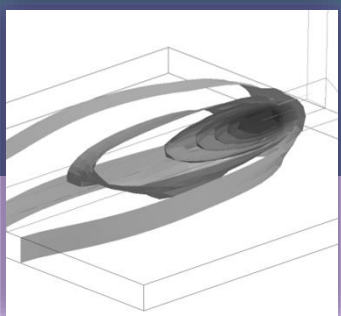
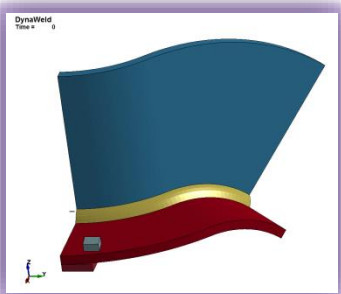


Informationstag



Schweissen und Wärmebehandlung mit LS-DYNA

DYNAMore Swiss GmbH
Ingenieurbüro Tobias Loose



14.04.2016, Zürich

DYNAmore Swiss GmbH

- founded in 2011 as ETH Spin-off
 - ongoing cooperation ETH Zürich, IVP
- Office: TECHNOPARK® Zürich
- 3 employees in Zurich:
 - David Schröder
 - Andriy Krasovskyy
 - Bernd Hochholdingner
- Our expertise:
 - Cold- and hotforming simulation
 - Simulation of welding processes
 - Thermal und thermo-mechanical coupled analysis
 - Structural Analysis – static and dynamic
 - Impact and crash simulations
 - Explicit - implicit
 - Fatigue
 - Material modeling, ...



DYNAmore - Companies

■ Countries and their Headquarters

- Headquarters in Stuttgart
- Nordic – headquarters in Linköping
- Swiss – headquarters in Zurich
- Italia – headquarters in Torino
- France – headquarters in Versailles



■ Further Offices

- Ingolstadt
- Dresden
- Langlingen (Wolfsburg)
- Berlin

■ On-site Offices

- Sindelfingen (Daimler AG)
- Weissach (Porsche)
- Ingolstadt (Audi)
- Gothenburg (Volvo)



Stuttgart [Headquarters]

DYNAmore – The People

■ Who we are

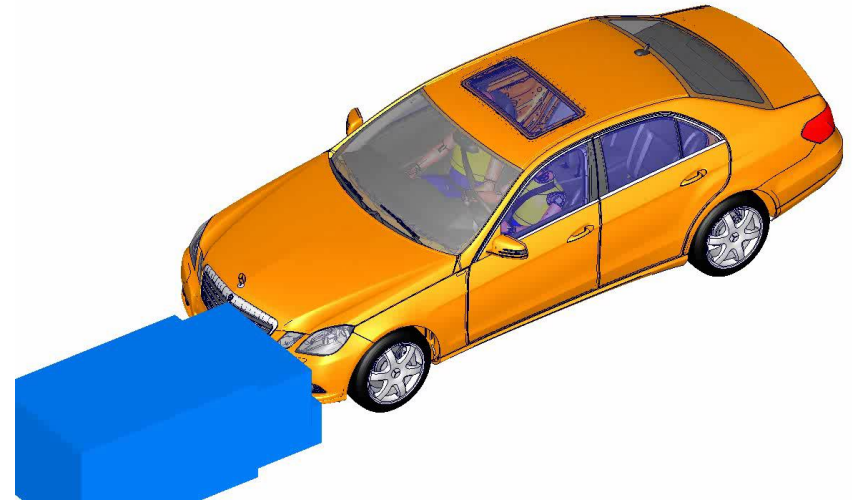
- In total close to 100 people
- Civil and mechanical engineers, mathematicians, computer scientists,...
- The employees are from 13 different countries



DYNAmore – The Products

■ Software

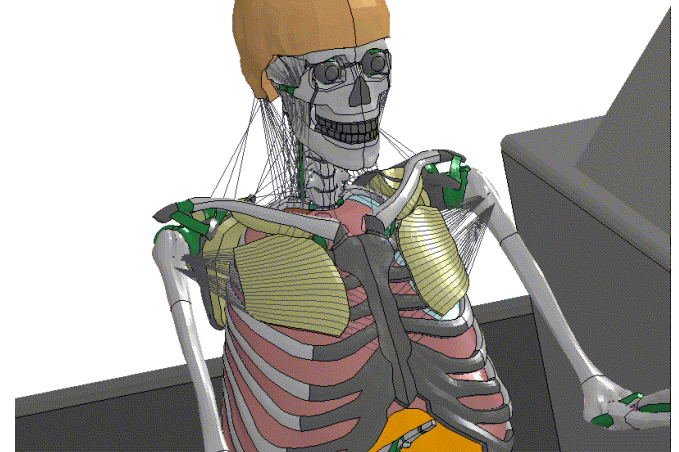
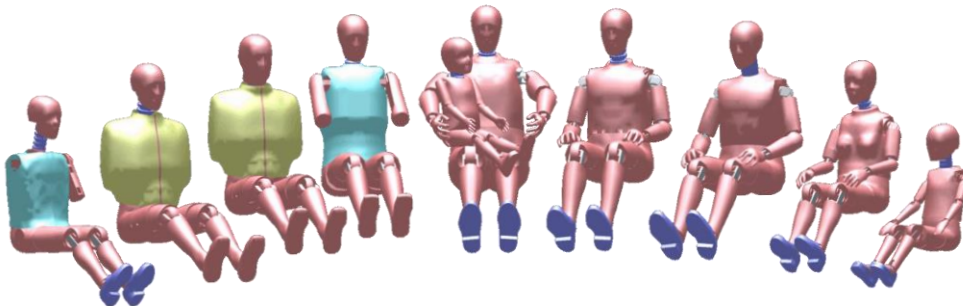
- LS-DYNA
- LS-OPT & LS-TASC
- LS-PrePost
- eta/DYNAFORM, FEMZIP, Digimat
- Simulation Data Management (SDM)
 - LoCo, CAViT, Status.E



■ Models

- Barrier and impactor models (Arup/Daimler/Porsche)
- Dummy models (FAT/PDB/Humanetics/LSTC)
- Human model (THUMS)

THUMS AM50 Occupant Model Version 4 201
Time = 0



DYNAmore – The Services

■ Software

- European master distributor for LS-DYNA (w/o UK), plus Turkey and Brazil
- eta/DYNAFORM, FEMZIP, Digimat

■ Engineering

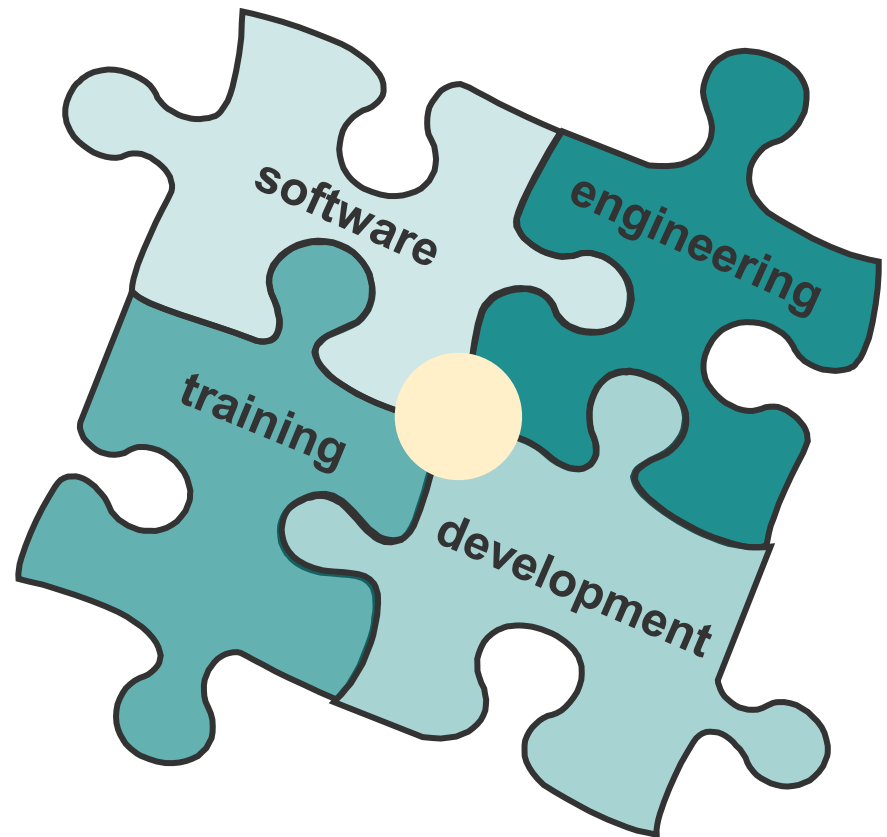
- (pilot) projects & benchmarking

■ Development

- Software development
 - 6 developers for LS-DYNA
 - 3 developers for LS-OPT
 - 1 developer for LS-PrePost
- Material & dummy models
- System & process integration
- Customization & method development

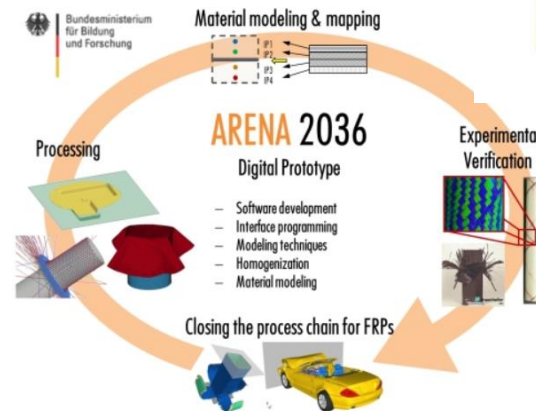
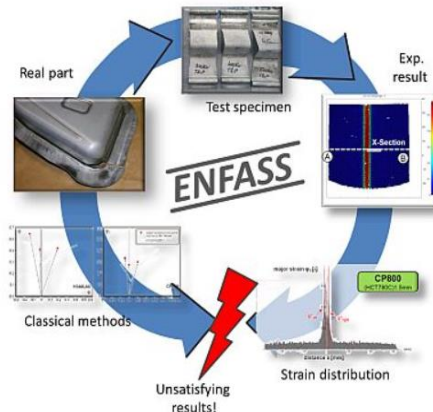
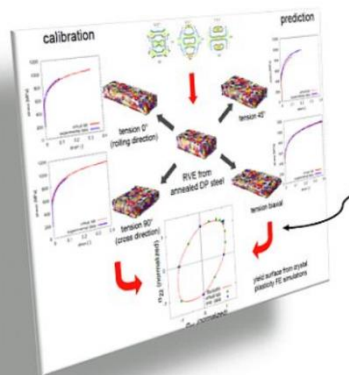
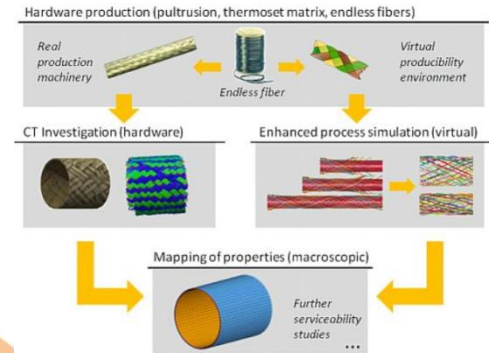
■ Training &

- Seminars & on-site coaching
- Conferences
- Support

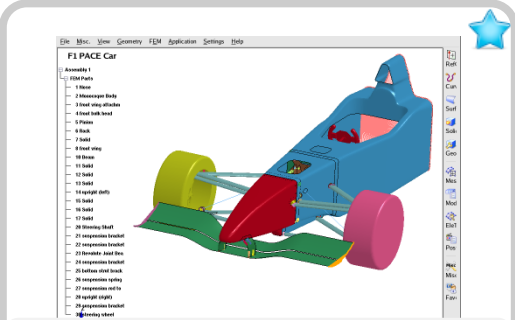


DYNAmore – Advanced Customer Support

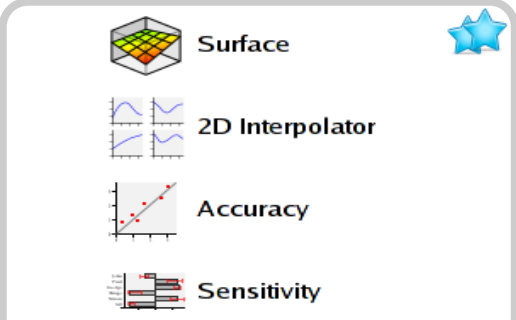
- Customer specific revisions of LS-DYNA
- Material model development (CWM, GISSMO, PHS, etc.)
- Mapping of simulation data (forming, composites, etc.)
- Material parameter determination
- ...
- Partner in many research projects (national/ international)
 - Composites: Swim-RTM, T-Pult, ARENA 2036
 - Forming: ENFASS, TWIP4EU
 - Many more



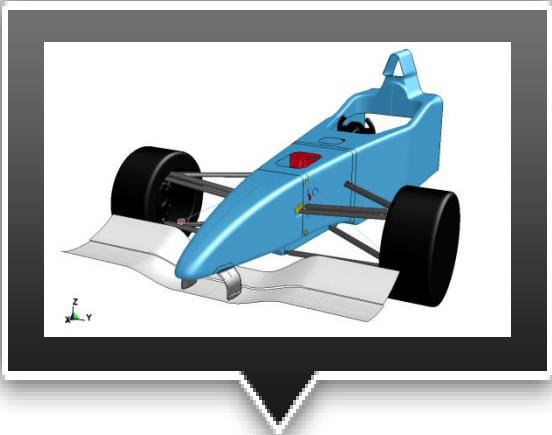
LSTC Product Range



LS-PrePost

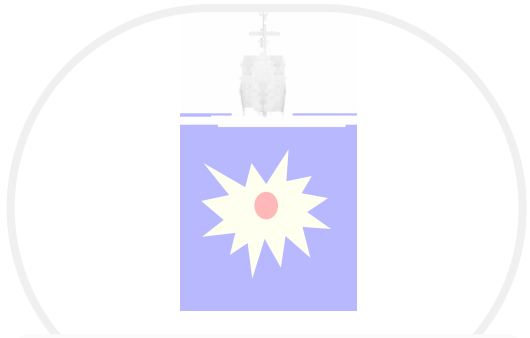


LS-OPT/LS-TaSC




Dummies & Barriers

LS-DYNA
One License – all features

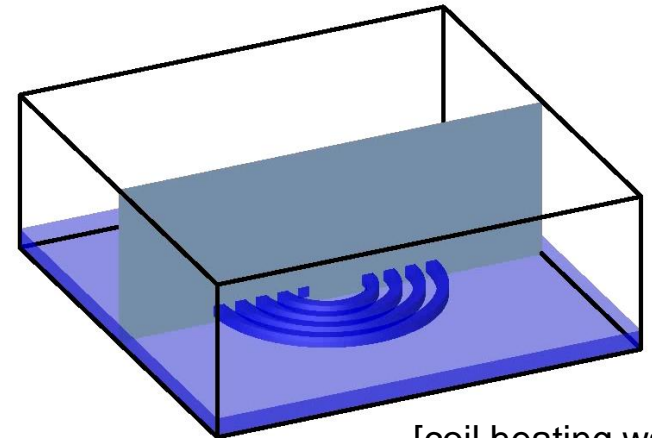
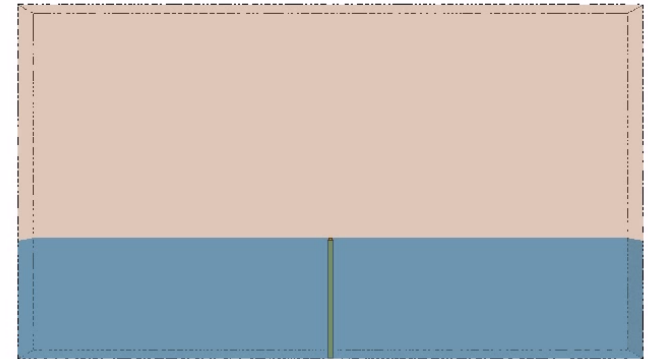


USA

★ **FREE OF CHARGE!**

LS-DYNA R8 – The Multiphysics Solver

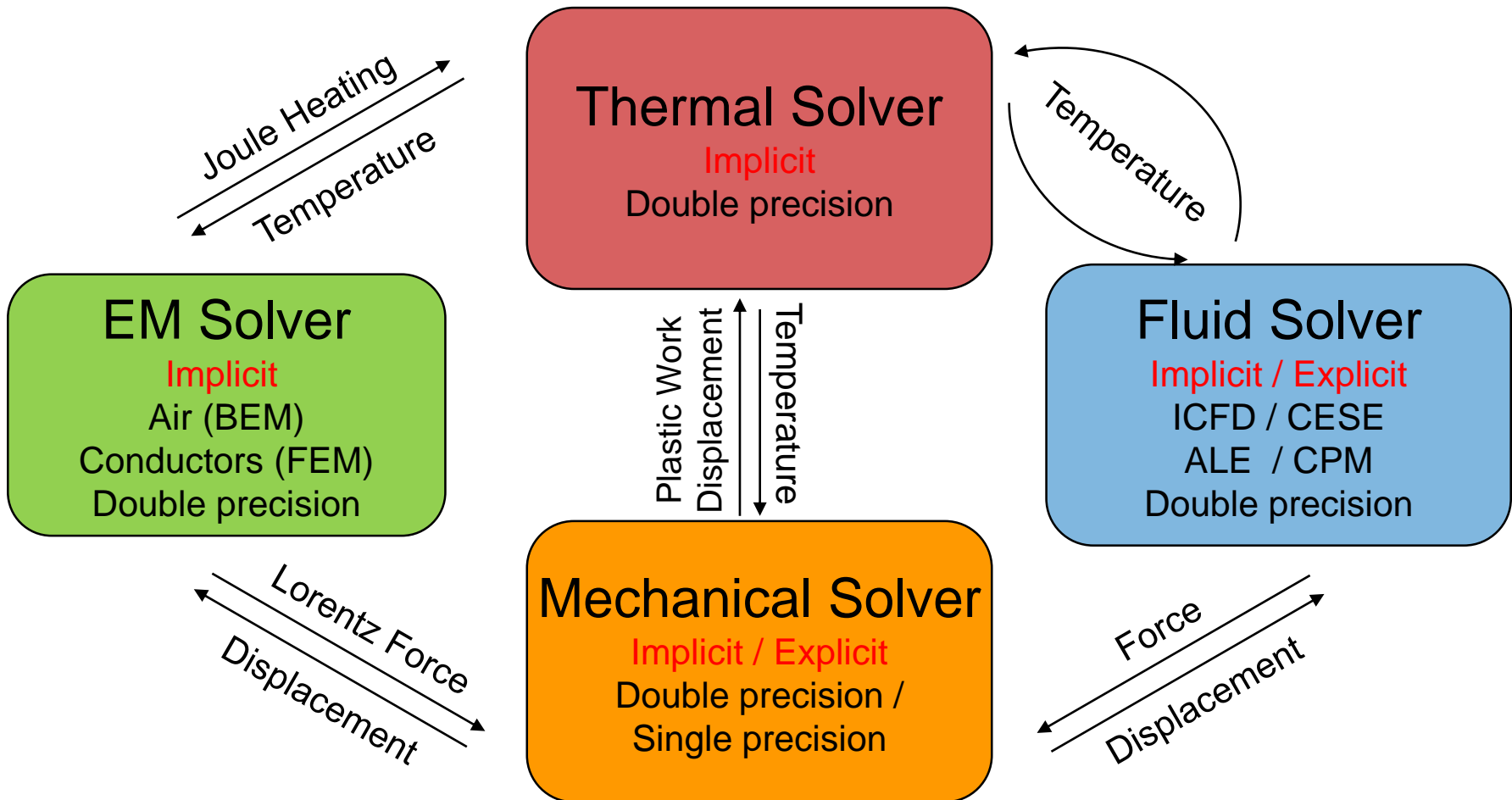
- Combine the capabilities
 - Explicit/ Implicit **structural** solver
 - **Thermal** solver & heat transfer
 - **Incompressible fluid** solver (ICFD)
 - **Compressible fluid** solver (CESE)
 - **Electromagnetics** solver (EM)
 - **Frequency domain**, acoustics, modal analysis
 - Finite elements, iso-geometric elements, ALE, EFG, SPH, DEM, CPM, ...
 - User elements, materials, loads
- Into **one** scalable **code** for
 - highly **nonlinear transient** problems
 - **static** problems
- To enable the solution of
 - coupled **multi-physics** and
 - **multi-stage** problems
- On **massively parallel** systems



[coil heating water]

LS-DYNA R8 – The Multiphysics Solver

- No need for co-simulation, as all solvers are included!



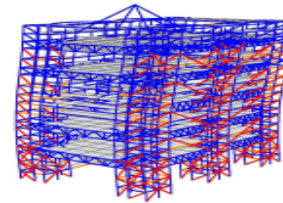
LS-DYNA R8 – The Applications

Automotive



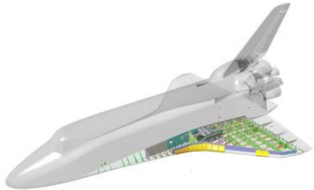
Crash and Safety
NVH
Durability

Civil Engineering



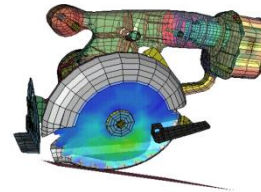
Concrete structures
Earthquake safety
Wind- & Waterpower

Aerospace



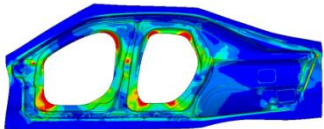
Bird strike
Containment
Crash

Electronics



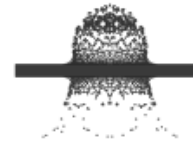
Drop analysis
Package analysis
Thermal

Manufacturing



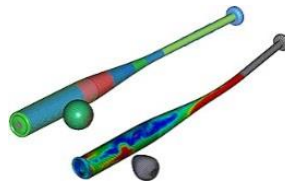
Stamping
Forging

Defense



Detonations
Penetrations

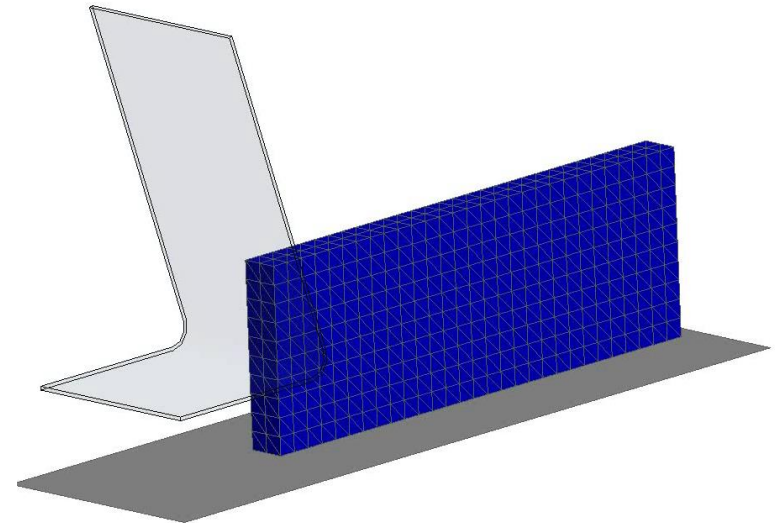
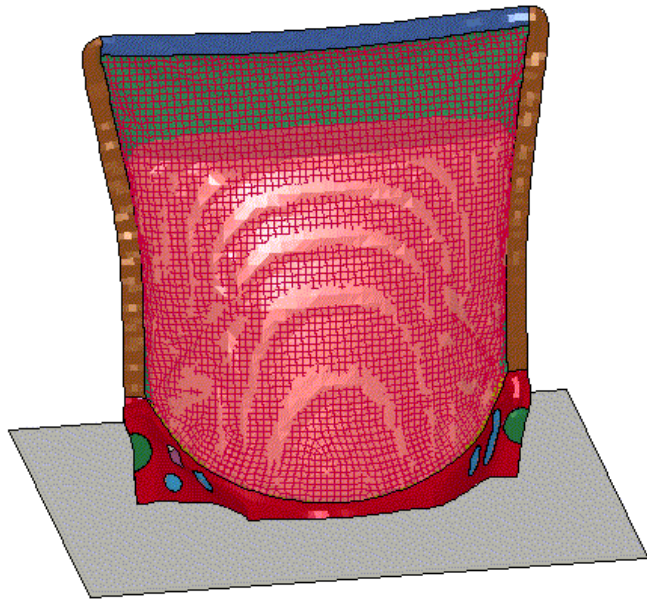
Consumer Products



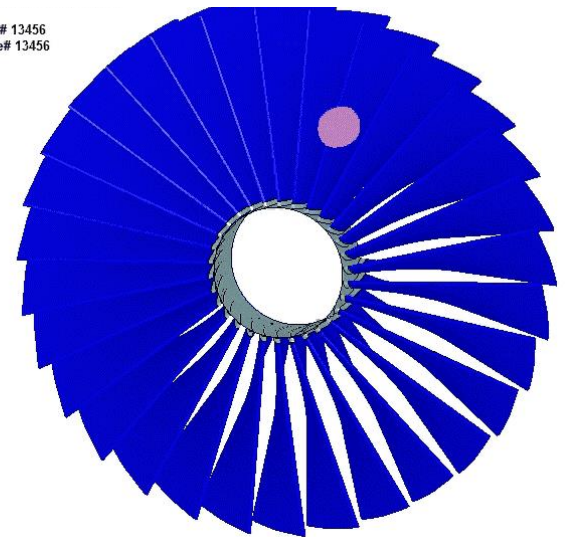
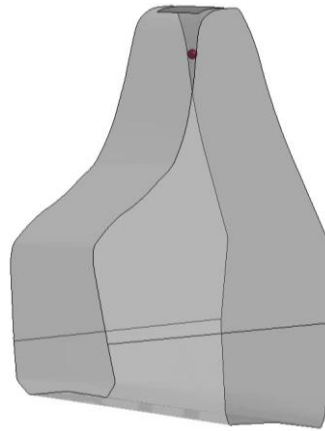
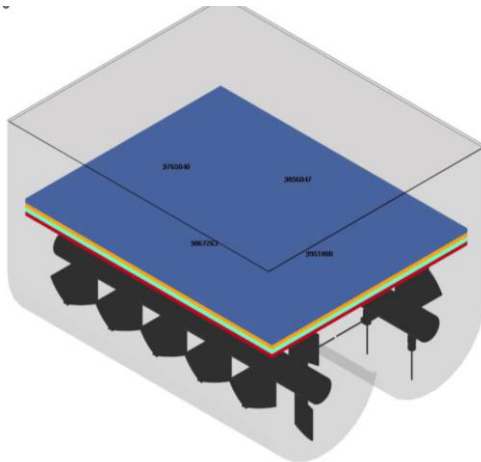
Biomechanics



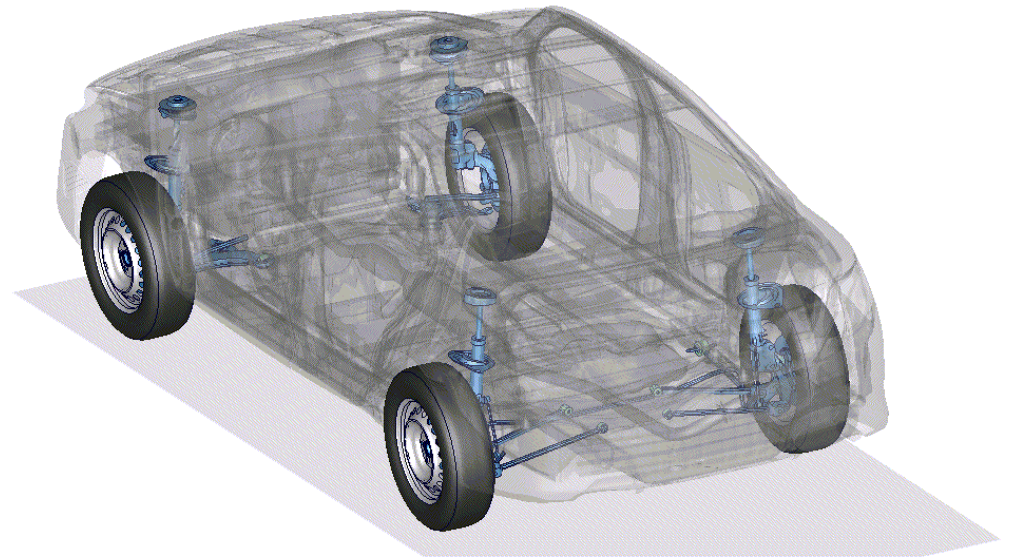
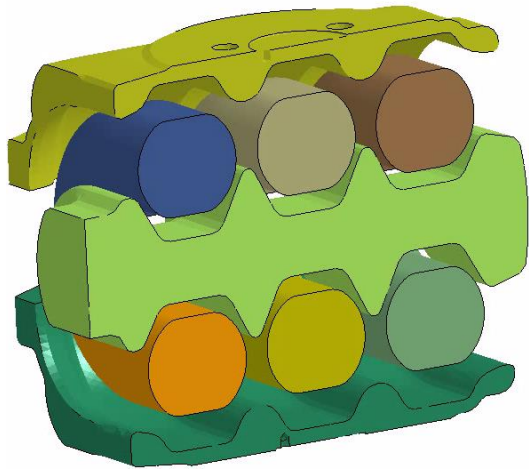
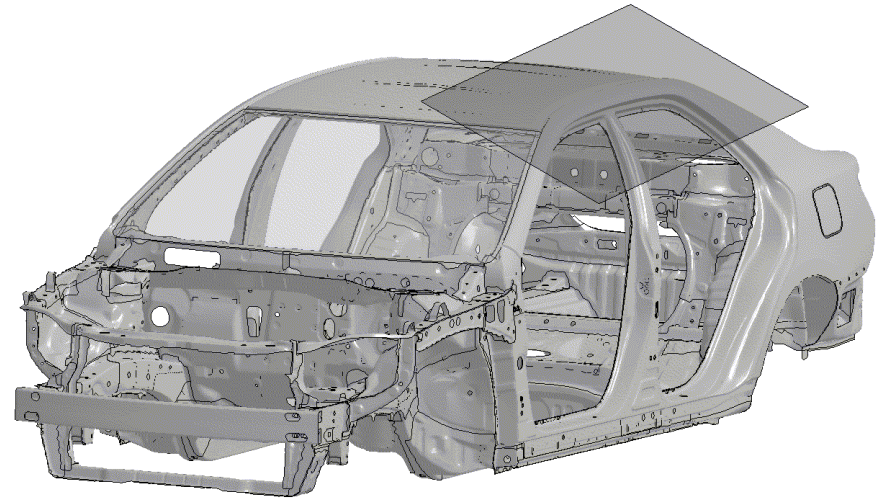
Courtesy Alcan Packaging



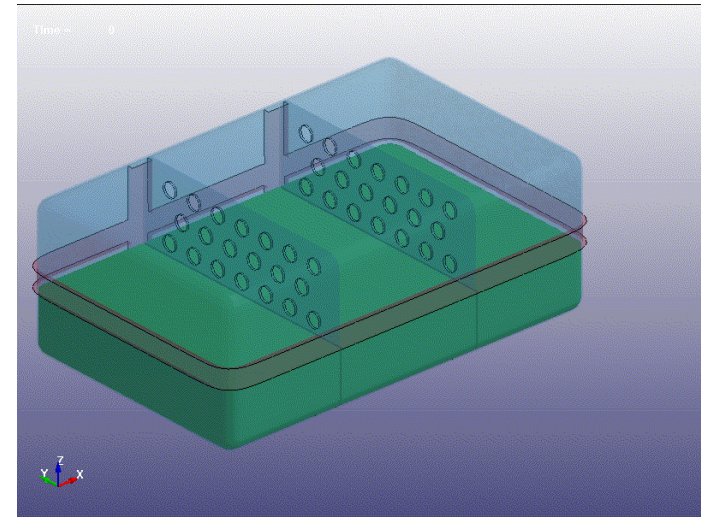
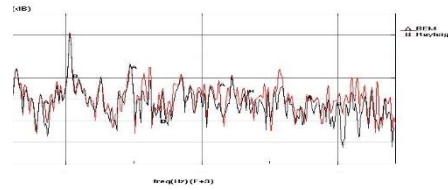
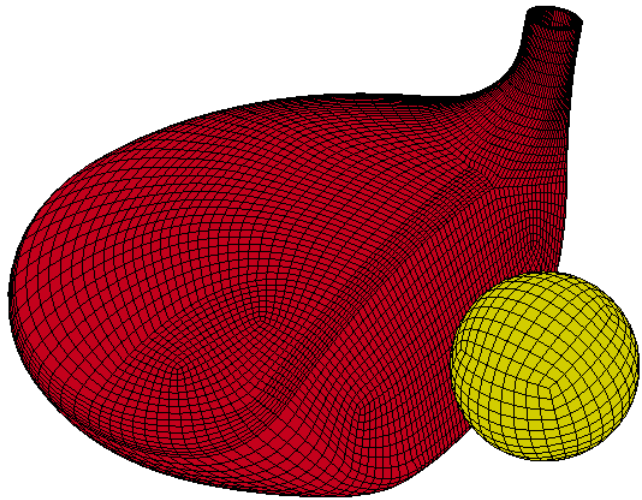
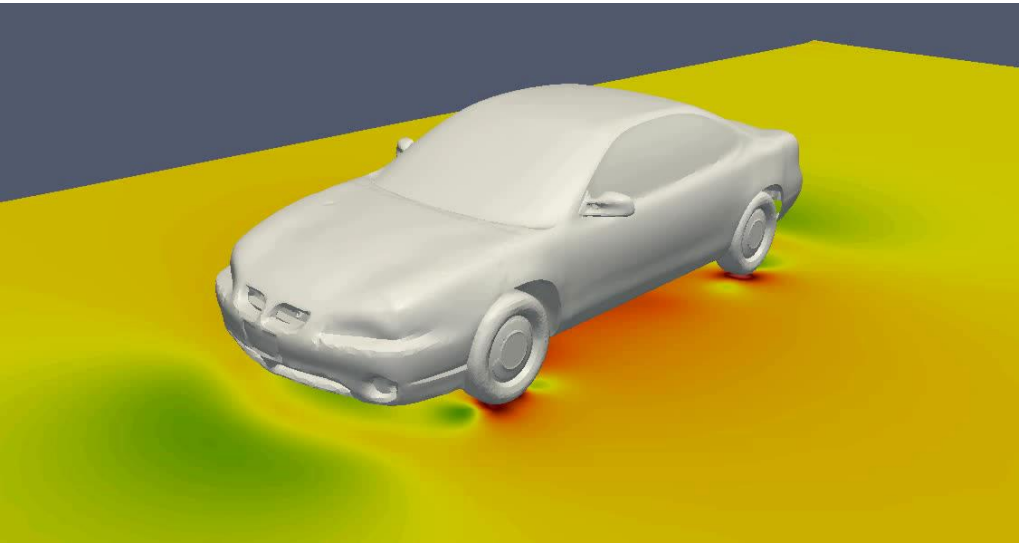
max ipt. value
min=0, at node# 13456
max=0, at node# 13456



static and quasi-static implicit



Courtesy of Dellner Couplers AB



Welding Simulation

DynaWeld

Time = 0

Contours of Temperature, middle

min=293, at node# 99000011

max=293, at node# 99000011

Fringe Levels

3.000e+03

2.729e+03

2.459e+03

2.188e+03

1.917e+03

1.647e+03

1.376e+03

1.105e+03

8.344e+02

5.637e+02

2.930e+02

