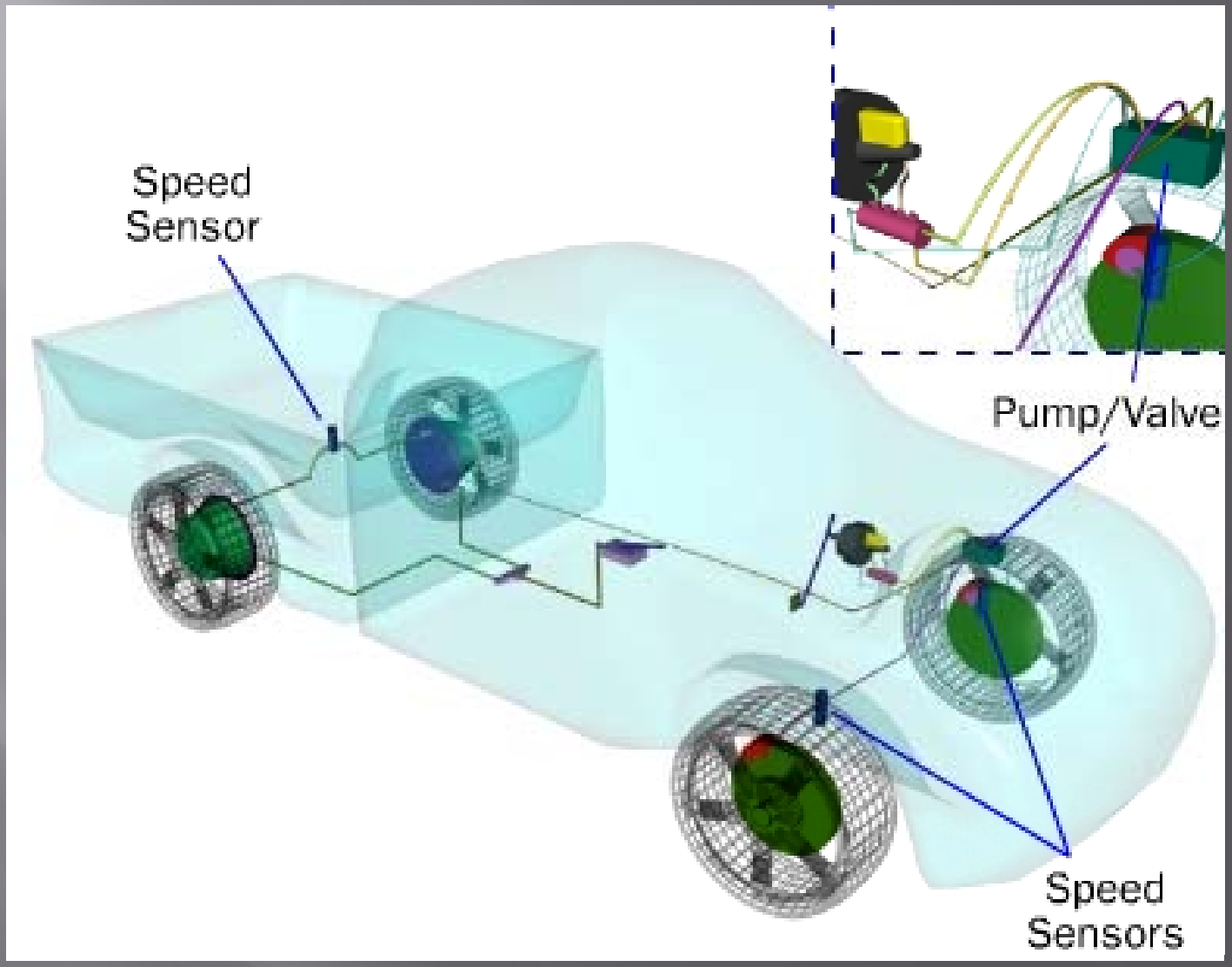
Lateral Under-run Protection Device

Role of Electronics in Modern Vehicles

ADAPTIVE CRUISE CONTROL

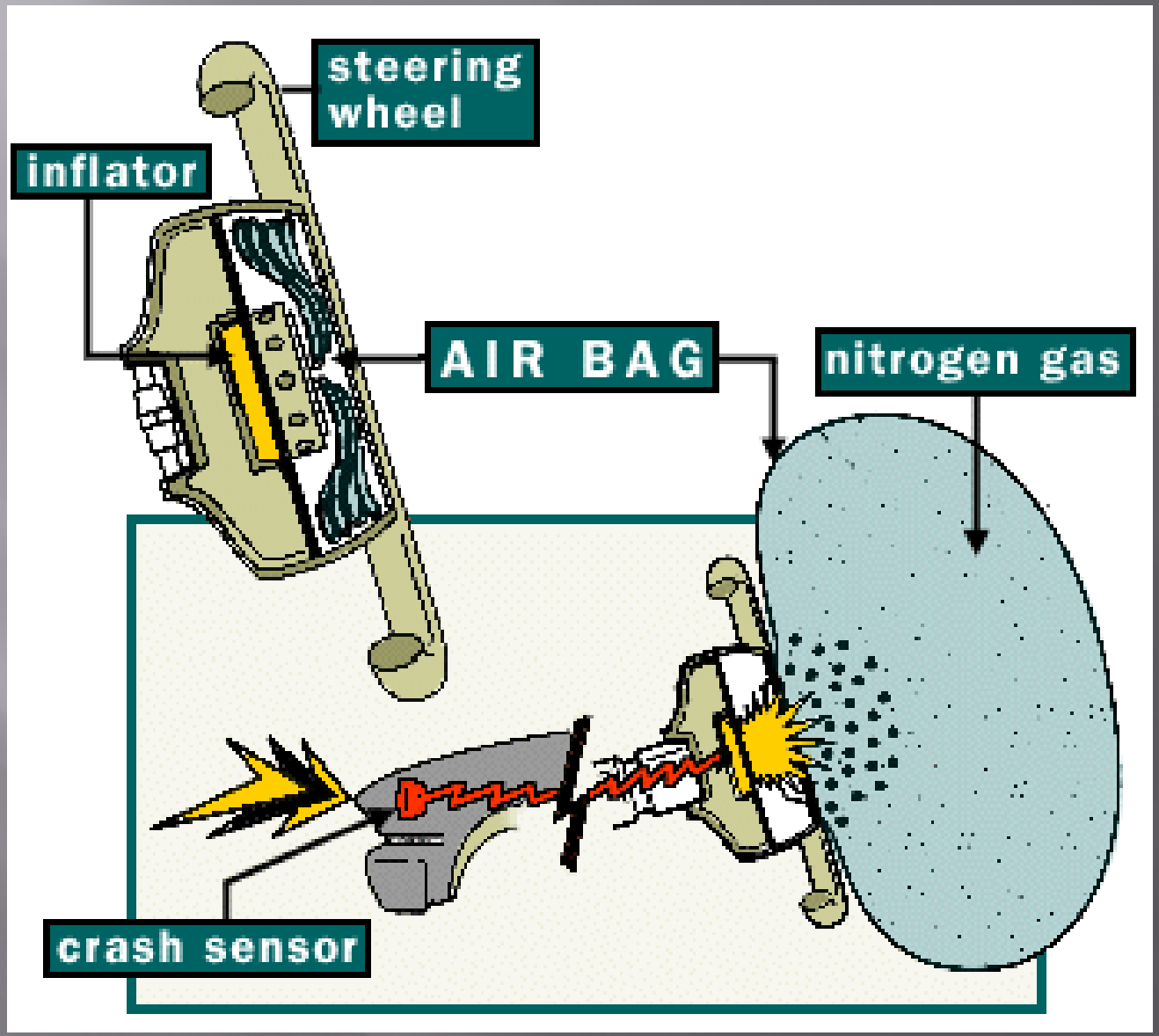


BRAKING CONTROL

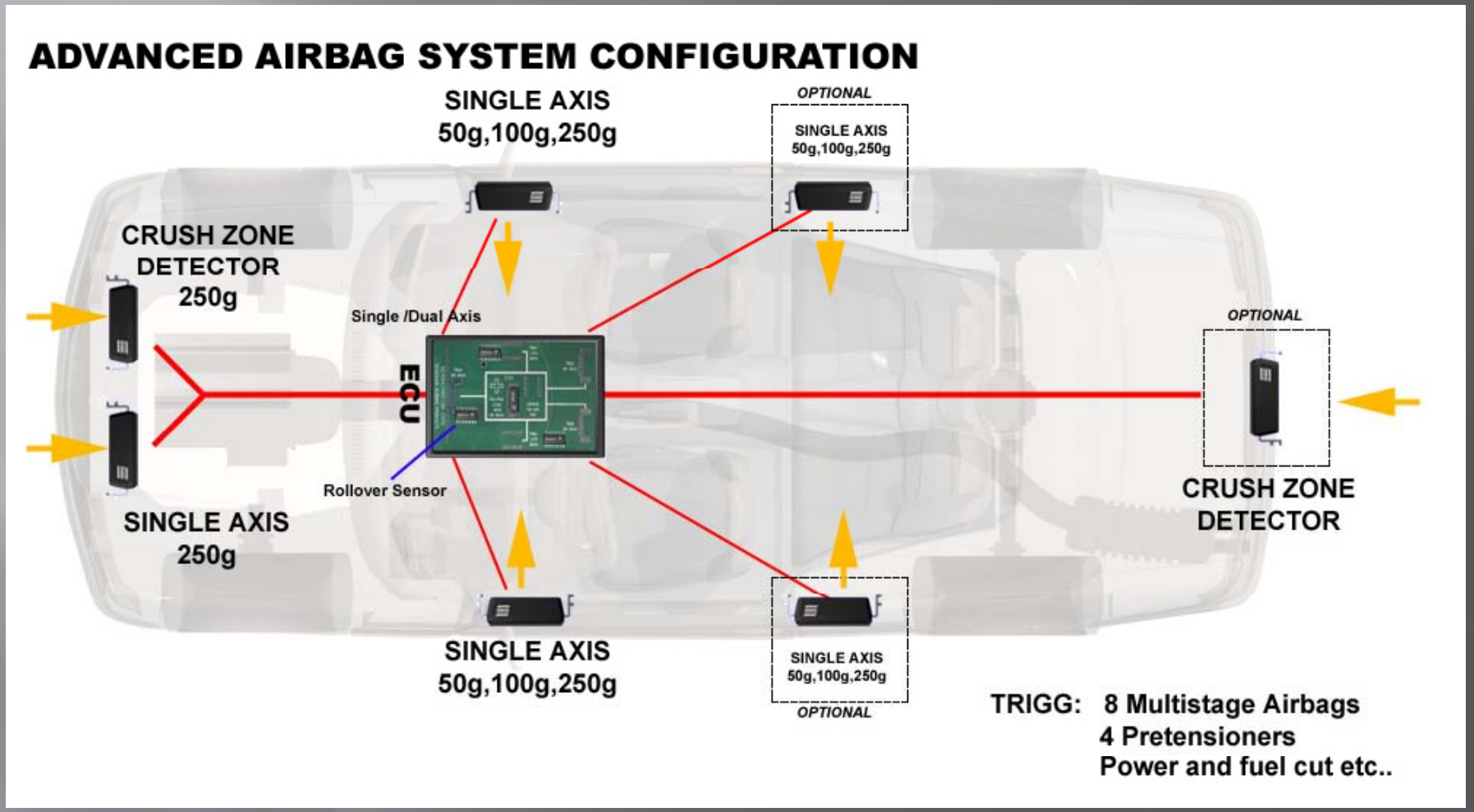


ANTILOCK BRAKING SYSTEM

AIR BAG



AIR BAG SYSTEM CONFIGURATION



STEERING SYSTEM – STEER-BY-WIRE

Convenience & entertainment systems

Comfort & Convenience is attained by modern electronics gadgets & controls such as

- Power windows
- Power sunroofs
- Steering column adjustment
- Seat adjustment
- Electronics heating/cooling control
- Maximum auxiliary control on steering

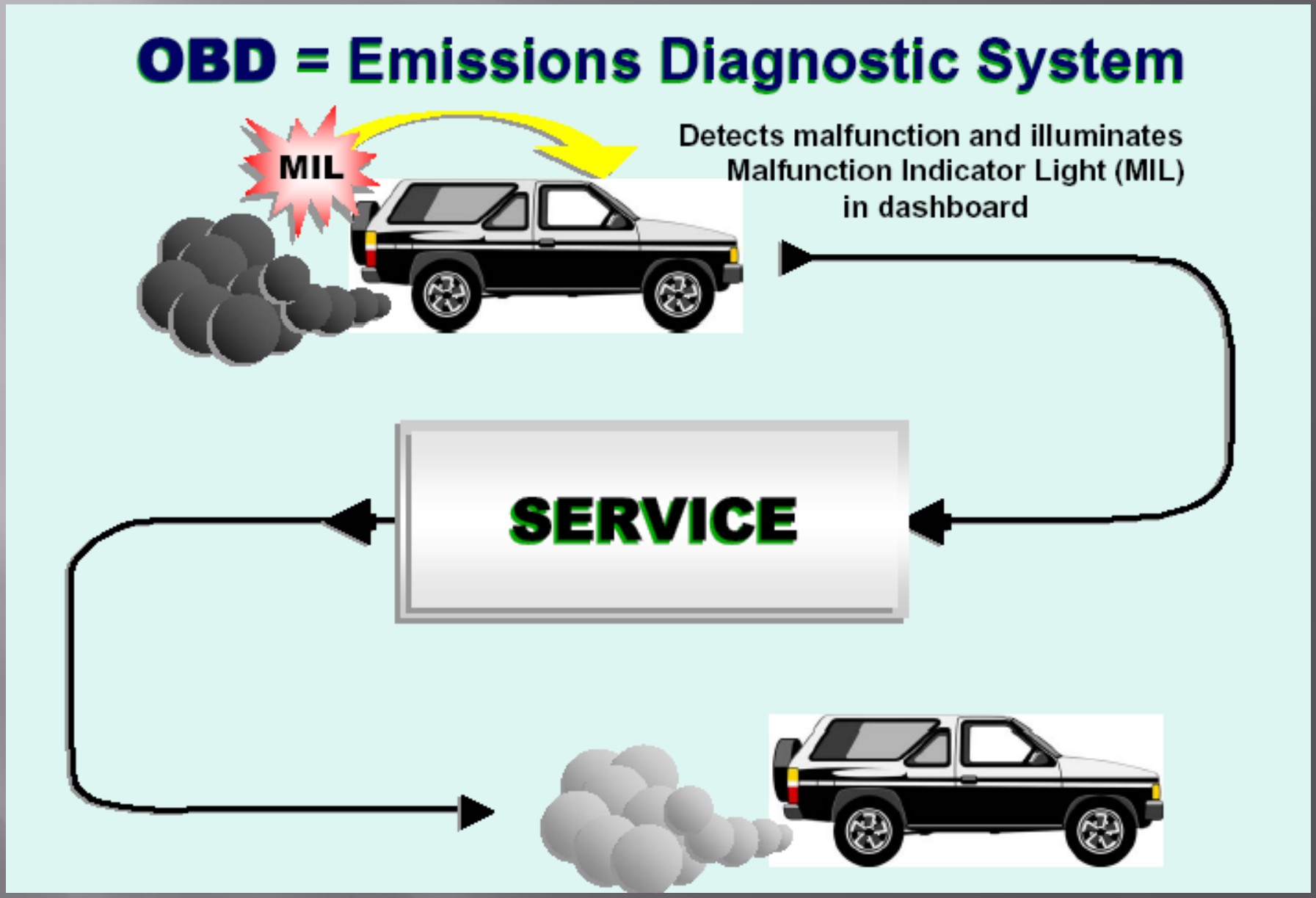
Entertainment system includes

- CD player
- CD changer
- FM/AM
- LCD display

Passenger convenience systems

- Central locking systems
- Garage door opening systems
- Tire pressure control systems
- Keyless Entry systems
- Parking aid systems
- Rain sensor systems
- Automatic toll payment systems
- Automatic headlamp activation systems
- Power steering & power braking systems
- Navigation
- Cruise control

ON BOARD DIAGNOSTICS




Starbus
TATA

Inspection and Certification

Automation of Safety & Emissions test for Fitness Certification (Burari, Delhi)

Automation of Safety & Emissions test for Fitness Certification (Burari, Delhi)

Automated Vehicle Inspection Unit at Burari, Delhi

Data

Noise

Emission

Speedometer

Brakes

Side-slip

Suspension

Joint Play

Headlights

CNG Safety

Automation of Safety & Emissions test for Fitness Certification (Burari, Delhi)

Inauguration of the facility by the Honorable Chief Minister & Honorable Transport Minister of Delhi on 1st July 2005

I&C Center – Burari (Delhi)

Two automated fitness testing lanes with computerised testing equipment:

one for auto rickshaw, taxis, RTVs and vehicle up to 3.5 tons, and

other for buses, trucks and other commercial vehicles

Heavy Duty Lane


TATA
DL1L
C9726


चण्डीगढ़
N/P


KAPOOR
FRAGILE
गुरु रक्षा
EXTS
N/P
DL-1LE
7211
PUNJAB
HARYANA
CHD.
DELHI
U.P.


VENEERS
RDBL
NP


PUBLIC
CARRIER
GOOD SPEED


N·P
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9910072792
2008/04/23

MORTH PROJECT FOR I&C

- **Executing Agency States**
- ARAI
- Andhra Pradesh, Gujarat, Karnataka, Maharashtra and Rajasthan
- ICAT
- Haryana, Himachal Pradesh, NCT Delhi and Uttar |Pradesh
- SIAM
- Madhya Pradesh

I&C Lanes Project (MORTH)

- **S. No. Scope of Supply QUANTITY**
- **1 Common Equipment**
- i Free Wheel Trolley 10
- ii Calibration Equipment set 10
- iii Automatic Tyre pressure filler and indicater 10
- iv Digital Camera with on line connectivity to the PC 20
- **2 Server,CCTV,Audiopaging,Lan Network**

I&C Lanes

- **3 Light Duty Vehicles Inspection Lane**
- i Roller brake tester – light vehicles 19
- ii Suspension tester – light vehicles 19
- iii Side slip tester – light vehicles 19
- iv Joint Play tester – light vehicles 19
- v Head light tester 19
- vi Smoke Opacimeter 19
- vii Exhaust gas analyzer 19
- Viii Speedometer Tester – light vehicles 19
- ix Sound level Meter 19

I&C Lanes

- **4 Heavy Duty Vehicles Inspection Lane**
- i Roller brake tester 19
- ii Joint Play tester 19
- Iii Side slip tester 19
- iv Head light tester 19
- v Smoke Opacimeter 19
- vi Exhaust gas analyzer 19
- vii Speedometer 19
- viii Sound Level Meter 19

Prince Michael International Road safety Award

Barcelona Award for Automotive Innovation

Golden Peacock National Award for Quality

SAE Award for Environmental Excellence

THANKS FOR YOUR Patience