CHALMERS

Traffic safety research on micromobility

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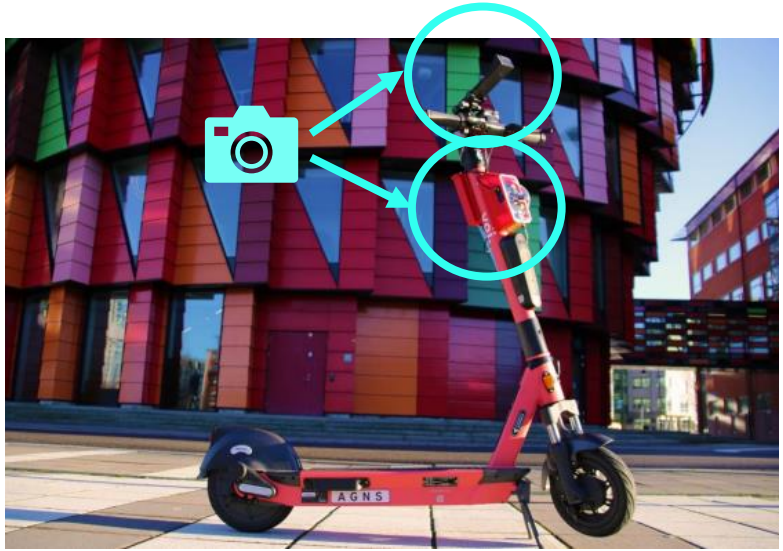
SCANIA VOLVO

TRAFIKVERKET

Outline

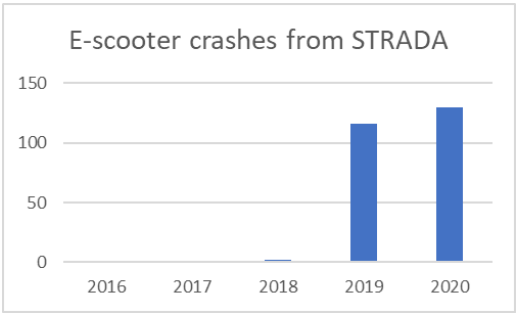
- Micromobility vehicles
- Micromobility trends
- Micromobility data
- Some results



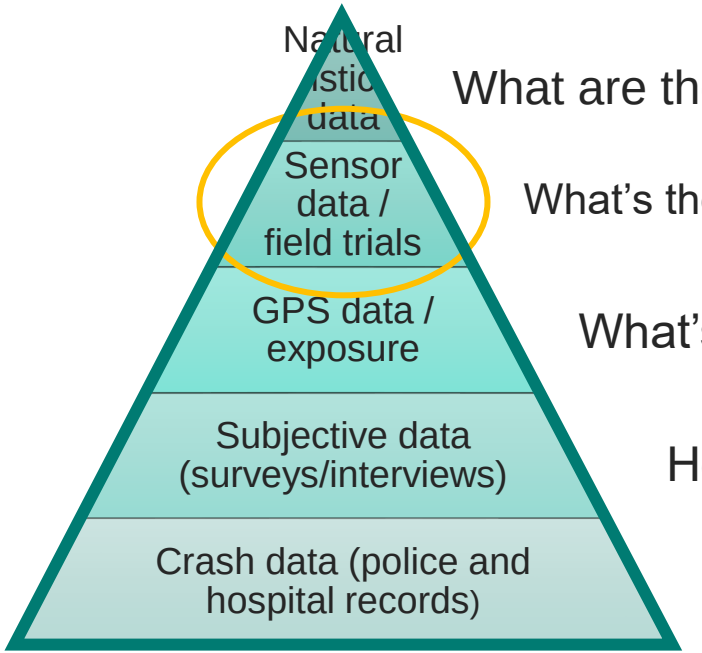
Micro-mobility vehicles

Micromobility trends & traffic safety

- Micromobility is increasing (at least in the West/Americas)
- E-bikes are still popular
- E-scooters are booming (especially in sharing systems)
- New e-vehicles are coming around and none has been as successful as e-scooters *yet*
- Micromobility crashes are increasing especially for e-scooters
- Exposure alone may not explain the increase
- Crash-risk for e-scooters is higher than for bicycles
- Injuries look different across vehicles (specifically bicycles and e-scooters)



Micromobility data (for safety research)



What are the causes of the problem?

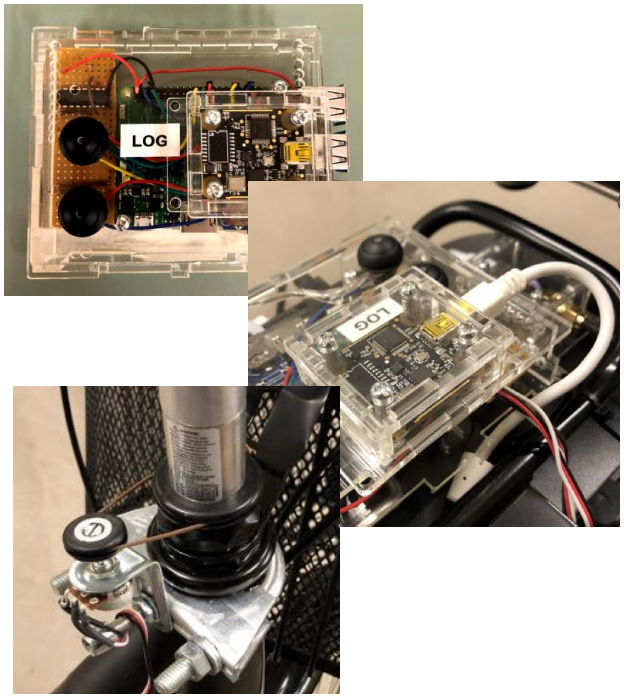
What's the role of the vehicle (and the human as a controller)?

What's the role of exposure?

How do stakeholders experience micromobility?

What is the safety problem?

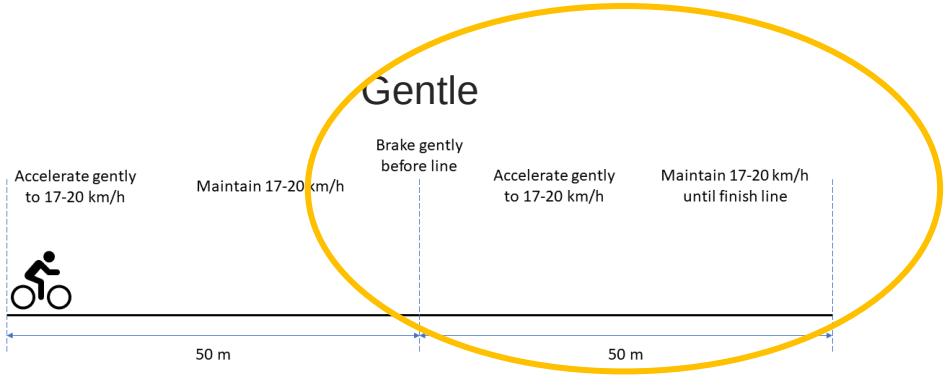
Instrumentation

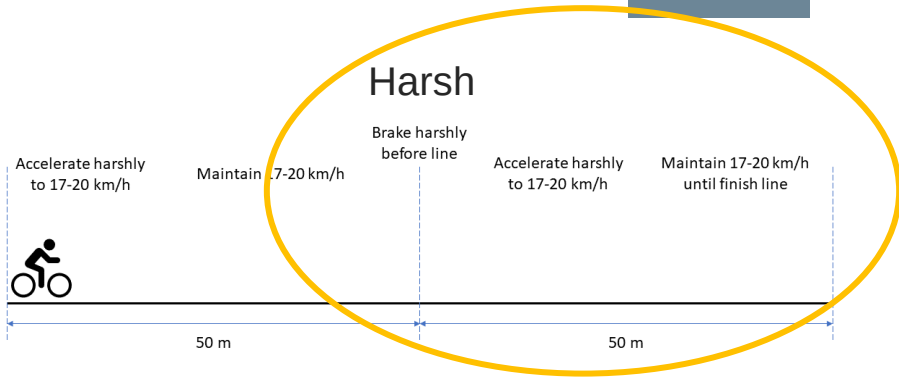


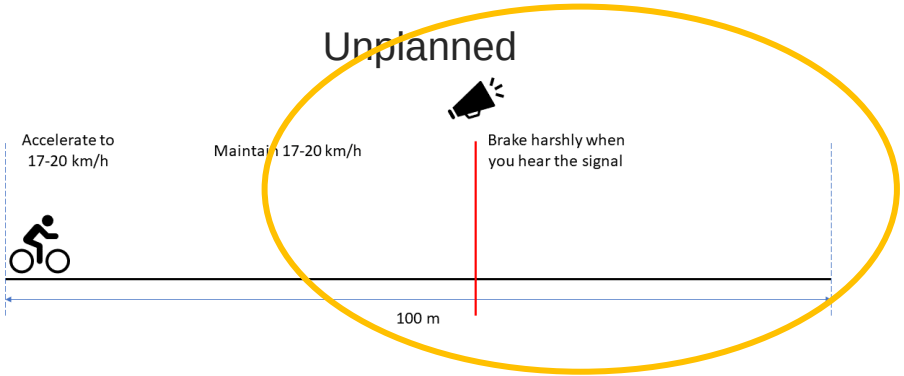
TME180 – Automotive Engineering Project

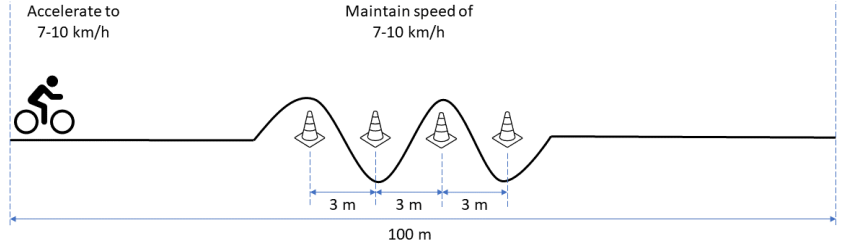
[Estelle Aimar, Ashwij M. Rao, Nithin Revadal, Weicheng Xiao, and Di Xue: Testing New E-Vehicles for Personal Mobility]

Protocol









[Alessio Violin: Development of an experimental protocol for testing new electric personal mobility vehicles]

Experiments

- 34 participants
- Mean age 25 years old
- Mean height 175 cm
- Mean weight 71 kg
- 25 male – 9 female

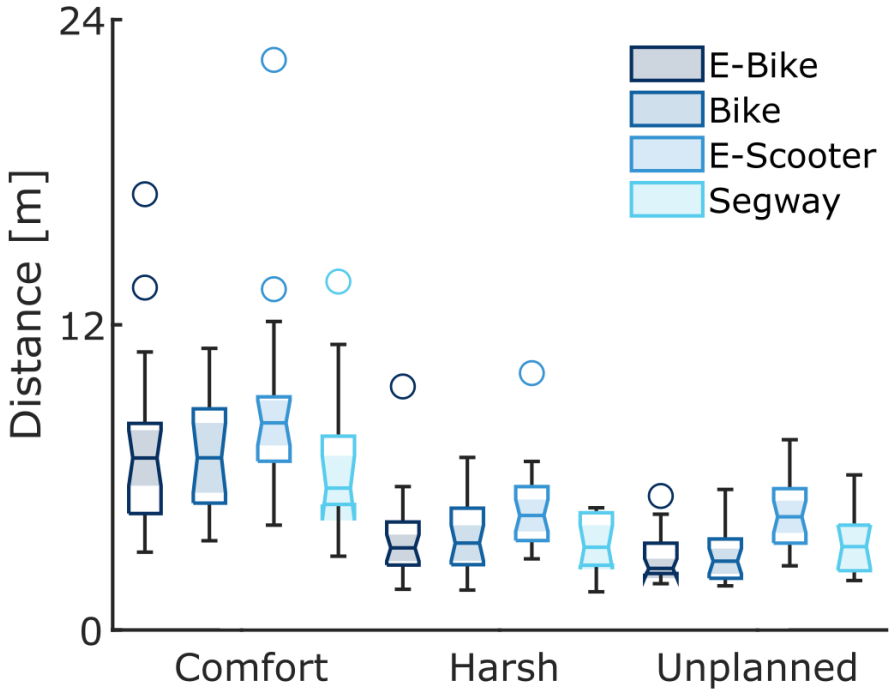
[Lucas Billstein Christoffer Svernlöv: Evaluating the Safety and Performance of Electric Micro-Mobility Vehicles]

Experiments

- 3+ Vehicles
- 2 Accelerting conditions
  - Comfort
  - Harsh
- 3 Braking conditions
  - 2 harsh (expected and unexpected)
  - 1 comfort
- 1 Slaloom condition
- Measures:
  - Braking distance
  - Reaction time
  - …

[Dozza et al., A data-driven framework for the safe integration of micro-mobility into the transport system: Comparing bicycles and e-scooters in field trials; Journal of Safety Research]

Results



- Bike brakes more efficiently than e-scooter in all conditions.
- Participants on Segway were not able to reach the desired speed.
- The best crash avoidance strategy depends on the vehicle type.

[DICE project: sponsored by Toyota Motor Europe]

Conclusions

- Safety research on micromobility is growing rapidly and the research gap is still large
- E-scooters are the “star” of *today* (på gott och ont)
- Several data sources support traffic safety research on micromobility
- Crash databases may tell the number and the cost of micromobility crashes
- Field trials help understand the role of the vehicle and the rider (as an operator) and help:
  - Policy making
  - Education
  - System design and testing
  - (Digital) Infrastructure maintenance and development
  - Cooperative applications
- Naturalistic data can show why crashes happen