

United Nations - Economic Commission for Europe
70th Session of the Working Party on Road Traffic Safety
Round table on the safety of two-wheeled vehicles
Geneva, 23 March 2015

Improved Safety of Motorcycles, Scooters and Mopeds

George Yannis, Professor, National Technical University of Athens

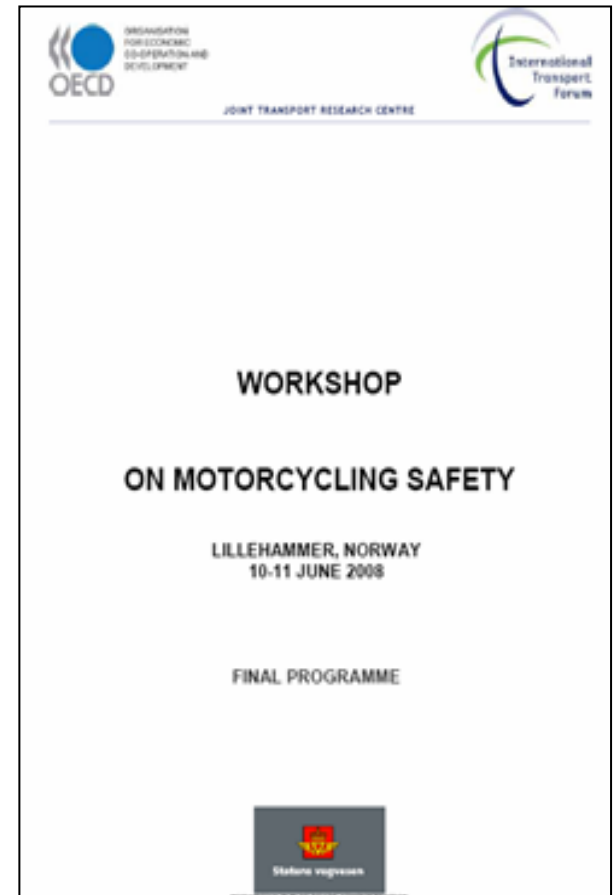


ITF Working Group

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Background

- Motorcyclists safety is a growing concern in most countries
 - Mobility
 - Fatalities
 - Severe injuries
- Workshop on Motorcycling Safety (Lillehammer - June 2008)
 - Researchers, policy advisors, industry, motorcyclists associations
 - A number of areas for improving the safety of motorcycling
- Deserve further investigation



WG - Safety of Powered Two-Wheelers

28 experts representing **18 OECD/ITF** countries

- A wide range of background and skills
- From research to decision making

Working Group **participants:**

Australia, Austria, Belgium, Canada,
European Commission, France ,
Germany, Greece, Israel, Italy,
Mexico, Netherlands, New Zealand,
Norway, Portugal, Spain, Sweden,
United Kingdom, United States,
ITF/OECD

Objectives:

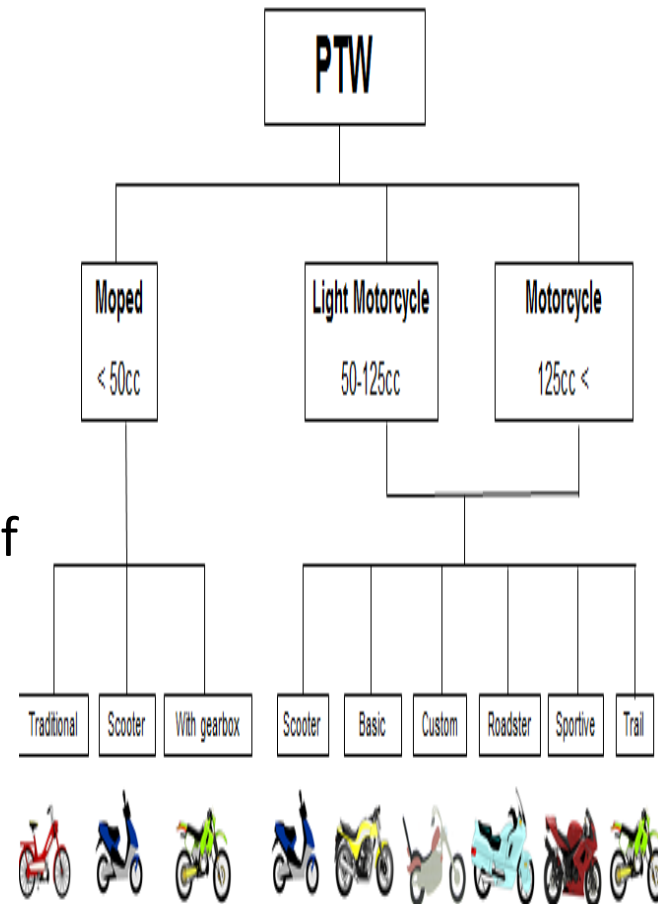
- **Review** the latest research works in the field of motorcycling safety
- Better **understand** road crashes mechanisms and configurations
- **Evaluate** the most effective measures in the framework of a “safe system” approach
- Make **recommendations** to decision makers in OECD/ITF countries

The IRTAD Report on “Safety of Powered Two-Wheelers”

- Powered two-wheeler **fleet and usage**
- Powered two-wheeler **crash characteristics**
- Factors contributing to powered two-wheeler **crashes and their severity**
- Countermeasures addressing **road user behaviour**
- Countermeasures promoting the use of **personal protective equipment**
- Countermeasures targeting **vehicles**
- Countermeasures targeting **infrastructure and traffic management**
- Specific powered two-wheeler issues in **low and middle income countries**
- Developing and implementing an **integrated road safety strategy for PTWs**

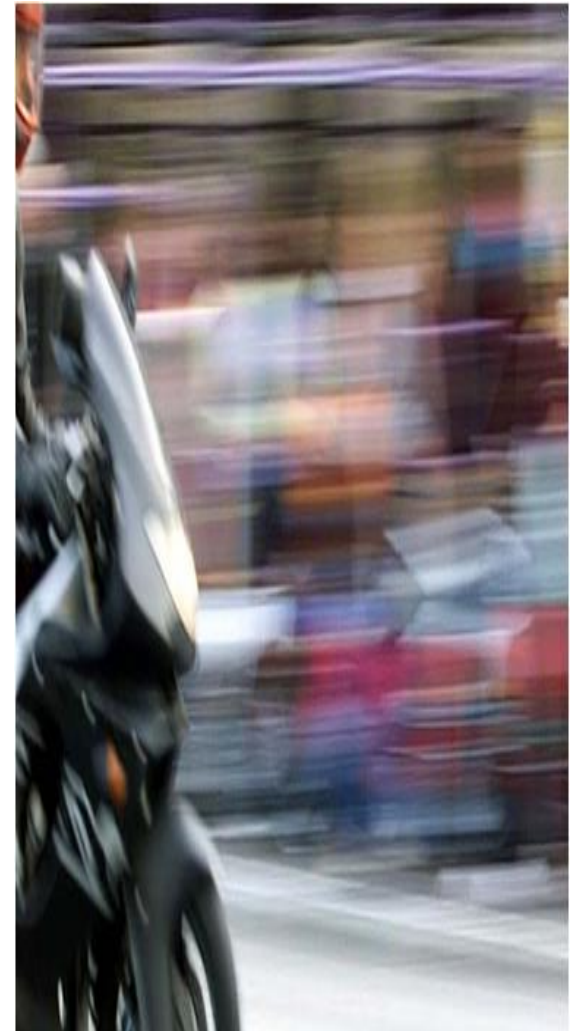
Powered Two-Wheeler Fleet and Usage

- Riders use PTWs both for **commuting** and for **recreational** riding.
- There is effort towards **regional harmonisation** (e.g. in Europe) of the licensing systems for PTWs, still there is diversity within federal environments among their jurisdictions, in particular on the minimum age to ride a PTW.
- PTWs are becoming an important component of the transport system and in some cities represent **up to 30%** of the motor vehicle fleet.
- Only a few countries have a **national transport strategy** for PTWs; though several measures have been taken at local level.



Powered Two-Wheeler Crash Characteristics

- PTWs are clearly **overrepresented** in road traffic casualties.
- PTW trends are **not following** the overall **decrease** in fatalities in the OECD countries; this may be explained by the large increase in PTW numbers and respective mobility
- In Europe, the number of motorcyclists killed in the 40-60 year age group has **doubled** in 10 years.
- A significant proportion of crashes **are single vehicles crashes** occurring on **rural** roads.
- Almost one third of all PTW fatalities occur at **junctions**.



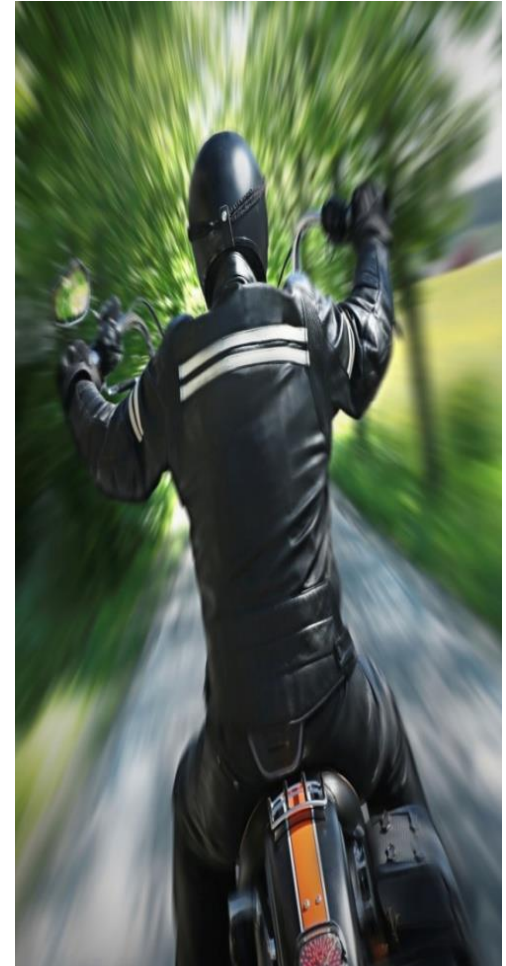
Factors Contributing to Powered Two-Wheeler Crashes and their Severity

- Driver and rider-related behaviour factors are considered **more prevalent** in PTW crashes compared to vehicle and road environment factors.
- **Speeding** and **consumption of alcohol and/or drugs** are critical in the occurrence and severity of crashes.
- A large number of crashes involve problems of **perception** or **appraisal** by the other vehicle operator and of PTW conspicuity.
- **Road environment factors** have an important influence on crash severity (e.g. roadside obstacles and barriers, speed reduction installations) rather than on crash occurrence.



Countermeasures Addressing Road User Behaviour

- To improve the safety of motorcyclists, it is possible to influence both riders' and other drivers' behaviours through **education, training and licensing; enforcement and communication**.
- Access to PTWs should be **gradual**, with a licensing system aiming at managing novice rider risks while riders are gaining experience and maturity.
- **High-visibility** enforcement accompanied by communication and publicity measures has proven to have a strong deterrent effect.
- The success of an enforcement and communication strategy depends on the **involvement** of **motorcyclists themselves**.



Countermeasures Promoting the Use of Personal Protective Equipment

- The use of helmets with **adequate safety standards** should be promoted and regulated.
- The effectiveness of **high visibility clothing** in reducing conspicuity related crashes, depends on time and location.
- **Airbag jackets** appear as a promising technology to minimise injury.
- Introducing **mandatory requirements** imposes a cost on riders, and may cause significant community opposition. Still any increase in the use of protective clothing through promotion to increase rider awareness has the potential to provide significant benefits.

Motorcyclist's Clothing

Without safety gear With safety gear



Countermeasures Targeting Vehicles

- Periodic **inspection** of PTWs has the potential to reduce the incidence of safety-related defects of the tyres, the brakes and the lights.
- **ITS** developed for motorcycle offer opportunities to improve the safety of the rider as well.
- There is a number of **obstacles** specific to PTW that need to be carefully addressed, including the challenges posed by the Human Machine Interface requirements, costs, and the required support from the motorcyclists community.



Countermeasures Targeting Infrastructure and Traffic Management

- PTW are very sensitive to the **road and traffic environment**, including infrastructure design (e.g. alignment, curves, etc.), maintenance (holes, gravel, etc.) and interaction with other road users. Due to this sensitivity, defects in the road layout are likely to create more difficulties for PTW riders than for operators of other motorized vehicles.
- Road and traffic management have traditionally been designed for four-wheeled vehicles. In some cases, these are **not properly** adapted for PTWs.



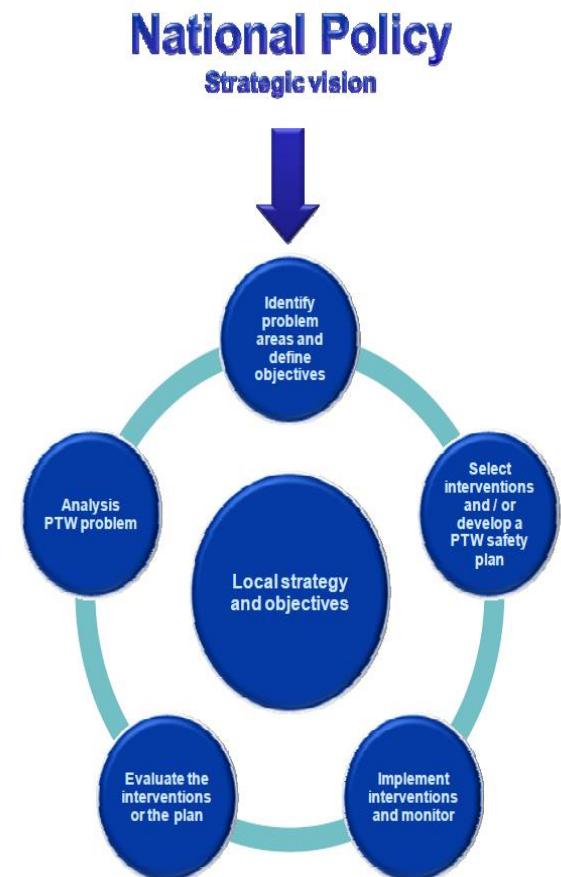
Specific Powered Two-Wheeler Issues in Low and Middle Income Countries

- PTWs often play a more **important role** in the transport system of low and middle income countries than in high income countries.
- The number one priority in all countries should focus on the **proper wearing of good quality** helmets by all PTW passengers.
- Rider and driver **education** and a **licensing system** to test the capacity of the riders are also priorities.



Developing and Implementing an Integrated Road Safety Strategy for PTWs

- Adopt a highly ambitious vision for road safety.
- Set interim targets to move systematically towards the vision
- Develop a Safe System approach, essential for achieving ambitious targets
- Exploit proven interventions for early gains
- Conduct sufficient data collection and analysis to understand crash risks and current performance
- Strengthen the road safety management system
- Accelerate knowledge transfer
- Invest in road safety
- Foster commitment at the highest levels of government



Key Message 1

***Powered two-wheeler (PTW)
numbers are growing and PTWs
play a significant role in mobility***

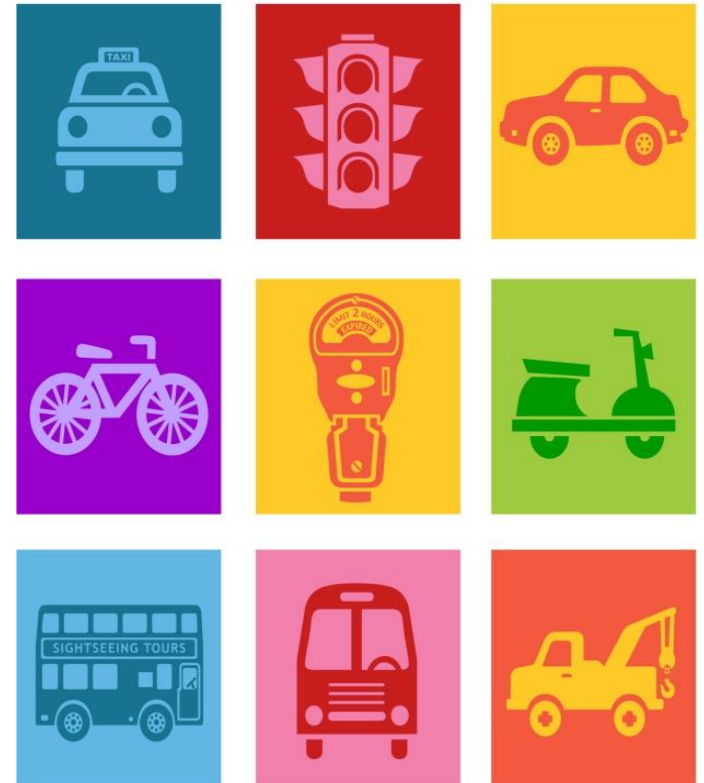
- PTWs play a significant role in **mobility** in many countries, particularly in many large cities.
- Some riders use PTWs as their primary form of transport, others for recreation. For many it is **the only affordable** or practical means of individual motorized mobility.



Key Message 2

It is essential to consider PTWs needs in transport policy.

- PTWs are becoming an important component of the transport system, which in many countries has given priority to four wheel vehicles.
- PTWs need to be properly **integrated into mobility plans.**



Key Message 3

PTW riders are at far more risk than car drivers

- PTW have not benefited at the same pace as car occupants from safety improvements over the recent decades.
- In OECD countries, PTW represent 17% of total fatalities on average, while they account for about 8% of the motorised vehicle fleet.
- PTW fatalities often comprise a much higher proportion of total fatalities in low- or middle-income countries.
- In addition to the human casualties, the economic costs associated with PTW crashes are significant.



Key Message 4

Failures of perception and control are frequently implicated in PTW crashes:

- The most frequent PTW fatal crashes are:
 - ***collisions at intersections***, commonly involving problems of perception and appraisal by both the driver and the rider, and
 - ***single-vehicle crashes***, due to PTWs being more sensitive to external perturbations (e.g. road surface or weather conditions).
- Speeding and consumption of alcohol and drugs are critical factors in the occurrence and severity of PTW crashes, as for other road users.



Key Message 5

A safe system approach is required to improve the safety of PTWs

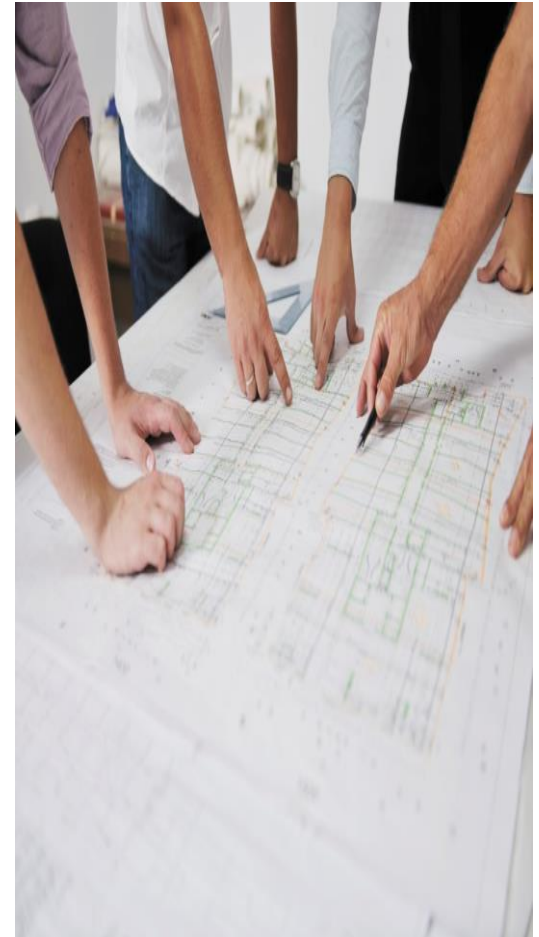
- Growing PTW traffic makes it imperative to adopt safety interventions **targeting** this mode of transport, while integrating it into a safe system approach.
- While a safe system approach concerns all countries, a tailored approach is also required when considering the **local specificities** with regard to powered two-wheeler safety.



Key Message 6

Improving PTW safety is a shared responsibility of all stakeholders

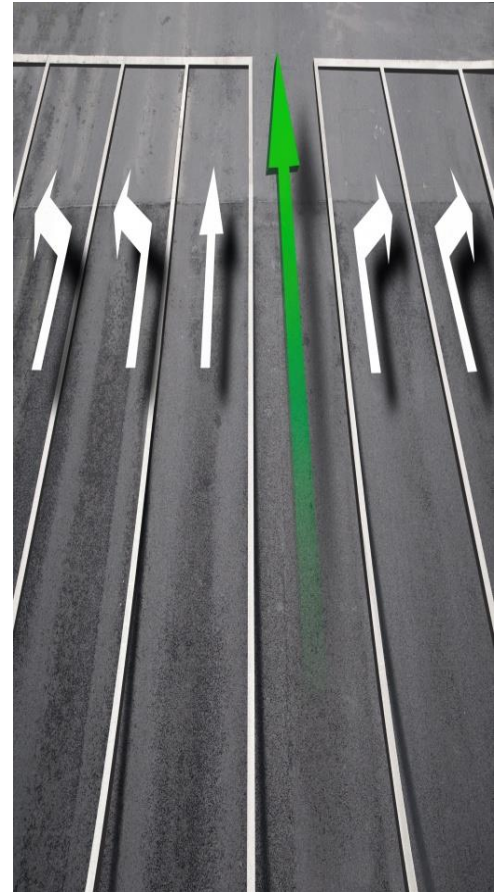
- All relevant stakeholders need to be actively involved in the process of **drawing up and implementing** a shared road safety strategy which includes safer behaviour of all road users, safer infrastructure and vehicles with enhanced safety features.
- PTW safety is not only the responsibility of governments, administrations, and manufacturers, but also PTW associations, insurance companies, the media, etc.



Key Message 7

A toolbox of measures is required to improve the safety of PTW riders

- These measures must take into account the **specific challenges** associated with PTW mobility and also consider the variety of PTW users, insofar as some segments may be addressed with particular measures.
- A strategic approach should consider the most **effective combination of measures** according to the specific needs of individual jurisdictions.



Key Message 8

Promoting appropriate behaviours of road users is a prerequisite

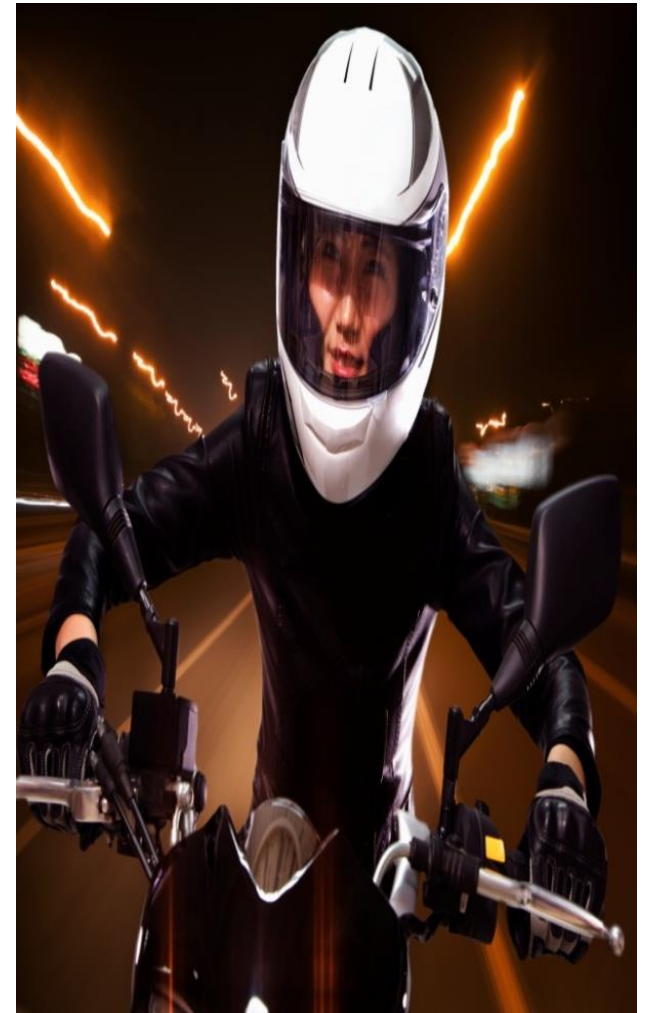
- **Licensing, training** and education are essential tools for improving riding safety.
- **Novice** riders of every kind of PTW should be trained. Training should be designed to promote safe behaviours.
- **Other road users** should be aware of the specific risks associated with the vulnerability and crash patterns of PTWs.
- **Enforcement** of traffic rules is an indispensable ally of other safety measures.
- Communication **campaigns** addressing required behaviour changes should be targeted at key groups of drivers and riders.



Key Message 9

Helmets provide the most important protection against severe injuries and death

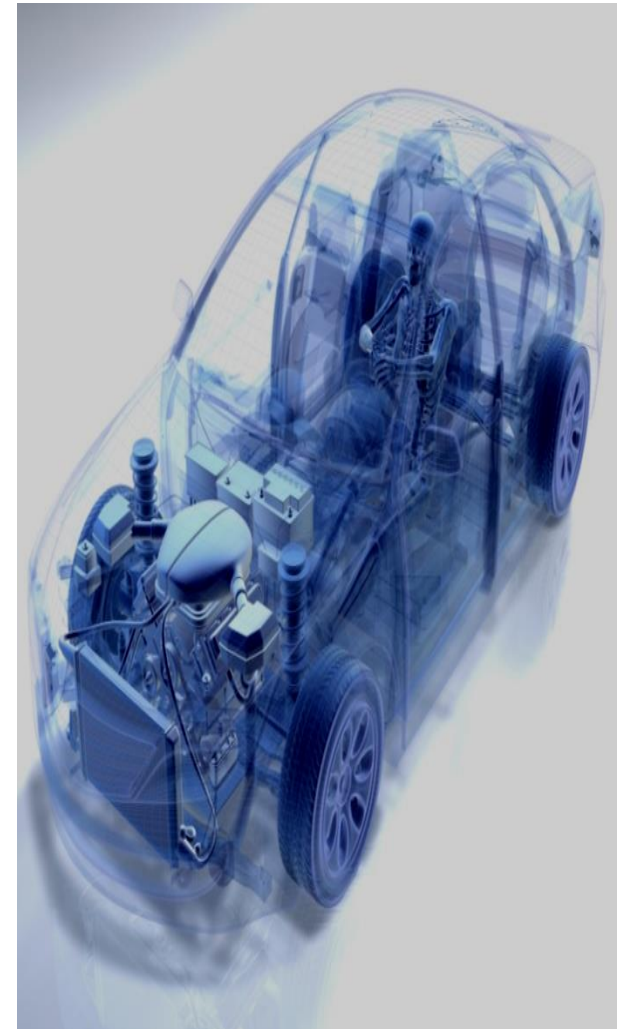
- All countries should have and enforce a **helmet law**.
- A **100% wearing rate** is the only acceptable objective.
- Wearing **protective clothing** with adequate safety standards – adapted to regional conditions - is essential to reduce the severity of injuries and should be promoted.



Key Message 10

Vehicles with enhanced safety features can save lives

- Car and motorcycle industries are continuously developing **safety devices** to both avoid crashes and mitigate their consequences.
- **Active safety** is crucial for the safety of motorcyclists. Enhanced safety features in PTWs should be adopted, notably with the general introduction of advanced braking systems.
- **Crash avoidance systems** on board other vehicles may also contribute to reducing collisions with PTWs.



Key Message 11

Self-explaining and forgiving roads contribute to lower crash risk

- Infrastructure should be improved with the development of **self-explaining roads**, traffic calming measures and PTW-friendly infrastructure.
- The consequences of crashes are particularly exacerbated for PTWs by the **aggressiveness of obstacles**. Infrastructure measures require an integrated impact assessment taking into account all roads users and local conditions.
- Engineers, road designers and providers, local authorities, road safety auditors should be trained to **consider PTWs** in the design, construction, maintenance and operation of roads, and be provided with the necessary risk assessment tools to make the right decisions.



Key Message 12

It is essential to extend our knowledge of PTW mobility and crash mechanisms

- Additional **research** is needed to better understand current challenges related to PTW mobility and safety.
- Operational research and development is needed to achieve a traffic system which better integrates and protects PTWs in a **cost efficient manner**.
- Appropriate **data and analyses** are prerequisites for evidence based PTW policies



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