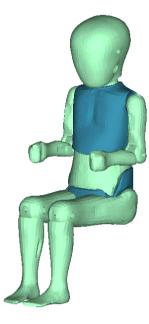## Content:

- Motivation and targets for the development
  of the P-Dummies (P1.5 and P3.0)

- Planned Project workflow

  - Geometry scan

  - CAD data creation

  - Mesh creation

  - Model assembling and input data

  - Validation simulations

- Status quo and time schedule
  for the project

Motivation:

- Due to requests from child seat developers a project is launched

- Euro NCAP is using P1.5 and P3 on the rear seat

- The development of the Q-Dummy series is still in progress and the replacement of the P-Dummies by the Q-Dummies seems to be delayed

Targets for the model development:

- The models should be developed in a very short time window

- The costs for the model should be moderate

- Mass validated model

- No material tests should be done, if possible

- Only similar material data of other dummies are used

- The calibration test of the manual should be fulfilled

    - Joint stiffness adjustment

    - Static neck and lumbar spine test

Workflow – Geometry scan:

- The geometry creation is done by laser scanning

- The models were disassembled to a reasonable extend

- Scanned components:

    - Head
    - Lumbar spine

    - Neck
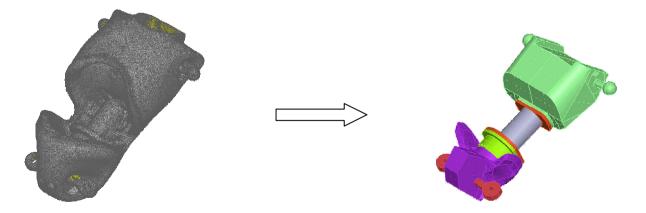   - Pelvis

    - Neck load cell
    - Arms/Legs

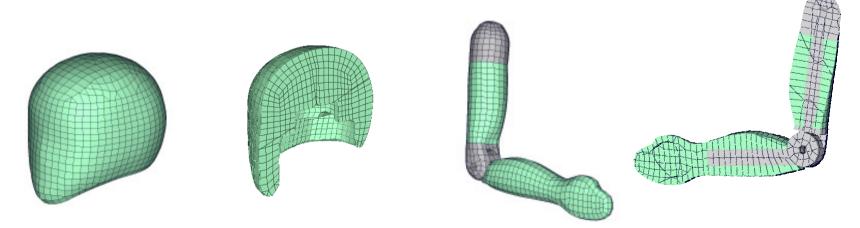   - Torso

Workflow – CAD data creation:

- Target is not to get complete CAD data set of the models

- The step from STL data to meshed parts should be very short

- Important surfaces are joint together for meshing

- Highly concave sections or geometry are added by hand (ANSA, Hypermesh)

- Thus design of a few contours is not based on approximated data

Workflow – Mesh creation:

- The single components will be meshed by using a element length
  of 5-8mm

- All parts are meshed by solid elements covered with
  contact shells if needed

- The time step size will approximately be 1.0E-3 ms without mass
  scaling

Workflow – Model assembling and input data:

- The position of the single components are adjusted
  only for the FE-Model

- All joints will be modeled in the dummy and a tree-file
  for positioning is included

- Bones and inner plastic parts will be rigid

- For rubber and foam materials similar material of other models should
  be used

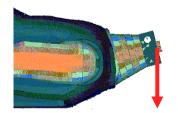- Instrumentation like it is described in the manual

Workflow – Planed validation simulations:

- In a first step the calibration definitions of the manual are used to adjust the first behavior of the models

    - Joint stiffness under gravity load

    - Bending of neck and lumbar spine under gravity load

Status quo and time schedule for P3 Model:

- Geometry scan → **finished**

- Weighing of components → **finished**

- Geometry generation and meshing → **finished**

- Model assembling → **finished**

- Including calibration information → **finished**

- Stability check and documentation → **in progress**

All additional offered tests are welcome to enhance the model quality!

The P1.5 Model will follow after finishing P3 Model and depending on customer interest.