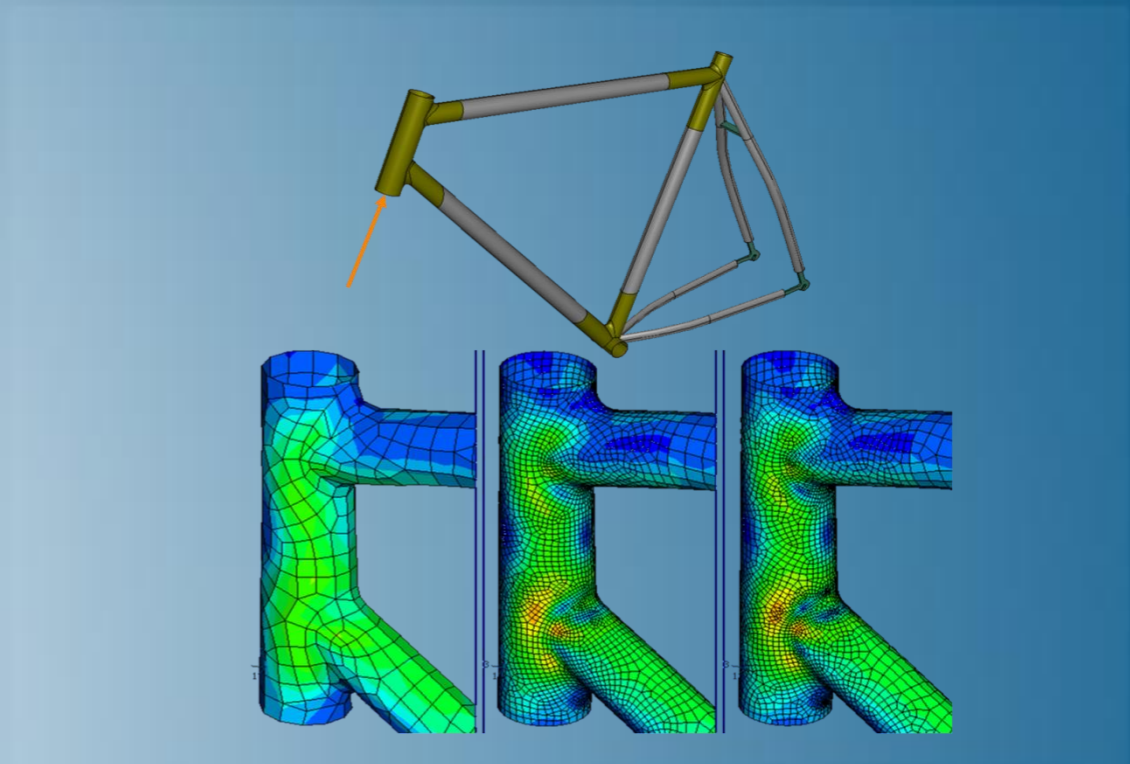


Adaptive Remeshing in Abaqus/Standard

Abaqus 2019



3DEXPERIENCE[®]



About this Course

Course objectives

Upon completion of this course you will be able to:

- ▶ Set up an adaptive remeshing process
- ▶ Specify adaptive remeshing rules
- ▶ Interpret error indicators and their associated output variables

Targeted audience

Simulation Analysts

Prerequisites

This course is recommended for engineers with experience using Abaqus



1 day

Day 1

- ▶ Lecture 1 Introduction to Adaptive Remeshing
 - Workshop 1 Plate with a Circular Stress Riser

- ▶ Lecture 2 Remeshing Rules for Adaptivity
 - Workshop 2 Heat Transfer Analysis of a Reactor Pressure Vessel

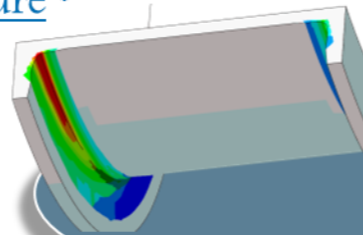
- ▶ Lecture 3 Error Indicators and Mesh Sizing

SIMULIA

- ▶ SIMULIA is the Dassault Systèmes brand for Realistic Simulation solutions
- ▶ Portfolio of established, best-in-class products
 - Abaqus, Isight, Tosca, fe-safe, Simpack

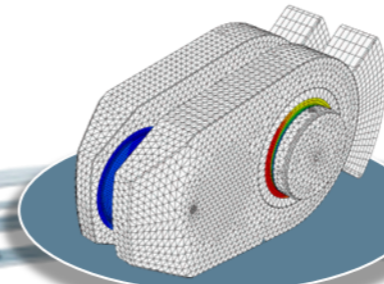
Design Optimization: Tosca Structure *

Simulation-driven design refinement to improve performance



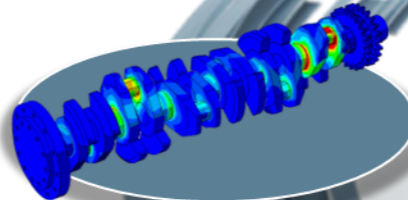
Durability Assessment: fe-safe *

Accurate life estimation to achieve certification



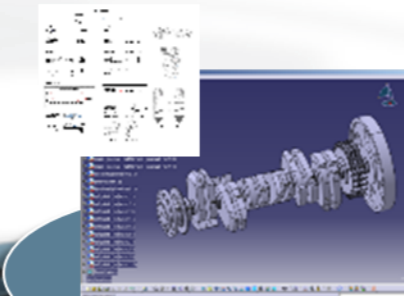
FEA Stress Analysis: Abaqus *

Detailed stress analysis using extracted load history from MBS



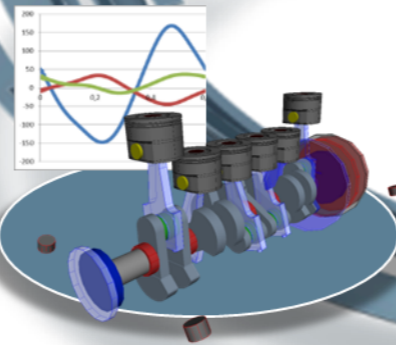
CAD Geometry: CATIA

Fully parameterized 3D geometry; FEA model generation via associative interface



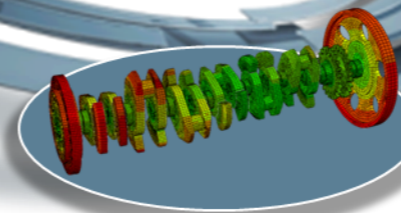
Multibody Simulation: Simpack

System analysis to extract virtual load history of complete working cycle



Mesh Calibration: Isight *

Automated mesh calibration; sufficient mesh quality for accurate results

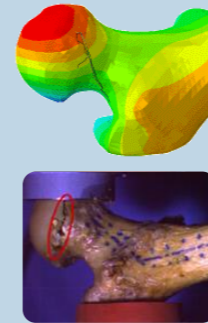


* Included in extended licensing pool

SIMULIA's Power of the Portfolio

Abaqus

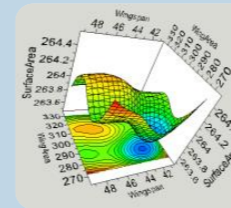
- Routine and Advanced Simulation
- Linear and Nonlinear, Static and Dynamic
- Thermal, Electrical, Acoustics
- Extended Physics through Co-simulation
- Model Preparation and Visualization



**Realistic Human Simulation
High Speed Crash & Impact
Noise & Vibration**

Isight

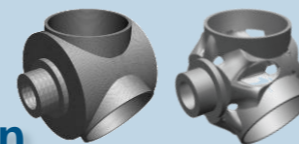
- Process Integration
- Design Optimization
- Parametric Optimization
- Six Sigma and Design of Experiments



**Material Calibration
Workflow Automation
Design Exploration**

Tosca

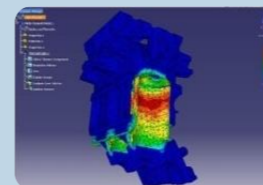
- Non-Parametric Optimization
- Structural and Fluid Flow Optimization
- Topology, Sizing, Shape, Bead Optimization



**Conceptual/Detailed Design
Weight, Stiffness, Stress
Pressure Loss Reduction**

fe-safe

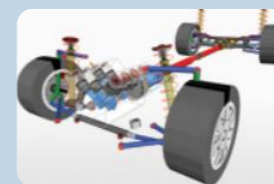
- Durability Simulation
- Low Cycle and High Cycle Fatigue
- Weld, High Temperature, Non-metallics



**Safety Factors
Creep-Fatigue Interaction
Weld Fatigue**

Simpack

- 3D Multibody Dynamics Simulation
- Mechanical or Mechatronic Systems
- Detailed Transient Simulation (Offline and Realtime)



**Complete System Analyses
(Quasi-)Static, Dynamics, NVH
Flex Bodies, Advanced
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Revision Status

Lecture 1	11/18	Updated for Abaqus 2019
Lecture 2	11/18	Updated for Abaqus 2019
Lecture 3	11/18	Updated for Abaqus 2019
Workshop 1	11/18	Updated for Abaqus 2019
Workshop 2	11/18	Updated for Abaqus 2019

Lesson 1: Introduction to Adaptive Remeshing

Lesson content:

- ▶ Adaptivity Techniques in Abaqus
 - Arbitrary Lagrangian Eulerian (ALE) adaptive meshing
 - Mesh-to-mesh solution mapping
 - Adaptive remeshing
- ▶ Basic Elements of Adaptive Remeshing
- ▶ Applicability and Restrictions
- ▶ Workshop Preliminaries
- ▶ Workshop 1: Plate with a Circular Stress Riser



2 hours

Lesson 2: Remeshing Rules for Adaptivity

Lesson content:

- ▶ Remeshing Rules: The Basics
- ▶ Multiple Remeshing Rules
- ▶ Example: Thermal-Stress Analysis of a Reactor Pressure Vessel
- ▶ Manual Adaptivity
- ▶ Workshop 2: Heat Transfer Analysis of a Reactor Pressure Vessel



2 hours

Lesson 3: Error Indicators and Mesh Sizing

Lesson content:

- ▶ Basics of Error Indicators
- ▶ Considerations in Error Indicator Selection
- ▶ Interpreting Error Indicator Output
- ▶ Mesh Sizing Methods
- ▶ Constraints on Mesh Sizing



2 hours