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## Economic Commission for Europe

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Working Party on Road Traffic Safety

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**Consolidated Resolution on Road Traffic (R.E.1):**

**Amendment proposals on policies for Powered Two Wheelers (PTW)**

### **Policies for Powered Two Wheelers for South-East Asian countries and other low and middle income countries**

**Submitted by Chair of WP.1 and the Institute of Road Traffic Education\***

#### *Summary*

1. This document offers policies for improving powered two wheelers (PTWs) safety in South-East Asian countries and other low and middle income countries where rapid motorization takes place.
2. The document is to serve as a basis for including good practices and recommendations on PTWs safety for South-East Asian countries and other low and middle income countries in the Consolidated Resolution on Road Traffic (R.E.1).

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\* This document was submitted late due to delayed inputs from other sources.

## **I. Introduction**

### **A. Background**

1. The use of powered two wheeled (PTW) vehicles is common, popular and growing worldwide. The growth in the use of these vehicles – motorcycles, scooters and mopeds - in both developing and developed countries has been caused by a number of factors. These include urbanization and the increased need for mobility and accessibility, alongside relative vehicle affordability and flexibility. Poor walking and cycling infrastructure, limited public transport services and the expense of cars are also contributing factors. In addition, as income rises, the purchase of a scooter or motorcycle becomes a viable first step towards personalized mobility. With growing modal share, PTWs are increasingly associated with fatal and serious injuries and present a major road safety concern with social, economic and personal implications. The vulnerability of the PTW user is affected by their interaction with fast-moving cars, buses and trucks, the relatively high speed at which they normally move compared to other vulnerable road users, and their lack of both visibility and physical protection.

2. To gain some perspective on the extent of the PTW road safety issue in South East Asia, the World Health Organization statistics report that the 11 nations of the region account for the highest proportion of worldwide road deaths at 30.4 per cent. Powered two wheelers account for 34 per cent of these deaths in South East Asia. In addition, it seems likely that the PTW crash rate is will continue to rise as infrastructure expands and traffic grows at rapid rates. There is a need therefore to address the safety of powered two-wheeled vehicles through legal instruments and good practice relevant to the local conditions.

3. This paper therefore recognizes that there may be many suggestions made for improving PTW safety on the roads. However, these suggestions can only become practical and applicable intervention strategies if they take account of the cultural and social contexts of the affected countries and are ‘tailored to the particular context of every country’. Equally important, background influences on safety are road quality, driver behaviour and safety culture in different countries.

4. Nevertheless, this policy document has been developed based on a review of practices in Southeast Asia and in consultation with representatives of key stakeholders. It is envisaged that the principles, concepts and options offered hereinafter may be transferred to countries with similar transport needs found elsewhere.

### **B. Policy transferability and replicability**

5. This policy document has been developed based on a review of practices in Southeast Asia and in consultation with representatives of key stakeholders. It should be viewed not only as a regulatory instrument but as a capacity building action of paramount importance not only for the Southeast Asia but for other regions of the world as well. It is imperative that all countries are committed and implement the policy principles outlined hereinafter. It is also vital that the countries engage in policy dialogues and facilitate discussions and other inclusive actions on PTW safety to create knowledge pertinent to PTW safety.

## II. Policy issues

### A. Road safety policy

6. A well-structured policy is necessary to clarify ownership and responsibility, and targets which are transparent, equitable and reflect accurately road user requirements. Such a policy should consider options, priorities and sustainability (economic, social and environmental). PTW policy should explicitly focus on road safety and recognize it as its primary aim. It should also be part of a holistic vision for road safety and should involve all stakeholders from both the public and private sectors. Policy for PTW should be defined at both Government and Public Sector Bodies level. Policy instruments should include legislation, regulation and taxation. PTW policy should include vision and mission of all the organizations concerned, objectives communicable to others and detailed standards. PTW safety policy should be sensitive to road user needs and reflect local conditions associated with the environment (security and noise) and societal needs (access and mobility), cultural and religious characteristics. PTW policy should be considered in terms of:

- Mobility;
- Economic growth and stability;
- Prosperity.

7. It should ensure healthy lives, make cities and human settlements inclusive, safe and sustainable and strengthen institutions and communities. PTW safety policy as part of a wider road safety policy should facilitate the establishment of appropriate institutional structures (e.g. National Road Safety Council, an executive Road Safety Agency, etc.). PTW policy should be based on the Safe System Approach (ECE/TRANS/WP.1/2014/6).

### B. Legal and regulatory considerations

8. A comprehensive policy for PTW safety should consider:

- (a) Infrastructure Considerations;
- (b) Road Users:
  - (i) Rider Training;
  - (ii) Licences (Full driving, provisional/probationary) and permits;
  - (iii) Insurance;
  - (iv) Safety apparel;
  - (v) Helmet use regulations.
- (c) Public Health Approach to PTWs' Safety;
- (d) Post-Crash Management; and
- (e) Vehicle Standards.

9. PTW policy should raise awareness of PTWs as a legitimate transport mode. It should recognise the benefits of PTW use in South and Southeast Asian countries and link them with region's specific growth needs and transport issues. The role PTW can play in both urban and rural transport should be also recognised together with their vulnerability and their specific safety needs.

### C. Policy and Funding

10. PTW safety policy should explicitly recognize that human life is priceless and be associated with a code of ethics.

11. Like any other road safety policy, PTW policy should be linked to the public health policy. To be implemented, sustained and secure funding from the public and private sectors should be attained. Innovative funding mechanisms may have a role to play within this context, for example, 2nd generation road safety funds, social impact bonds (SIB), as well as mechanisms such as taxation and hypothecation. Collaborations should be encouraged between the public organizations, the private sector, the industry, the road users and the wider society. Appropriate financial and economic models should be identified to support the development of new funding mechanisms. These models should capture satisfactorily the needs of the road users and the entire society.

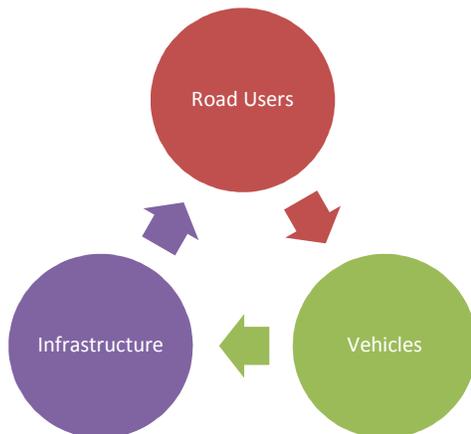
### D. Policy dissemination

12. Policy related documents should be made available to the public domain through official dissemination means of governments. Government and other officials working in this field should be made aware of the policy documents.

## III. Key themes

13. PTW safety like any other road safety topic should be considered in terms of its three main components:

- (a) road users;
- (b) infrastructure; and
- (c) vehicles.



14. These may be further elaborated as follows.

## **A. Behavioural issues**

15. Influencing behaviour is key to public policy. Behavioural aspects of PTW safety should be seen from two perspectives: the rider's and the other road users'. Often the focus is on rider behaviour, although other road users' behaviour is also directly relevant to safety outcomes for PTWs. It is important that PTW policy should address the need that all road users should develop holistic skills and knowledge that influence their behaviour in the road environment. It is particularly necessary to ensure that riders are made aware of their vulnerability as PTW users and the need to act and respond to threatening stimuli effectively and efficiently to maintain and promote their (and other users') safety.

### **1. Rider**

16. Rider error is found to be the major cause of PTW crashes. Individual PTW rider behaviour is influenced by the behaviour of other riders which can lead to risky habits becoming common, cultural practice within a country or a particular city. It is therefore necessary to address problems such as bus lane intrusion, conglomeration of two wheelers ahead of the junction stop line, overloading of the vehicle with goods or passengers and indulgence in distracting activities such as mobile phone usage while riding through road safety campaigns, consistent enforcement, and other measures. Evidence shows that improving the conspicuity of PTW drivers contributes to the improvement of their safety but it is attitudes to safety apparel and use of headlights that should be the focus of interventions that promote PTW visibility. However, due regard should be given to the need to work around the issues arising from certain approaches being financially difficult to introduce such as ABS systems to PTW and safety apparel for riders such as jackets and helmets.

### **2. Professional services**

17. Professional services (e.g. taxi services, carriers who deliver goods) using two wheeled vehicles should be regulated or licenced, and the drivers' skills and character should be of good standing.

### **3. Other road users**

18. Legal instruments should encourage behaviour change among other road users towards PTWs, albeit recognizing that such change will be difficult. They should also recognize that other users, such as pedestrians and cyclists, can arguably be more vulnerable in an encounter with a PTW. General road safety awareness mixed with a sensitivity to one's own mortality would help these users to adopt self-protective behaviours in challenging road environments. However, it is important that there is overt realism with regard to any suggested countermeasures. There may be cultural, social, religious and other influencers of behaviour that may require further training with regard to modifying behaviour towards PTWs. It is difficult to encourage behavioural change on a large scale. Smaller actions and interventions to influence some change may be a solution as evidenced by the work of the UK's Behavioural Insights Team ([www.behaviouralinsights.co.uk](http://www.behaviouralinsights.co.uk)).

19. Drivers of larger motorised vehicles should be regularly targeted by safety information campaigns which highlight (a) the recognised inconspicuity of PTWs, particularly at junctions, (b) lane discipline, and (c) the important role PTW users play to the economic and social development at community and country level.

## **C. Infrastructure**

20. Road infrastructure is at the core of PTW safety. Policy-makers should ensure that infrastructure is well-maintained, receives the necessary investment and is PTW friendly. Powered two wheelers are relatively unstable vehicles and also vulnerable to crashes due to driver error and infrastructure insufficiencies. This two-fold source of risk implies that roads should be designed to take account of PTW needs and also that infrastructure-related safety features should be considered to lower the risks to PTW users through maintenance and improvement programmes. It is important that infrastructure considerations for PTW safety should aim at identifying the causes of accidents and options to address them based on robust engineering principles and prioritized needs of road transport.

### **1. Road design**

21. Safe road design standards should be established for PTW based on predictable road geometry, appropriate visibility, wide and constant radii for curves, together with principles for obstacle free zones. Appropriate and secure parking areas for PTWs should also be part of infrastructure design. In addition, all new designs and maintenance activities should include road safety audits which give due regard to effects on PTWs.

22. To improve PTW safety, a number of road design options could be considered. Although safety barriers should be avoided, when used, they should be PTW friendly. Due attention should be given to a tendency for PTW crash incidence at T and Y junctions. Entry angles of roundabouts should be between 30o and 40o. Speed bumps should be avoided or have a predictable low impact. Motorcycle lanes should be designed with regard to the movement characteristics and speeds of PTWs.

### **2. Traffic engineering**

23. It is important that established traffic engineering principles and methods should be used to record and analyse the traffic conditions which are specific in SE Asia with the view to develop sustainable solutions. Working practices based on empirical knowledge of local conditions should be supported by analytical (i.e. theoretical) concepts and associated approaches. Any option to address the problems encountered should be based on robust evidence (data). Traffic characteristics (e.g. traffic flows, demand, composition) and predictions should be carefully scrutinised to minimise the associated risks.

### **3. Road Maintenance**

24. To ensure that roads can be made safer for PTW riders, it is important to treat the road surface condition which may be affected by potholes, thickly painted markings, dirt, clay, water, oil and other sources of risk to the rider. Road maintenance programmes and appropriate standards should address skid resistance, surface texture and choice of materials. Black spots management for PTWs should also be part of maintenance. Roads fitted with signage, roadside features and alignments aimed at drivers of larger vehicles which cause risk to PTW riders should be evaluated and remedied to become safer. Road defects contributing to uneven surfaces, together with faulty drainage and drains should be treated. Night-time retroreflectivity of road markings in rural areas is particularly important.

### **4. Road demand management and regulation**

25. The increasing number of PTW on roads should also be addressed through appropriate regulatory options as part of wider demand management strategies which aim to manage the demand for road transport by maximizing the utilisation of the existing infrastructure. Measures may include motorcycle exclusive lanes, advanced stop lines/zones, channelization using painted road markings, control of longitudinal and lateral

distances, speed management (through enforcement and information and use of appropriate speed limits (e.g. 30 km/h). Segregated lanes for PTWs may include grade separation at intersections and non-exclusive lanes with extra space provided on the outer side of the road. Road authorities should also consider using separate supplementary sign for PTWs.

## **D. Vehicle issues**

26. PTWs or any modifications should meet minimum safety standards, and this becomes increasingly important as they age. It is necessary to ensure that there are regulations in place aimed at maximising safety for riders and passengers. At the same time, there should be complementary legislative policies and practices introduced to promote adherence to regulations.

### **1. Safety standards and regulations**

27. Policy instruments and safety regulations should be employed to reflect local nuances. These standards and regulations should build on international best practice, consider local circumstances and then be tailored to best address social, economic, environmental and behavioural effects on PTW safety. Standards should be legally enforceable.

### **2. Improving PTW design**

28. There should be collaborative work between manufacturers, practitioners, policy-makers and the research community to enable PTW design to evolve to reflect the latest advances which help to design out safety risk. Innovative designs that address the mobility issues of South and Southeast Asian countries should be encouraged on the condition that they conform to safety standards. Such designs should cover the transportation of both people and goods.

## **E. Mitigations of PTW-related death and injury**

29. Powered two wheeler related death and injury can be linked to multi-faceted causes such as behaviour, design and perceived risk. However, central to the consideration of ways to prevent crashes and improve outcomes are the use of safety apparel and medical care post-crash.

### **1. Helmets and other safety apparel standards**

30. Protective gear for two wheeled vehicle riders (drivers and pillions) must cover helmets, as a minimum. Other protective gear should include gloves and boots together with jackets and trousers using appropriate materials available locally. Helmet standards should be compulsory.

31. The widespread differences worldwide in regulations, standards and other policy components should be reconciled through standardization and harmonization actions. These should also consider the local traditions and religious views. Subsequently it is important that individual nations develop plans to adopt the standards and regulations needed.

### **2. Medical care at crash site**

32. The importance of prompt and effective care for people injured in PTW crashes is paramount. Expeditious medical intervention and transfer to suitable care facility is central

to beginning recovery and lessening the likelihood that a seriously injured person will become a fatal victim.

### **3. Health care provision and follow up**

33. To obtain deeper insight into the patient's journey from crash to recovery, each trauma receiving centre should maintain a PTW dedicated register of details pertaining to injuries and outcomes. This register should be standardised across all such health care sites. In addition, information thus obtained should be transferred to a central database for interrogation to obtain patterns, features and further understanding of medical factors which may contribute to public health policy development.

## **F. Training considerations**

34. Sound road user training is fundamental to providing a basis for development of skills that promote safety for all. It is important to note that it is through practice that skills are developed and honed. Therefore, a sufficient period of training should be required prior to license testing.

35. It should be recognized that training and testing is just one element of a driver and rider licensing system and appropriate enforcement is needed to ensure that the standards are firmly applied.

36. The training and testing standards should cover the following

- The vehicles that can be driven;
- Who can drive them;
- When and where they can be driven;
- The processes to achieve all of the above.

37. Whilst it should be acknowledged that different approaches may be followed, good practice suggests a training and testing system should include the following key components:

- Realistic grouping of vehicles;
- Administrative arrangements for the system (validity, renewal, retesting, staging, etc.);
- Minimum age for entitlement;
- A competence framework covering the attitudes, knowledge, skills and understanding that a safe and responsible driver and rider needs;
- Based on the competence framework a set of standards for:
  - the characteristics of a safe and responsible driver and rider;
  - the content of training;
  - the trainers who deliver it.
- Operating procedures and standards covering the content, location and duration of driving tests and for the recruitment, training, qualification, supervision, monitoring and development of driving examiners;
- What happens after the test - penalties, post-test or remedial development, restrictions.

38. The driving/riding test should, as a minimum, contain:
- A theory test based on the Highway Code and educational materials using a large validated item bank that is not in the public domain;
  - An off-road test of control and safety for motorcycle riders that should include safety checks, emergency braking, braking accurately under control, negotiating bends, figure of eight, slalom, etc.;
  - An on-road test incorporating a realistic range of road and traffic conditions and lasting a minimum of 25 minutes. The content should be specified.
39. Resource materials should be developed to include:
- A Traffic or Highway Code for all road user groups (covering the regulations and best practice for using the roads);
  - Educational (books, DVDs, Apps, on-line content) to support those learning to drive and to act as reference material for qualified licence holders;
  - Sample theory test questions (but not the live questions and not the answers).
40. In countries where standards do not exist, research should ideally be undertaken to develop an evidence based set of standards (competences) covering:
- The attitudes, knowledge, skills and understanding that a safe and responsible driver/rider needs;
  - Training delivery;
  - The trainers;
  - The examiners;
  - The driving/riding test.
41. Consideration should be given to introducing hazard perception training and testing
42. Learner motorcycle riders should have to wear suitable protective clothing (in addition to a helmet), a high visibility vest, display a sign on the machine to indicate that they are learners and be accompanied by a qualified motorcycle trainer who is in radio contact at all times. No more than 2 trainees should be allowed with the same trainer.
43. In addition, the industry and the insurance companies should offer support and incentives for rider training. In addition, as the quality of instruction is central to the training's effectiveness, instructor competence should be regulated as part of training provision.

## **1. Rider**

44. In the context of PTWs, pre-license training should include technical riding skills such as manoeuvres and appropriate actions in response to varied traffic situations, as well as the importance of using protective clothing and equipment. At the same time, training should also include emphasis on attitudes to safety, defensive riding and hazard perception.
45. There should also be additional training made readily available post-licensing focused on unravelling any actions that have become habits which could be detrimental to safety and updating risk awareness and defensive riding.

## **2. Other road users**

46. All other road users are responsible for their own and other users' safety. During their pre-license training, non-PTW users should be made aware of the vulnerability of

PTW users, develop understanding of where and when crashes with PTWs are most likely to occur and acquire robust risk awareness and hazard perception skills.

## **G. Data management**

47. Data and their management is at the core of needs-based decision-making. Therefore, governments and public organizations dealing with PTW safety data should define and consistently use data relevant to their core responsibilities and needs. Data should enable decision making for at least two functions: (a) strategic planning and (b) implementation, operations and evaluation.

48. Data for PTW should be collected for (a) accident investigation and (b) injury causation. Ideally, these two data sets should be fully integrated. This is challenging and therefore as a minimum, governments and public organizations dealing with PTW safety should aim at standardizing and harmonizing data sharing and exchanging.

49. Data and their management should be sustainable. The choice of data should be based on their (a) relevance to the core responsibilities, needs and priorities of the organization concerned, (b) appropriateness to current needs and resources, (c) reliability, and (d) affordability.

50. Data analysis should lead to performance indicators for PTWs which will quantify, monitor and evaluate the associated road safety policies and plans.

### **1. Standardization of crash data**

51. Crash data should enable an understanding of where incidents are taking place, the nature of these occurrences and the circumstances that surround them. Through such data, patterns, causation, black spots, extenuating factors and other important issues around a crash may be gathered and analysis performed to understand and work towards prevention of a similar occurrence. Reliable and robust data collection for each crash should offer a clear and true picture of the distribution and details of crash incidence on a country's road network. Data should be gathered with consistency and reliability, and database interrogation should be carried out by trained staff who understand the shades of meaning within the multiple aspects of the crash records.

### **2. Crash databases**

52. It is important that individual crash records are comparable to others within a database. This should be achieved through joint institutional working (police, public health, local and national authorities and researchers) to agree the nature and contents of data-gathering instruments that will be used at every crash where there is a fatal, serious or minor injury to at least one person involved. Legislation should be put in place to make completion of such forms mandatory within a time-bound period (say, 24 hours) of the crash. A mechanism for checking the accuracy of the data within each form should be put in place as another mandatory aspect of the data collection process.

53. With standardization of data collected, there is a need for reliable systems to store and enable interrogation of the information obtained. GIS-based crash databases should be established which enable analysis to take place at several layers of understanding, for example, at a particular geographic location, across a designated section of road network, across a predetermined junction type in a set area. This data should also be searchable via queries which draw together crashes with particular characteristics and those that appear to be outliers among others that share common features. The wealth of analysis available through such databases should not be under-estimated as a key to the development of road safety solutions.

## **IV. Sustainable PTW safety**

54. The concept of sustainable PTW safety should be systematically addressed in policy documents, in terms of:

- economic and financial sustainability
- environmental sustainability
- social sustainability

55. The economic and financial sustainability should concern improved effectiveness and efficiency through a holistic decision-making environment and engagement of stakeholders, the industry and the road users in the strategic planning for PTWs' road safety. The environmental sustainability should address the health threatening aspects of PTW safety, its impact in terms of costs and benefits, the use of local knowledge and technology, and the impact of climate on road safety. Social sustainability should be linked to gender biases against the inclusion of the needs of women in road policy and planning, support of cost-effective methods in the implementation of road safety policies for PTWs, and community participation in decision-making.

### **A. Cost-Benefit Analysis**

56. Any option to improve PTW safety should be based on evidence of its efficiency in terms of maximising its benefit to cost ratio. Appropriate transport economic methods such as Cost-Benefit Analysis and Economic Impact Analysis should be used as appropriate together with economic and financial data of good quality.

### **B. Research and Development**

57. To be sustainable, the implementation of PTW policy should be based on local knowledge and expertise developed through appropriate research and development programmes. Research organisations, Universities and the industry should establish collaborative schemes and build international links within and outside the South and Southeast Asian region to develop country-tailored methodologies, designs and materials conforming with and expanding on the international standards. Governments should support such programmes financially and in kind.

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