

Analyse des performances d'une caisse en blanc

Calcul de rigidité en flexion et torsion sous Virtual.Lab

Agenda

- **LMS Virtual.Lab Structures**
 - Introduction
 - Dassault Systèmes FEA Solutions
 - LMS Virtual.Lab Structures

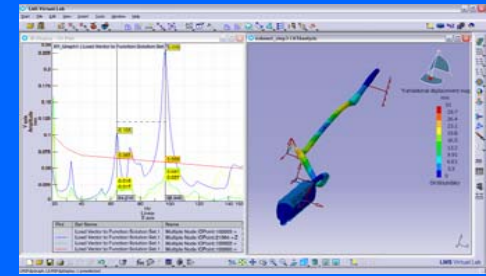
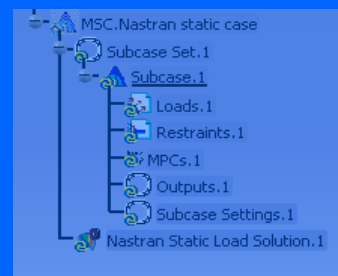
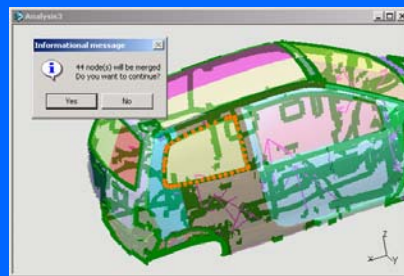
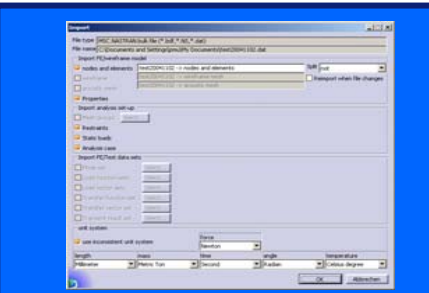
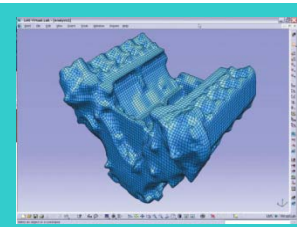
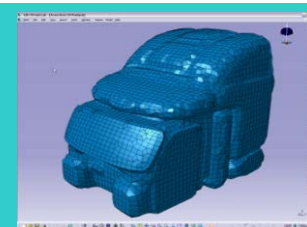
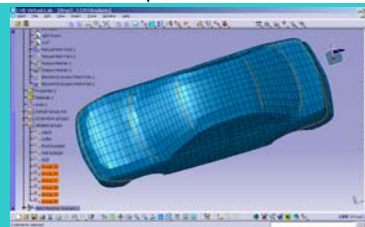
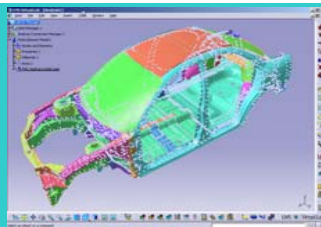
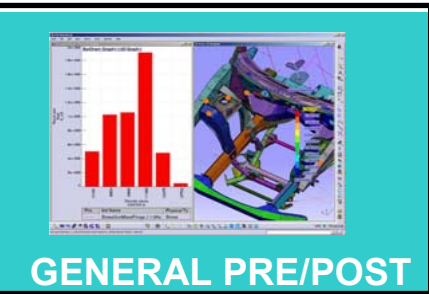
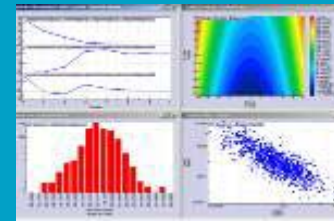
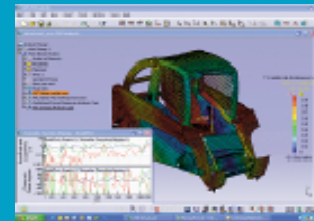
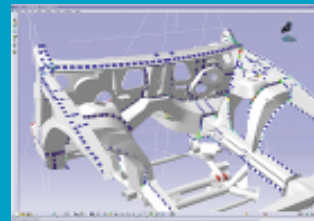
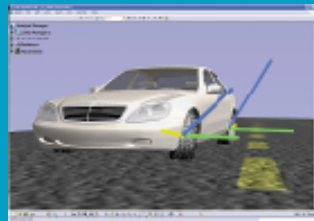
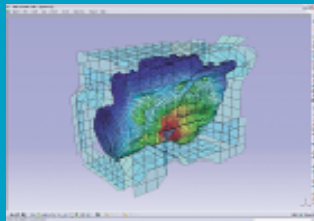
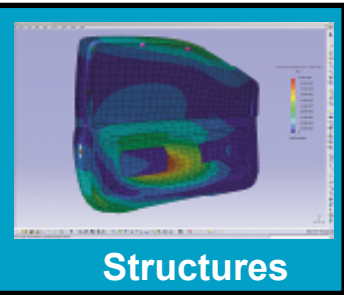
- **Demonstration**

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 - Introduction
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 - LMS Virtual.Lab Structures

- **Demonstration**

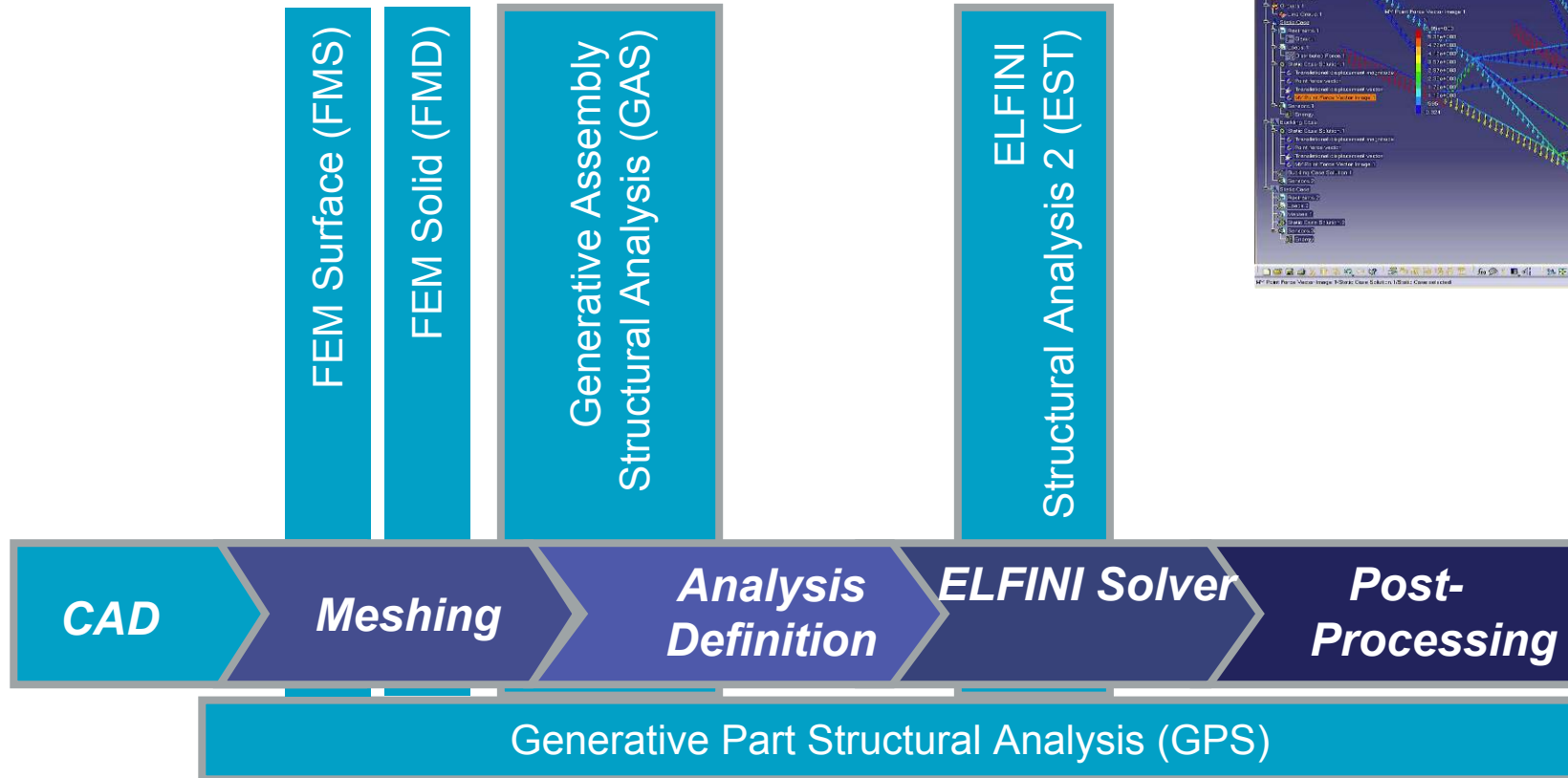
LMS Virtual.Lab



Agenda

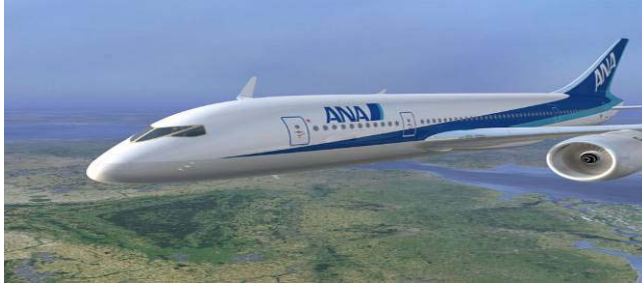
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- **LMS Virtual.Lab Structures:**
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 - LMS Virtual.Lab Structures
- **Demonstration**

Solutions Dassault Systèmes



Key features: *Associative, Geometry Based*

Challenges techniques

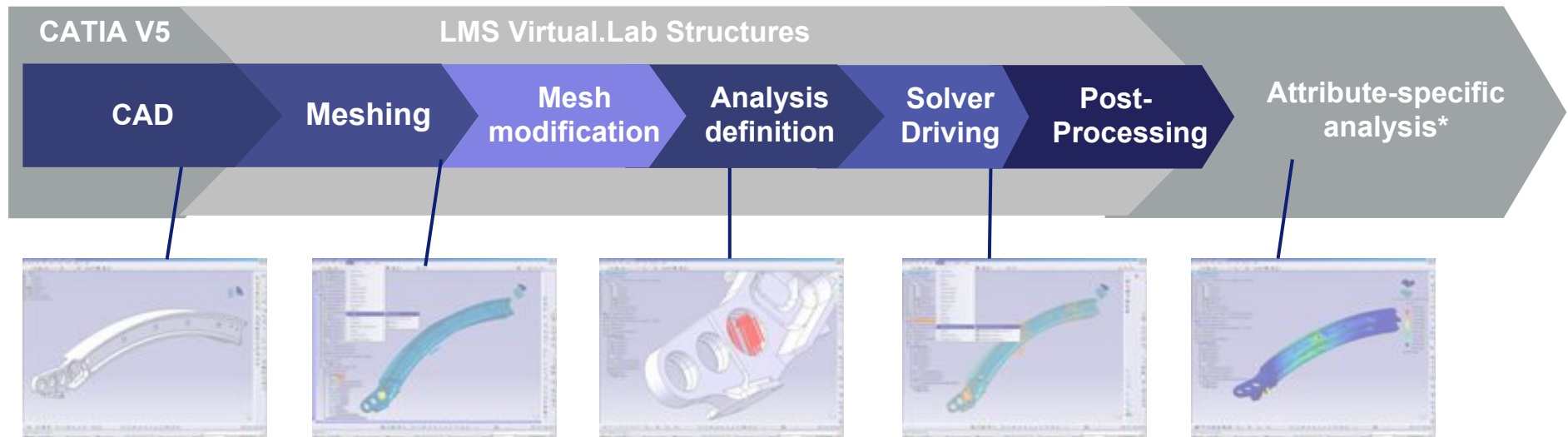


- Puis-je utiliser mes codes Eléments Finis standards (Nastran, ANSYS, ABAQUS...)?
- Puis-je importer des maillages « orphelins » ,des résultats, des groupes?
- Puis-je exporter des maillages/modèles pour une étude externalisée ou pour partager mes données?
- Puis je effectuer des scenarii basés sur des entités EF (et non exclusivement CAO), et prendre en compte des spécificités liées au solveur?
- Puis-je effectuer des analyses avancées sur des structures composites?

LMS Virtual.Lab Structures : La solution la plus avancée pour le calcul de structures dans CATIA V5

Processus PLM : du modèle géométrique à une analyse EF intégrée.

- LMS Virtual.Lab Structures: le seul pré- et post- processeur complètement intégré dans CATIA V5

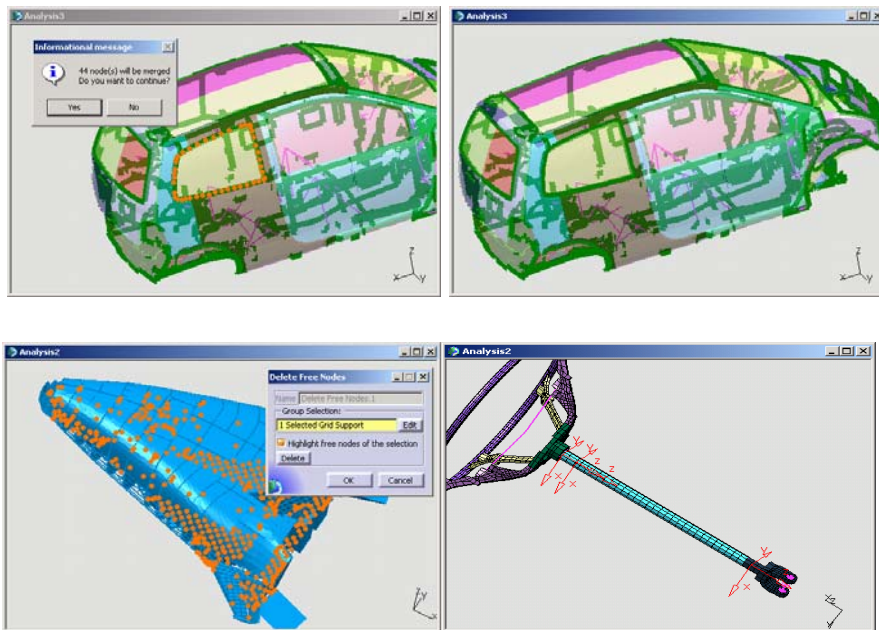


- Intégration maximum avec CATIA V5 dans le processus de développement produit.
 - Associativité du design à la représentation analyse.
 - Evite la duplication des comportements et sémantiques entre les diverses applications.

LMS Virtual.Lab Structures

Mesh Based Design

Comprehensive set of mesh based pre-processing functionalities



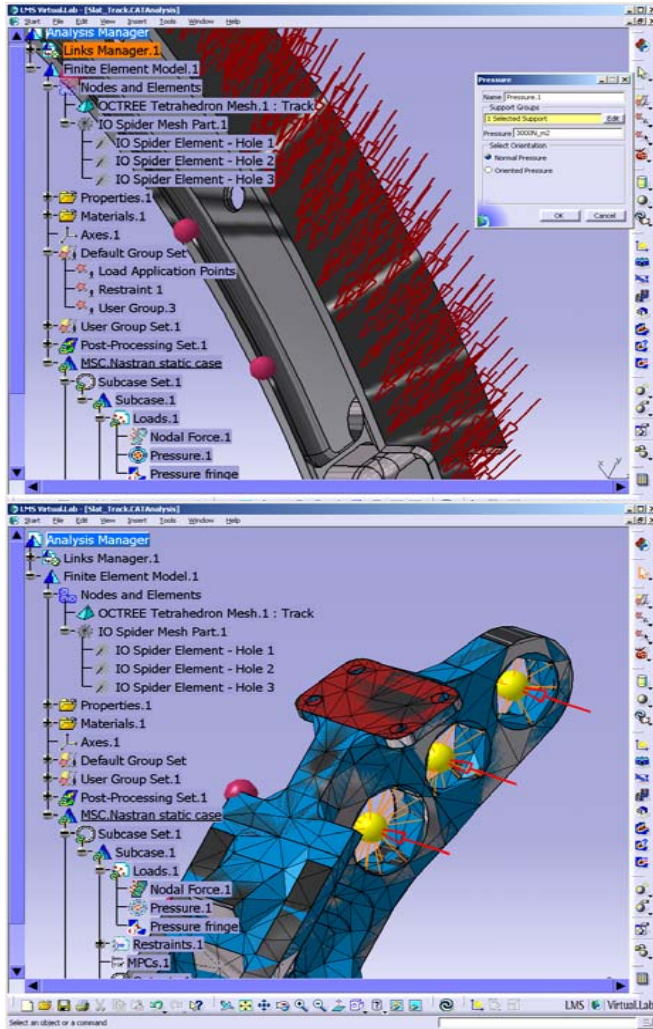
- Mesh Quality Checking
- Model Verification (incl. Solver specific checks)
- Axis Systems
- ID Management
- Nodes, Elements Creation & Editing
 - Wide variety of elements (general & solver specific)
 - Dragging, moving nodes
 - Projection, Extrusion, Splitting, Merging, Skinning & other transformations on elements/groups
 - Mapped 2D Meshing
- Property & Material Creation/Editing
 - Basic and solver specific properties/materials
- Extended FEM Grouping

LMS Virtual.Lab Structures Driver

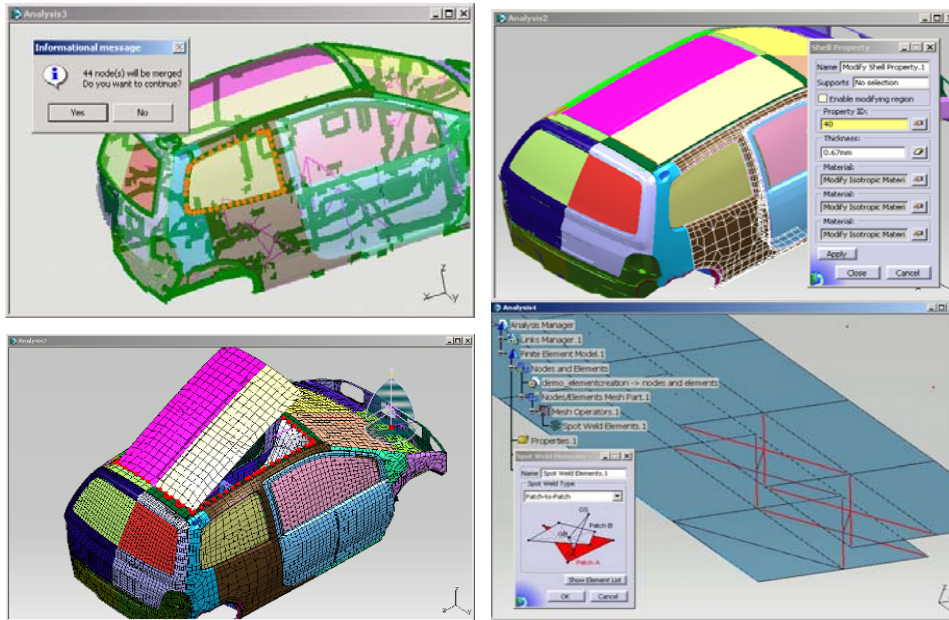
Associative analysis with 3rd party solvers in V5

- Set-up & drive solver specific analysis cases
 - Loads
 - Restraints
 - Output Requests
 - Solver & Solution specific parameters
 - Enhanced job submission (local/remote)
 - Job monitoring
- Multi-solver support (Nastran, ANSYS, Abaqus, ..)

No need to be a solver expert!



LMS Virtual.Lab Structures Interface



■ IMPORT

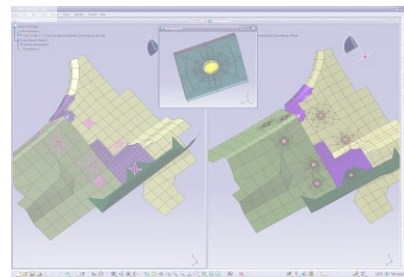
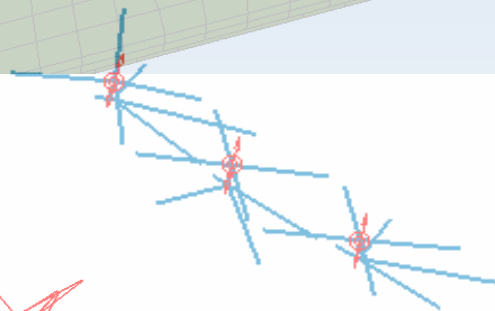
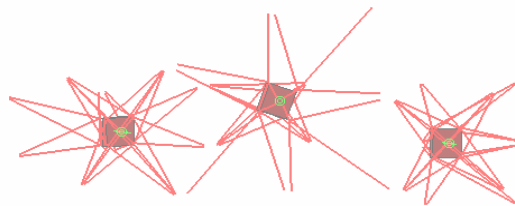
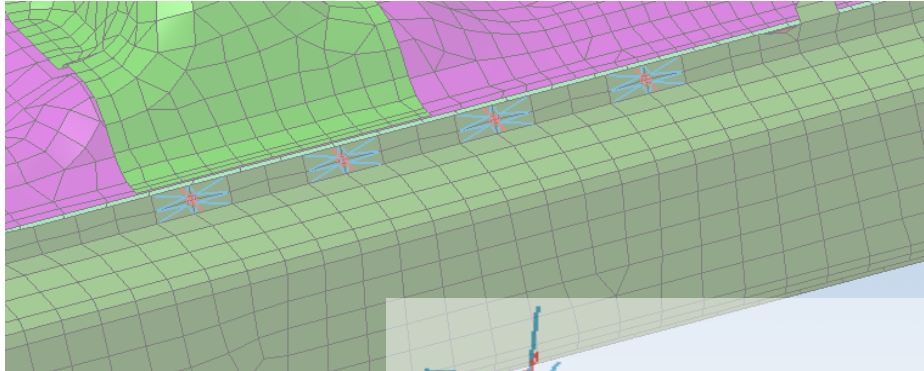
- Complete “orphan” meshes (nodes, elements, properties, materials)
- *Analysis setup* (loads, restraints, subcase definition and analysis parameters)
- *Results* like stresses, strains, modes...

■ EXPORT

- Mesh (part) with corresponding properties, materials ...
- Export of DS analysis case
- Export of LMS analysis case

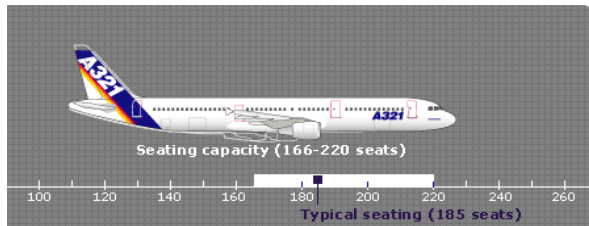
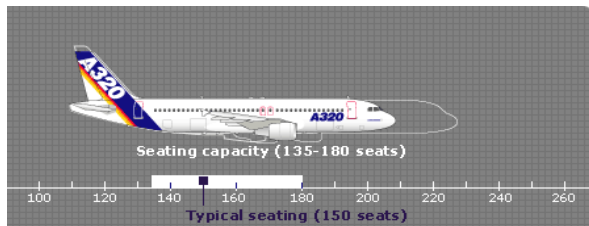
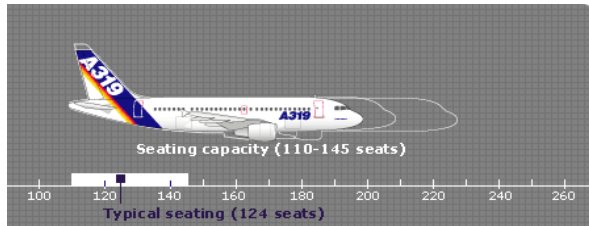
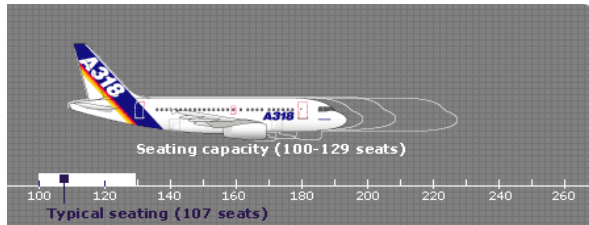
A complete gateway from and to V5

Spot Weld Modeling Extension to Mesh Based Design



- Weld locations from
 - External file
 - LMS Weld format
 - ANSA format
 - MEDINA format
 - Interactive selection
- Weld types
 - RBE3-HEXA
 - CWELD
 - 2T, 3T, 4T
 - Nastran export of CATIA meshed welds
- Diagnostics
 - Sort on status
 - Highlight problem on mesh
- Fine spot welds for Durability
 - Replace critical spot welds by fine model
 - Insert spot weld patterns & adapt mesh locally

LMS Virtual.Lab Structures Mesh Morphing Capabilities



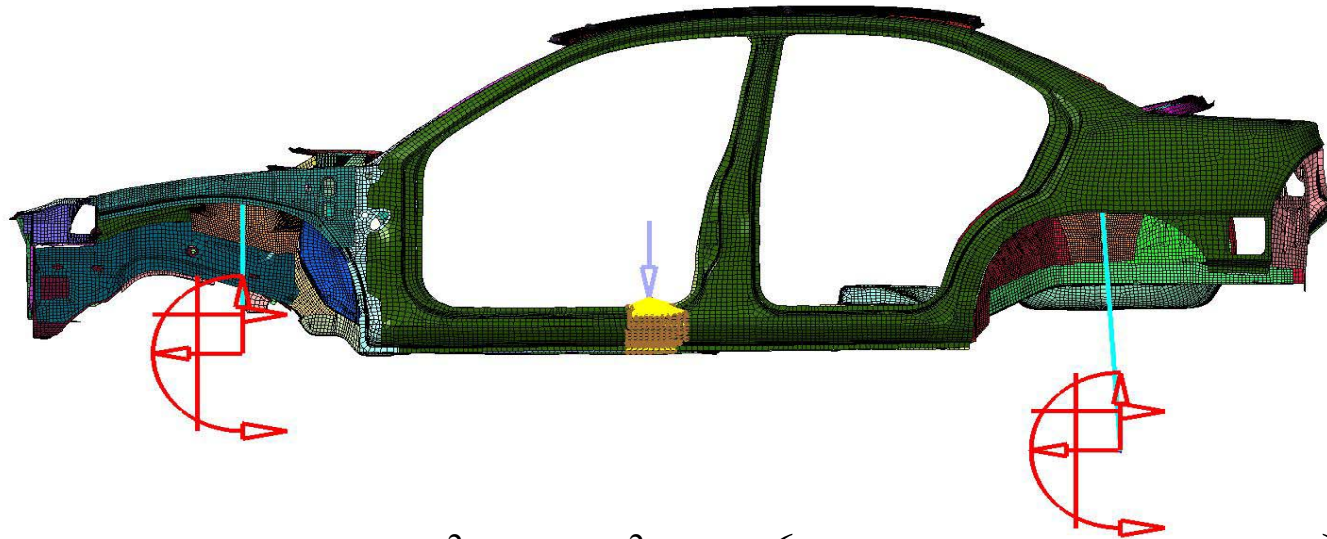
- The Virtual.Lab Morpher allows to morph (change/stretch) an existing mesh to a hypothetical design or target shape
 - Rapidly
 - Flexible (user-friendly)
 - Without remeshing
 - Parameterizedwhile preserving the model integrity and connectivity
- Upfront Engineering
 - Re-use existing analysis models (FE) for Pre-CAD analysis
- Detailed Engineering
 - Analysis of engineering variants directly on FEM model before detailed CAD design update

Agenda

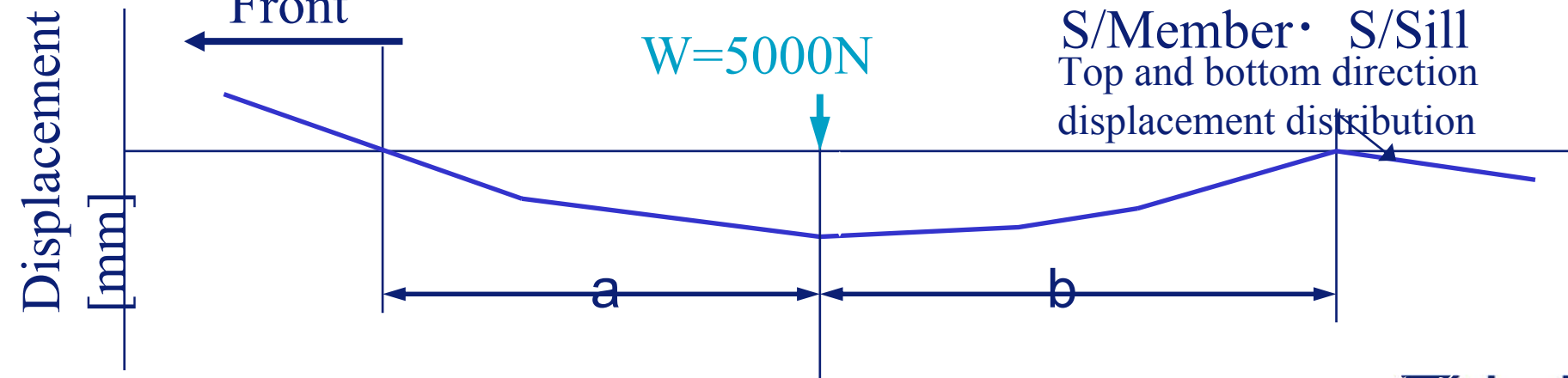
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Global rigidity

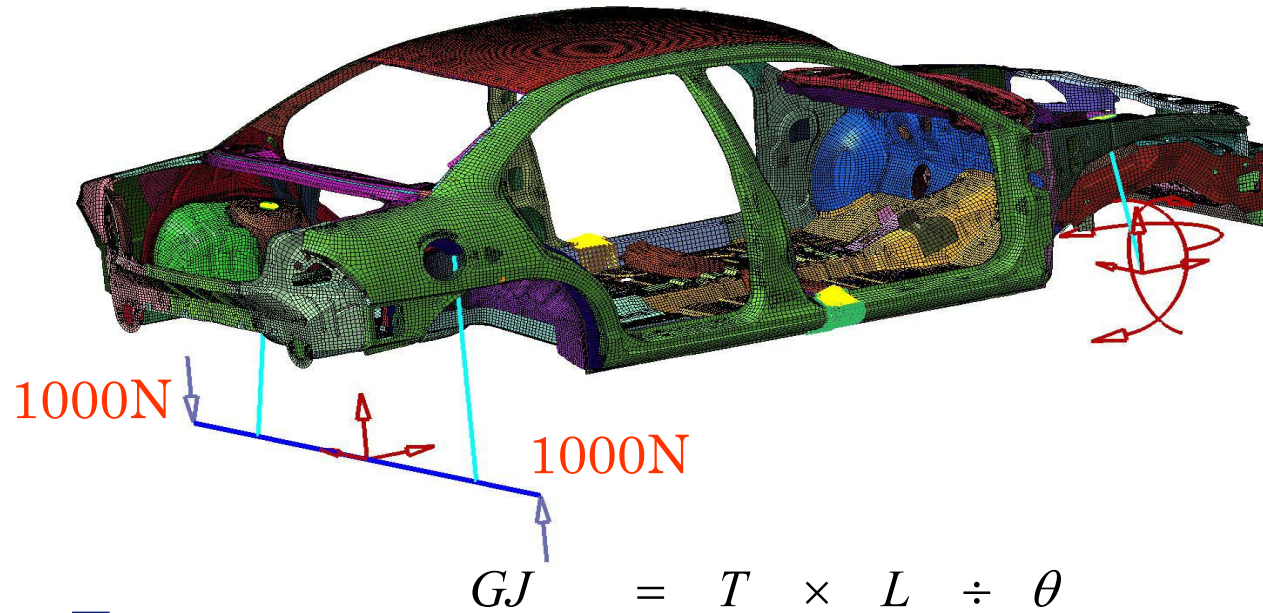
Boundary condition for bending



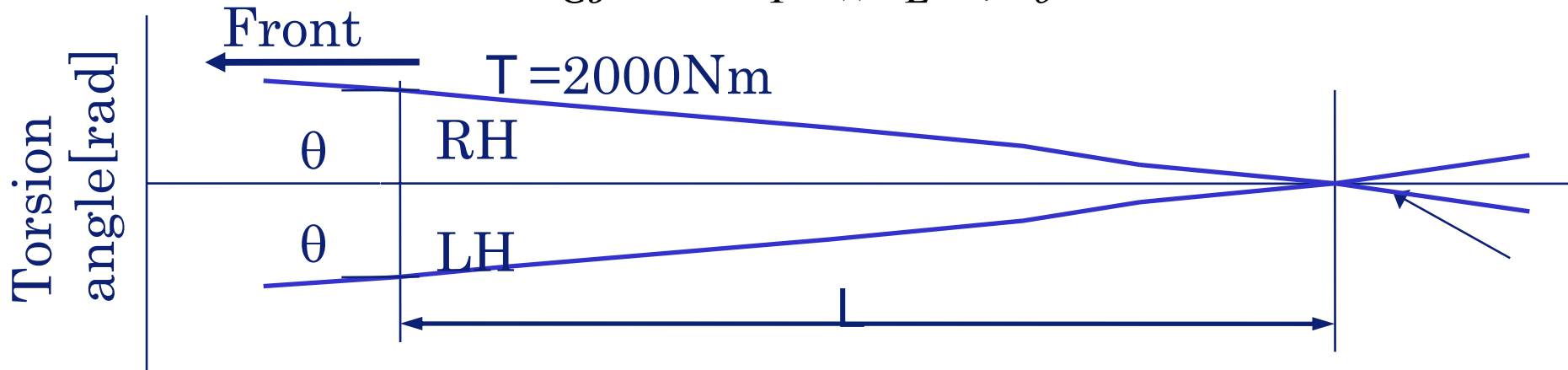
$$EI = W \times a^2 \times b^2 \div (3 \times \delta \times (a + b))$$



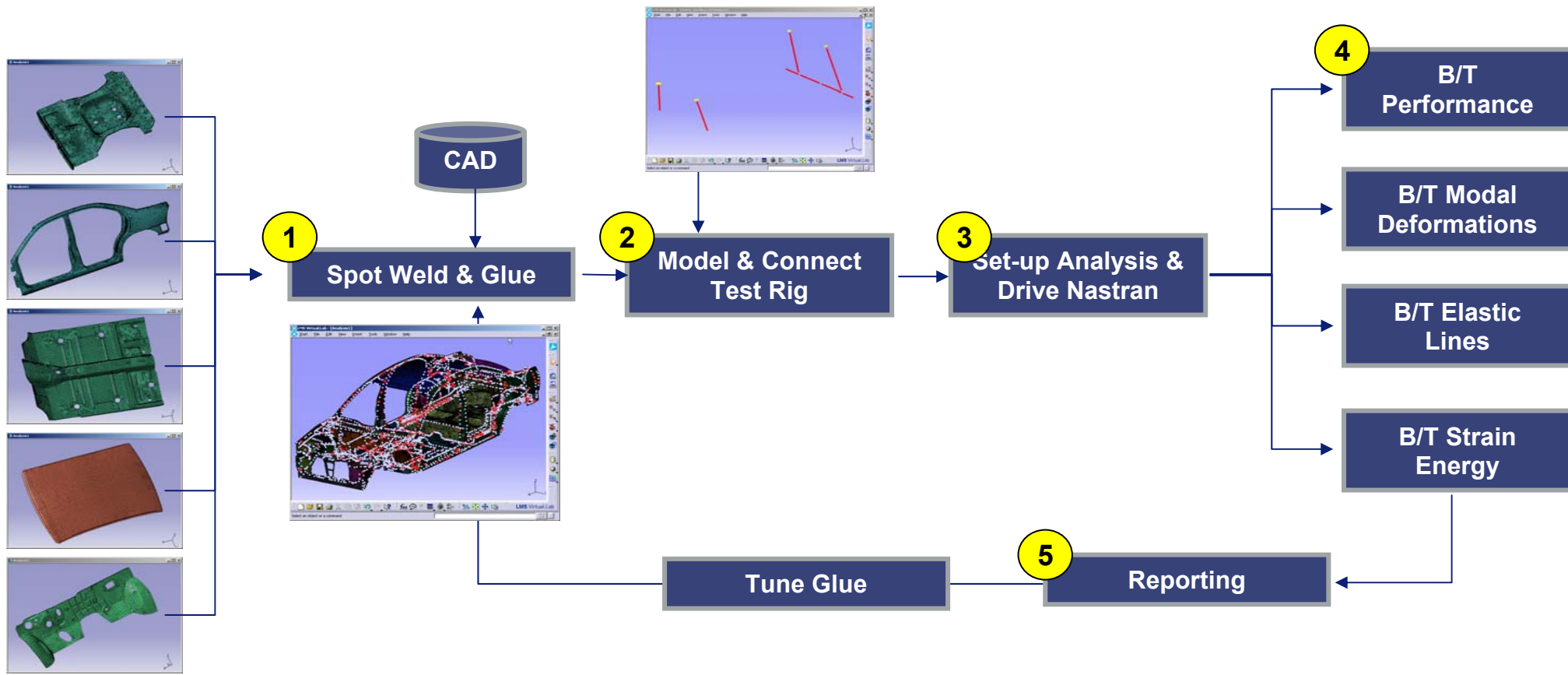
Boundary condition for torsion



$$GJ = T \times L \div \theta$$



BIW Bending & Torsion Performance Tuning



Steps

- Spotwelding
- Glue Connection
- Fast Connection of test rig to BIW
- Nastran cases setup and driving
- Post processing 3D and 2D
- Automatic reporting

