Generic Vehicle Models IWG-DPPS

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Background

- Generic vehicle models have been developed by TU Graz within the CoHerent project for the certification of pedestrian models (according to TB024)

- Models are currently maintained by TU Graz and the code houses (dynamore, Altair, esi, Dassault)

- The model owners are TU Graz, ACEA and Euro NCAP

- For a formal agreement, boundary conditions of usage / reference should be further clarified.

- No objection from Euro NCAP and TU Graz for model usage now, but important issue of model maintenance has to be solved

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# How to include GV models in regulations?

- Option A: Refer in Mutual Resolution to specific models.
  - Where should models be stored? By whom should they be distributed?
  - How can we refer to a specific FE model in the mutual resolution? (in terms of formulation and specification)
  - Should models be encrypted?
  - Who makes sure that models are running in future code versions?
  - How should they be revised (update to current fleet every 5 years)?

  - + Everyone uses for sure the same models (however: how to proof?)
  - + In line with Euro NCAP
  - - **Administrative challenges have to be solved**

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How to include GV models in regulations?

- Option B: Detailed specification (description) of the generic vehicle models in the (appendix of) a mutual resolution
  - Include mesh as node coordinates into the appendix
  - Include description of modelling approach
  - Include corridors for the structural behaviour of the model (based on the current Euro NCAP GV models and as tight as possible)
  - **Applied GV models should be submitted together with certification results**

  + Easier from organisational point of view, because theoretically everyone can rebuild the models, but as models are defined in detail, they would still behave very(!) similar (it all depends on a proper specification)
  - Not everyone has to use exactly the same model → this could affect certification results. (However: If GV models are certified prior to HBM certification, this can be addressed)
  - Risk that models that can be used for regulation can't be used for Euro NCAP
  - Higher workload for the certification of the models (as GV models have to be checked)

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Examples for Specification

- The foam layer features:
  - Piecewise-linear behaviour (elasticity, yielding, compaction-initialisation, full-compaction);
  - Definable energy absorption;
  - Negligible expansion upon compression (i.e. a Poisson's ratio of 0);
  - No strain rate dependency (It is assumed that interface layer's inertial effects are more important for the impact response behaviour than material induced strain-rate effects.)
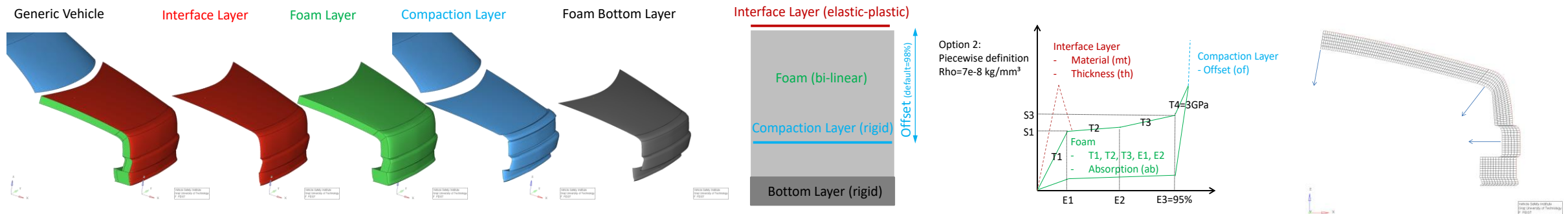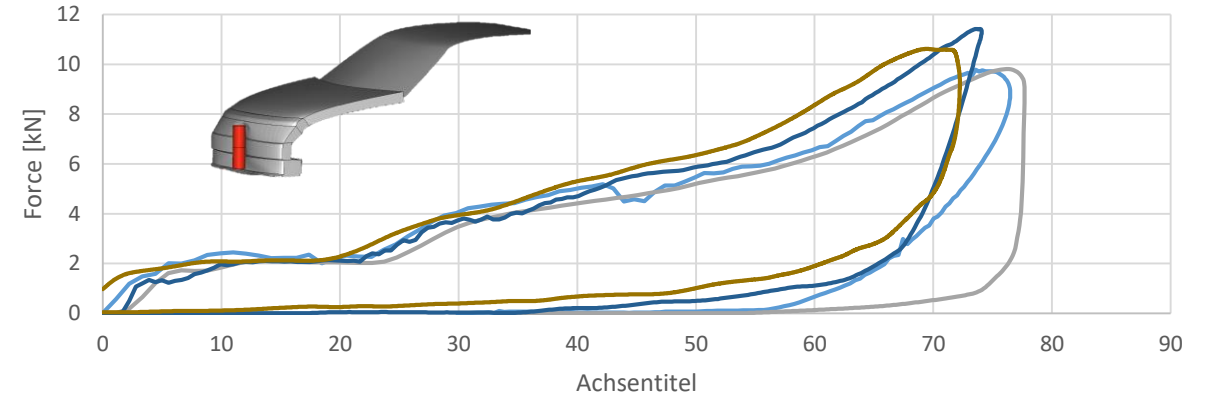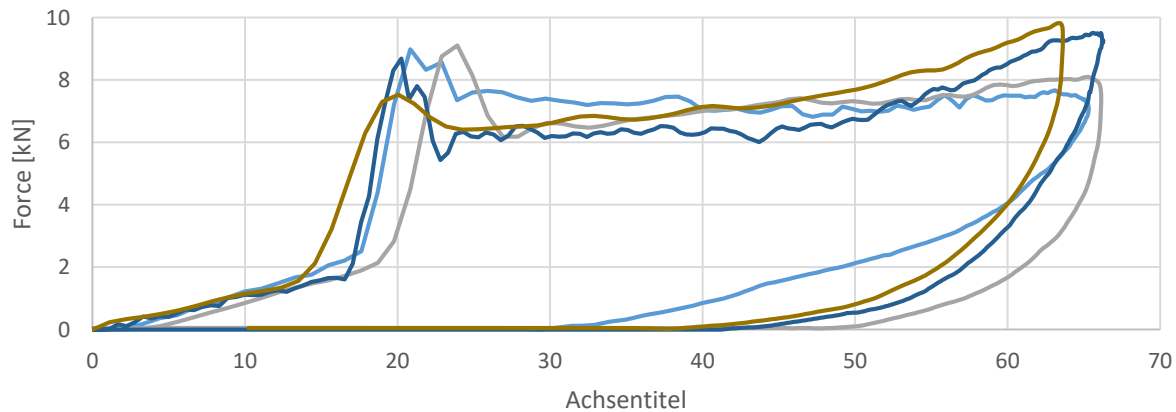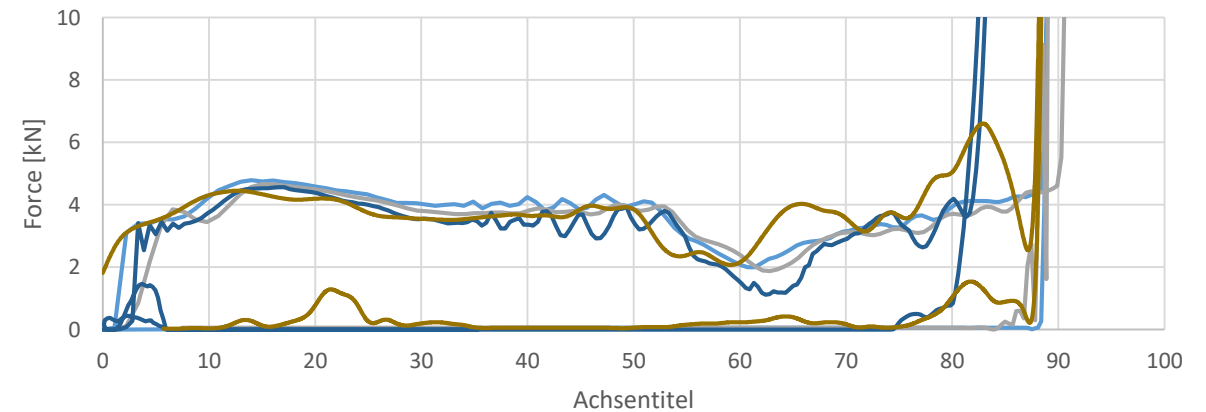
Corridors for GV responses
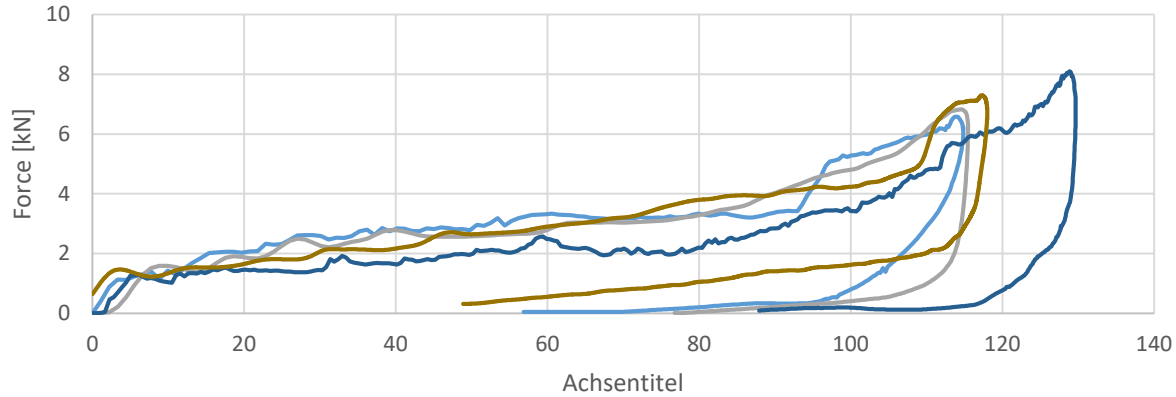
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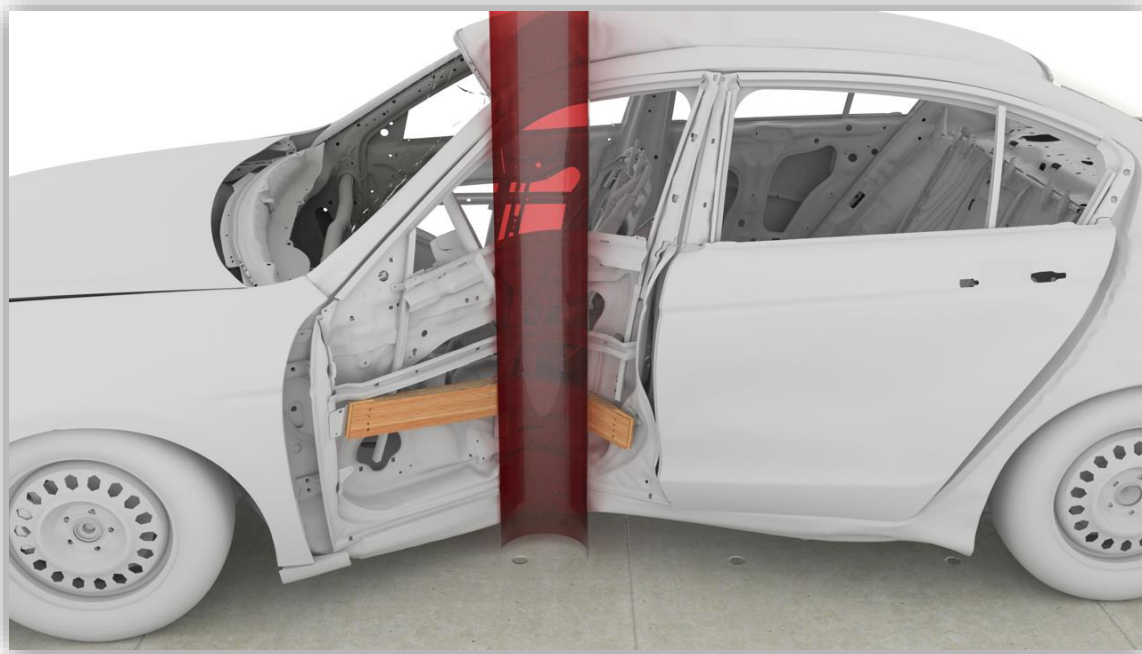
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