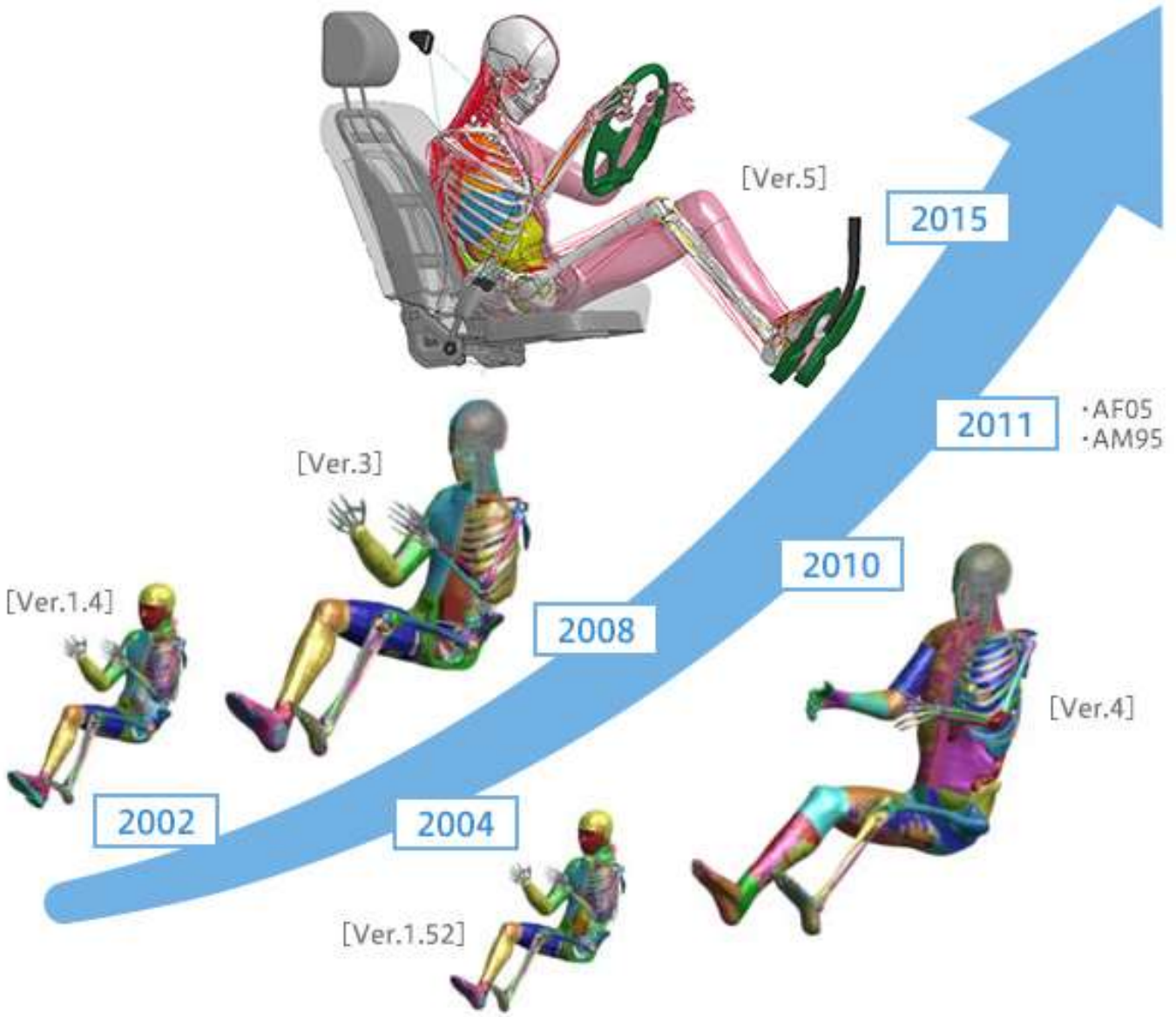
THUMS and DYNAmore GmbH Dummy Models

Lavendra Singh

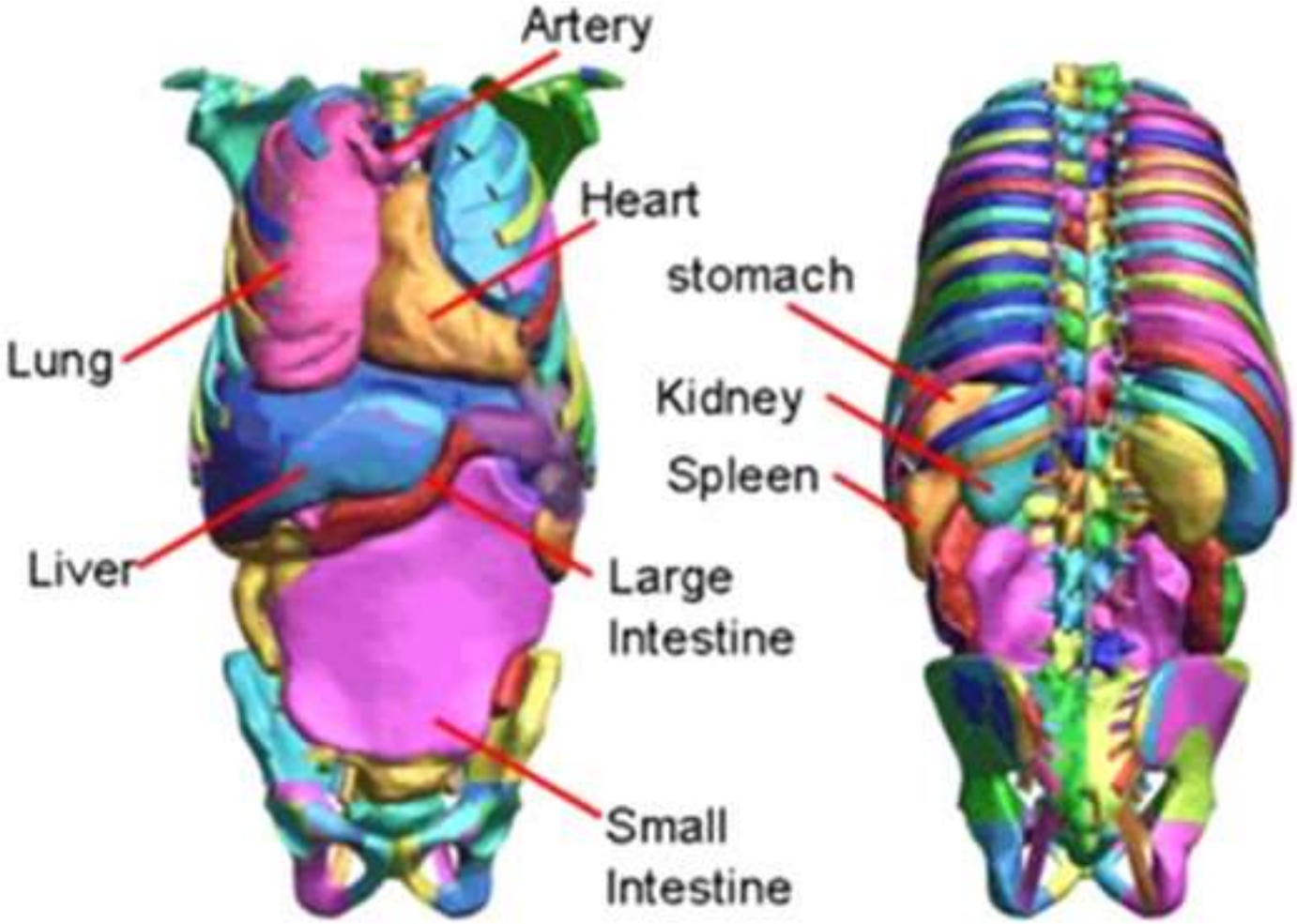
ARUP

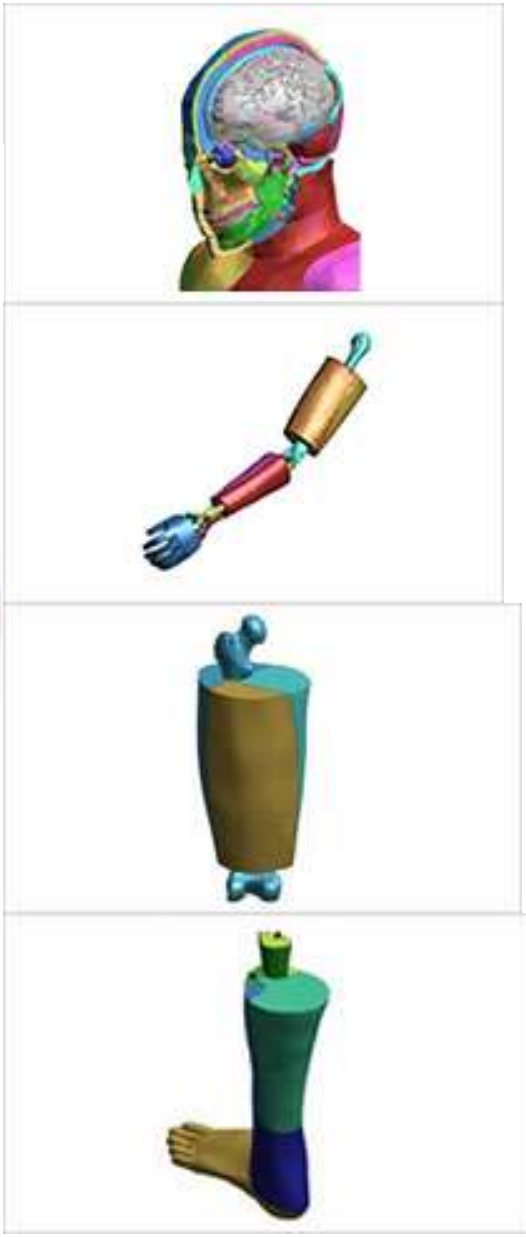
THUMS



Courtesy: https://www.jsol-cae.com/en/product/structure/thums/

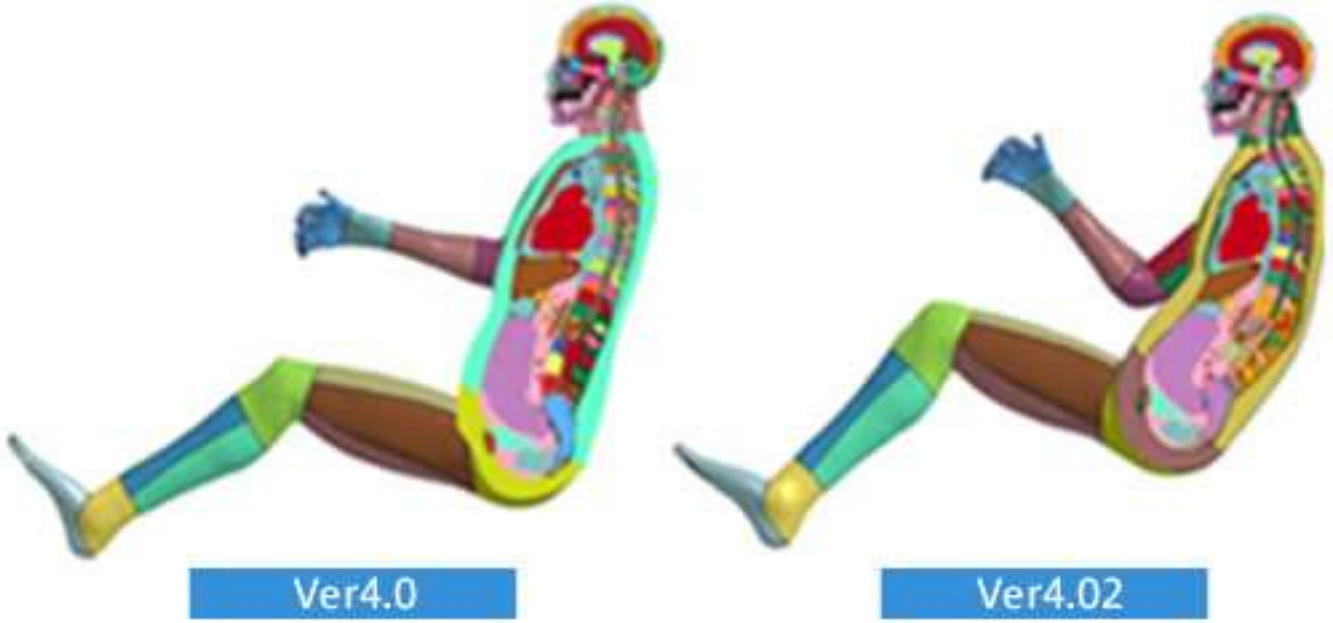
Version 4.02





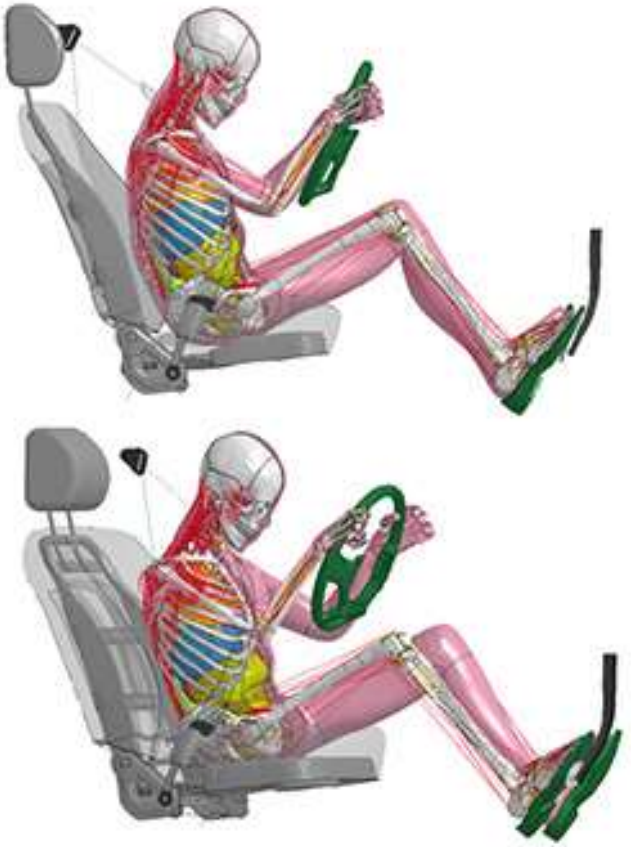
Courtesy: https://www.jsol-cae.com/en/product/structure/thums/

Gravitation effect



Courtesy: https://www.jsol-cae.com/en/product/structure/thums/

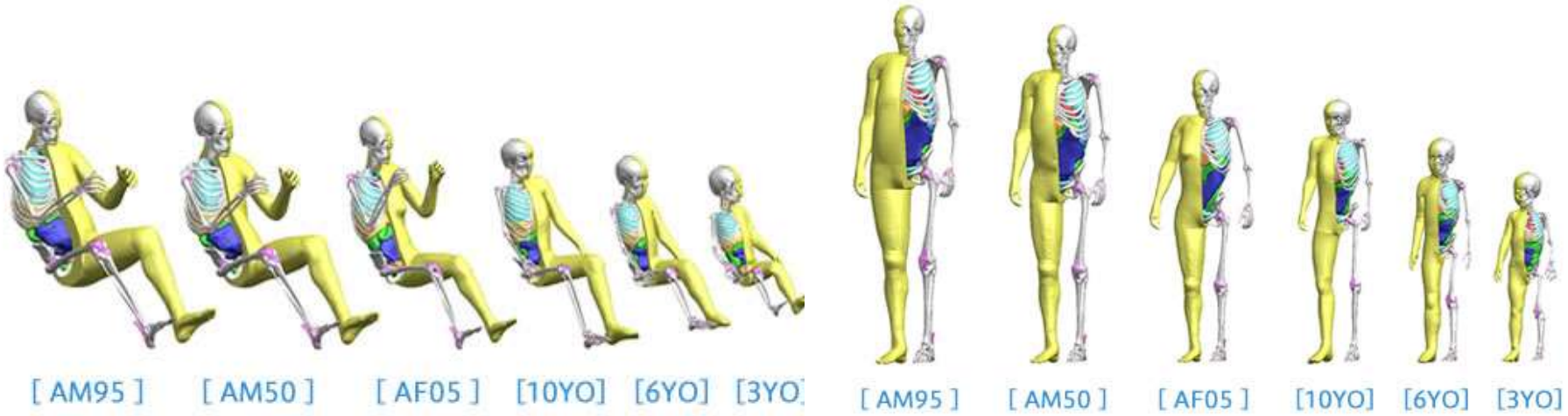
Relaxed state



Braced state

Courtesy: https://www.jsol-cae.com/en/product/structure/thums/

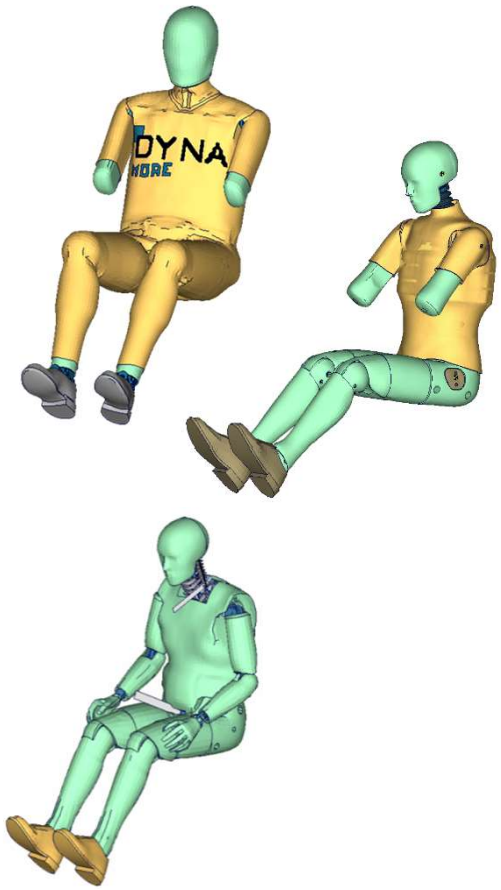
Different Sizes



Courtesy: https://www.jsol-cae.com/en/product/structure/thums/

Euro NCAP

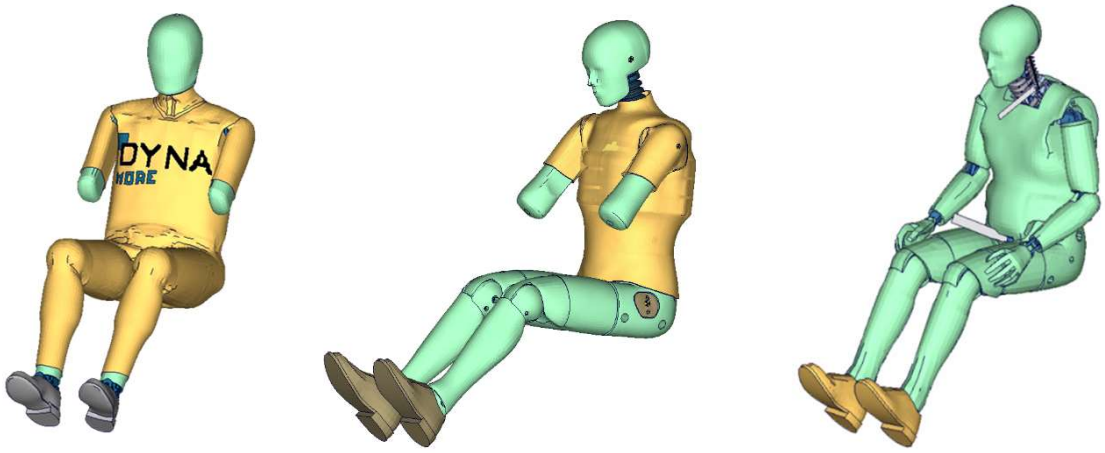
- ***https://cdn.euroncap.com/media/41783/tb-024-pedestrian-human-model***



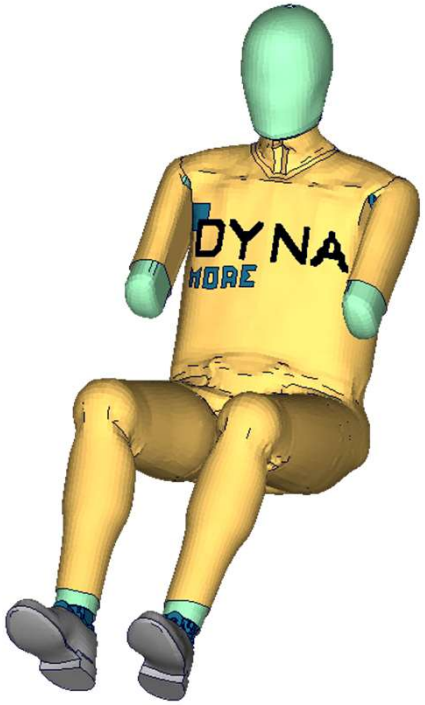
Recent Developments of DYNAmore Dummy Models

Recent Developments

- WSID50th
- ES2/2re
- BioRIDII



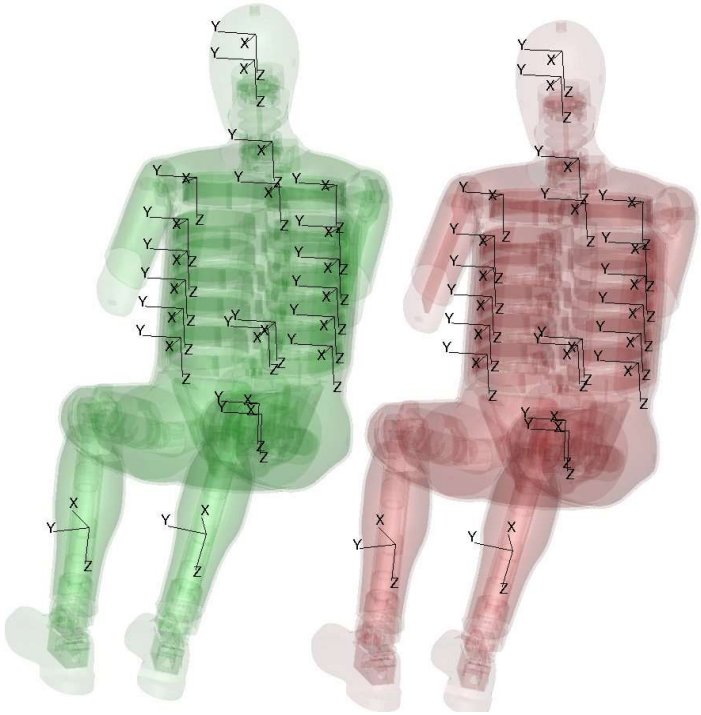
- **Recent Developments**
- **WSID50th**
- **ES2/2re**
- **BioRIDII**



The recent developments: WSID50th

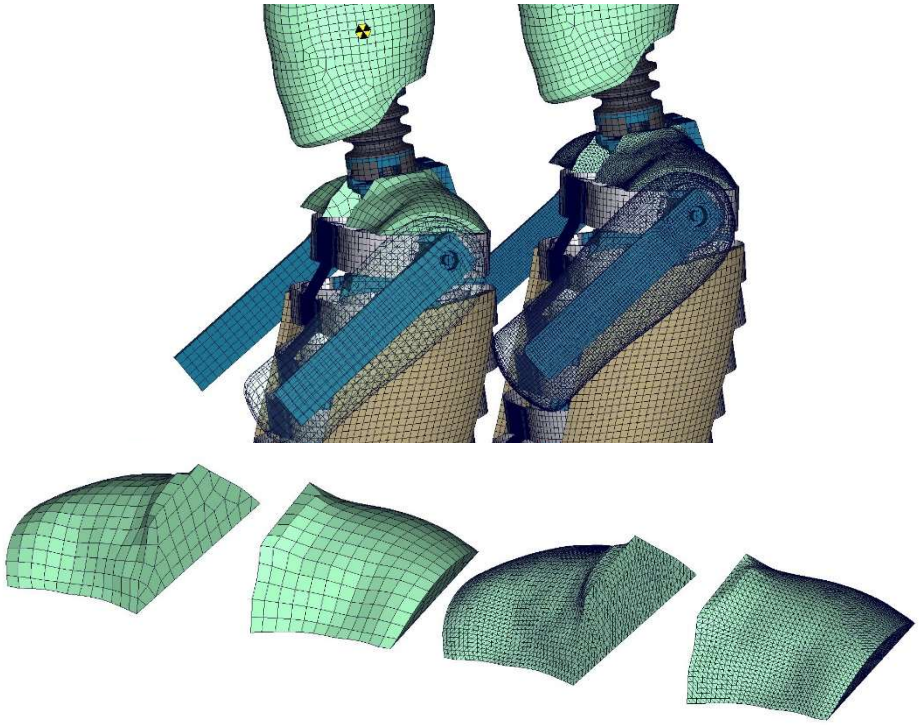
- The Right_Hand_Dummy model has the same coordinate system as the Left_Hand_Dummy model for output. Both are based on SAE J211.

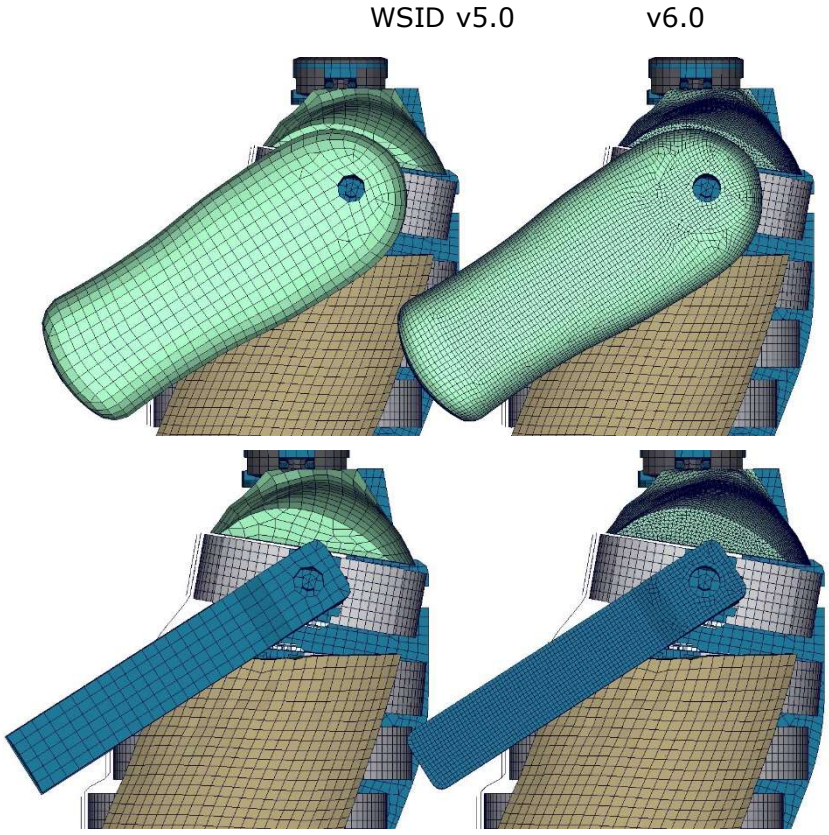
WSID50th V6.0 LHD WSID50th V6.0 RHD



The recent developments: WSID50th

- Geometry Update.

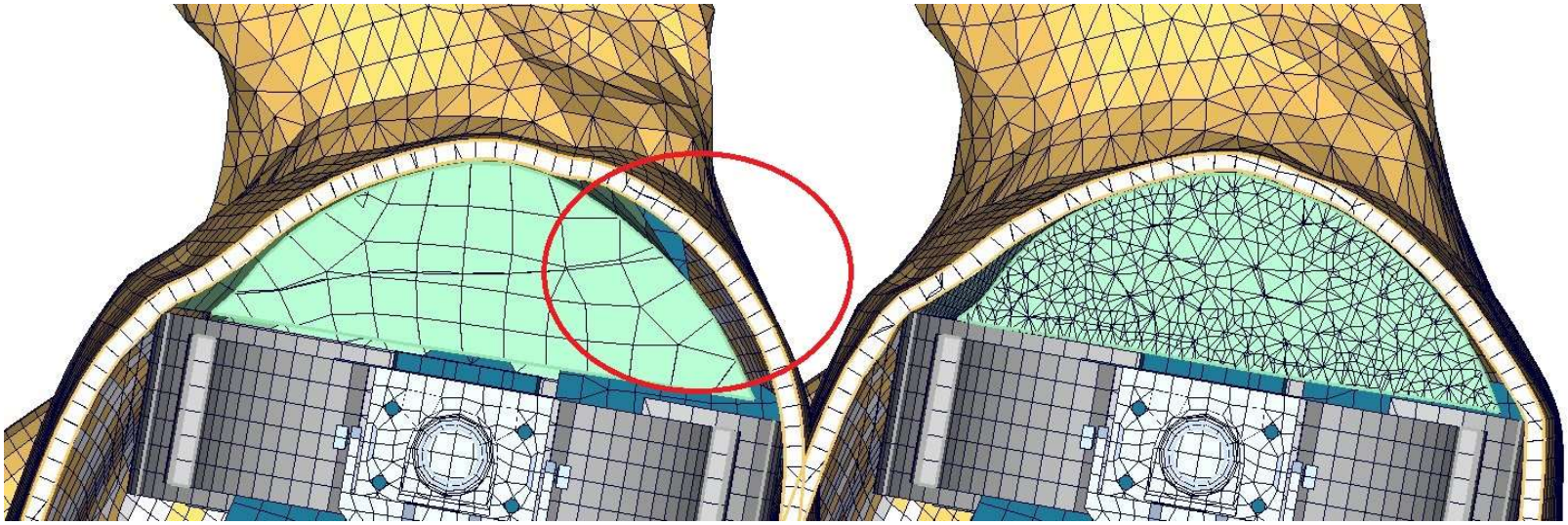




The recent developments: WSID50th

- Jacket is put on tightly and with initial stress.

WSID v5.0 v6.0



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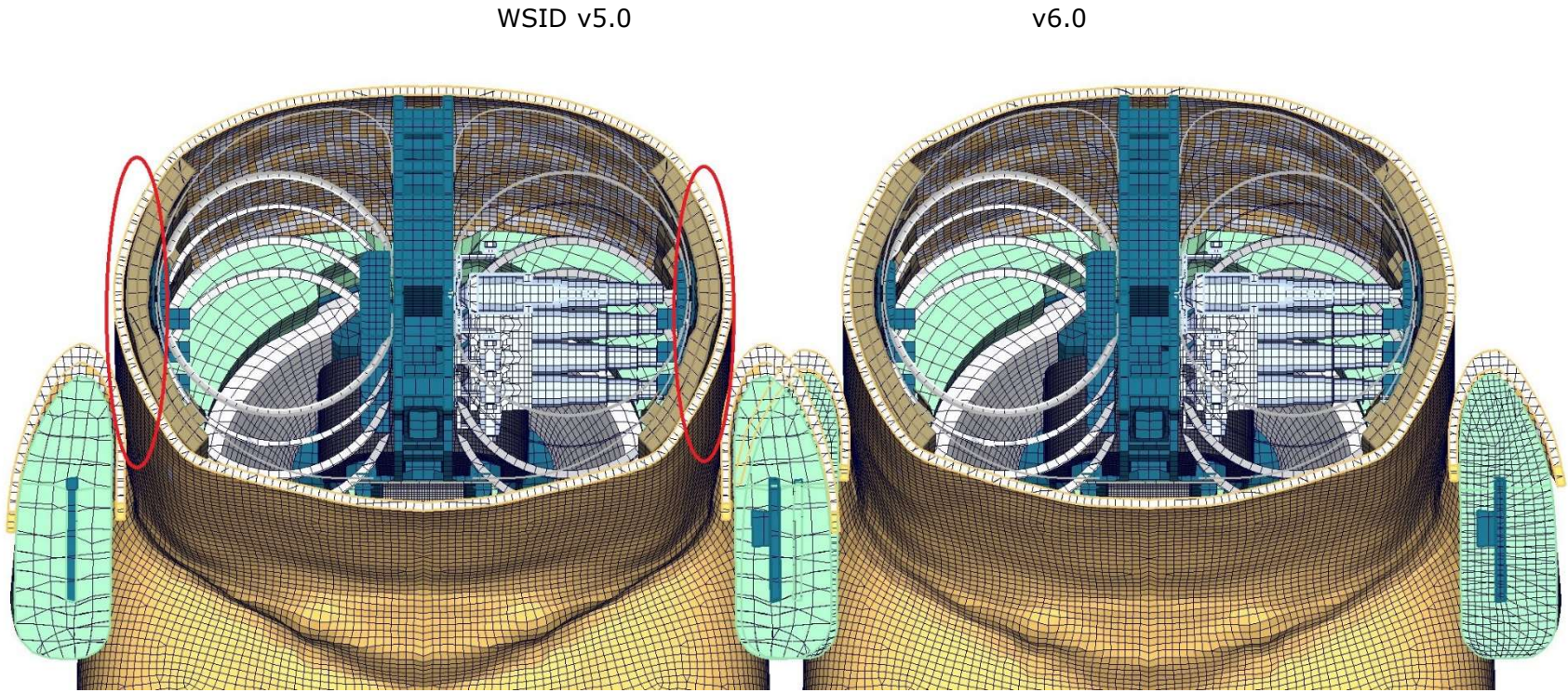

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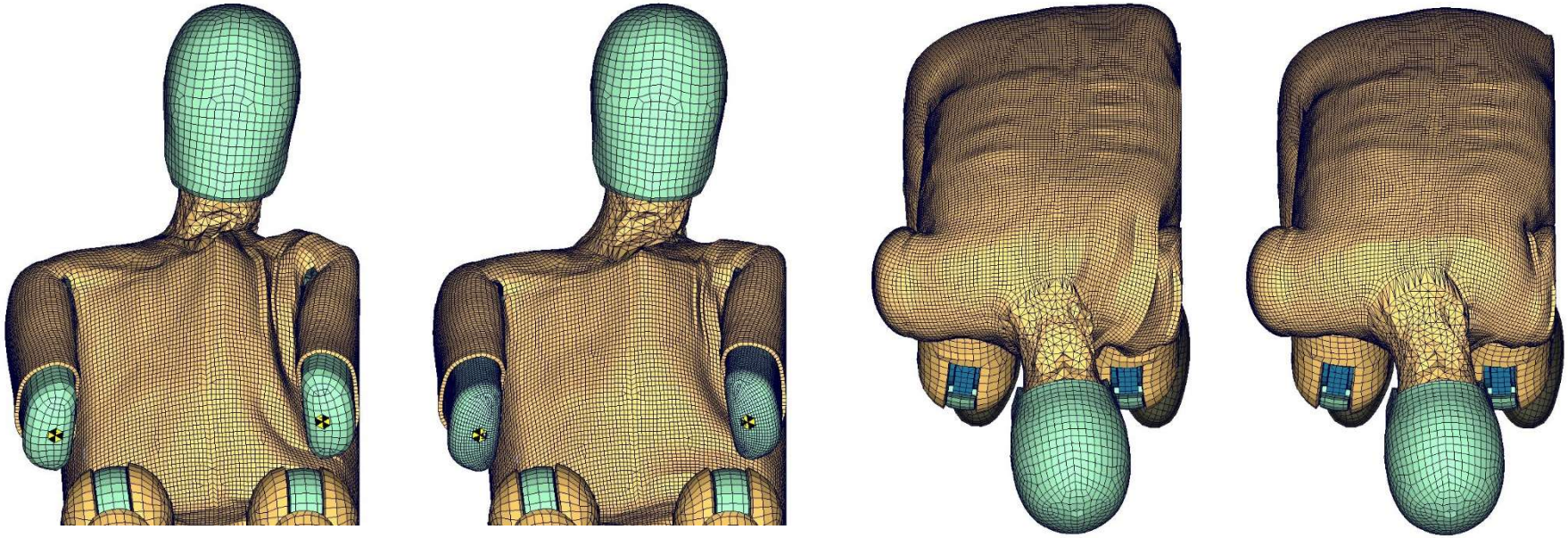
WSID v5.0 v6.0 WSID v5.0 v6.0



The recent developments: WSID50th

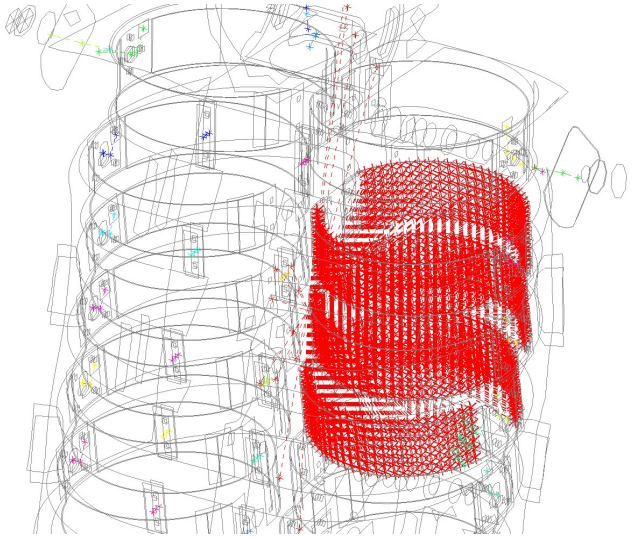
- Thickness of thorax-rib's damping material is variable by parameter.
- Constrained method for optional thorax_rib_damping_mat_nodes:

Version 5.0: The optional nodes are constrained by: *CONSTRAINED_EXTRA_NODES_SET

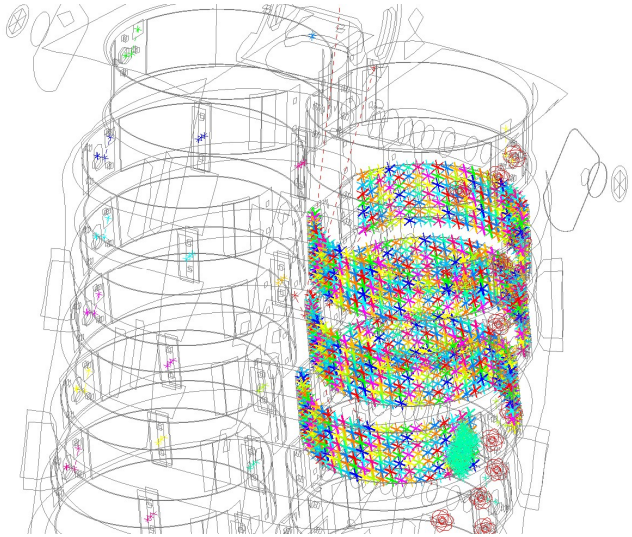
Version 6.0: The optional nodes are constrained by: *CONSTRAINED_NODAL_RIGID_BODY

The thickness of thorax-rib's damping material can be changed after the position of dummy in version 6.0

WSID v5.0

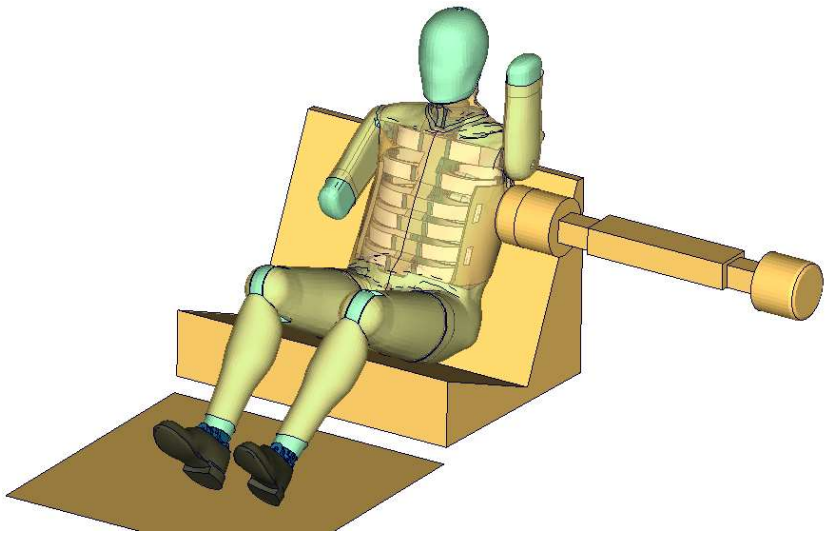


v6.0



The recent developments: WSID50th

- Thickness of thorax-rib's damping material is variable by parameter.
  - &trd_opt == 1: The thickness of thorax rib (Damp-MAT) is 3.00mm.
  - &trd_opt == 2: The thickness of thorax rib (Damp-MAT) is 3.45mm.
  - &trd_opt == 3: The thickness of thorax rib (Damp-MAT) is 3.90mm.
  - &trd_opt == 4: The thickness of thorax rib (Damp-MAT) is 4.35mm.
  - Original thickness of thorax-rib's damping material is 3.00mm after calibration.



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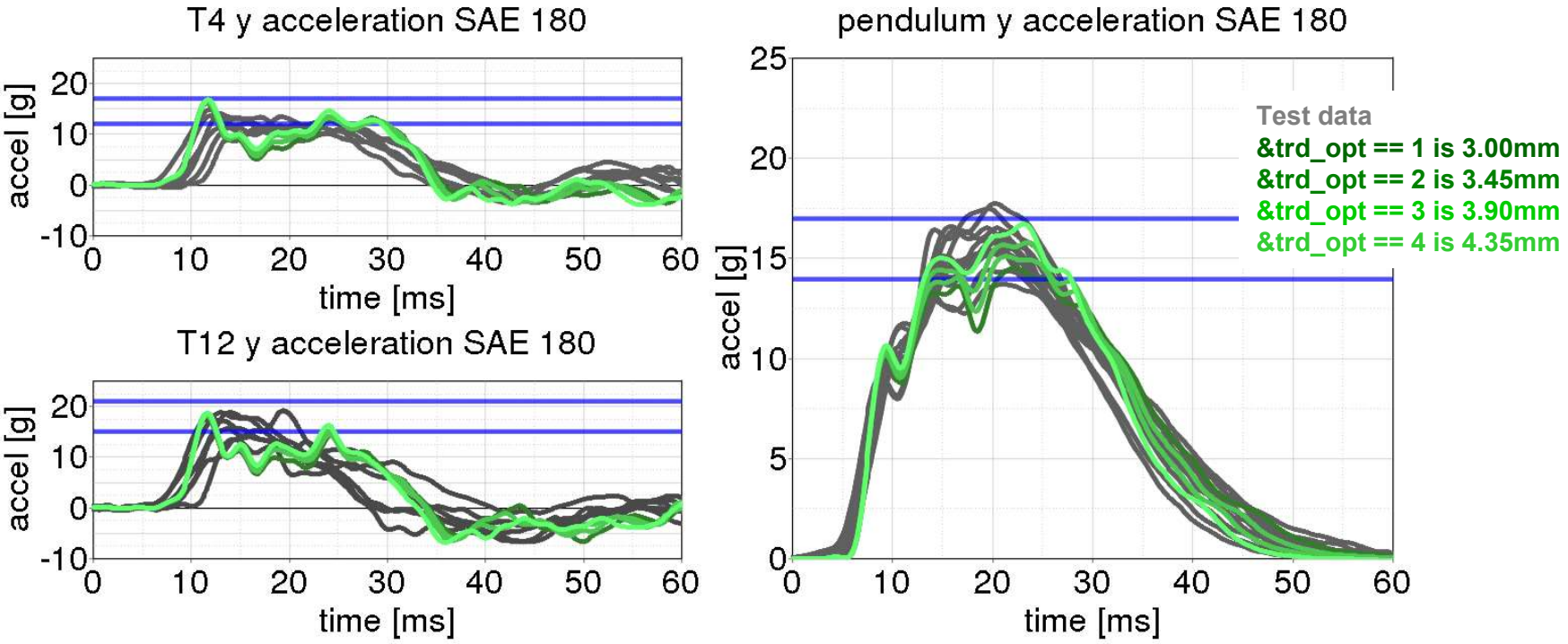

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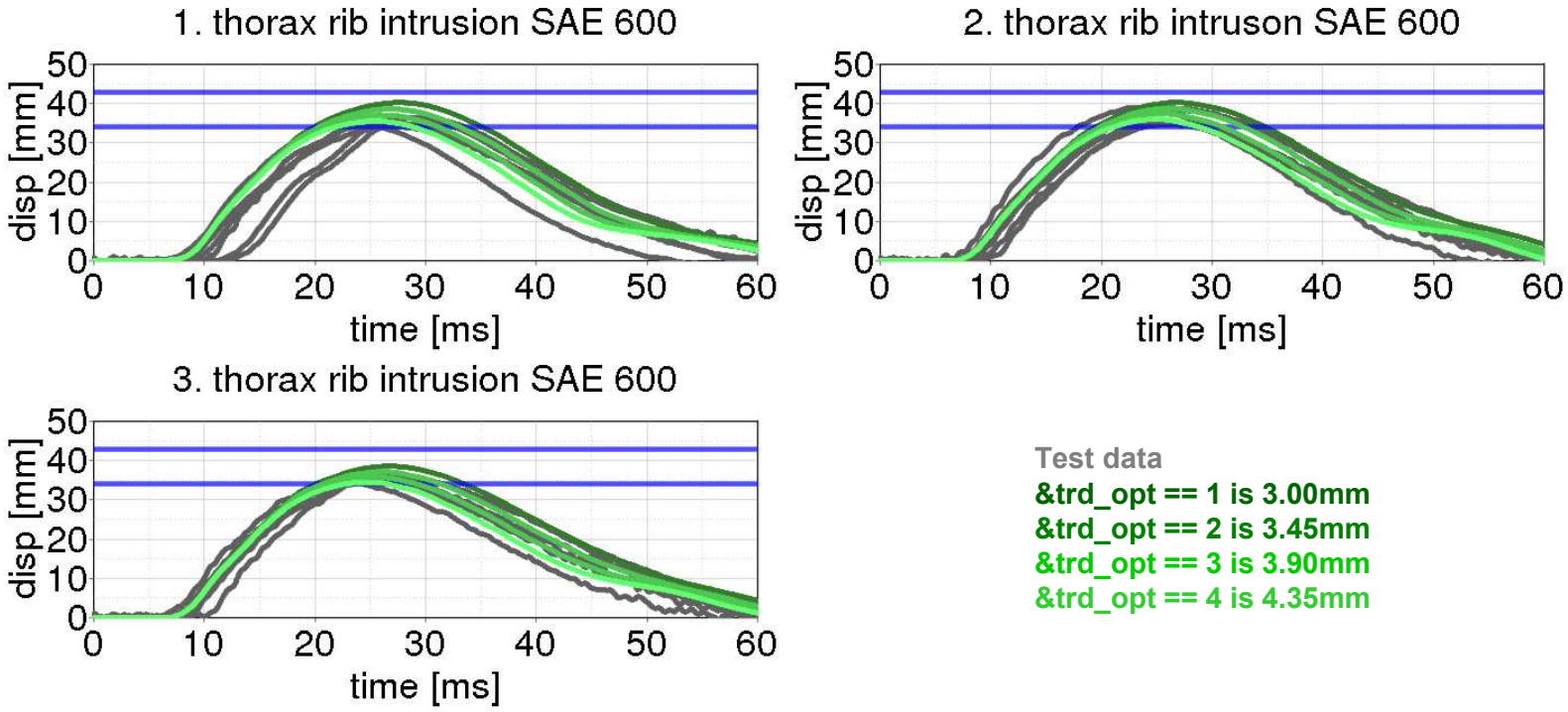

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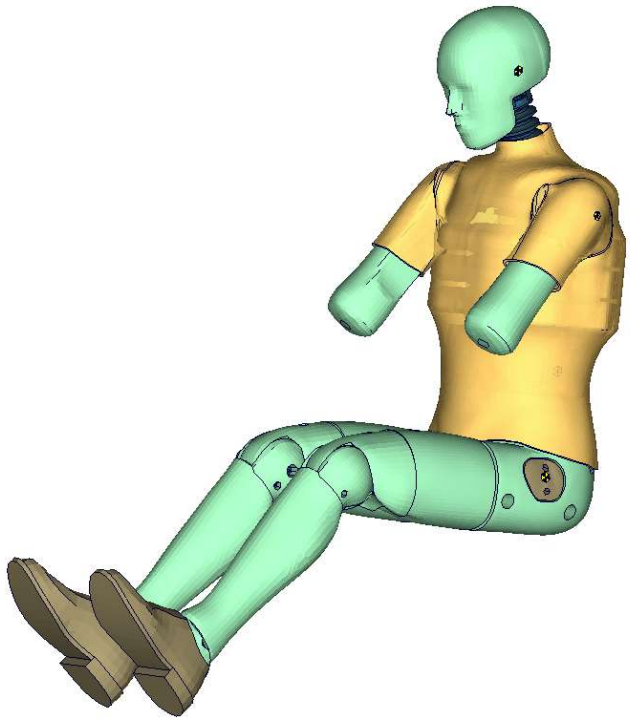
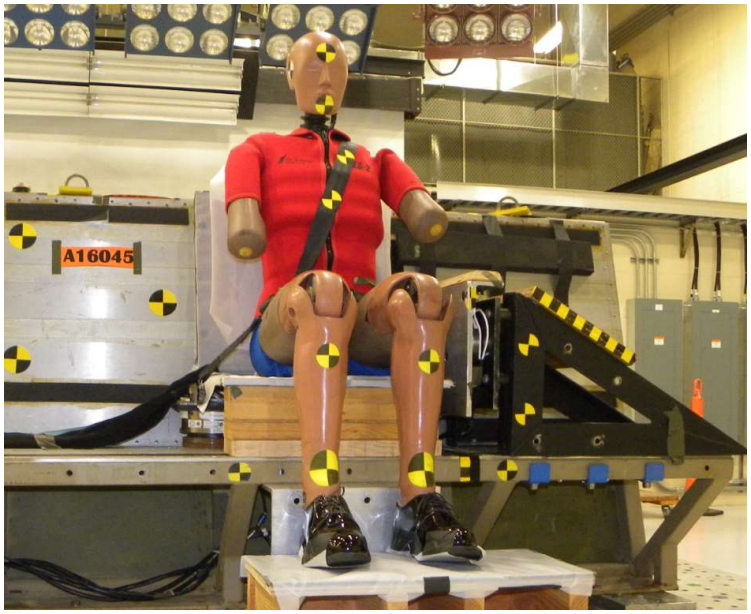


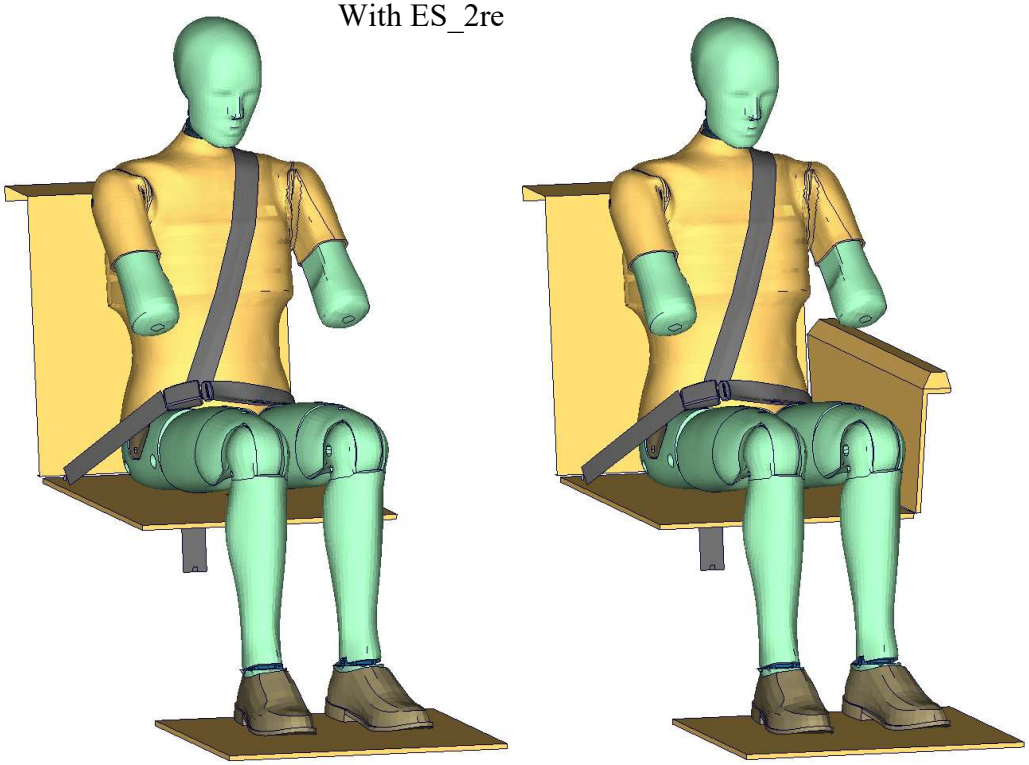
The recent developments: ES2/2re

- ARP5765 RevB: Purpose to use in aerospace area



Courtesy of FAA, Sled test for validation

With ES_2re



The recent developments: ES2/2re

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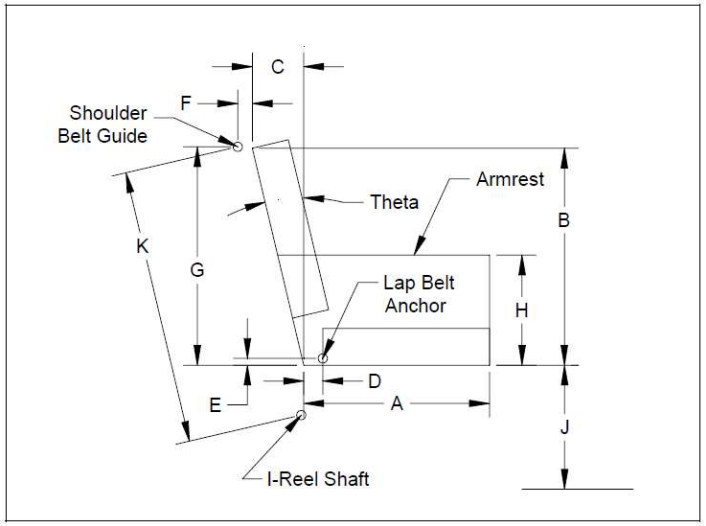
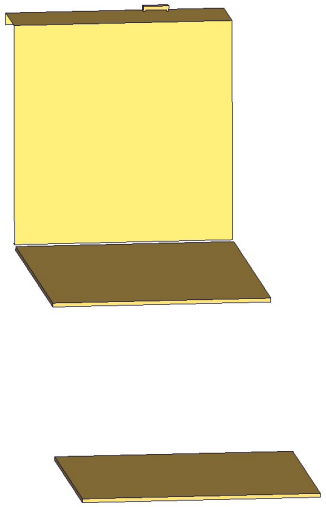
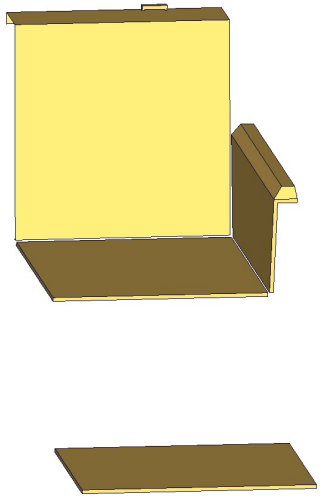


Courtesy of FAA, Sled Seat for validation



Sled_Seat without armrest



Sled_Seat with armrest

The recent developments: ES2/2re

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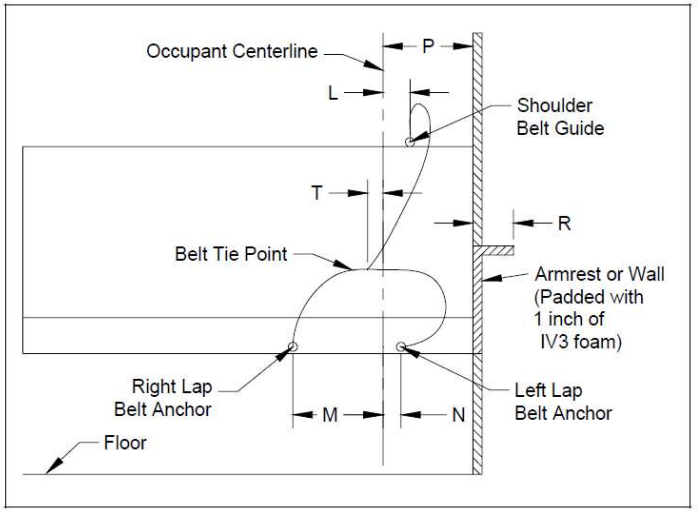
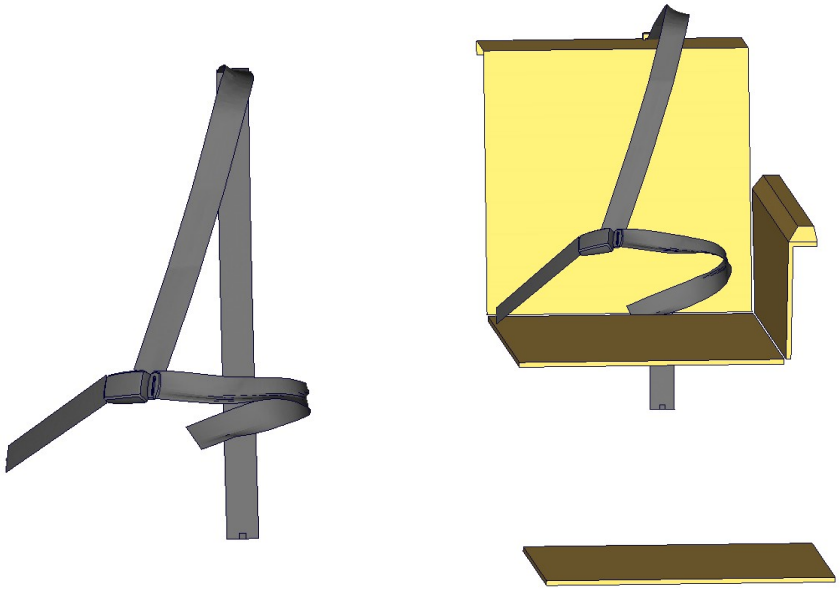


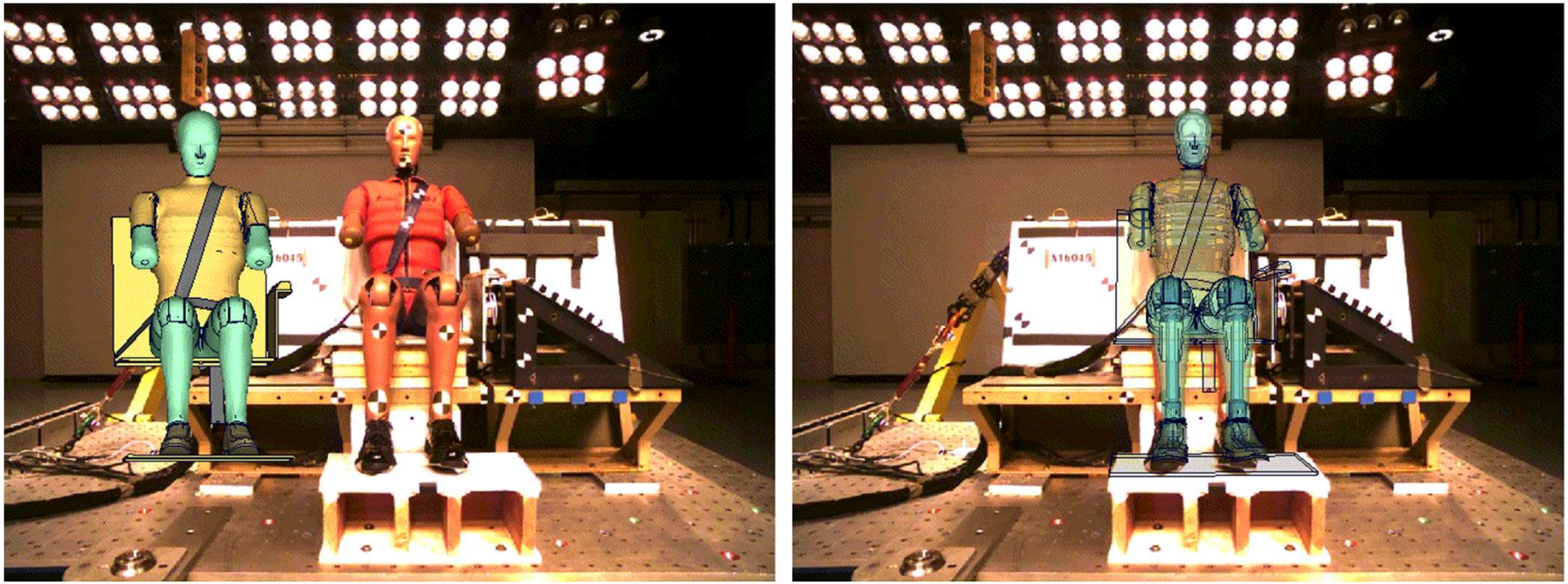
Courtesy of FAA, Seatbelt for validation



Seatbelt model

The recent developments: ES2/2re

- ARP5765 RevB: Purpose to use in aerospace area

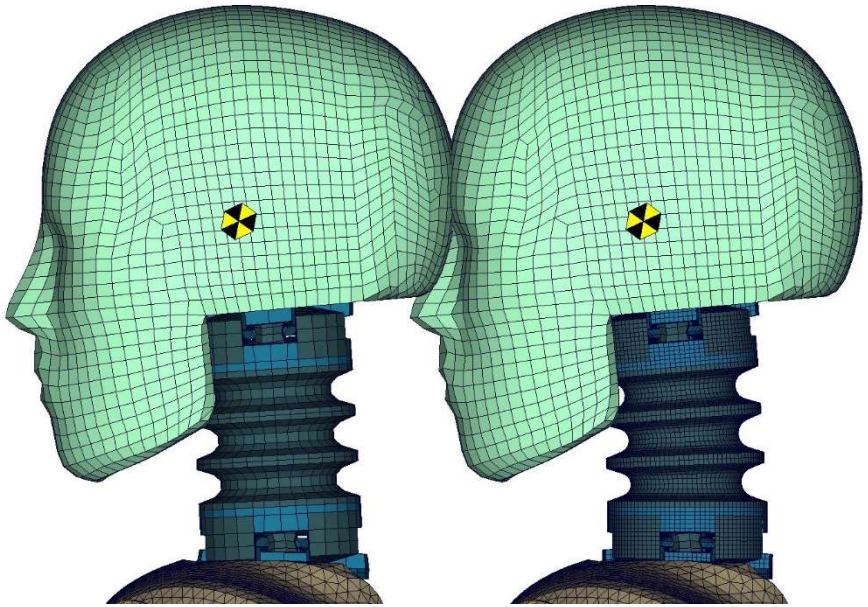


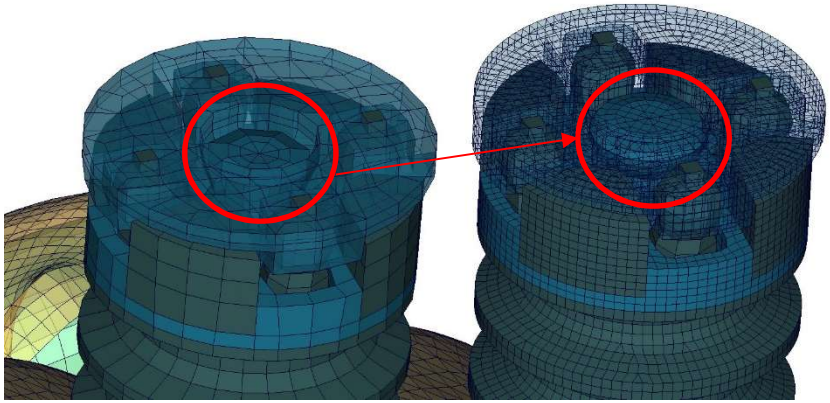
Courtesy of FAA, Sled test for validation vs Simulation

The recent developments: ES2/2re

- New mesh (2.5mm) for Neck, old mesh (5mm ~ 9mm)
- Joint adjustment
- MAT…

ES2/2re v7.0 v8.0





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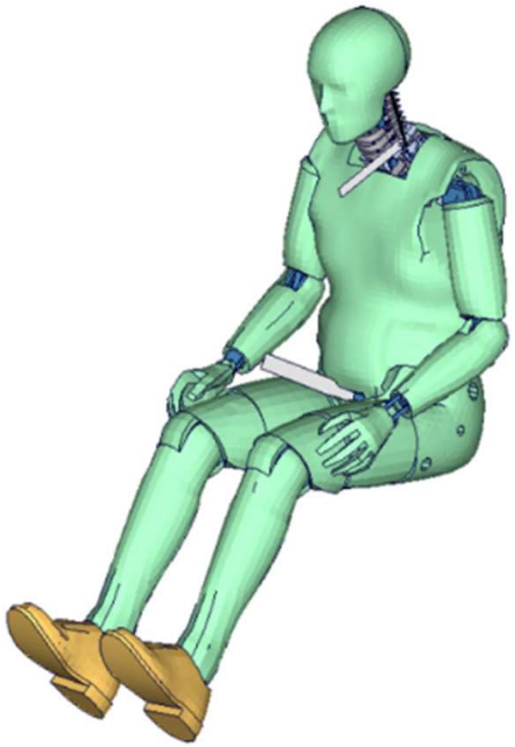
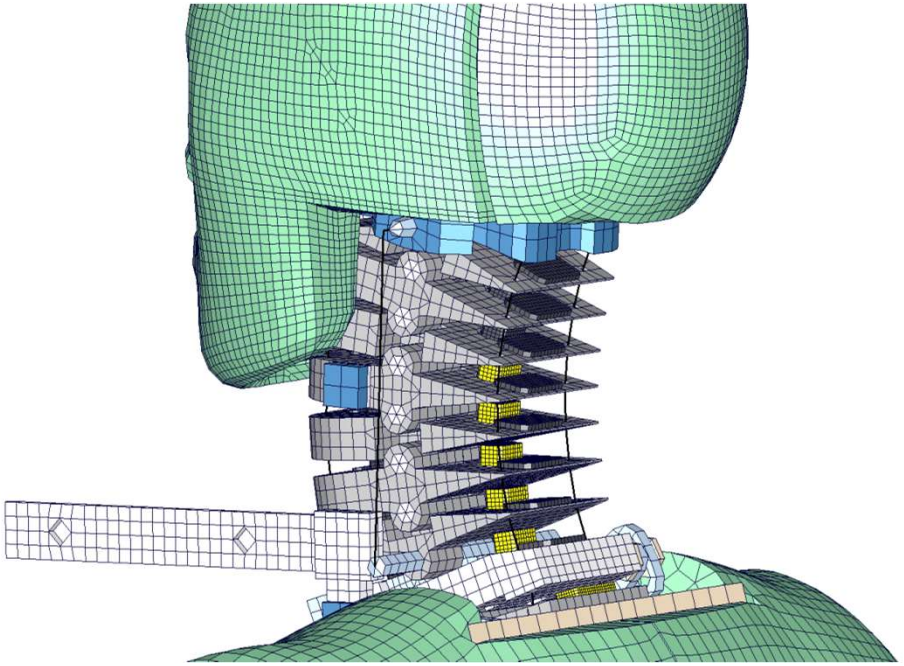


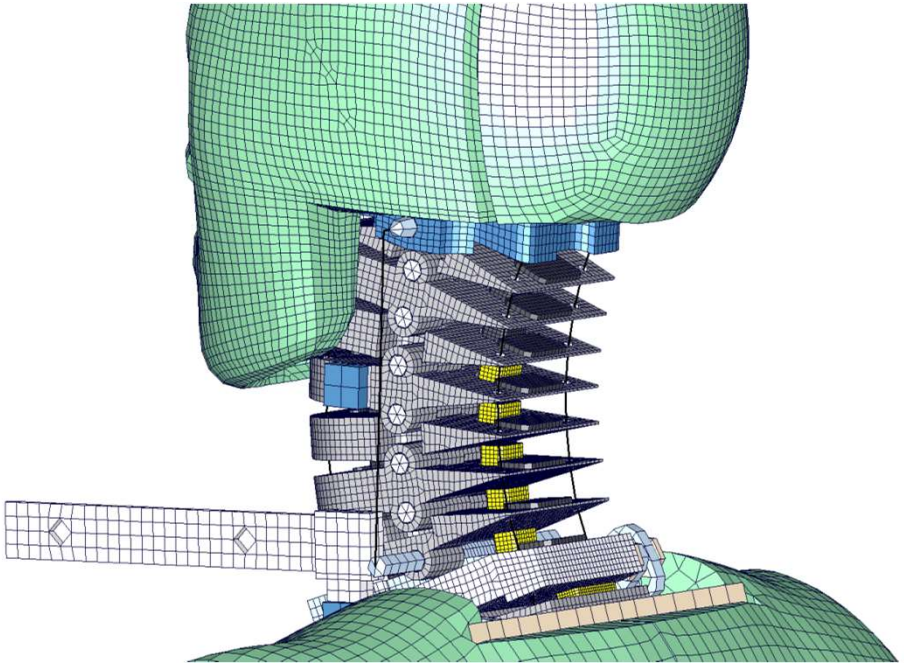
The recent developments: BioRIDII

- Geometry Update.

BioRID v3.9



BioRID v4.0



The recent developments: BioRIDII

- Geometry Update.

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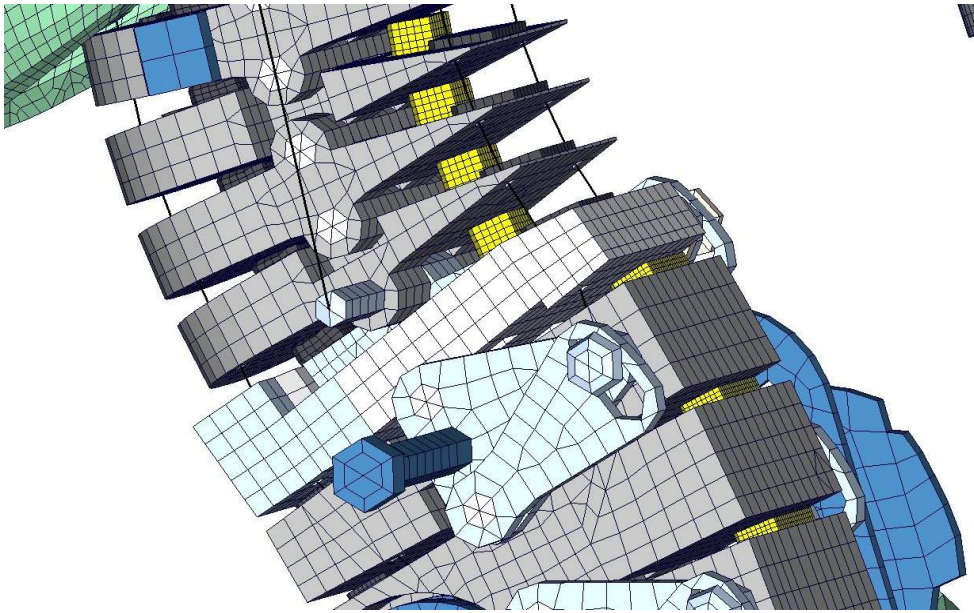
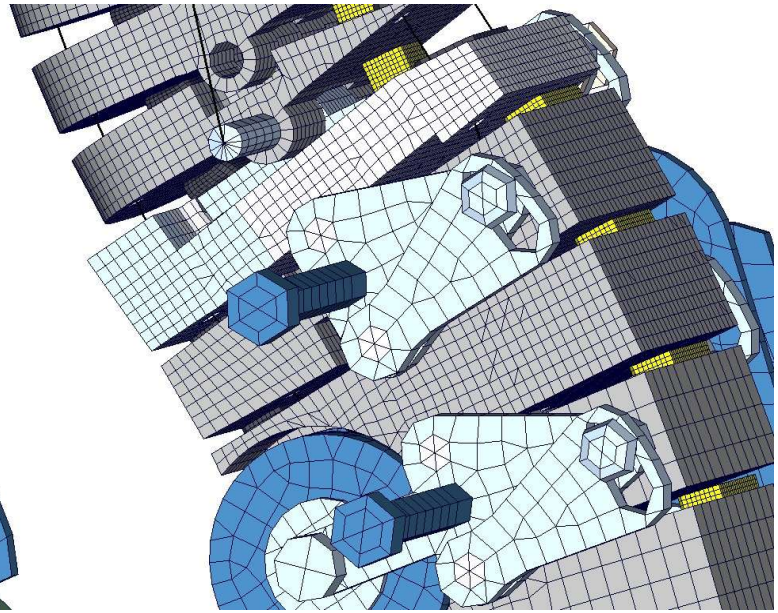


BioRID v4.0



- Recent Developments

- WSID50th V6.0 was released in the end of 2018

- ES2/2re V8.0 will be released in the early of 2019

- BioRIDII V4.0 still doesn’t have the exactly time schedule
  We are still working on the calibration phase

For improving the response of the models and their usability we appreciate the feedback from all users

India.support@arup.com

Thank you for your attention!