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Finite Element Analysis Projects Portfolio

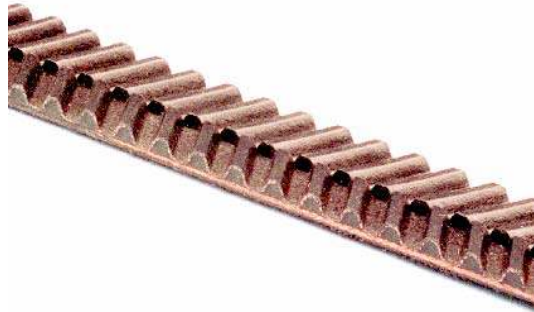


ISO 9001:2000

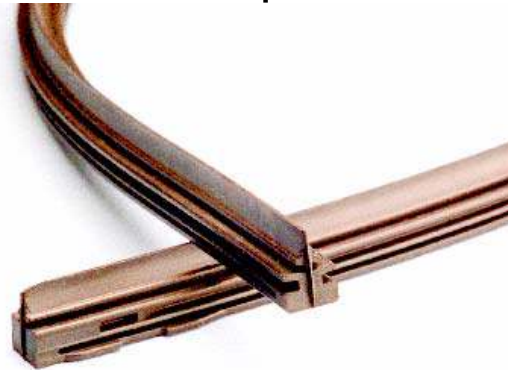
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Components analyzed by finite element analysis

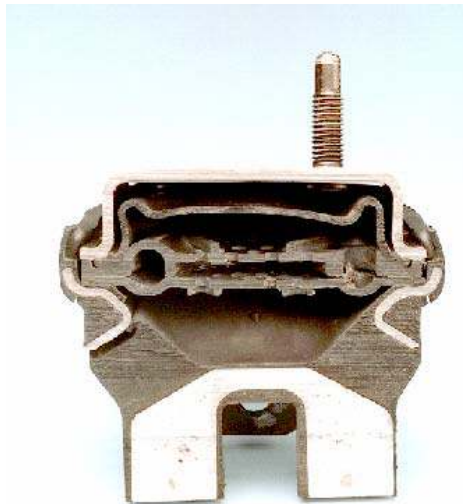
Timing Belt



Wiper Blades



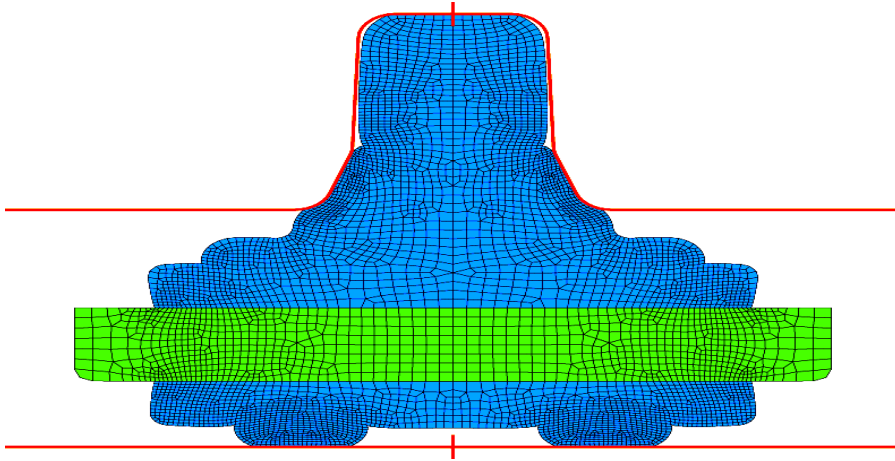
Engine/Transmission Mounts



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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

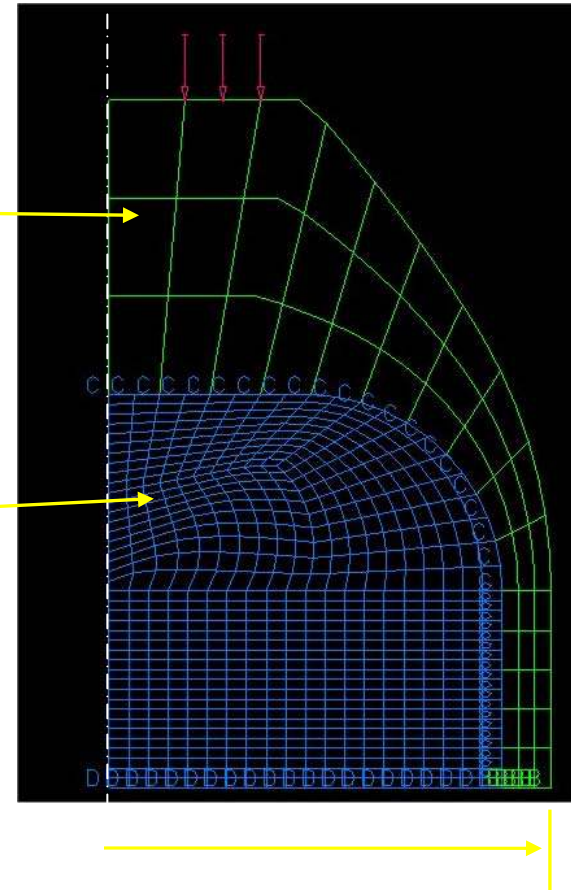


Hydromounts used in automobiles to damp vibrations caused by the engine mount

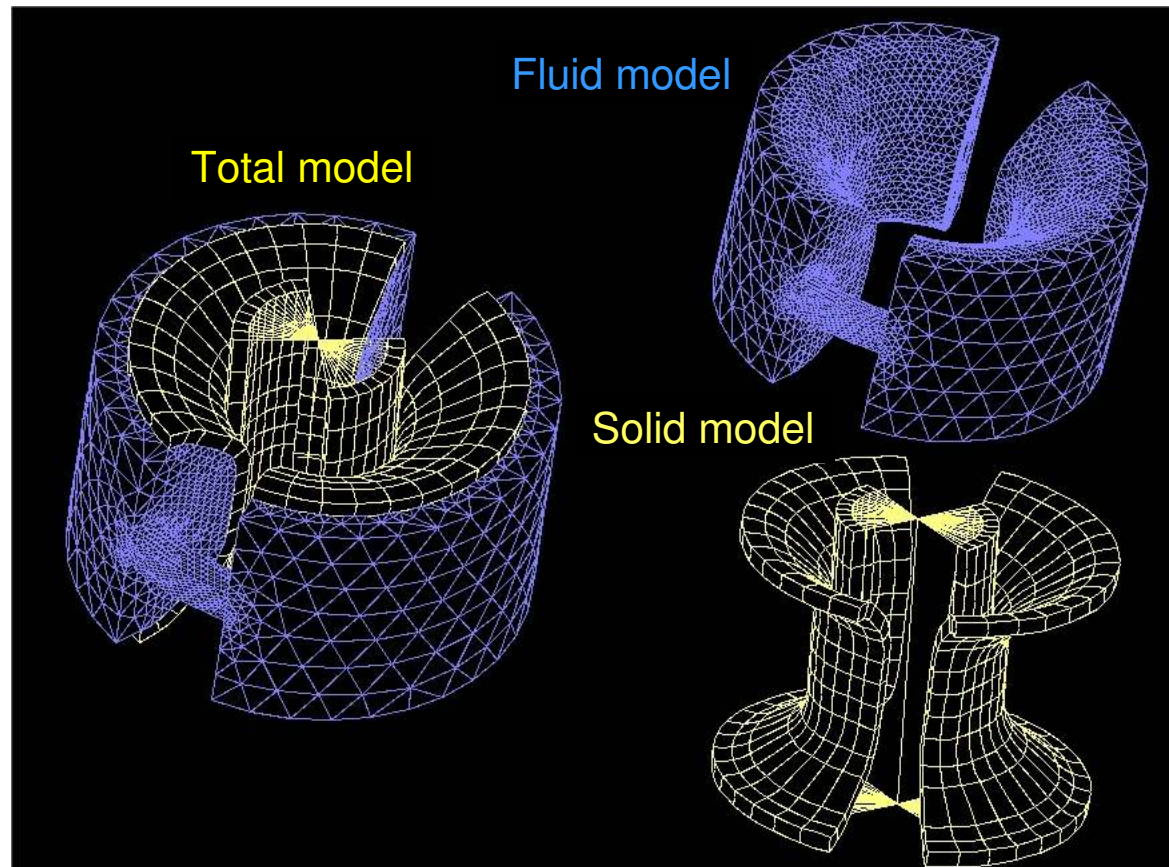
Rubber Wall:
Mooney Rivilin
(non-linear
incompressible)

Fluid chamber
Highly viscous oil

- Model: Highly nonlinear, transient FSI, strong coupling
- Boundary condition load:
 - Sinusoidal displacement
 - Amp= 0.05 mm



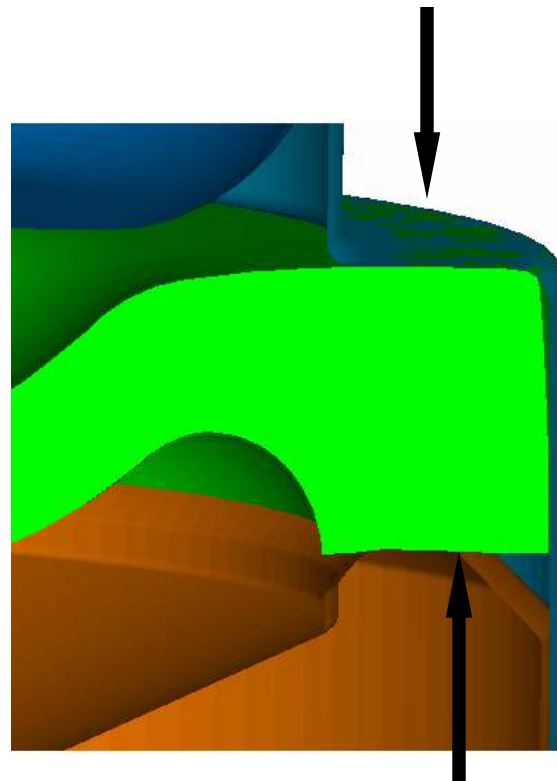
Fluid Structure Interaction (FSI): Hydromount Pre-Study



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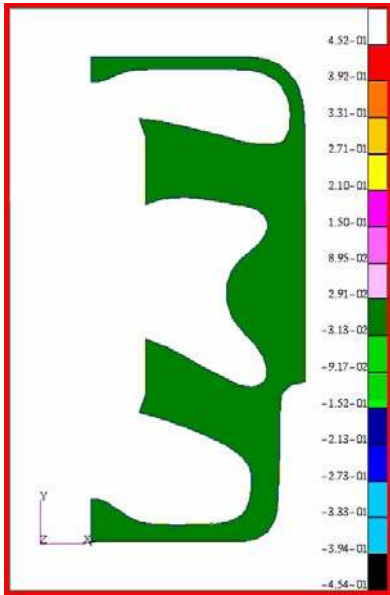
Example: Contact problem in rubber components

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



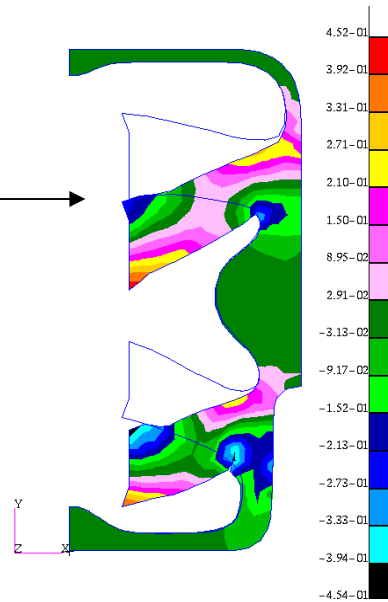
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Design optimization example: Engine Mount



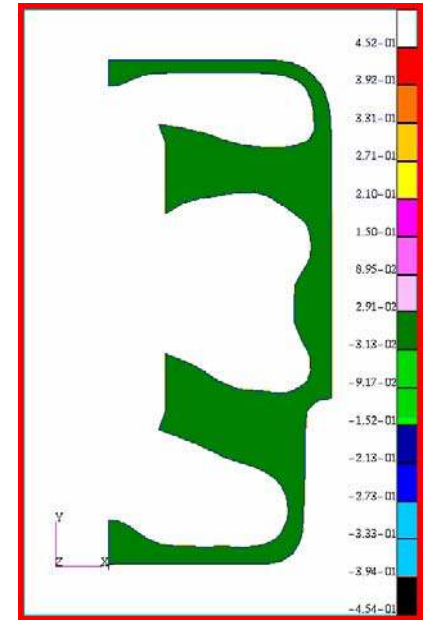
Pro/E Model

FEA
Analysis



Optimization

Area reduction:
– 16.7%

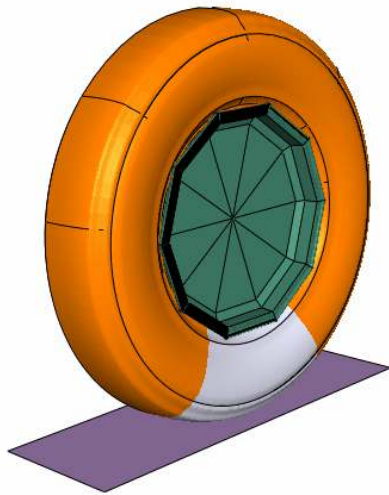


Optimization Problem:

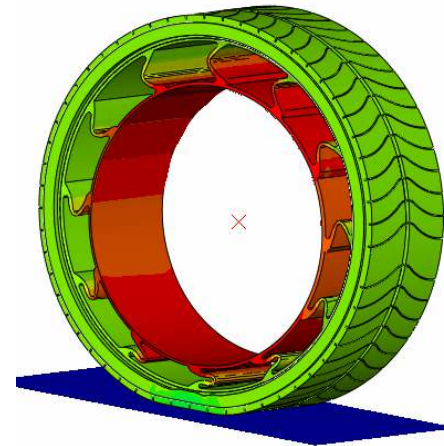
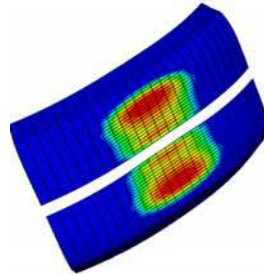
- Objective: minimize area of the mount
- Constraints:
 - maintain the stiffness as in the initial design;
 - keep the hydrostatic pressure at critical points in an admissible range

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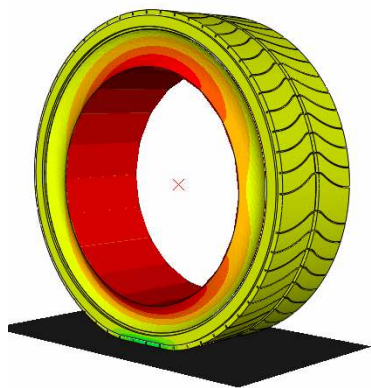
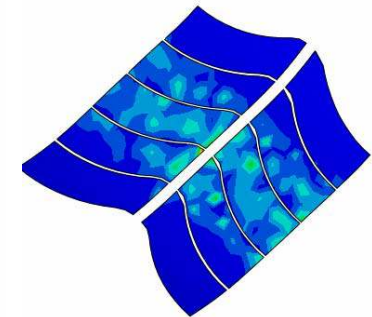
New Tires Design, Analysis and Development



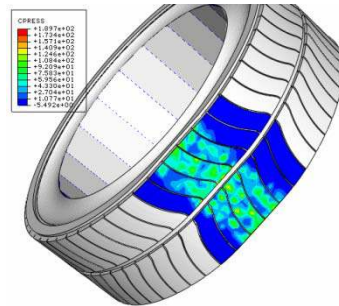
Footprint analysis of half tire model



Footprint analysis of Airless "Elastomer Spoke" PU Tire



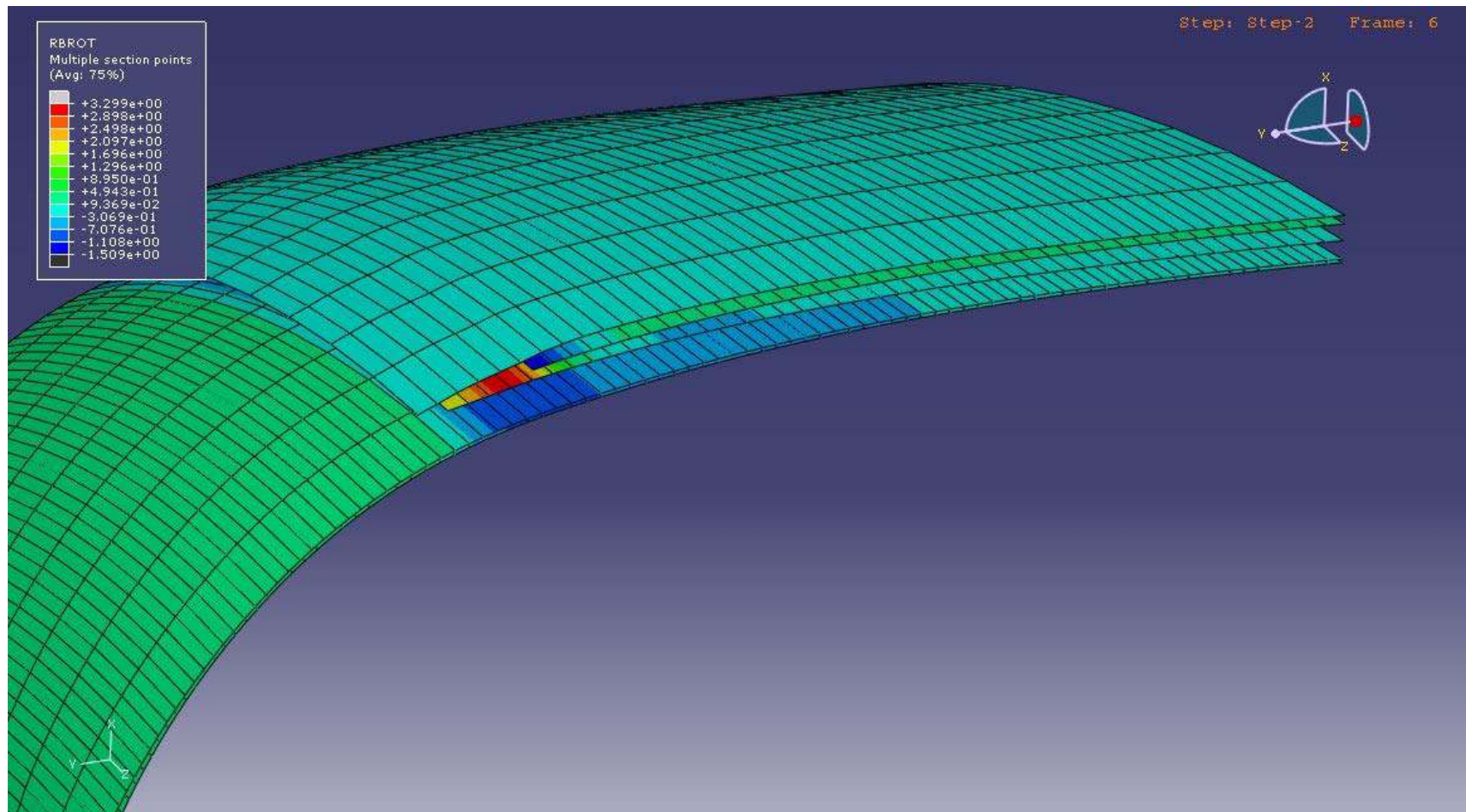
Footprint analysis of Airless Polyurethane (PU) Tire



Tire FEA Services

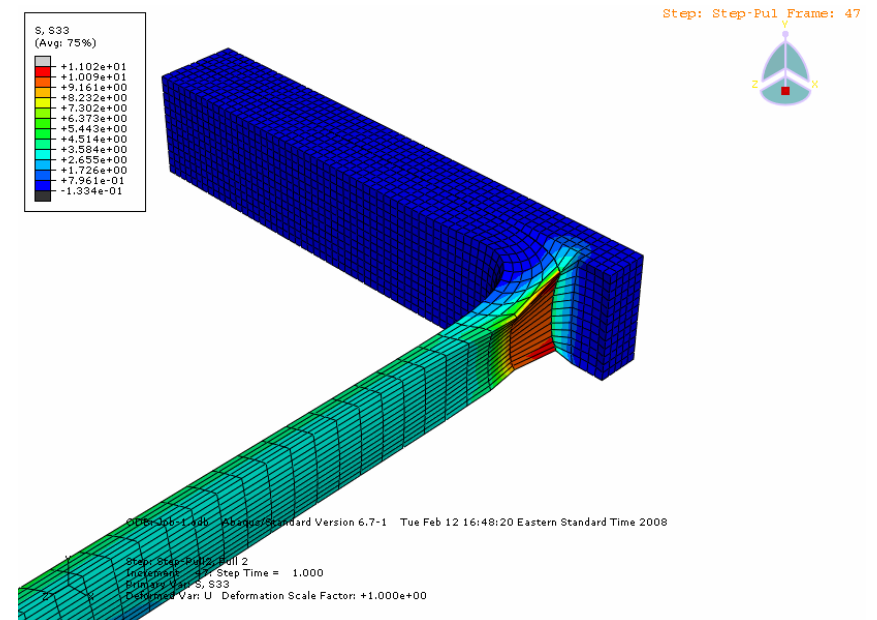
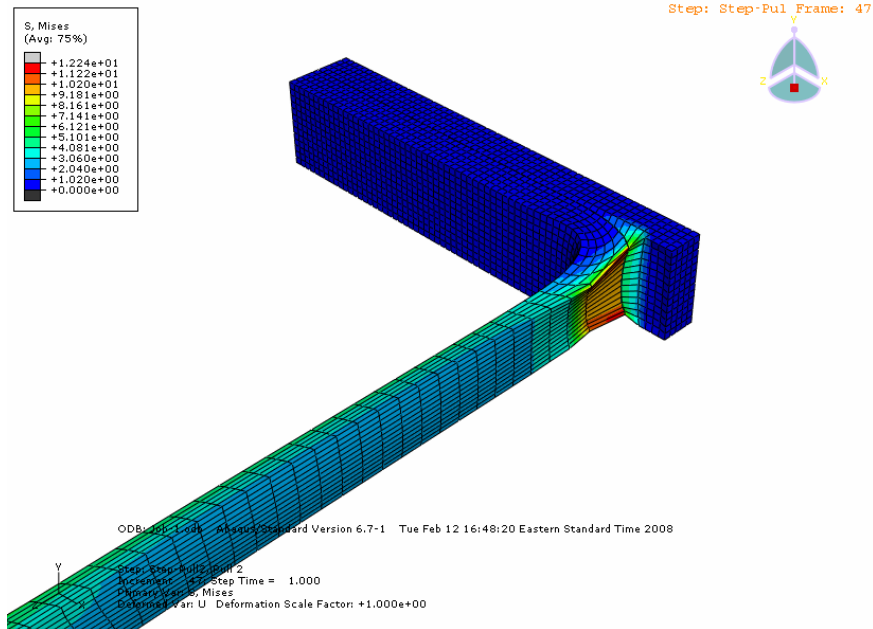
- Foot Print analysis of tire
- Steady-state rolling analysis of tire
- Subspace-based steady-state dynamic tire analysis
- Steady-state dynamic analysis of a tire substructure
- Coupled acoustic-structural analysis of a tire filled with air

Fabric reinforcements in tire FEA model



Maximum deformation RBROT at the belt edge = 5.3 deg

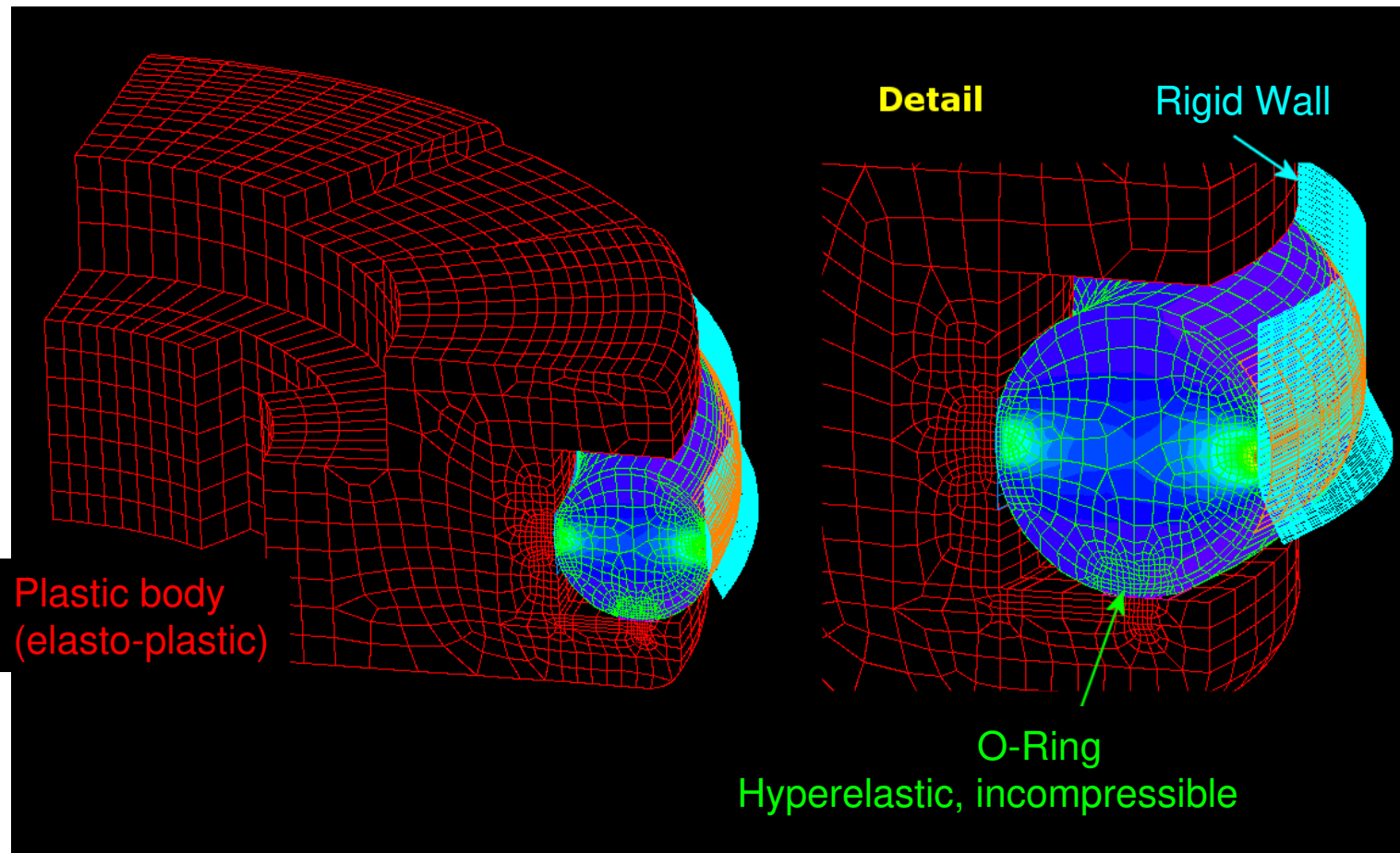
Peel Strength – FEA Study



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

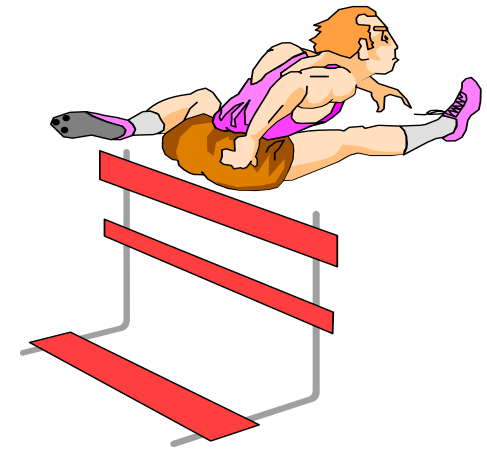
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Structural analysis example: O-Ring Compression



Thank you

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



“Progress through continuous innovation, technology and customer success”