



# PIARC Global Road Safety Knowledge Exchange Vehicles

# Summary

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- **Recommendations**

# About PIARC



# PIARC

## World Road Association

- Founded in **1909** as a non-profit, non-political Association
- Foster and facilitate global discussion and **knowledge sharing on roads and road transport**
- **124 government members** worldwide
- Retains **consultative status** to the Economic and Social Council of the **United Nations**
- **4 Strategic themes**: ST1 road administration, ST2 mobility, ST3 safety and sustainability, ST4 resilient infrastructure
- **16 Technical Committees (TCs)**, 4 per strategic theme, unite experts from numerous areas including road safety and design, network operations and maintenance, finance and governance.



# PIARC Road Safety Technical Committee

## Technical Committee T.C. 3.1: Road Safety part of ST3:

- Observes specific **road safety issues for LMICs**
- Explores the implementation of **proven countermeasures**
- Updates the “**Road Safety Audit Guidelines**” and the “**Road Safety Manual**”
- Disseminates and encourages the **application of the manuals**
- Provides **access to well-chosen safety measures** and their dissemination among **LMICs**
- Studies the implications of **connected and automated vehicles**

# PIARC Road Safety Activities

- **Technical reports** prepared by the Technical Committees
  - Well-Prepared Projects
  - Automated Vehicles – Challenges and Opportunities for Road Operators and Road Authorities
- **Road Safety Manual:** an electronic manual for all technicians and managers concerned about road safety issues **acknowledged by the United Nations**
- **Seminars** organised by the Association available online
  - Connected and Autonomous Vehicles, a Pathway towards a Safer Future, 27-28 October 2021
  - Road Safety in Low to Middle Income Countries, 18-20 May 2021
- Declaration of **Support** to the **UN Decade of Action**

# PIARC Global Road Safety Knowledge Exchange Project

- Aiming to **promote knowledge sharing** through appropriate implementation aids that will reflect previous work of but not limited to PIARC
- Focus on spreading road safety knowledge to **Low- and Middle-Income Countries**, where **death rates** due to road traffic injuries in LMICs are **three times higher** than in high-income countries (HIC).
- With the support of National Technical University of Athens (**NTUA**) and Austrian Institute of Technology (**AIT**)
- Deliverables for this project include **fact sheets, presentations**. Based on the road safety manual and other relevant **material produced by PIARC** technical committees (reports, case studies etc.).

# Vehicles Safety Fundamentals





# Priority UN Vehicle Safety Standards (1/2)

- **1-2: Frontal impact protection and side impact protection (R94 and R95):** ensure that cars withstand the impacts of a frontal and side impact crash when tested at certain speeds. These crashworthiness regulations help to protect occupants withstand the impact of front and side impact crashes.
- **3: Electronic stability control (R140):** prevents skidding and loss of control in cases of oversteering or understeering and is effective at reducing crashes and saving lives.
- **4: Pedestrian front protection (R127):** provides softer bumpers and modifies the front ends of vehicles that can reduce the severity of a pedestrian impact with a car.

# Priority UN Vehicle Safety Standards (1/2)

- **5-6: Seat-belts and seat-belt anchorages (R14 & R16):** ensure that seat-belts are fitted in vehicles when they are manufactured and assembled and that the seat-belt anchor points can withstand the impact incurred during a crash, to minimize the risk of belt slippage and ensure that passengers can be safely removed from their seats if there is a crash.
- **7: Child restraints (R129):** ensure that the child seat is in place with the adult seat-belt and that ISOFIX child restraint anchorage points are fitted to secure the restraint.
- **8: Motorcycle anti-lock braking systems (R78):** help the rider maintain control during an emergency braking situation.

# LMICs Vehicles Safety Fundamentals

- **None of the Low income countries** have implemented any of the 8 priority UN vehicle safety standards
- Only **4% of Lower-middle income countries** have implemented the priority UN vehicle safety standards **R94, R95, R140, R127 and R78**
- Regarding the **upper-middle income countries**:
  - **16%** have implemented **R94** and **R95**
  - **13%** have implemented **R140** and **R127**
  - **5%** have implemented **R78**



# Vehicles Safety Issues



# Vehicle Safety Systems

- **Passive Safety Systems** intend to limit the damage caused to driver and passengers in the event of a crash:
  - Airbags,
  - Seatbelts,
  - Helmets,
  - Whiplash protection system, etc.
- **Active Safety Systems** play a preventive role in mitigating crashes by providing advance warning or by providing the driver with additional assistance in steering/controlling the vehicle:
  - Anti-lock braking systems
  - Electronic stability control, etc.

# Vehicle Safety Regulations

- In many LMICs **vehicle safety** is **not effectively regulated** through design standards or maintained through mandatory vehicle inspection schemes.
- The **vehicles safety features** have penetrated countries to a **different extent**.
- “**Standard equipment**” in new vehicles **differs between countries**.
- **Depending on regulations in place** per destination market, vehicles are produced with different safety features.
- **Automobile companies** frequently “**de-specify**” **life-saving features** in newer models sold in countries where regulatory frameworks do not require these features.

# Overweight Vehicles

- **Weight limits** for road freight vehicles typically cover the aspects of gross vehicle weight and axle load.
- **Gross vehicle weights** differ greatly between countries and continents.
- **Axle loads** are linked to infrastructure design parameter
- **LMICs** report very low compliance levels due to **overloading for cost saving** and **lack of enforcement.**



# Overweight Vehicles Effects

- Effects of overloading on the pavement residual life depend on **factors**:
  - Type of traffic
  - Load distribution
  - Vehicle wheel and suspension
  - Type of pavement; condition, thickness, unevenness, cracking
  - Environmental factors; temperature, water presence
- **Unpaved roads**, mostly present in LMICs, are the **most affected** by overloading, resulting in secondary rutting and corrugation, increasing the dynamic impact of the load and accelerating pavement deterioration.
- Overloading influences the **safety performance** of the overloaded vehicles



# Vehicles Safety Measures



# UN Decade of Action for Road Safety



# Safe System Approach

- **UN Second Decade of Action for Road Safety**, with a goal of reducing road traffic deaths and injuries by at least 50 per cent from 2021 to 2030
- Adoption of **Safe System Approach** is necessary to prevent fatal and serious crashes.
- Vehicles should be designed to **ensure** the **safety** of those inside and those outside them.
- **Vehicle safety** is increasingly **critical to the prevention of crashes** and contributes to substantial reductions in the number of deaths and serious injuries on the road.

# Safe System Principles



**Death/Serious Injury  
is Unacceptable**



**Humans  
Make Mistakes**



**Humans Are  
Vulnerable**



**Responsibility  
is Shared**



**Safety is  
Proactive**



**Redundancy  
is Crucial**

# Vehicle Safety Regulations

- Apply **harmonized legislative standards** for vehicle design and technology to ensure a uniform and acceptable level of safety worldwide.
- Governments should provide, through legislation, a **minimum set of safety standards** for vehicles, considering:
  - all “**traditional**” categories of vehicles, including passenger cars, vans, trucks, buses, and powered two- and three-wheelers,
  - “**informal**” modes prevalent in many countries, especially LMICs; tuk-tuk, skylabs, jeepneys

# High-quality harmonized safety standards (1/2)

- Standards on **front and side impact** to ensure that occupants are protected in a front and side-impact crash
- **Safety belts** and safety belt anchorage for all seats to ensure that safety belts are fitted in vehicles when they are manufactured and assembled
- **ISOFIX child-restraint** anchor points to secure the child-restraint systems attached directly to the frame of the vehicle to prevent misuse
- **Electronic stability control** to prevent skidding and loss of control in cases of oversteering or understeering
- **Advanced emergency braking** to reduce collisions

## High-quality harmonized safety standards (2/2)

- **Pedestrian protection** standards to reduce the severity of impact with a motor vehicle
- Motorcycle **helmets** certified according to international harmonized standards
- **Anti-lock braking system** and daytime running lights for motorcycles
- **Intelligent speed assistance** systems to help drivers keep to speed limits
- **eCall** or Accident Emergency Call Systems (AECS) to trigger an emergency response by an in-vehicle sensor

# Actions to Ensure Vehicle Safety

- **Mandatory certification and registration systems** for new and used vehicles based on established safety requirements and combined with routine inspections
- Regulations for the **export and import of used vehicles** that are accompanied by inspections at entry and exit points, and mandatory periodic technical inspection of vehicles
- Building demand for safer vehicles by **encouraging independent new car assessment programs**





# Mitigation of Overweight Vehicles (1/2)

- **Legislation** is the first step. A well formulated legal text should contain:
  - Precise definitions of the vehicles considered
  - Precise definitions of the types of axles and axle sets concerned
  - Precise definition of the scope of the network on which the legislation is valid
  - The exact weight limits
  - The relevant derogations under which the legislation does not apply
  - The methods of detection that can be applied to discover violations
  - The consequences of violations
- **Education** of transport operators and all actors in the transport chain regarding the applicable legislation and its modalities.
- Proper **information** regarding the consequences of overloading

# Mitigation of Overweight Vehicles (2/2)

- Use of low-tech to high-tech equipment for the **detection** of overloading
  - Static weighing scales
  - Movable static scales
  - Weighing in motion
- **Effective enforcement** of weight limits by deployment of more staff and increase in fines could lead to higher compliance and a decrease in safety risk
- **Penalties:**
  - Financial (fine)
  - Operational (immobilization and offloading)
  - Institutional (loss of reputation for the operator)

# Vehicle Automation

- **Smart Vehicles** or autonomous Vehicles are bringing us in a different mobility environment.
- 94% of road accidents are caused by **human distraction**
- Autonomous vehicles could **prevent all crashes caused by impaired driving**
- **Driver disengagement** is critical phase in which accidents with ADAS may occur
- **LMICs** should start with **small pilot deployments** of the most mature automated services; safety-related automated services are preferable, as road safety is the highest motivation for deployment.



# Recommendations



# Vehicles Safety Recommendations

- Providing a **safe operating environment** for road users is a **primary responsibility** for the government and industry organisations that design, build, maintain and regulate roads and vehicles.
- Regarding vehicle automation, **LMIC** governments and transport industry **should be prepared** to avoid being caught off guard and to not get left behind the global community
- Prevention and mitigation solutions for **overloading** include four steps:
  1. **Legislation**
  2. **Prevention and education**
  3. **Detection and enforcement**
  4. **Penalisation**

# PIARC IS BOOSTING ROAD SAFETY IN LMICs

- **Vehicles safety** is a contributing factor to road safety and an area where the PIARC Road Safety Technical Committee has produced relevant reports, case studies and documents available to all road authorities and stakeholders.
- PIARC is engaged in **promoting road safety** all over the world and committed to **actively support safety in LMICs**.
- All actions contribute fully to the success of the **UN Decade of Action for Road Safety**.
- The new knowledge-sharing campaign for road safety will provide **monthly updates**, on social media and on PIARC website, for **all essential road safety areas**.
  - **Stay tuned for more actions and events!!**



# Relevant PIARC reports

- [Overweight Vehicles: Impact on Road Infrastructure and Safety](#)

# Thank you for your attention!



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