NWC 2015
NAFEMS WORLD CONGRESS

NAFEMS

Incorporating the 2nd

spdm
INTERNATIONAL CONFERENCE
Simulation Process & Data Management

The Future of Geometry Interaction with Simulation

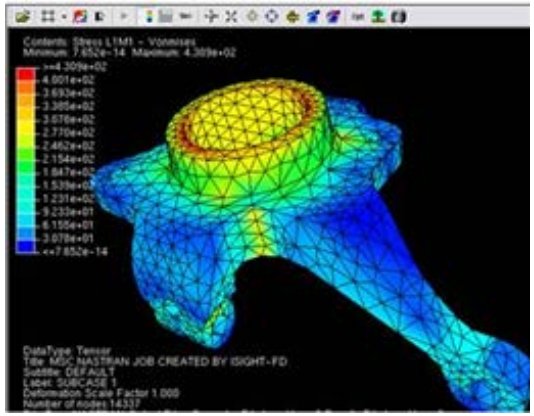
Joe Walsh
intrinSIM, USA

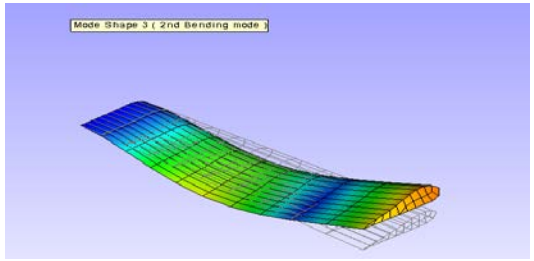
The Future of Geometry Interaction with Simulation

- We have been working on CAD/CAE Integration for over 2 decades – why is this still an issue
- The purpose of the models are fundamentally different
  - CAD models precise geometry
  - CAE models approximated physics

CAE models approximated physics

- Precise geometry is not required for CAE
- Precise connectivity is required for CAE
- Details may make meshing and solution too expensive for the accuracy desired
- Different physics usually require different models





CAE models approximated physics

- CAE models account for solution of physics to a desired accuracy
  - Loads, Boundary Conditions, Materials, Field Propagation
- Typically requires an expert in the loop
- Some limited success with CAD embedded CAE
- Full blown CAD is not suited to many of the model revisions

The Future of Geometry Interaction with Simulation

- The purpose of the models are fundamentally different
- The forms of the models are fundamentally different
- CAD centric models only cover a subset of assemblies and analyses
- Transforming CAD to usable CAE still accounts for 70-80% of the time spent in analysis

Transforming CAD = 70-80% of time

- Means a large opportunity for Vendors
- Multiple software vendors are addressing this issue with “evolutionary” interactive tools for the Analyst
  - Allows analyst to make CAE models effectively
  - May dramatically reduce time for analysts to make models
  - A great step forward
  - … but we need more

We need More

- The “evolutionary” simulation geometry tools will be very successful from a business perspective and may help buy some time until we will need “revolutionary” tools
  - Dramatically reduce the level of expertise required
  - More automation
  - Allow for capture of recipes and replay on design iterations
  - Allow for knowledge capture & reuse

Enabling the Revolution

- Increased emphasis on “fit for purpose” applications
- Increased emphasis on Systems Engineering
- Unlimited access for the appropriate “performance” evaluation needed
- Emergence of simulation knowledge capture & reuse
- Emergence of near real time / near physics approaches
- Emergence of “meshless” approaches
- More …