

The background of the slide is a complex, abstract pattern of numerous thin, overlapping lines in various colors including red, orange, yellow, green, cyan, and blue. These lines are tangled and flow across the frame, creating a sense of dynamic movement and complexity. A semi-transparent white horizontal band is positioned across the middle of the image, serving as a backdrop for the text.

Moldflow Summit 2017

Advanced Materials Exchange What's New & Roadmap

Rick Dalgarno

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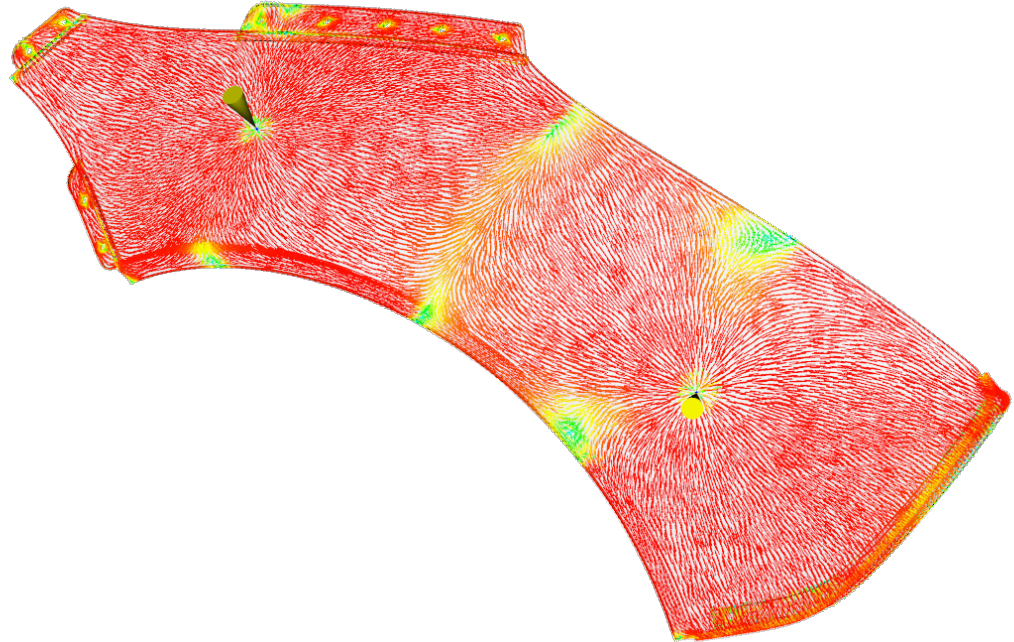


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As-Manufactured Analysis | Vision

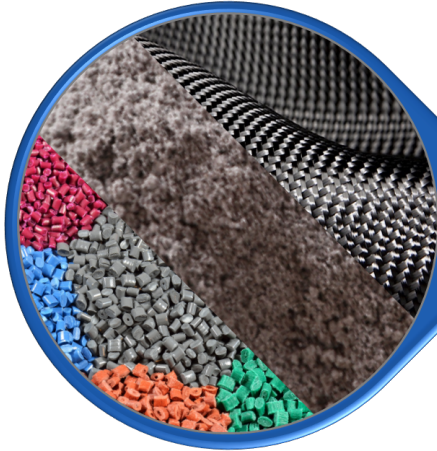
As-Manufactured Analysis

- Map results from Moldflow to FEA program
 - Material Properties
 - Fiber orientations
 - Residual stress/strain
 - Weld-surfaces
- Nonlinear FEA simulation
 - Elastic-plastic response
 - Tension and compression
 - Failure predictions
 - Weld-surface strength

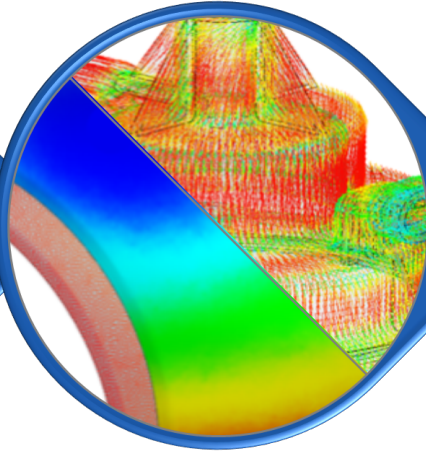


As-Manufactured Analysis

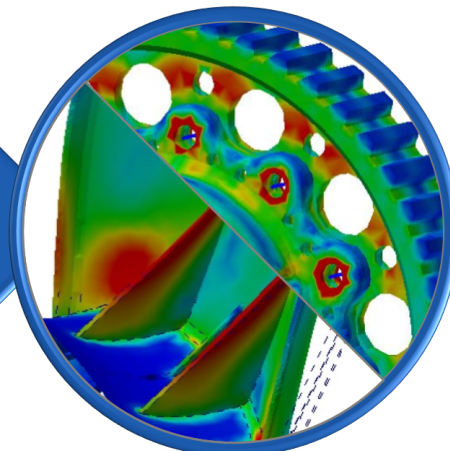
Material



Process

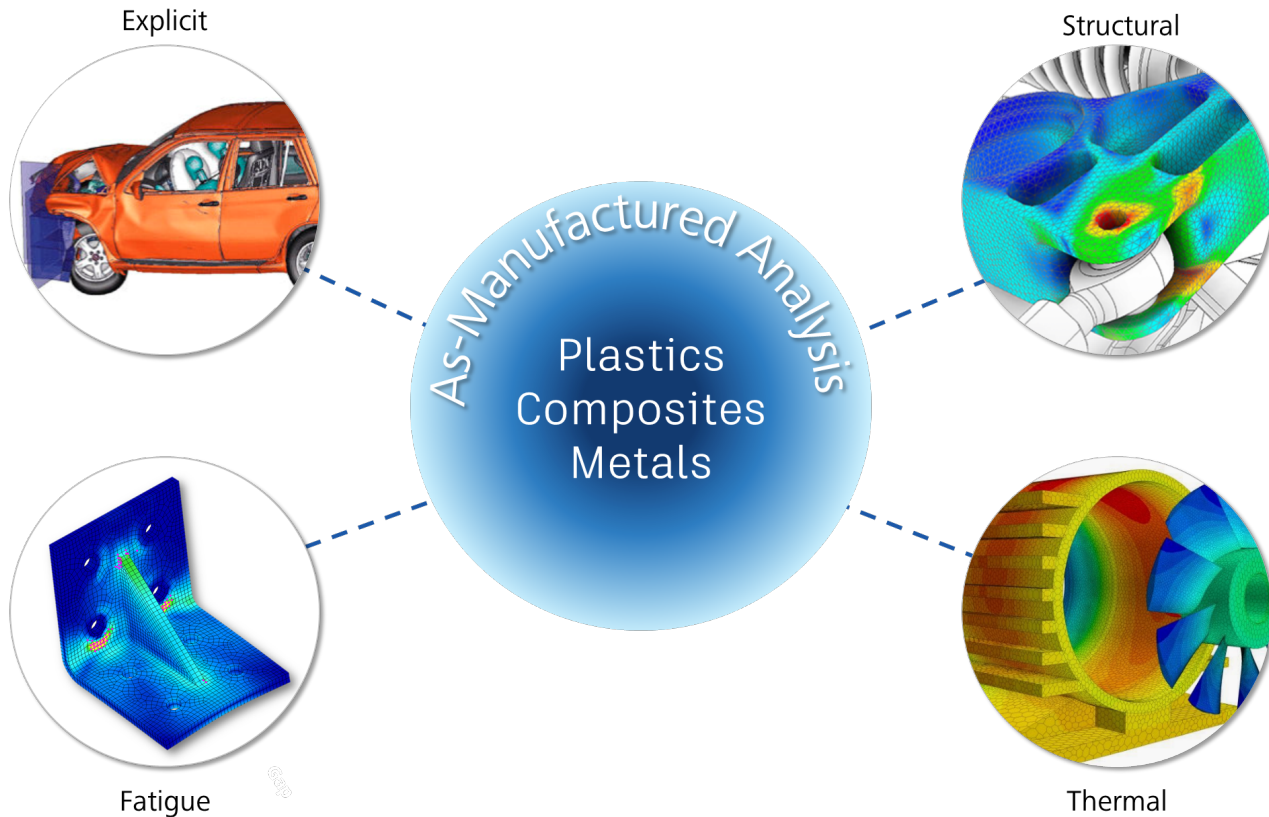


Performance



As-Manufactured Analysis

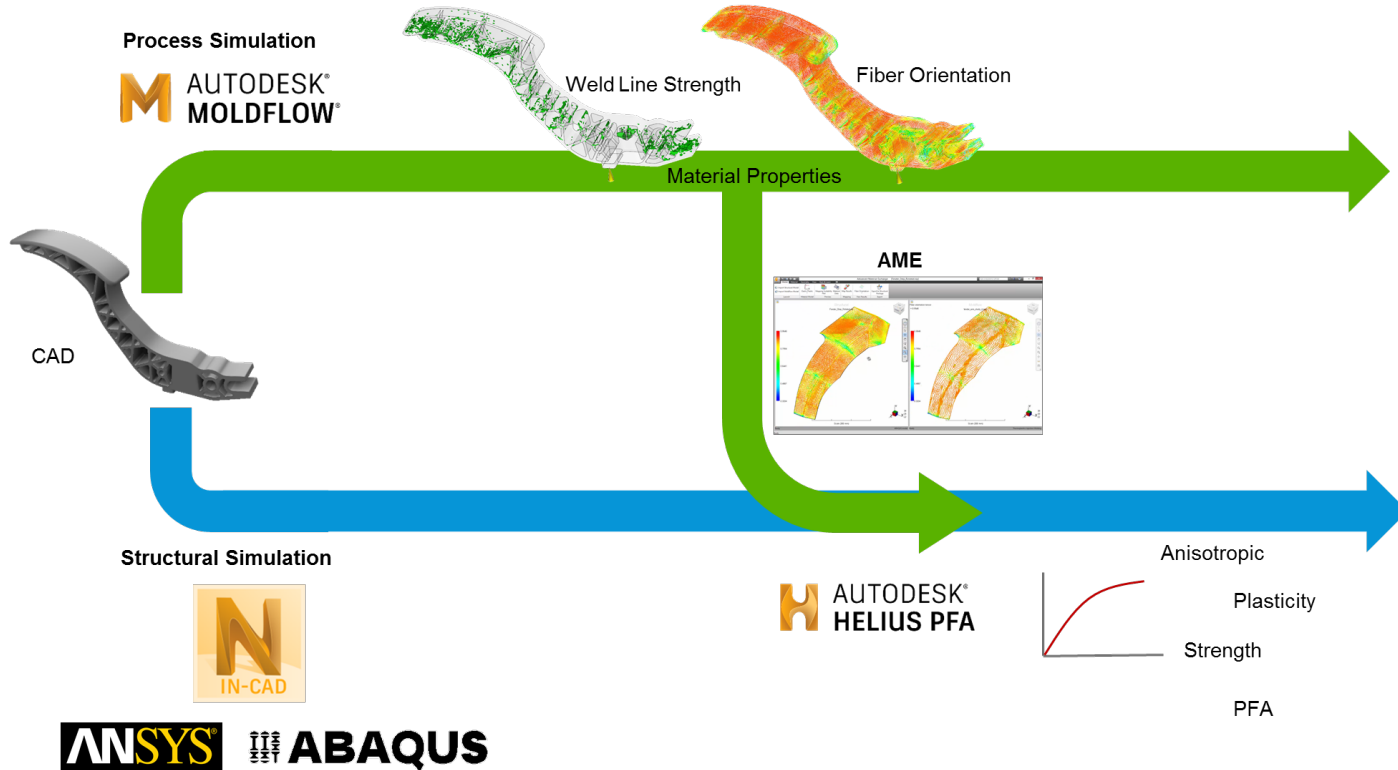
As-Manufactured Analysis | Applied Physics



As-Manufactured Analysis | Capability Vision

Manufacturing Process	As-MFG Sim			
	Structural	Crash	Fatigue	Thermal
Injection Molding (IM)				
Compression Molding (SMC & BMC)				
HP-RTM & Hybrid Overmolding (RTM)				
Additive SLS & FDM				
Additive DMLS/DMLM				
Hand Layup / AFP / ATL				

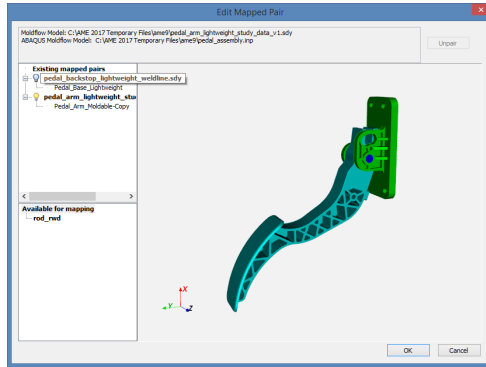
Helius & Advanced Material Exchange



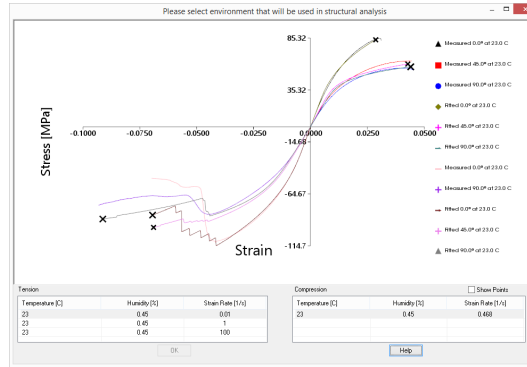
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As-Manufactured Analysis | What's New

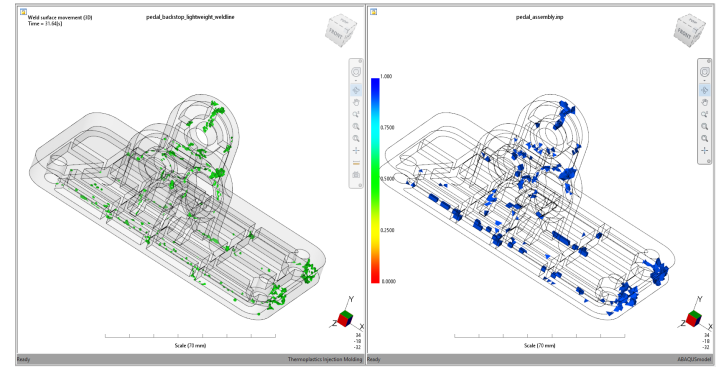
2017 Release Year Review



Structural Assembly Support



Compression vs Tension



Weld-Surface Strength

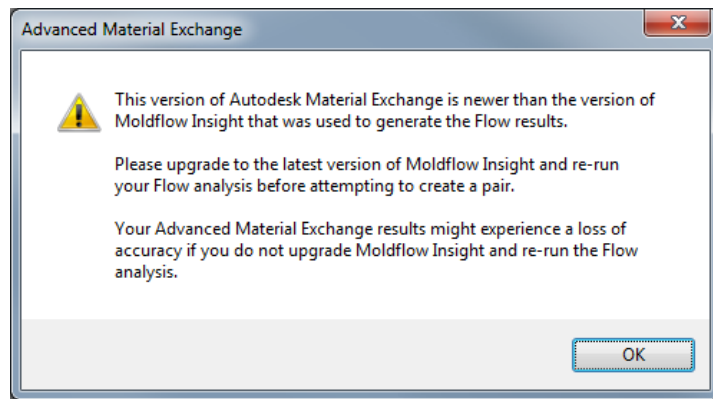
Helius PFA Entitlement

- Moldflow Insight Ultimate users with a subscription license (MUS) will automatically be entitled to Helius PFA



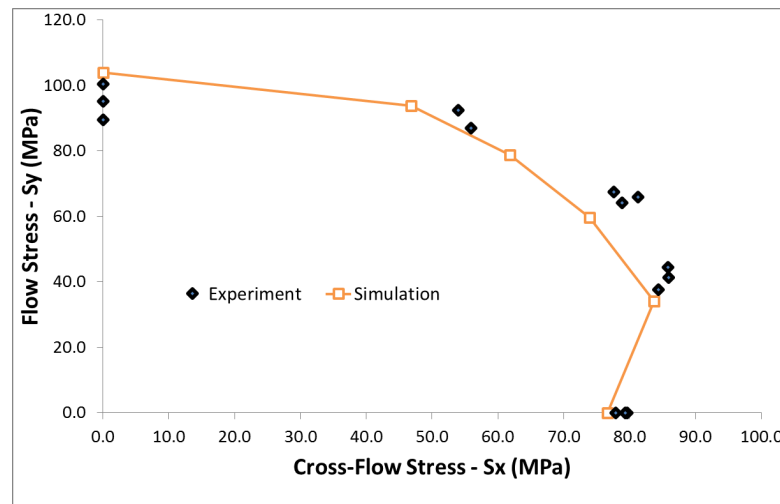
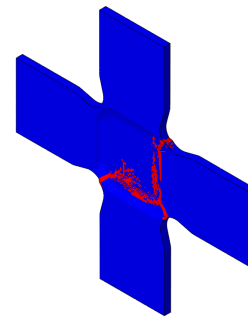
Synchronization of Fiber Orientation Model

- The fiber orientation model used by Insight and AME need to be consistent
 - AME 2018 uses the MRD model to characterize the material
 - Insight 2017 R2 and newer defaults to MRD
 - Previous Insight releases defaulted to other models (Folgar-Tucker, RSC)



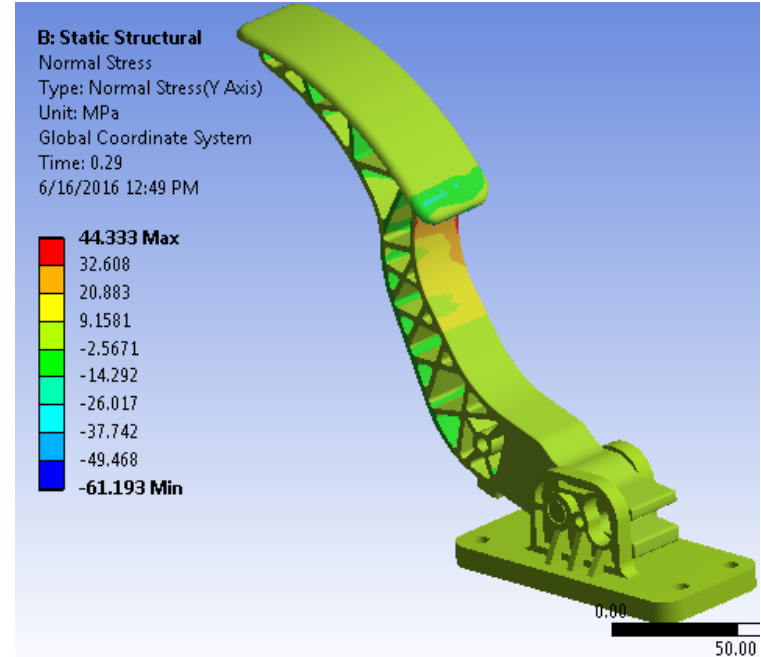
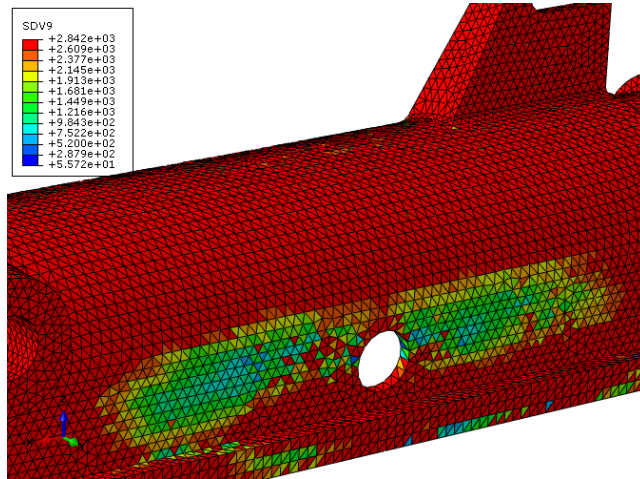
Material Model Enhancements

- New Polynomial Stress rupture model
 - Replaces MCT as default criteria
- Material characterization improvements
 - Failure coefficients are functions of the orientation tensor
- Result: Improved accuracy and more stable rupture behavior



Current FEA Platform Support

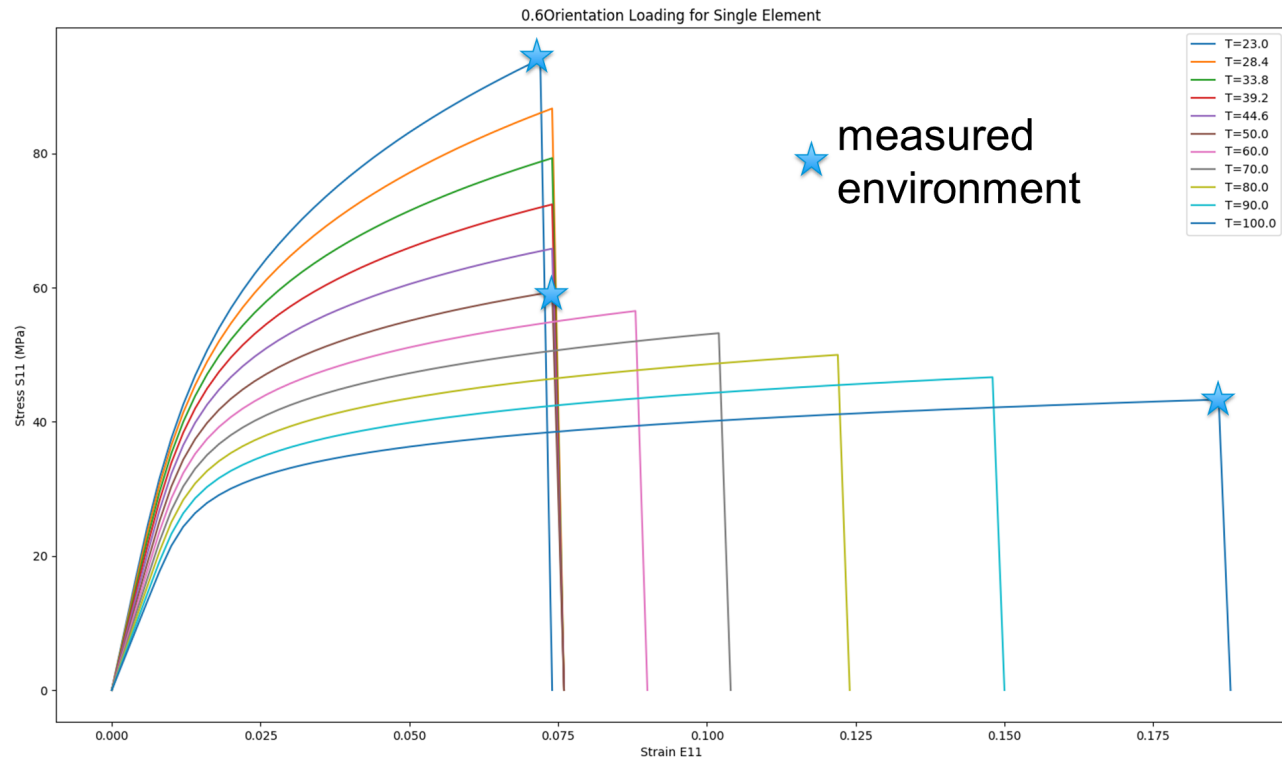
- Helius PFA 2018.0 added support for
 - Abaqus 2017
 - ANSYS 17.2 and 18.0



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As-Manufactured Analysis | Roadmap

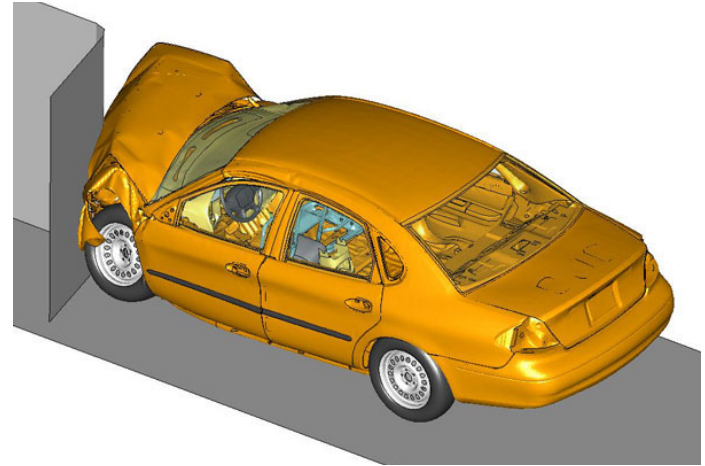
Temperature Dependent Material Properties



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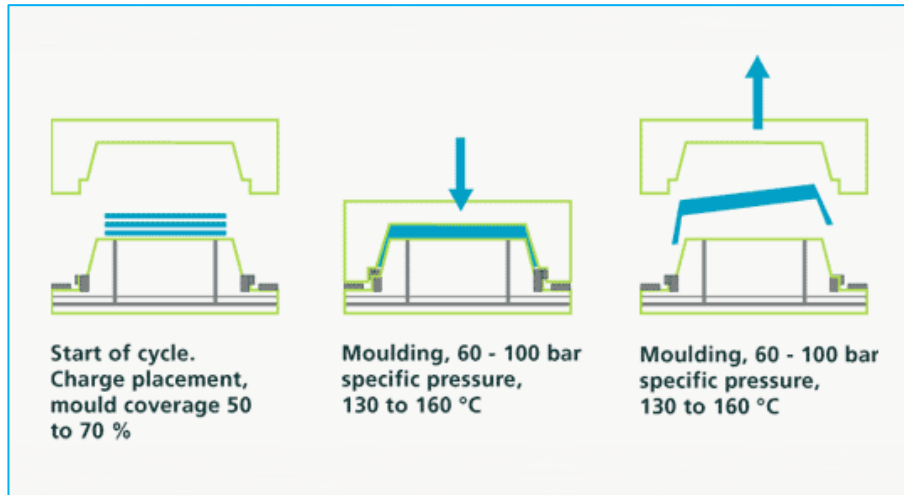
LS-DYNA Integration

- Dynamic event simulation
 - High strain rate
 - Compression dominated
- Injection and compression molded structures
- Goal is to predict crush loads and energy absorbed



Support for Compression Molded Parts

- SMC – Sheet molding compound
- Typically thermoset resin



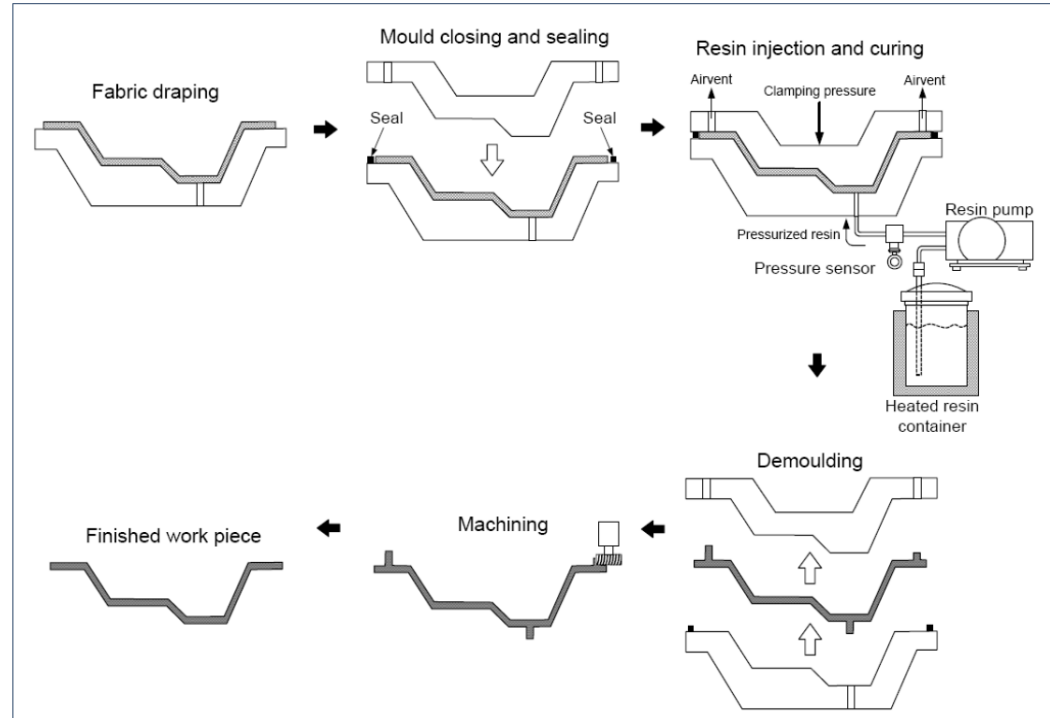
Overmolding

- Continuous fiber thermoplastic sheets (aka organo sheets) overmolded with additional thermoplastic
- Strength from continuous fibers with flexibility of injection molding
- High volume production



Resin Transfer Molding

- Dry fiber fabric is engineered
- Fabric is draped into mold
 - Charge is either preformed into shape or advanced to infusion stage
- Charge is inserted into final mold
- Injection/Compression infusion process is initiated
- Part is removed and post processed



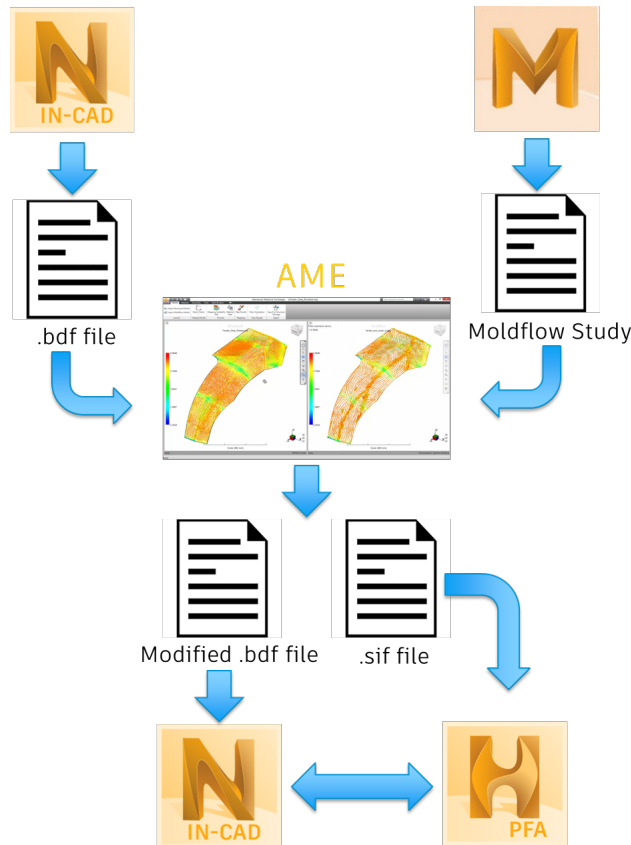
EADS - Jensen (2003)

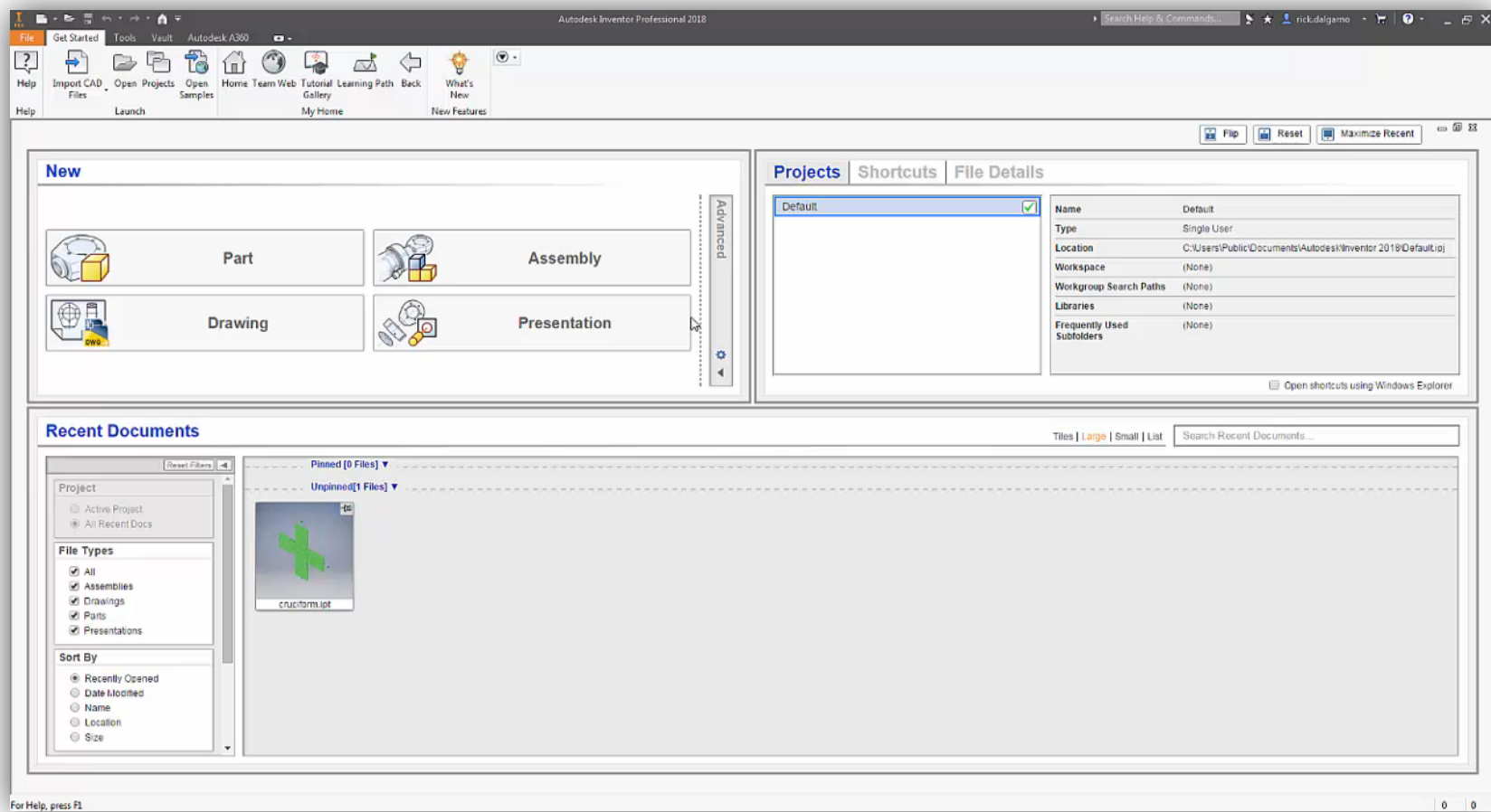
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As-Manufactured Analysis | Demonstration

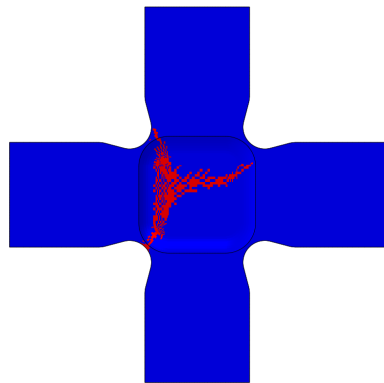
As-Manufactured Analysis | Nastran In-CAD

- Currently a prototype
- Compatible with Inventor
- Alternate workflow:
FEMAP + Autodesk
Nastran

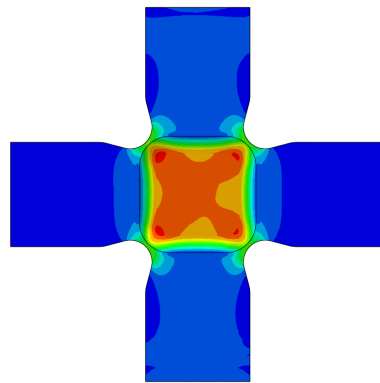




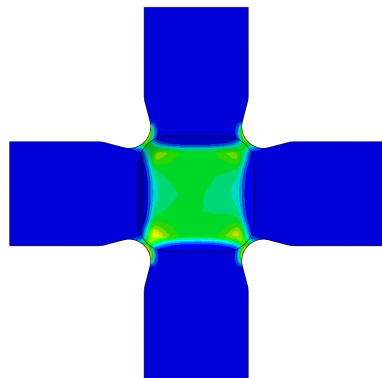
Key Outputs



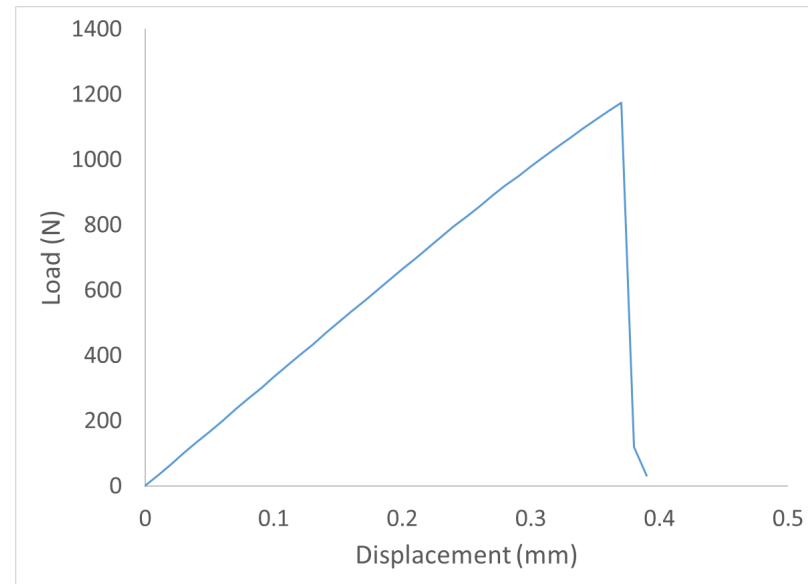
Rupture Status



Failure Index



Matrix Effective Plastic Strain
Matrix Effective Stress





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