PIARC Global Road Safety Knowledge Exchange
Vulnerable Road Users
Summary

• About PIARC

• VRUs Safety Fundamentals

• VRUs Safety Issues

• VRUs Safety Measures

• 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.).
VRUs Safety Fundamentals
LMICs Road Safety Fundamentals

- Each year, 1.35 million people are killed on the worlds’ roads, and a further 50 million are injured, with the vast majority of these (over 90 percent) occurring in LMICs.

- Death rates due to road traffic injuries in LMICs are three times higher than in high-income countries (HIC) (27.5 vs. 8.3 per 100,000 population)

- Despite the increased global attention and progress in policy-making at national level, the number of road casualties increased in 87 LMICs since 2013
LMICs VRUs Safety Fundamentals

- In most LMICs, the majority of road users are vulnerable road users – pedestrians, cyclists and those using motorized two or three-wheelers.

- Low-income countries have the highest proportion of fatally injured casualties among vulnerable road users at 57%, as opposed to 51% in middle-income countries, and 39% in high-income countries.
Distribution of deaths by road user type by WHO Region

Source: WHO, GLOBAL STATUS REPORT ON ROAD SAFETY 2018 accessed via https://www.who.int/publications/i/item/9789241565684
VRUs Safety Issues
VRUs Types

VRU often means **pedestrians and cyclists** in the mind of people. Other types of road users should be considered as well:

- **Powered two-wheelers (PTWs):** less stable, less visible, less protected. In LMICs the ownership and use of motorcycles and other two-wheelers are generally high.
- **Slow and small agriculture vehicles:** speed difference, less protected
- **Novice or elderly** car drivers: based on their task capability or resilience to accidents
- **Road workers**
Pedestrians Characteristics

- Persons **walking along a road** or a developed area
- **Unprotected** (no shell or cover)
- **Various reasons for walking:** journeys to work/school, exercise, leisure
- **Subgroups:** children, elderly, persons with impaired mobility, others
Cyclists Characteristics

- Persons **riding a two-wheeled (or three-wheeled) cycle**
- Principal **means of transportation** in LMICs
- Popular form of **recreation** usually in HIC
- Used by a **person of any age**
- **Subgroups**: pedal operated, electric (assisted)
PTWs Characteristics

- Two-wheeled motor vehicles or similar comparatively low cost and very affordable
- Favored mode of transport due to lack of public transport, increasing fuel prices, urban congestion, effortless parking
- High ownership in LMICs
- Not fully protected; helmet wearing not enforced in many LMICs
Other VRUs Characteristics

- Light duty farm vehicles
- Animal drawn vehicles
- Speed and mass difference with regular traffic
- Relatively unprotected riders/passengers
Factors related to VRUs Safety

- **VRUs** may themselves be a threat to others

- **Fatalities** amongst VRUs are higher in **LMICs** due to:
  - **Lack of resources** to provide or maintain adequate and safe infrastructure
  - **Land use planning problems**
  - **Unsafe users behavior**

- **LMICs** have greater variety and intensity of traffic mixing the slow-moving and vulnerable non-motorized road users, as well as the motorcycles with fast-moving motorized vehicles.
VRUs Crashes

- Casual factors for **pedestrian crashes** are:
  - Driver
  - Vehicle
  - Roadway/environment
  - Demographic/social/policy
  - Being a pedestrian

- Reasons why **crashes occur** include:
  - Careless crossing
  - Disobeying traffic lights
  - Jaywalking
  - Misjudgment of speed gap
  - Lack of proper facilities
VRUs 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% from 2021 to 2030

- Adoption of Safe System Approach is necessary to prevent fatal and serious crashes.
Safe System Principles

- Death/Serious Injury is Unacceptable
- Humans Make Mistakes
- Humans Are Vulnerable
- Responsibility is Shared
- Safety is Proactive
- Redundancy is Crucial
Measures for VRUs along road sections

- **Visual segregation by edge markings**: may be associated with a reduction of the lane width contributing to traffic calming
- **Wider and paved shoulder**: may contribute to speeding or unsafe overtaking
- **Appropriate traffic lane width**: too wide lanes may create erratic movement of vehicles. May be considered along with separated facilities for VRUs
- **Segregated footpath**: must be wide enough
- **Segregated lane for cyclists or mopeds**: consider carefully the intersection issues
- **Proper crossing facilities**: combined with cyclists crossing
- **Relocated bus stop**: important to connect the stop with footpaths, crossings
- **Kerbs and barriers**: adapted to the traffic and road environment situation
- **Traffic calming**: impact depends on the facilities for VRUs
Measures for Pedestrians (1/2)

- **Pedestrians at intersections:**
  - *Zebra crossing with or without a central refuge:* better if combined with traffic calming measures
  - *Installation of pedestrian fences and central refuges:* pedestrians would likely try to find a shorter way leading to unsafe situations
  - *A minor road central refuge at an unmarked crossing place*
  - *Traffic signals to control the movements at the intersection:* mostly in urban areas and suburban areas
  - *Pavement markings to restrict parking:* combined with use of flexible bollards
  - Install kerb extensions
  - Signs and equipment

- **Pedestrian crosswalks-signing:**
  - Dedicated signs and markings
  - Traffic calming measures
Measures for Pedestrians (2/2)

- **Pedestrians crosswalks-signals and lighting:**
  - **Use a pedestrian phase at the signals with symbols:** appropriate signal phase to mitigate risk of jaywalking
  - **Use a pedestrian phase at signals with a numerical countdown display**
  - **Acoustic signals/tactile knobs at crossings:** confusing if acoustic signals close to each other
  - **Appropriate lighting**

- **Sidewalk accessibility**
  - **Obstruction free:** give a clear path to pedestrians. Obstructions along cycle paths are even more dangerous
  - **Work zones:** adequate protective barriers, longitudinal barricades, provide safe pavement surface conditions
  - **Kerb ramps:**
    - Use kerb ramp at intersection: ramps also useful on cycle paths
    - Add tactile strips across the width of the sidewalk leading to the crosswalk: may be difficult to implement in historic city areas
Various Measures for VRUs

- **Pedestrians and cyclists crossing multiple lane road section:**
  - 50km/h speed limit dedicated marking/signs or rumble strips: better if combined with traffic calming measures
  - Middle island by reducing the lane width and protecting by a barrier
  - Traffic signals for pedestrians and/or cyclists: depends on traffic volume

- **VRUs at high traffic volume intersections:**
  - A sign-posted alternative cycle route away from junction: cyclists always tempted to shortcut even if not safe
  - Modify the layout of the intersection to cater for the cyclists
  - Marking, signing and signals at the intersection
  - Pre-start in time/space for cyclists: access to pre-start area should be eased
  - Pre-start in time/space for motorcyclists: may cause dangerous manoeuvres

- **Medians and refuge islands:** medians painted on the road surface, raised medians and refuge islands, multifunctional medians
Road Safety Audits and Inspections

- Target elements for RSA and RSI are risk factors for accident occurrence or injury severity.
- Should take into consideration the point of view of every kind of road user.
- Each route has to be logical and continuous.
- Take into account how interactions happen between different types of road users or transport modes.
- Checklists can be used to ensure safety aspects have not been overlooked.
Recommendations
VRUs Safety Recommendations

- Road design should include a **self-explaining and failure-forgiving road** according to the needs of the road users.

- Key message for road engineers and designers is to **include vulnerable road users in the design process** and include self-questions such as “what if a child /blind /elderly /disabled person is crossing.”

- Key **requirements**:
  1. Give road users enough time.
  2. The road must provide a safe field of view.
  3. The road environment must correspond with the road user’s perception logic.

- To ensure compliance, measures of **communication, education and enforcement**, including special warning signs and campaigns should be employed.
PIARC IS BOOSTING ROAD SAFETY IN LMICs

- **VRUs safety** is key priority for increasing road safety.

- PIARC Road Safety Technical Committee has provided a detailed presentation of the relevant safety issues along with an overview of possible design and remedial measures for each type of VRUs sub-groups respecting the Safe System Approach.

- PIARC is engaged in promoting road safety all over the world and committed to actively support safety in LMICs.

- 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

- Proceedings of the PIARC International Seminar on: “Road Safety in Low- and Middle-Income Countries: Issues and Countermeasures”
- Proceedings of the “International Seminar and Workshop on Safer Roads by Infrastructure Design and Operation”
- Road Safety Catalogue of Case Studies
- Proceedings of the Internal Workshop “Policies and Programs for Road Safety Management”
- 1st Webinar on COVID-19 and Road Safety
- 2nd Webinar on COVID-19 and Road Safety
- COVID-19: Initial Impacts and Responses to the Pandemic from Road and Transport Agencies
- Proceedings of the World Road Congress 2019
- Addressing Road Safety Worldwide: Vulnerable Road Users, Human Factors & RS in LMIC
- Vulnerable Road Users: Diagnosis of Design and Operational Safety Problems and Potential Countermeasures
Thank you for your attention!

World Road Association (PIARC)
Grande Arche – Paroi Sud – 5° étage
92055 – La Défense Cedex – France

www.piarc.org