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Can Experienced Riders Benefit from an Autonomous Emergency Braking System?

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Facts

- Risks for riders 10-40 times higher than passenger cars *(Blackman 2013)*

- No braking/poor braking in multi-vehicle crashes *(Penumaka 2013)*

- Experienced riders far from immune to risk *(Harrison 2005)*

Automatic braking for PTWs – why in the world?

One of the most effective safety interventions (Grant 2008)

www.pisa-project.eu

What is MAEB?

MAEB stands for
Motorcycle Autonomous Emergency Braking

- Obstacle detection unit
- Braking unit
- Electronic control unit

How does MAEB operate?

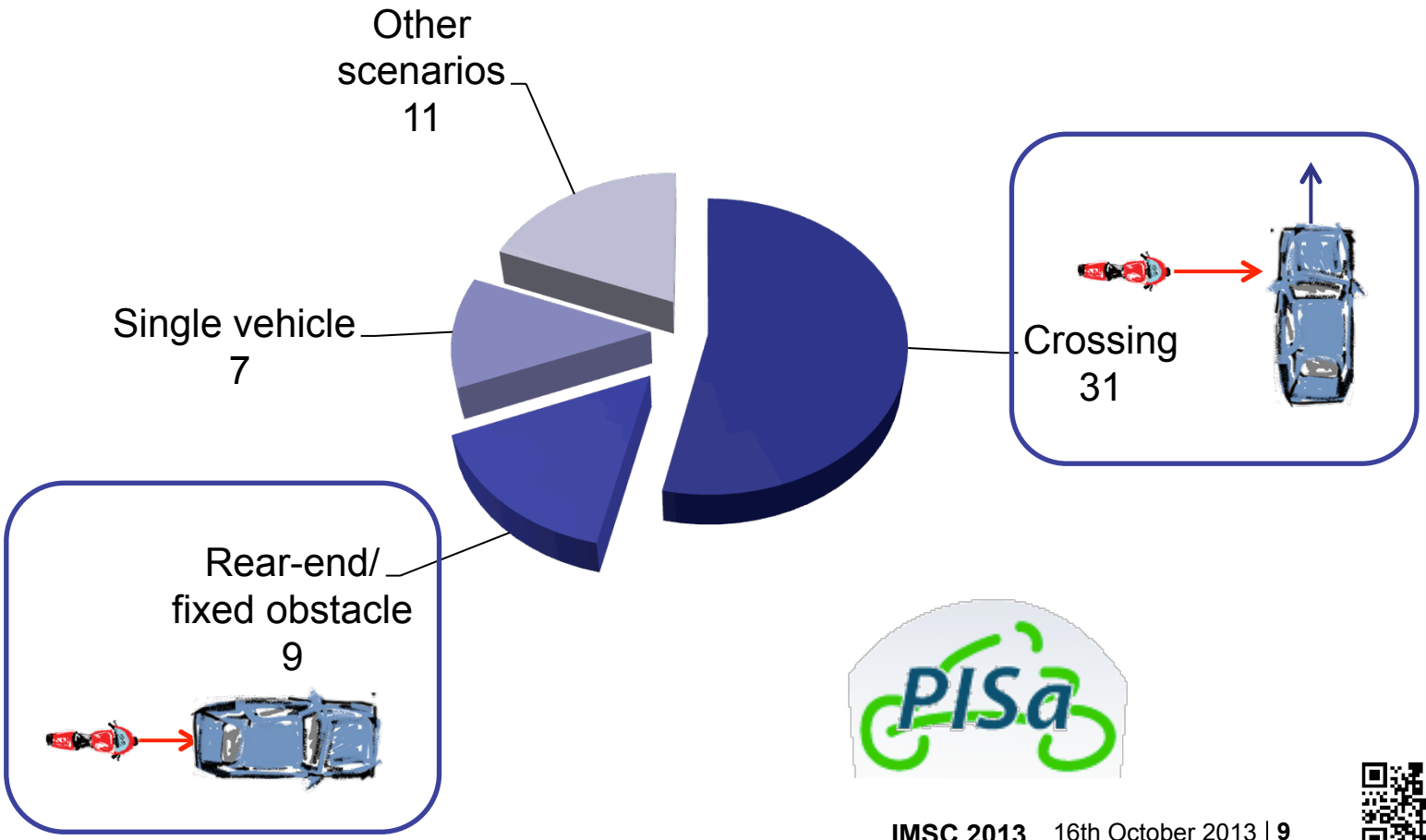
- Autonomous braking if rider does not brake
- Enhanced braking if rider does brake
- Activated only when collision is physically unavoidable

Can experienced riders benefit from an Autonomous Emergency Braking system?

Method

- Collection of real-world crashes
- Team of reviewers evaluated applicability of MAEB
- Where MAEB applicable, simulations to evaluate quantitative benefits considering:
  - Actual rider behaviour
  - Range of possible rider behaviours including experienced rider

Material 58 in-depth cases



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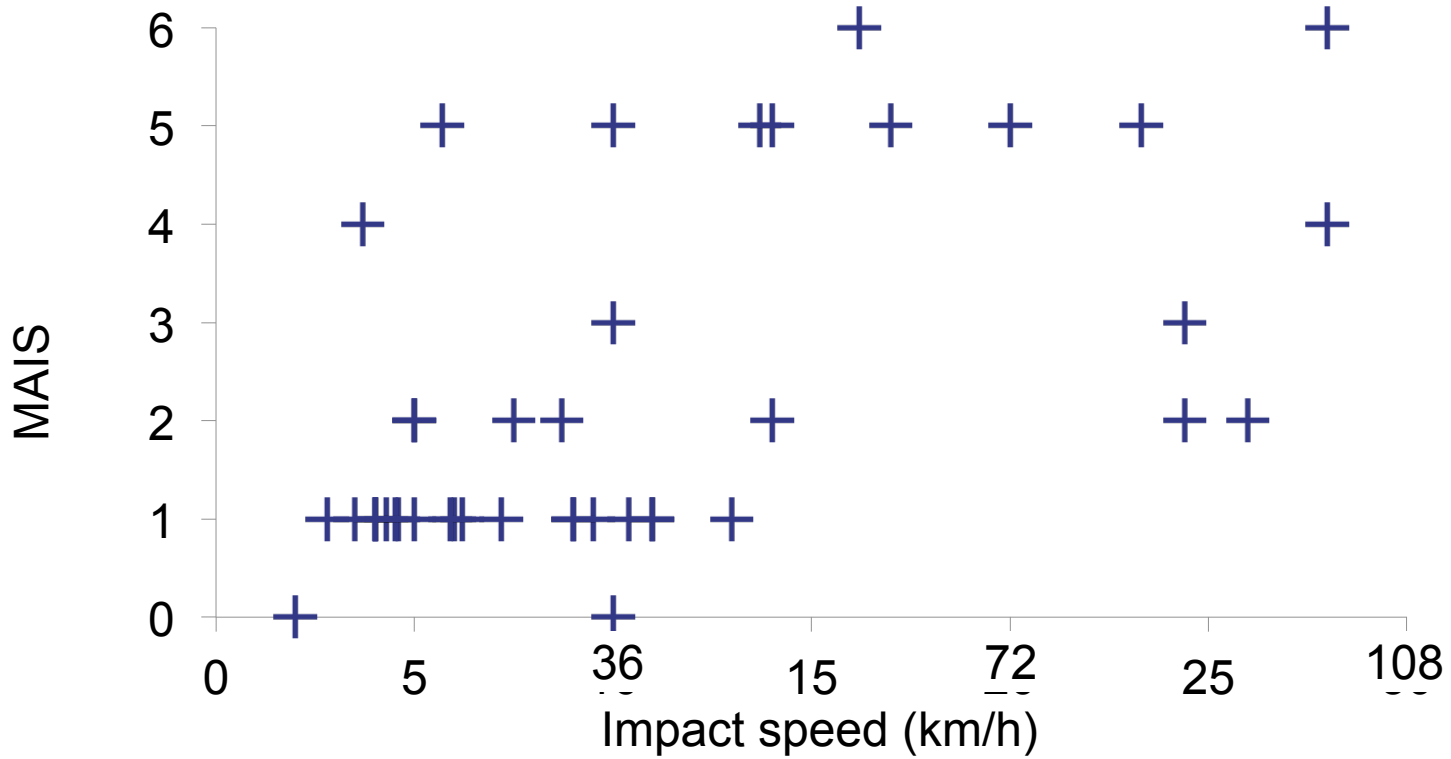

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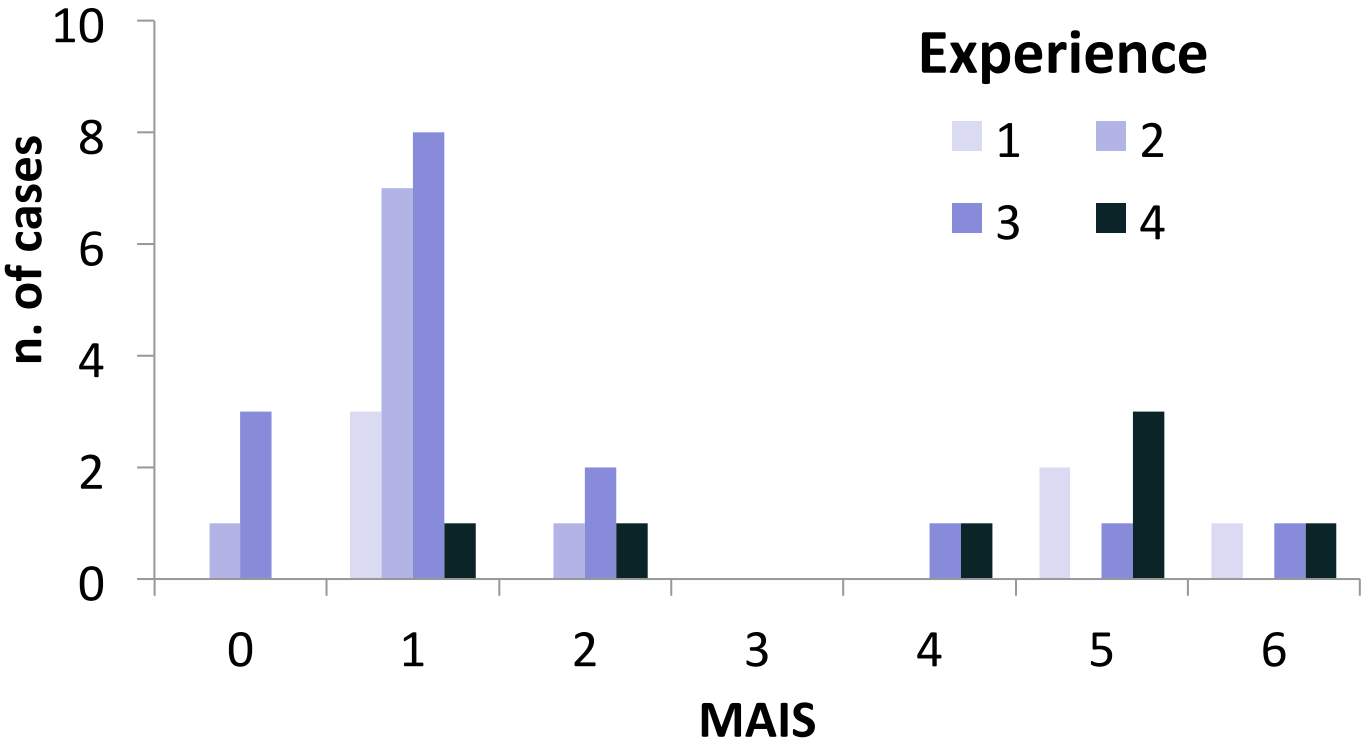
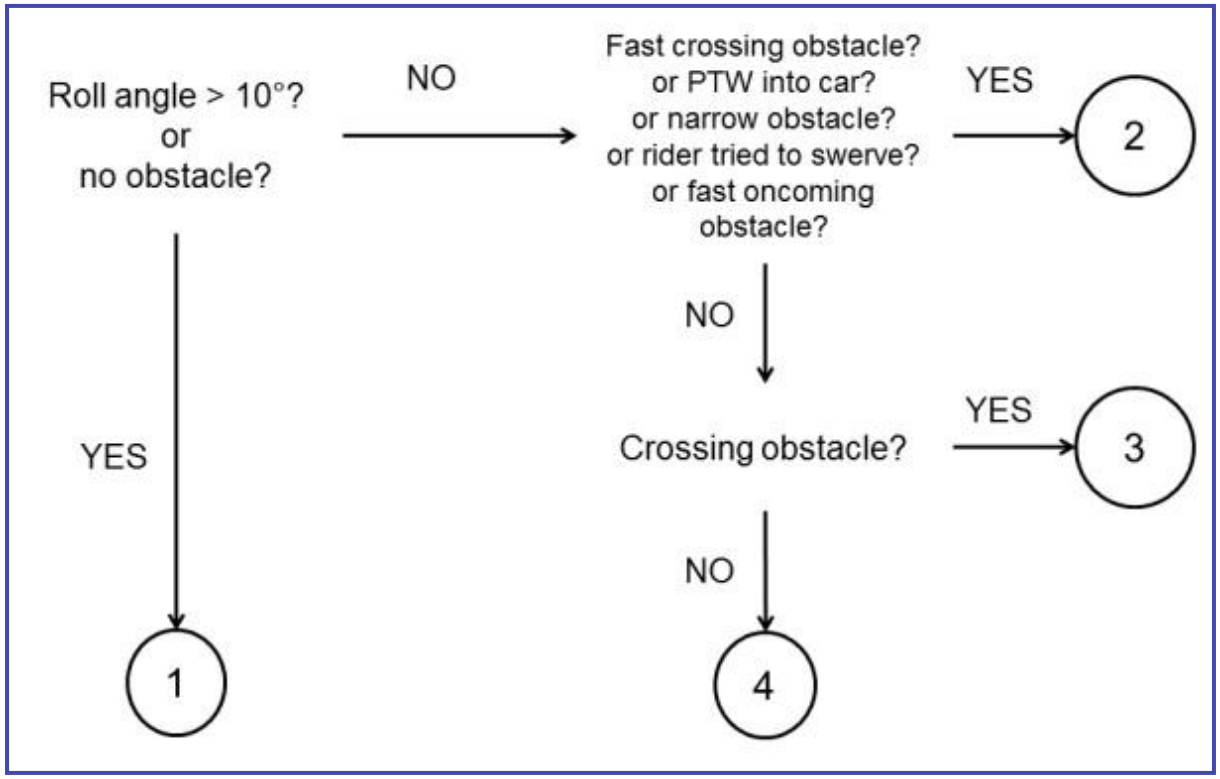


Applicability

- Score 1 to 4



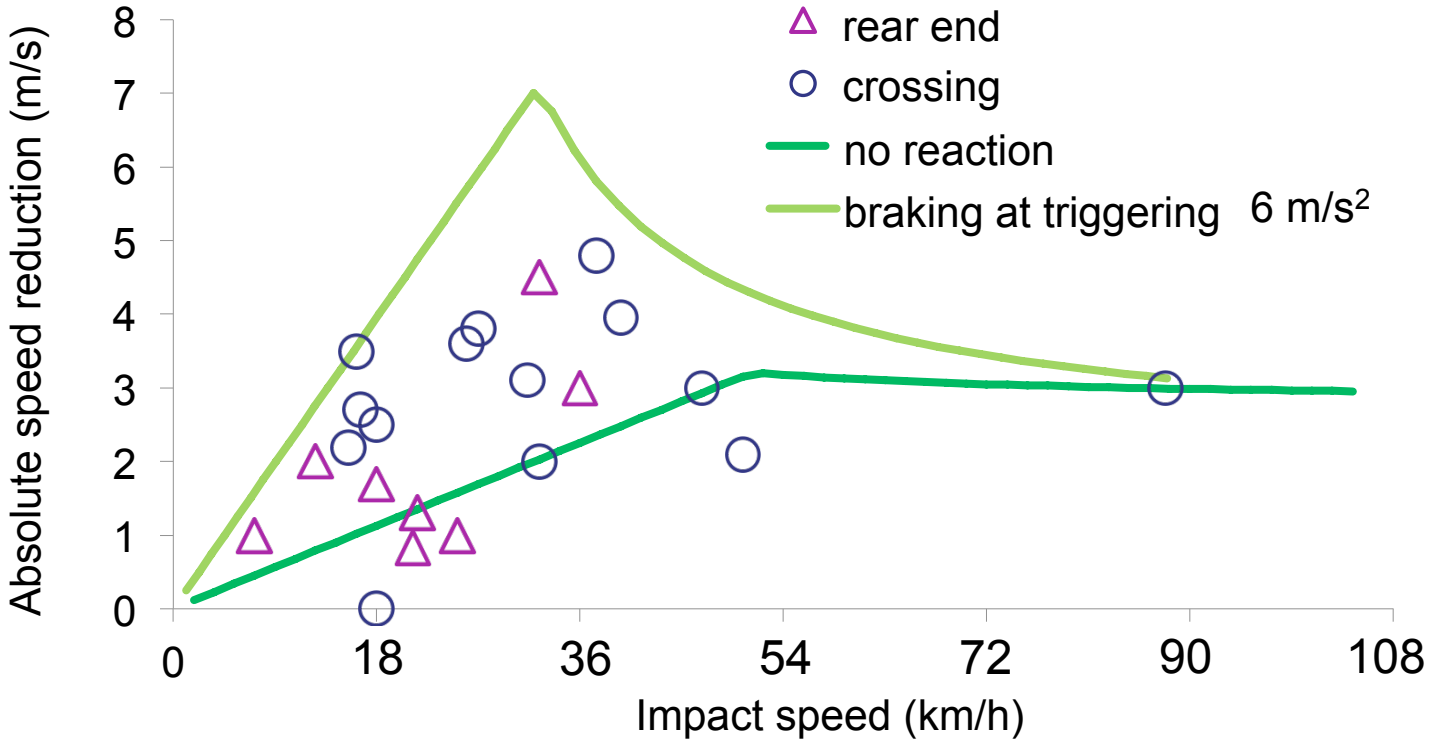
Quantitative estimation of benefits

- Computer simulations, Matlab based
- Simplified, longitudinal dynamics
- Range of possible rider behaviours:
  - No reaction
  - Late reaction, low/high deceleration
  - Early reaction, low/high deceleration

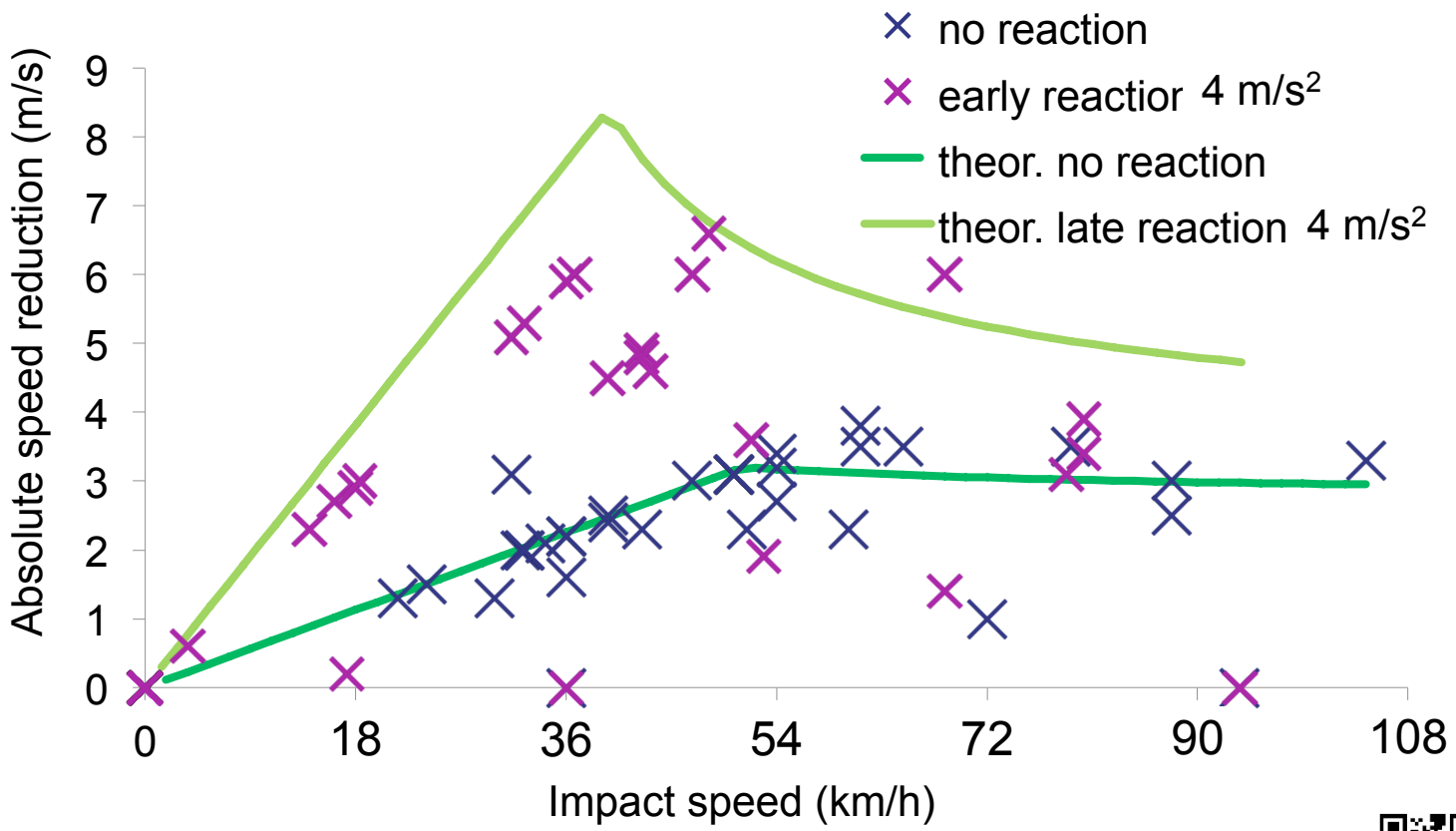
Results

- MAEB potentially applicable in 39 out of 58 cases
- Considering rear-end and crossing cases only (37 cases):
  - 17 cases (46%): no rider reaction
    - 5 out of those 17 cases (30%) were experienced riders
    - In 11 out of those 17 cases (65%) MAEB was applicable
    - 3 experienced riders would have benefitted (speed reduction in the range 4.7 – 11.5 km/h)

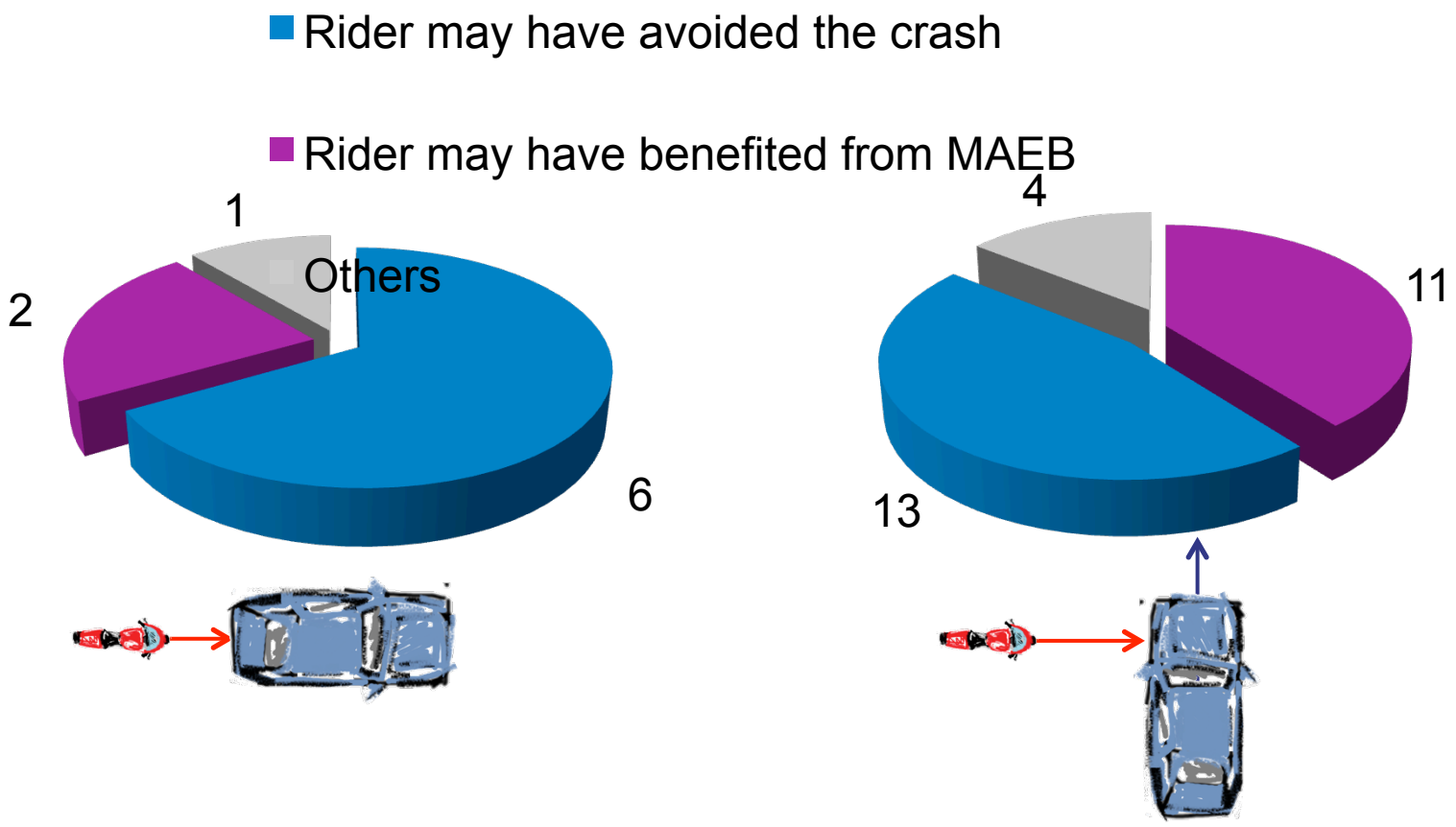
Results actual rider behaviour



Results range of rider behaviours



Results


Rider may have avoided the crash
Rider may have benefited from MAEB
1
Others
2
6
4
11
13

Let's summarize

1. Experienced riders far from immune to risk
2. Automatic braking as a potential help
3. Triggering strategy: automatic braking as last resort solution
4. Results indicate benefits for any rider including experienced riders

Conclusions

With potential collisions – unavoidable for even the most experienced of riders – advanced technical solutions should be considered as potential allies whenever it can be proved that they are able to assist in otherwise unrecoverable riding situations

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