Study on the need for harmonised rules to support the rise of micro mobility and increased road safety for personal mobility devices

ETSC – 13 May 2025

Giuseppe Marotta - GROW I2

Objectives of the study

The study sought to address the following overarching objectives:

- Develop a classification of existing PMDs with a view to determining groups of devices and common criteria based on design elements
- Undertake a detailed analysis of the market share and rise of the various PMDs to determine those that would most benefit from EU-wide rules
- Undertake an analysis of available data and information on crashes involving PMDs
- Assess the impact on market development of the fragmented pieces of legislation in terms of both technical and road traffic rules across the EU
- Develop regulatory options for common technical safety design requirements on the basis of the obtained classification and interlinks with existing pieces of EU legislation

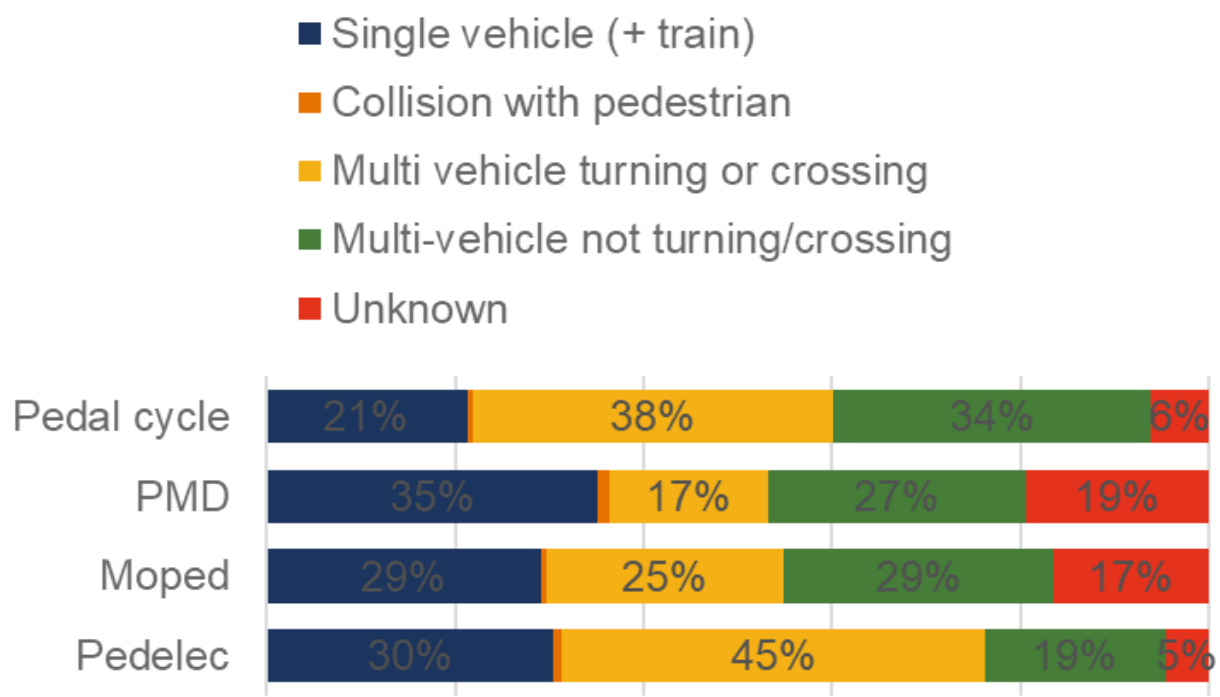
All PMDs currently excluded from European type approval framework (Reg. 168/2013)

L1e-B

Crashes involving PMDs

- Road environment:
  - EPAC (Pedelec) fatalities
    - 50% were in urban environments
    - 27% at junctions
  - PMD (excluding EPAC) fatalities
    - 73% were in urban environments
    - 29% at junctions

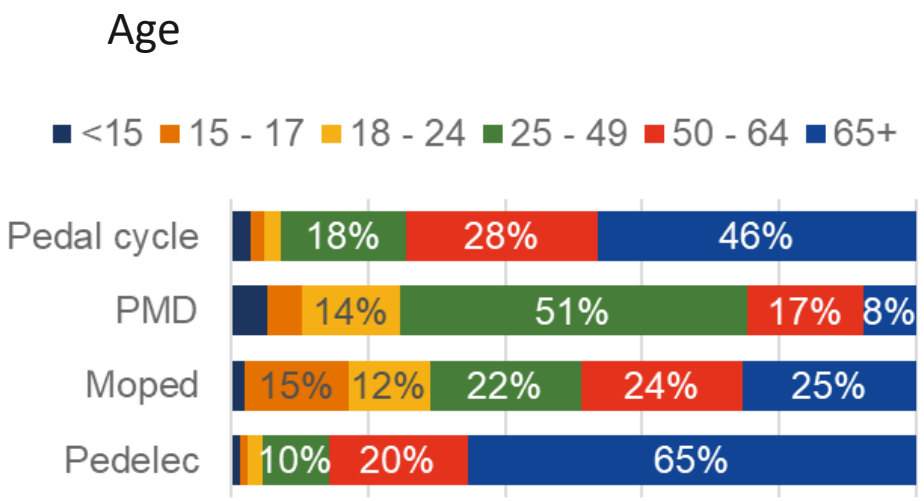
Collision types



European Commission

Crashes involving PMDs

- Time of day:
  - EPAC (Pedelec) fatalities most common between 10am and 6pm (67%)
  - PMD (excluding EPAC) fatalities were less common during the day (22%) and more common before 10am (44%) and after 6pm (34%)



European Commission

PMD market survey (non-exhaustive)

PMD Type	Count
Standing e-scooter	141
E-moped (not type-approved)	59
EPAC	91
Speed pedelec (not type-approved)	7
Cycles designed to pedal in L1e-B	10
E-Carrier cycles	20
Self-balancing personal transporter	3
Hoverboard	22
E-Skateboard	34
One-wheel	10
E-Unicycle	25
E-skates	11
Total	**433**

PMD Maximum Speed

PMD Type	Lowest Maximum Speed (km/h)	Median Maximum Speed (km/h)	Highest Maximum Speed (km/h)
Standing e-scooter	11	25	**170**
E-moped (not type-approved)	13	40	89
EPAC	25	25	25
Speed pedelec (not type-approved)	25	59	88
Cycles designed to pedal in L1e-B	45	45	45
E-Carrier cycles	25	25	45
Self-balancing personal transporter	20	20	20
Hoverboard	10	12.5	16
E-Skateboard	16	45	64
One-wheel	20	29.5	40
E-Unicycle	10	60	**125**
E-skates	10	25	32

PMD maximum laden mass (machine + maximum rider mass)

PMD Type	Lowest Maximum Laden Mass (kg)	Median Maximum Laden Mass (kg)	Highest Maximum Laden Mass (kg)
Standing e-scooter	54	139	226
E-moped (not type-approved)	104	156.5	242
EPAC	123	143	185
Speed pedelec (not type-approved)	151	171	196
Cycles designed to pedal in L1e-B	148	148	177
E-Carrier cycle	150	197	238
Self-balancing personal transporter	NA	NA	NA
Hoverboard	80	131	134
E-Skateboard	70	160	**264**
One-wheel	111	135	142
E-Unicycle	70	159.5	180
E-skates	102	102	122

What can be done to make riding safer?

- Behavioural rules (prevent dangerous behaviours e.g. speeding, or riding while inebriated)
- Technical rules (improve the controllability and stability of PMDs)

Supporting business through harmonisation

- A lack of harmonised technical rules means that businesses that trade in more than one EU member state may incur additional costs.

- Additional costs include:

  - Parallel approval processes
  - Different versions of the same product to be designed to comply with different national requirements
  - Need to engage with multiple national authorities
  - Inventory costs of storing different stocks of products in different national markets

Examples of problems arising from the current lack of harmonisation

- Ireland – mass limit for e-scooters 25kg
- Spain – mass limit for e-scooters 50kg
- Germany and the Netherlands – mass limit for scooters 55kg
- From our survey – 39 e-scooters legal in Germany, the Netherlands and Spain, but not Ireland
- 3 more legal in Germany and the Netherlands but not Spain or Ireland
- Spain and the Netherlands maximum speed – 25km/h
- Ireland and Germany maximum speed – 20km/h
- Segway Ninebot sell a German version of the F2 Pro E with a max speed of 20km/h
- In Spain they sell the same machine with a max speed of 25km/h
- The same machine is available in the Netherlands and Ireland, but isn't legal to use (according to the company's website)

Regulatory options considered

- Option 1 – Do nothing
- Option 2 – Increase the scope of Regulation (EU) No 168/2013 (Light vehicle type-approval regulation)
- Option 3 – Develop bespoke approval schemes for different types of PMD
- Option 4 – Develop a universal approval scheme for all PMDs

Preferred option

Conformity assessment

System	Requirements	Conformity procedure	Rationale
Maximum permitted mass	Maximum 250 kg	Declaration by manufacturer	Controlling the risk associated with heavier machines
Payload	Minimum and maximum declared	Declaration by manufacturer	Ensuring payload is considered when machines are designed
Structural integrity	Aligned to EN 15194 where relevant	Testing conducted by manufacturer or third party	Ensuring machines do not fail prematurely or in a dangerous manner In our view the structural integrity requirements of EN 17128 are insufficient to ensure safety
Battery safety	Aligned to EN 50604	Testing conducted by third party	Reducing the risk of fire, both in use and while charging
Stability and controllability	Aligned to eKFV	Testing conducted by manufacturer or third party	Reducing the risk of collisions due to loss of control/instability
Speed regulation	Maximum 25 km/h	Testing conducted by manufacturer or third party	Controlling the risk associated with faster machines
Maximum acceleration	Maximum 2m/s^2 demonstrated at minimum declared payload	Testing conducted by manufacturer or third party	Ensuring controllability
Braking	Minimum deceleration 3.5m/s^2 At least two completely independent systems capable of bringing the machine to a stop from maximum speed	Testing conducted by manufacturer or third party	Ensuring that machines can be stopped effectively. Ensuring redundancy so that a single failure does not become safety critical
Lighting	Aligned to EN 17128	Testing conducted by manufacturer	Ensuring visibility of the PMD to other road users
Audible warning devices	Aligned to EN 17128	Testing conducted by manufacturer	Ensuring that vulnerable road users can be alerted to the presence of a PMD
Anti-tampering	Aligned to EN 15194	Testing conducted by manufacturer or third party	Ensuring that users cannot modify machines in a manner that invalidates the assumptions made in technical and user regulations
Electromagnetic compatibility	Aligned to EN 15194	Testing conducted by manufacturer or third party	Ensuring that electrical interference does not impair the controllability of the machine
Moisture ingress	Aligned to EN 15194	Testing conducted by manufacturer or third party	Ensuring that moisture does not impair the controllability of the machine or cause dangerous electrical faults
Maximum permitted mass	Maximum 250 kg	Declaration by manufacturer	Controlling the risk associated with heavier machines

Thank you!