

# The development of a Moving Deformable Barrier test procedure

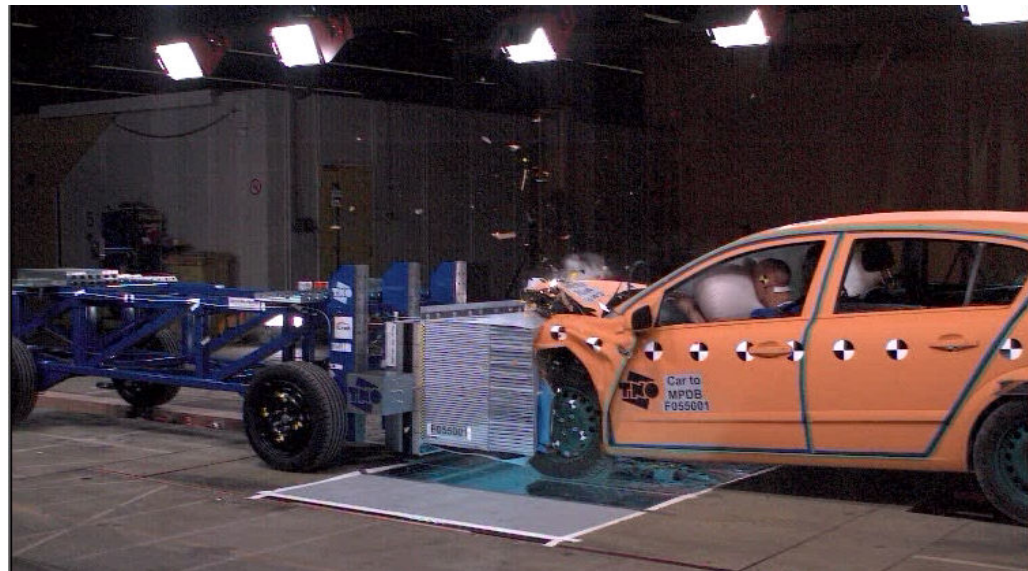
GRSP, Geneva

**TNO | Knowledge for business**



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# Partners

- Research institutes

- TNO
- UTAC



- Car manufacturers

- GME
- PSA
- Renault



- Barrier manufacturer

- AFL

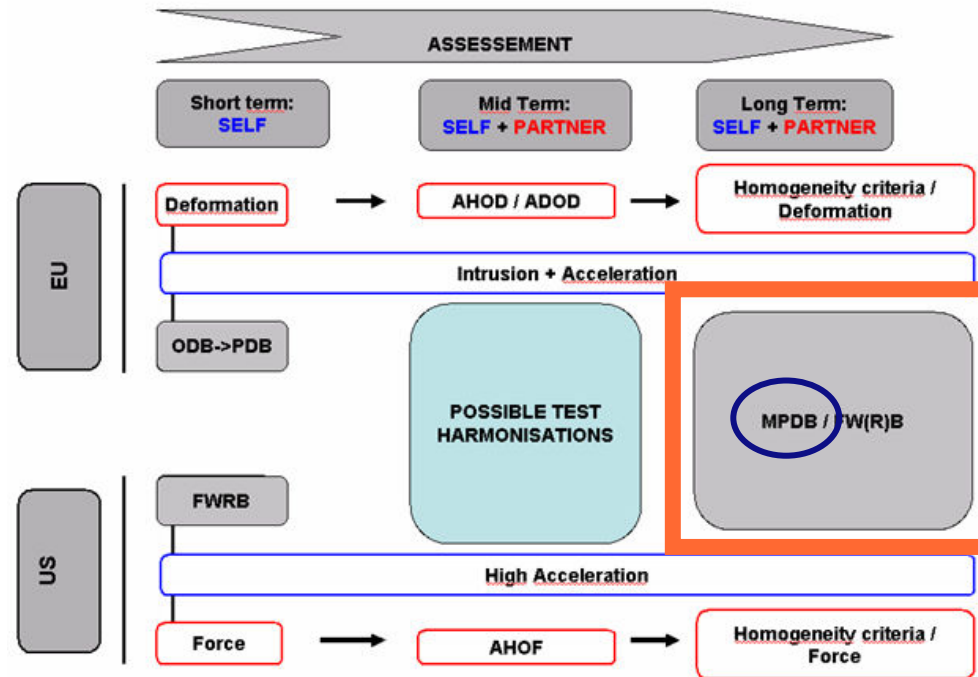


- Loadcellwall manufacturer

- FTSS



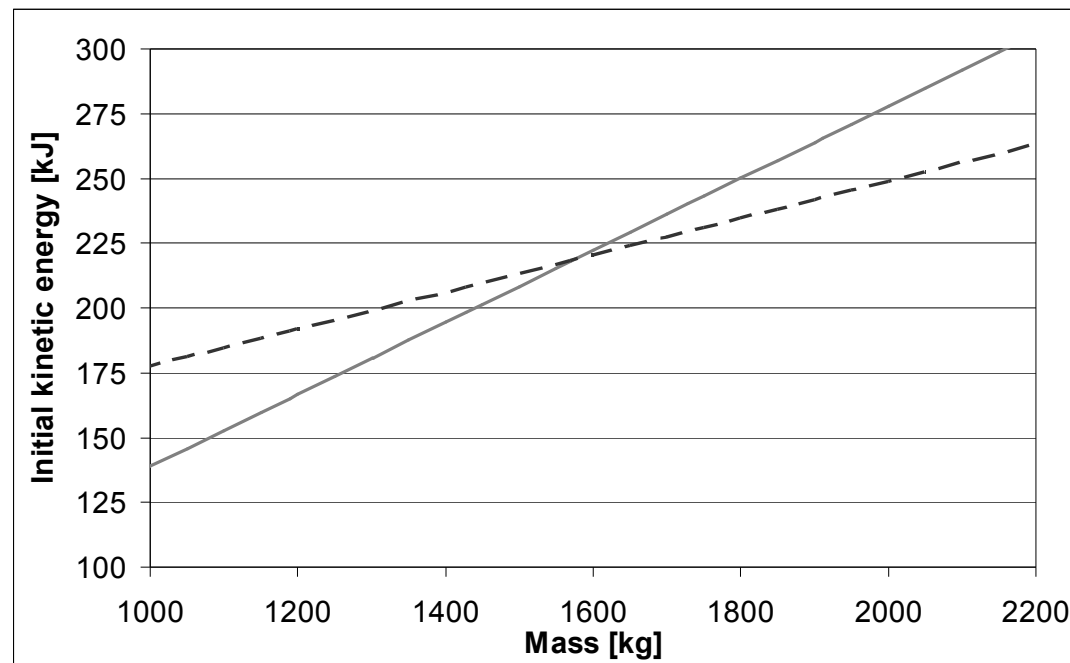
# Objectives



- Future step in compatibility
  - Feasibility and merits MDB, based on PDB
  - Partner and self protection

# Background

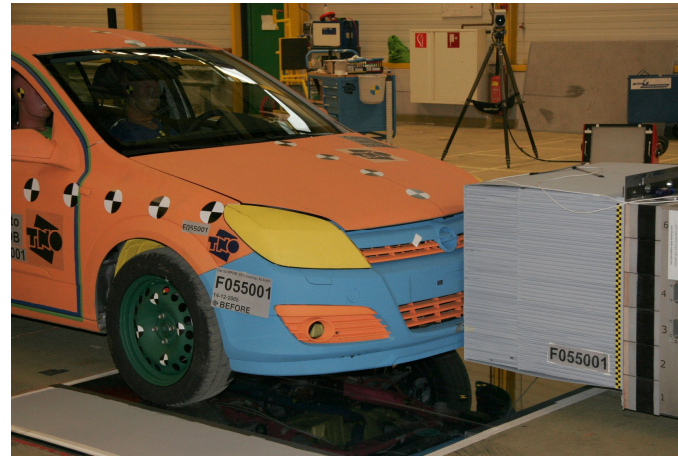
- Current regulatory and consumer tests have resulted in stiffness mismatch between vehicle classes
- Test severity needs to be balanced between vehicle classes





# MPDB-to-vehicle tests

- **Feasibility**
- **Repeatability**
- **Vehicle classes**



- **Performed tests**

- |                  |               |                    |
|------------------|---------------|--------------------|
| • Opel Astra 2x  | mass ratio ~1 | (1403/1500 = 0.94) |
| • Citroen C2     | mass ratio <1 | (1250/1500 = 0.83) |
| • Renault Clio   | mass ratio <1 | (1313/1500 = 0.88) |
| • Renault Laguna | mass ratio >1 | (1853/1500 = 1.24) |
| • Renault Espace | mass ratio >1 | (2163/1500 = 1.44) |

# MPDB-to-vehicle tests

## Main test-specifications:

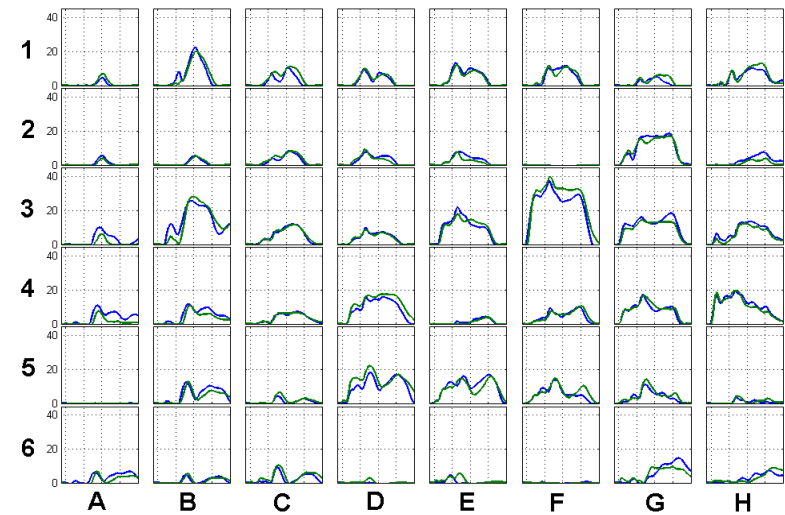
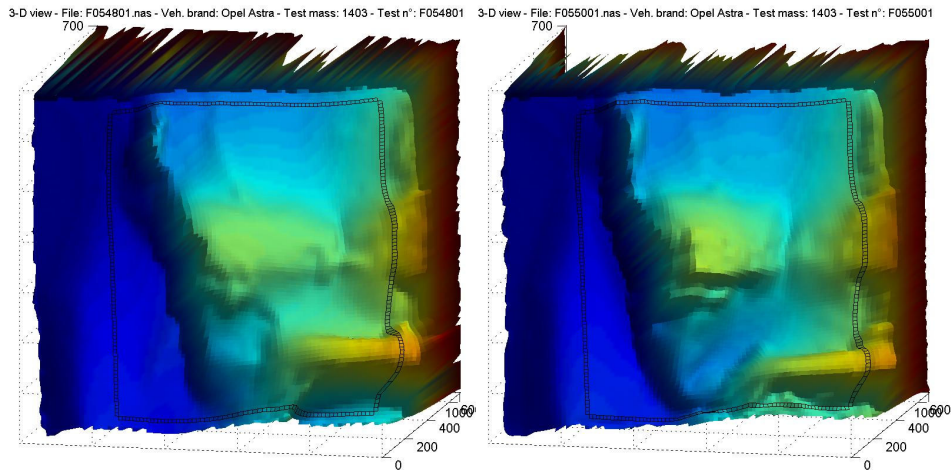
- Trolley mass 1500 kg
- HR LCW
- Closing speed 90 km/h (45/45 km/h)
  - Equal initial kinetic energy compared to static PDB-test
- Offset 50%
- PDB ground clearance 150 mm
- PDB version 8



# Results

## Repeatability

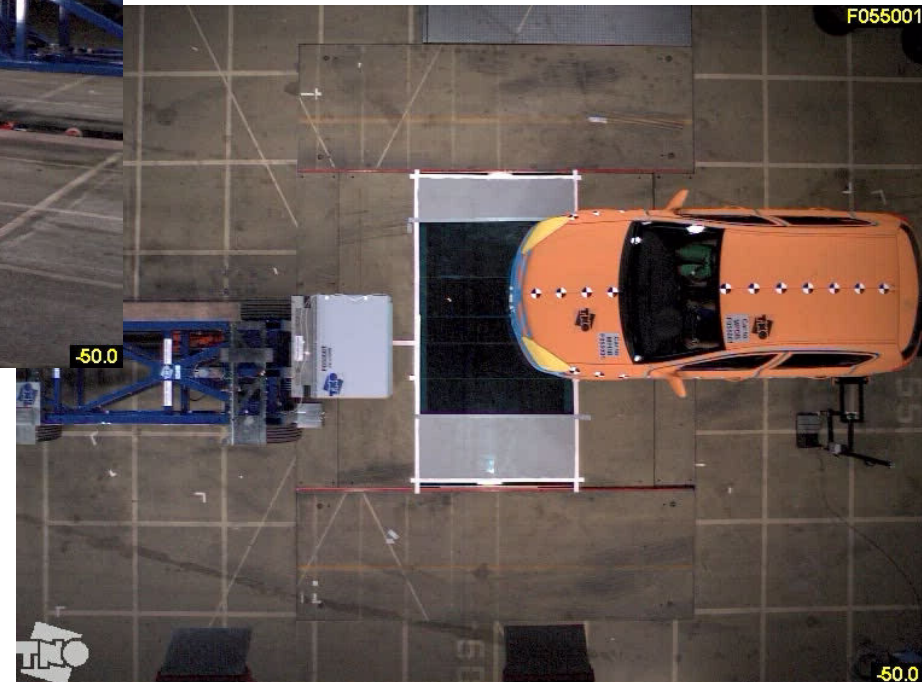
	<b>Astra-MPDB 1</b>	<b>Astra-MPDB 2</b>
ADOD (X)	242.2 mm	231.8 mm
AHOD (Z)	492 mm	493 mm





# Results

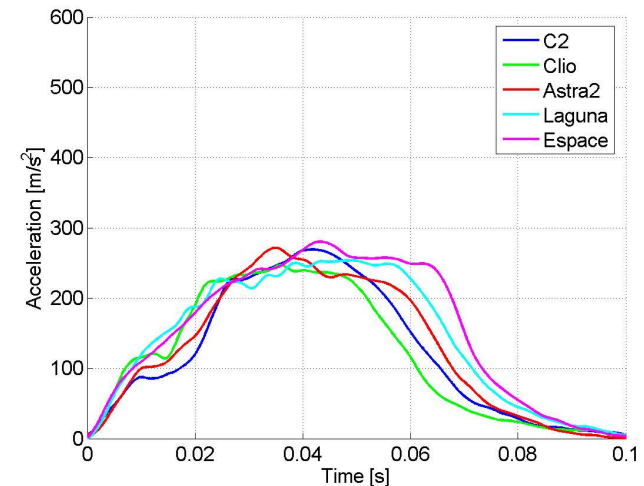
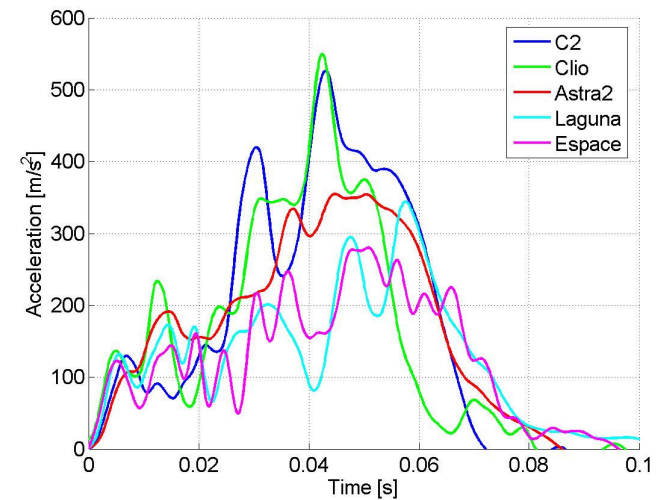
## MPDB-to-vehicle tests



# Results

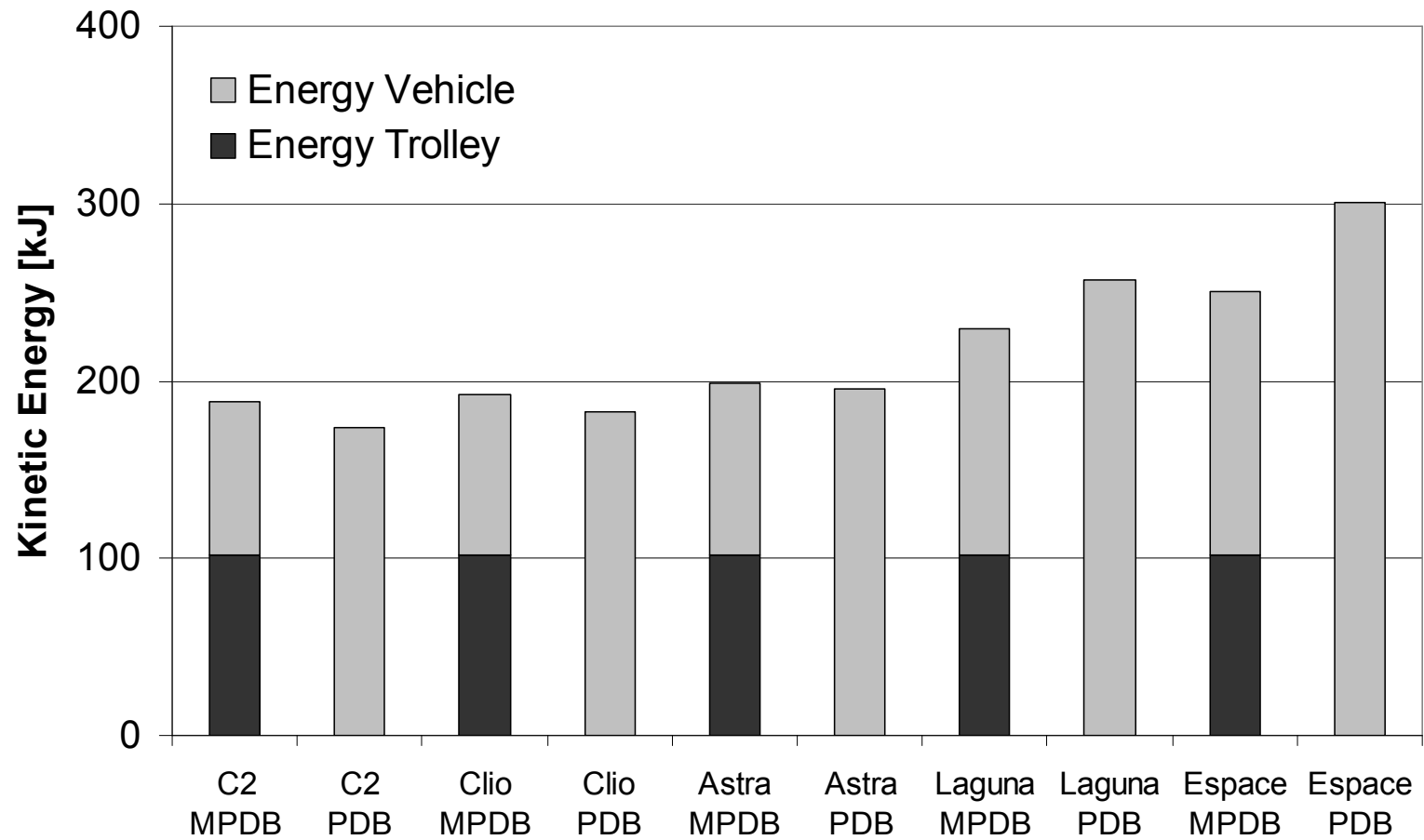
## MPDB-to-vehicle tests

- Vehicle acceleration levels increased for small vehicles and decreased for large vehicles compared to a fixed PDB test
- MPDB accelerations are an indication for homogeneity



# Results

## MPDB-to-vehicle tests



# Conclusions

- The developed MPDB test method showed to be feasible and repeatable
- The procedure is a more realistic representation of a frontal car-to-car crash than current procedures
- For vehicles with mass ratio  $< 1$  the severity is increased and decreased for mass ratio  $> 1$  compared to a fixed PDB test



# Future work

- Determine test specifications to maintain current self-protection levels
- FP7 proposal VVCP
  - Finalization of test protocol
  - Development of assessment criteria
    - Dummy
    - Barrier
    - HR LCW





# Thank you for your attention

