Hellenic Research and Educational Institute
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& Reduction of Traffic Accidents "Panos Mylonas"

Micromobility and Personal Mobility Vehicles

Road Safety Risks and Challenges

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Micromobility

- The term **micromobility** is used to define transportation with lightweight vehicles operating at low speeds and usually electric powered.
- Micro-vehicles used in micromobility are usually called **Personal Mobility Devices** (PMDs).
- Although PMDs can have many different types the most popular are the **e-scooters** or electric standing scooters.
- A suggested classification of PMDs is according to their maximum speed and/or their weight.

Type A	Type B	Type C	Type D
unpowered or powered up to 25 km/h (16 mph)		powered with top speed between 25-45 km/h (16-28 mph)	
<35 kg (77 lb)	35 – 350 kg (77 – 770 lb)	<35 kg (77 lb)	35 – 350 kg (77 – 770 lb)

(Source: OECD/ITF, 2020)

TYPES OF POWERED MICROMOBILITY VEHICLES[1]

	Powered Bicycle	Powered Standing Scooter	Powered Seated Scooter	Powered Self-Balancing Board	Powered Non-Self-Balancing Board	Powered Skates
Center column	Y	Y	Y	Possible	N	N
Seat	Y	N	Y	N	N	N
Operable pedals	Y	N	N	N	N	N
Floorboard / foot pegs	Possible	Y	Y	Y	Y	Y
Self-balancing[2]	N	N	N	Y	N	Possible

(Source: SAE J3194)

Micromobility - Advantages

Micromobility popularity is still increasing in post COVID-19 era especially in big cities.

The reasons:

- Low cost
- Ease to use – flexible
- Personal mobility – ideal for short distances
- Easy parking

Potential benefits:

- CO2 emissions reduction
- Modal shift
- Reduced traffic density

Micromobility - Concerns

- "The paradox of the green vehicle": E-scooters were introduced to reduce traffic density, but several studies show that they lead to an increase in the number of injuries (*Siman-Tov et al. 2013*).
- Another vulnerable user in an already congested system.
- A potential risk for pedestrians in the event of a collision.
- E-scooter rides may replace walking and cycling trips.
- Short lifespan of shared/rented e-scooters.

- Micromobility has been allowed to develop and grow without regulations for too long. This encouraged the development of a lawless sector – the 'Wild West' of transport .

Experience to-date 1/3

Road safety

- Although in most countries limited data for traffic accidents with e-scooters is available, there is concern that their use leads to an increase in road deaths.

- Head injuries are by far the most common in e-scooter crashes followed by injuries to the upper limbs. Other road users have been injured in road crashes with e-scooters and these are most often pedestrians and cyclists (*source: ERSO –ETSC*).

- E-scooter crashes are often unilateral, where only one road user is involved. Over 80% of e-scooter rider fatalities, resulted from crashes involving a heavier motor vehicle (*source: OECD/ITF*).

Experience to-date 2/3

Behavior

- Complaints from other road users that e-scooter riders break traffic rules, ride too fast and park inappropriately.
- Even though e-scooters are designed for one person some users carry passenger.

Legislation

- Safety standards for micromobility are not unified.
- Differences in legislation and traffic rules throughout Europe.
- Fragmented Legal Framework.

Experience to-date 3/3

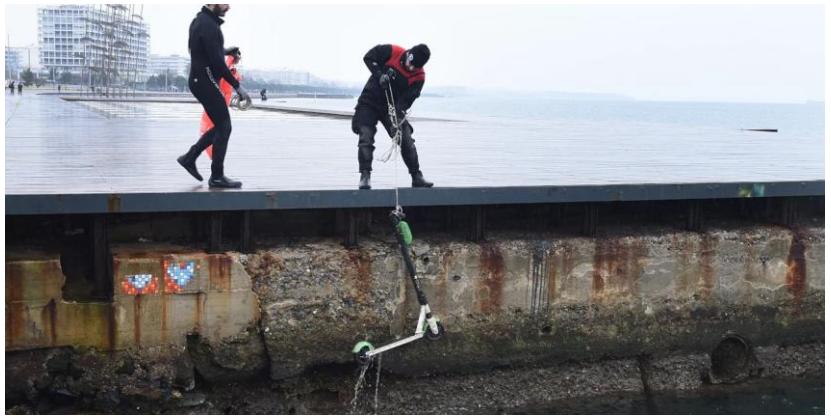
Interaction with other road users

- E-scooters are small and light vehicles that can move and maneuver quickly. For this reason sometimes are not visible to the other road users.
- The maximum speed of 25 km/h is high when the e-scooters are moving in pedestrian areas and low when moving between cars.
- E-scooters are not equipped with rear view mirrors to provide to their driver better visibility.
- E-scooter riders have to keep both hands on the wheel in order not to fall, which prevents them from sticking out their arm in order to show which direction they want to go.
- In the event of a collision between an e-scooter and a pedestrian, the pedestrian is likely to be more seriously injured than an e-scooter rider.

Rider Behavior

E-scooter travelling at 100 km/h in Thessaloniki ring road (*source: www.protothema.gr*).

Greek youtuber travelled from Thessaloniki to Athens with an e-scooter (*source: www.in.gr*).



Divers recovered 59 e-scooters from the bottom of the sea in Thessaloniki (*source: iefimerida.gr*).

Facts

- In Germany there are 120,000 e-scooters to hire, the highest amount in Europe.
- Registration and insurance are mandatory in Germany. E-scooters must be type approved.
- Over 900,000 private e-scooters were sold in France in 2021 while its overall number it is estimated at 2.5 million.
- In Greece it is estimated that there are 60,000 private e-scooters.
- In most countries the exact number of e-scooters cannot be determined as there is no obligation for registration.
- A new category of vehicles was created in French traffic code, called "cyclomobiles légers" - light mopeds. The category includes electric scooters and self-balancing vehicles with saddles and electric bicycles without pedals (*Décret n° 2022-31 du 14 janvier 2022*).

Road Safety Data 1/2

France

- 24 people died following a scooter collision in 2021 and 11,256 others were injured.
- In 2022, by the end of August, there had been 19 deaths involving e-scooters.
- In 9 out of 10 cases, e-scooter users were not wearing a helmet (source: *Académie nationale de méde*

Germany

- 5535 collisions resulting in personal injuries in 2021, involving e-scooters. 4.882 riders were injured and 5 died.
- 7583 people were injured in collisions involving e-scooters from January – October 2022 (provisional data), 6216 being the riders. 11 people died, 9 of them were e-scooter users (source: *Destatis*).

Greece

- 3 people died in collisions involving e-scooters from 2019 – 2022.

Road Safety Data 2/2

UK

- 1,352 collisions involving e-scooters in 2021, compared to 460 in 2020.
- 1,434 casualties in collisions involving e-scooters in 2021, compared to 484 in 2020.
- 10 killed in collisions involving e-scooters in 2021 (all of whom were e-scooter riders) compared to 1 in 2020 (source: *Department for Transport*).

Ireland

- The police reported in 2022 that there were 1,373 traffic incidents involving e-scooters, including 440 collisions, in the last 2½ years.
- Some 269 e-scooters have been seized by the police in the same period (*source: The Irish Times*).

Policy and Proposed Measures 1/2

Proposed measures to be considered by National Governments and Regional Authorities:

The measures for micromobility should follow the Safe System Approach

Infrastructure:

- Safer infrastructure that can accommodate e-scooters
- Redistribute space by creating a safe connected network for micromobility
- Dedicated parking zones
- More 30 km/h zones in the cities
- Do not allow the use of PMDs on the sidewalks

Policy and Proposed Measures 2/2

Vehicle:

- Restrictions on maximum power
- Improve design (larger wheels, frame geometry)
- Anti-tampering measures
- Mandatory safety equipment (lights, direction indicators, dual braking system, ring bell, mirrors, ADAS)
- A new vehicle category should be considered to include PMDs with maximum speed of 25 km/h. Type approval should be considered also.

Driver:

- Mandatory helmet and safety equipment
- Enforcement of the legal blood alcohol content, speeding and positioning on the road
- Training and education

Conclusion

Regulations should have consistency across EU

*We could **not** allow the green agenda to undermine safety agenda.*
These two strategies for the future need to be aligned.
Sustainability and Safety should be hand in hand!

Thank you !

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