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Finite Element Analysis Projects Portfolio

ISO 9001:2000

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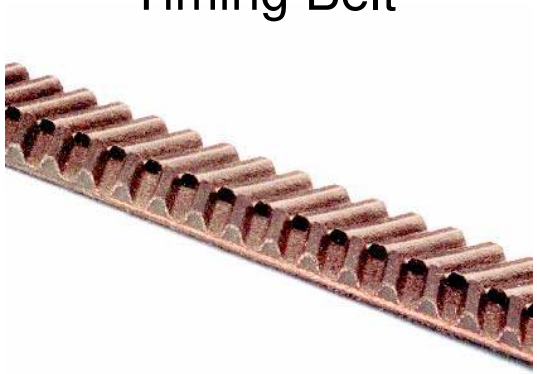
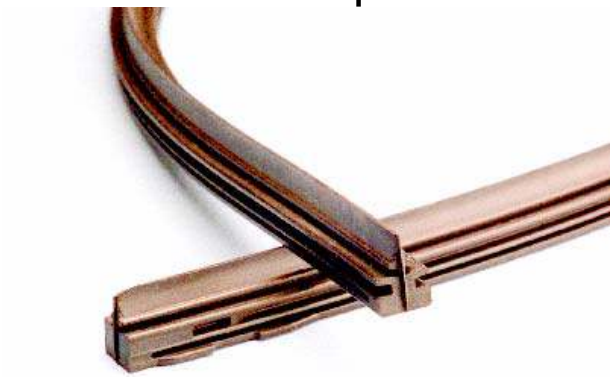
Components analyzed by finite element analysis

Timing Belt



Wiper Blades



Engine/Transmission Mounts

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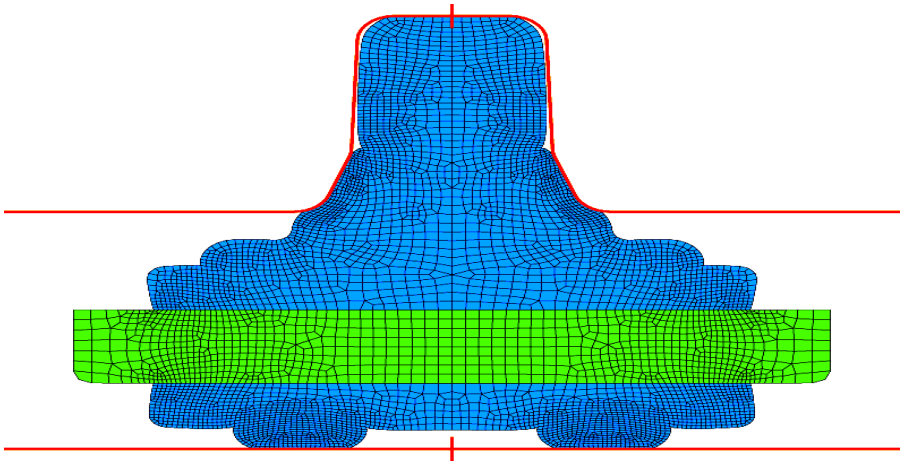
Components analyzed by finite element analysis

Valve Cover Gasket



Hospital Products

Hydromount

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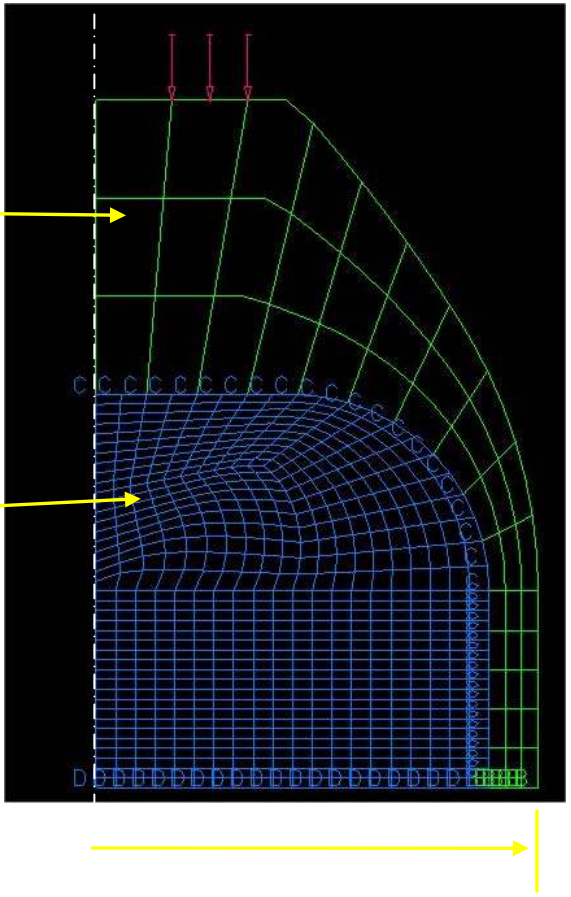
Example: Hydromount Study - 2d Axisymmetric model

Hydromounts used in automotives to damp vibrations caused by the engine mount

Rubber Wall:
Mooney Rivilin
(non-linear
incompressible)

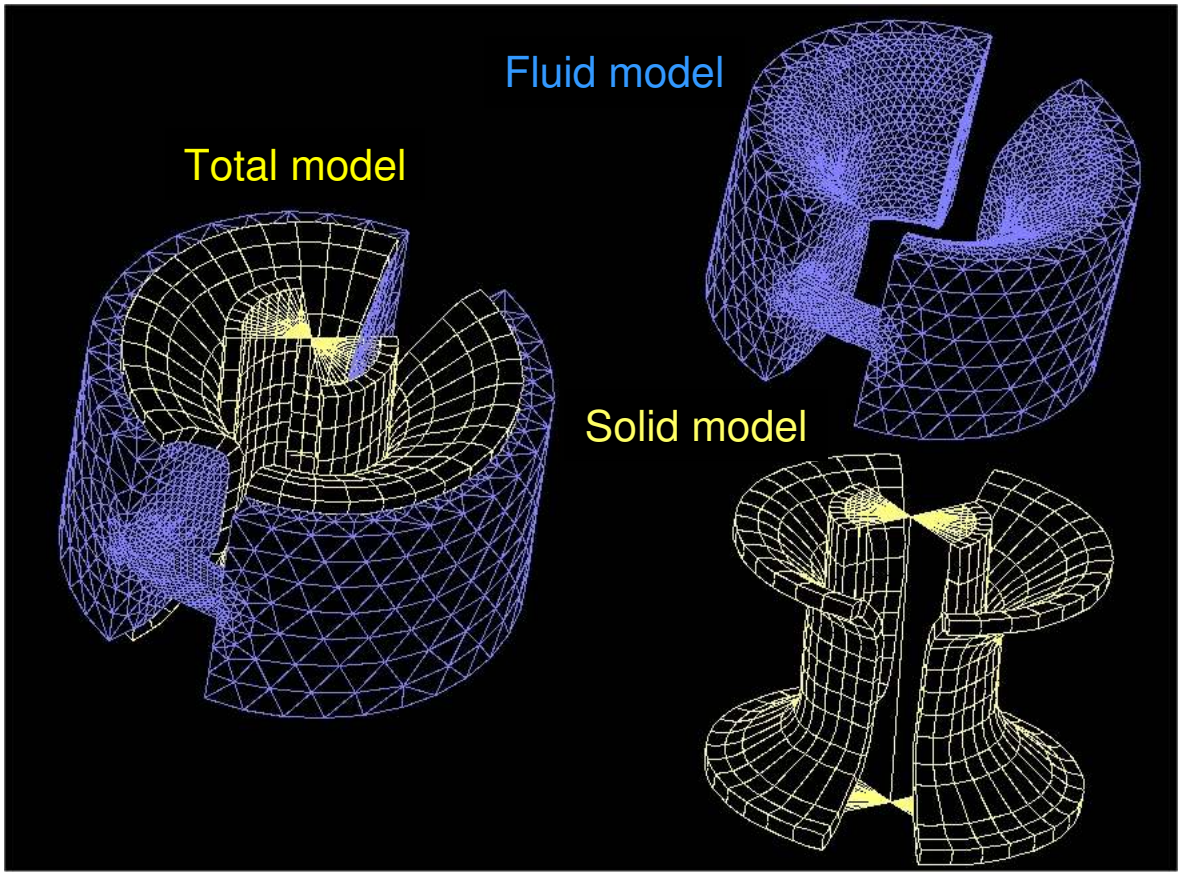
Fluid chamber
Highly viscous oil



• Model: Highly nonlinear, transient FSI, strong coupling

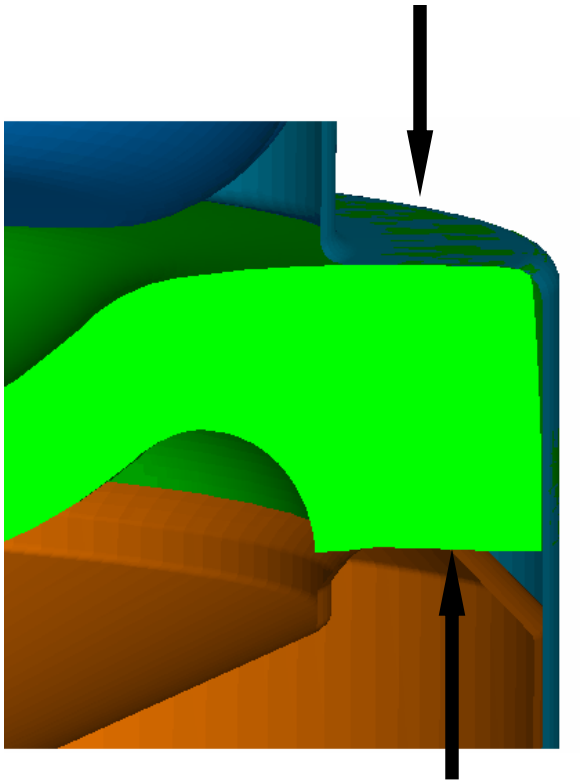
• Boundary condition load:
  - Sinusoidal displacement
  - Amp= 0.05 mm

Fluid Structure Interaction (FSI): Hydromount Pre-Study



Example: Contact problem in rubber components

- Most rubber parts are involved in assemblies and contact with other parts.



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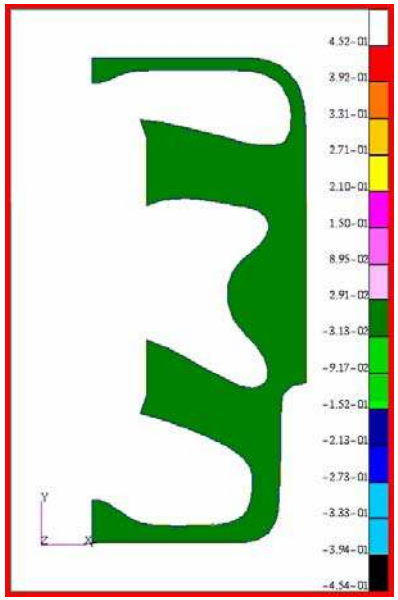
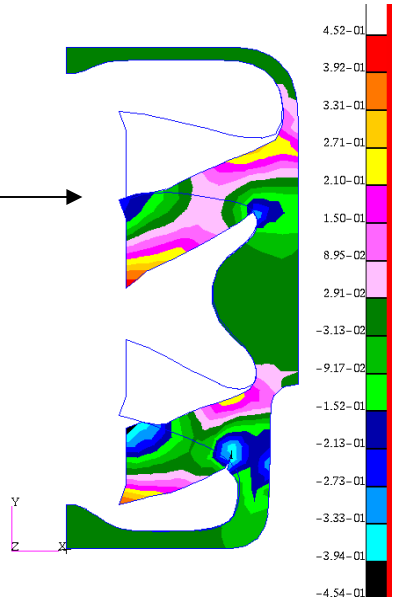
Design optimization example: Engine Mount



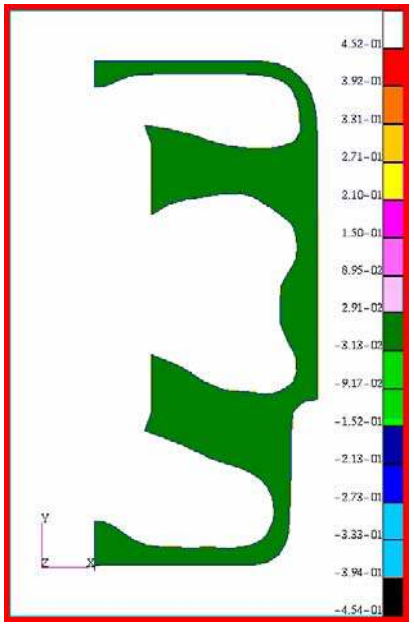
Pro/E Model

FEA Analysis →



Optimization →

Area reduction: – 16.7%



Optimization Problem:

- Objective: minimize area of the mount
- Constraints:
  - maintain the stiffness as in the initial design;
  - keep the hydrostatic pressure at critical points in an admissible range

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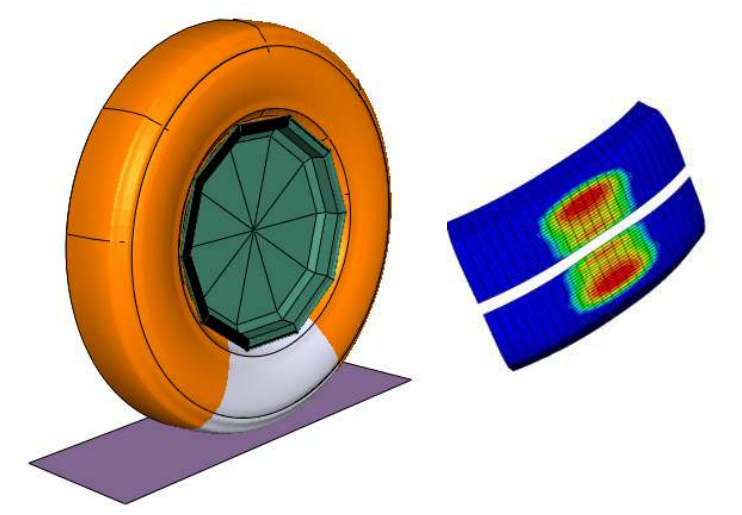
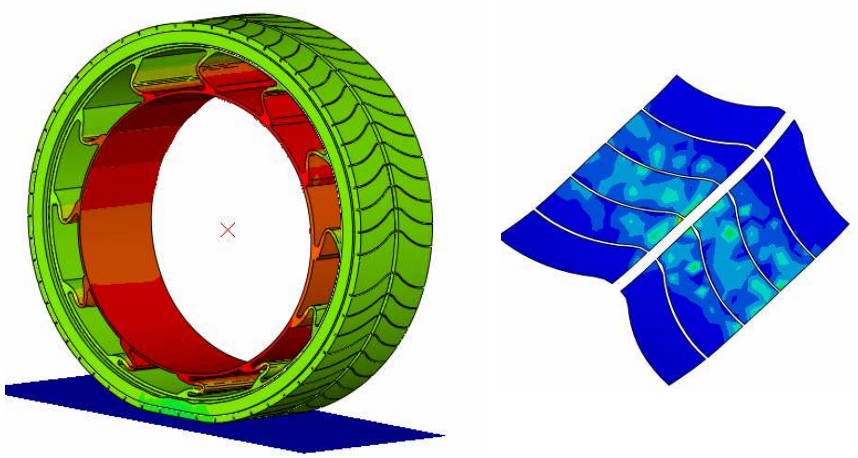
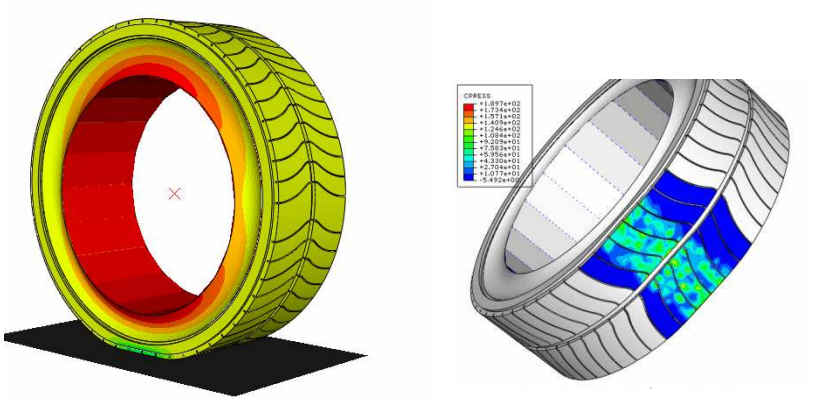
New Tires Design, Analysis and Development



Footprint analysis of half tire model



Footprint analysis of Airless “Elastomer Spoke” PU Tire



Footprint analysis of Airless Polyurethane (PU) Tire

Tire FEA Services

- Foot Print analysis of tire
- Steady-state rolling analysis of tire
- Subspace-based steady-state dynamic tire analysis
- Steady-state dynamic analysis of a tire substructure
- Coupled acoustic-structural analysis of a tire filled with air

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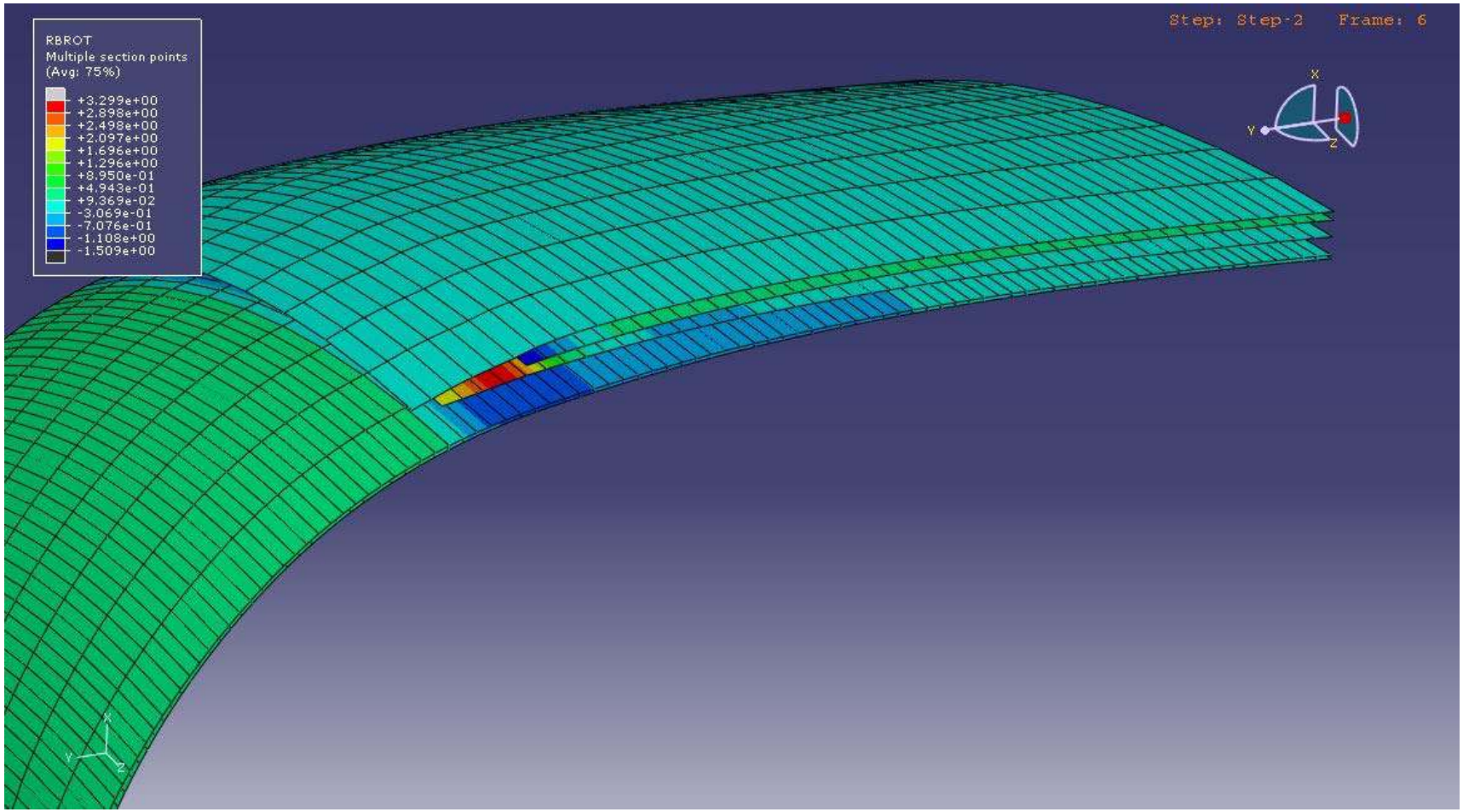
Fabric reinforcements in tire FEA model



Maximum deformation RBROT at the belt edge = 5.3 deg

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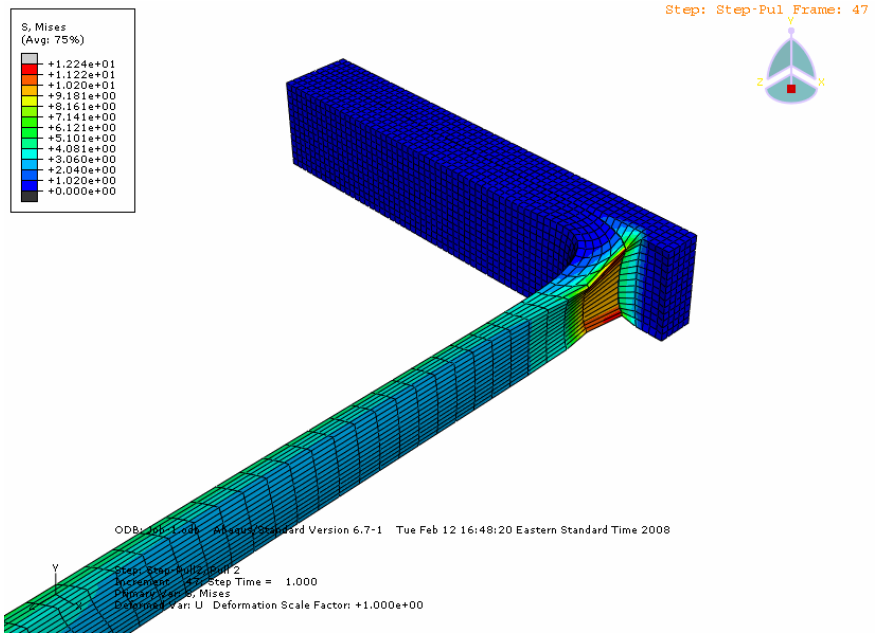
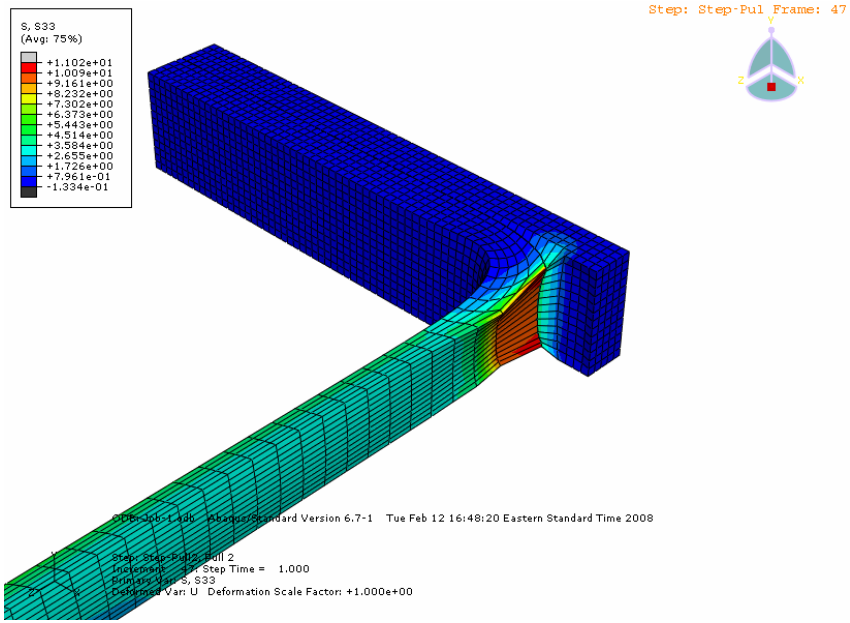
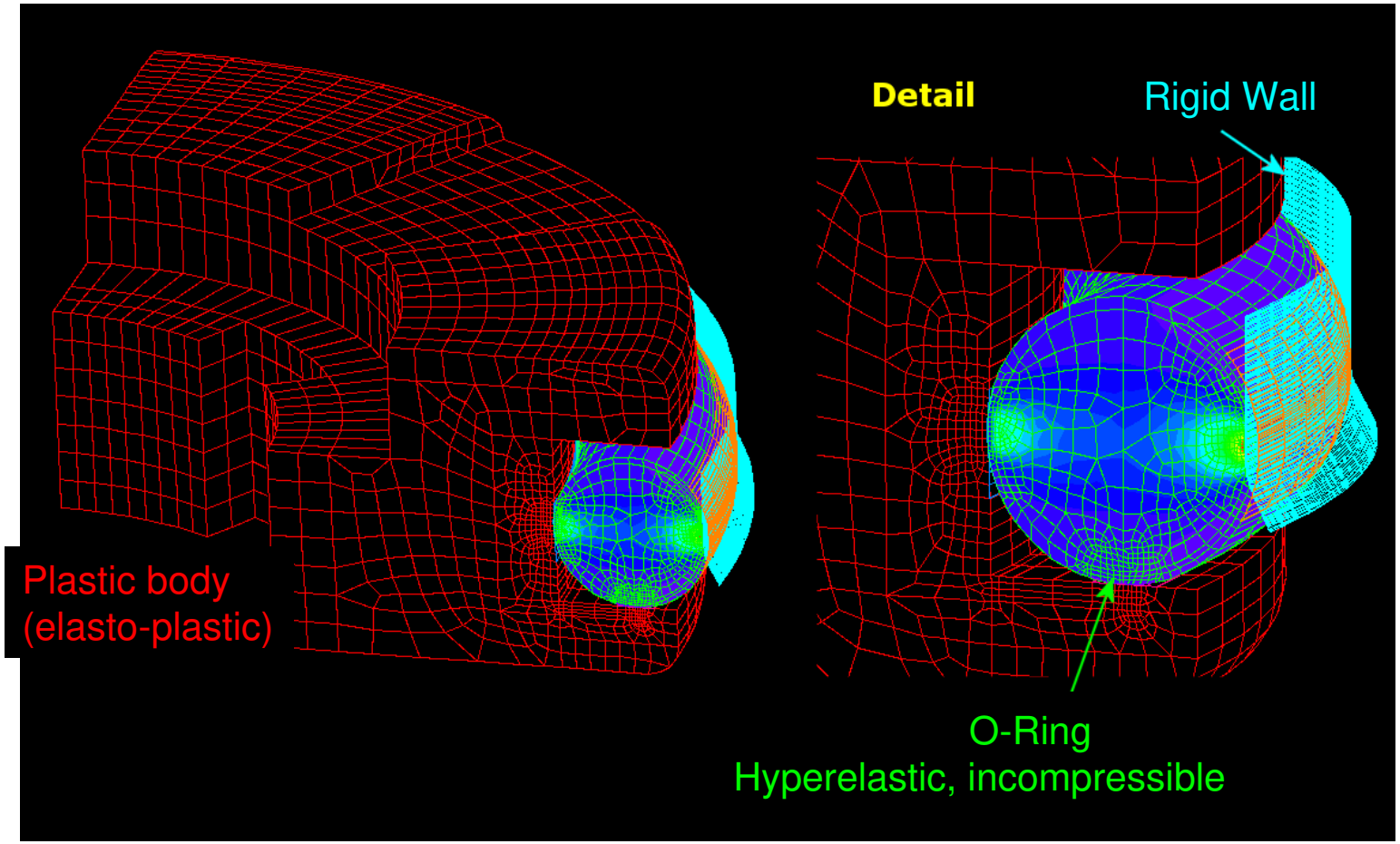
Peel Strength – FEA Study





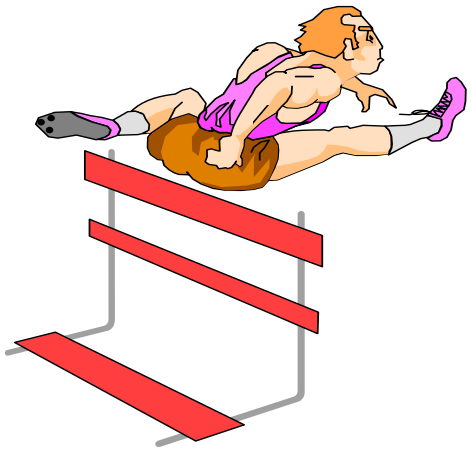
Crack growth analysis needs to be used to establish the stresses at the interface.

Structural analysis example: O-Ring Compression



Thank you

- **FEA**
- **Product Design**
- **Project partnership**
- **Confidentiality**
- **ISO 9001 : 2000**



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