

# Bumper systems

DEP MeshWorks as a rapid model building and assembly tool for Bumper systems

DEP MeshWorks Parametric FE Modeling engine is a great value add for What if scenarios and optimization of bumper performance under impact load conditions. Hex mesher and hex cutter tools are well suited for carving out complex features in bumper foams.

## Challenge faced to study what if scenarios quickly.

- Creation of hex mesh model for complicated bumper foam is certainly required. Tuning bumper performance for impact condition is also a challenge. Any acceleration to create ready to run solver deck is also very welcome.

## Solution

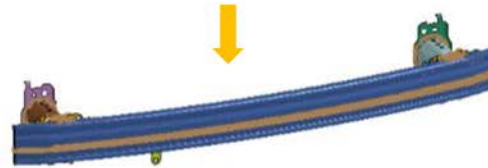
- MeshWorks batch mesher comes in handy to create shell mesh model for bumper system components. Hex mesher in MeshWorks together with hex cutter is great value add for addressing complex shapes of bumper foams. Extensive parameterization options available in MeshWorks help tune the bumper impact performance. Beads, darts, shape parameters besides size and material constitute 3G optimization methodology for tuning and mass savings.

## Value

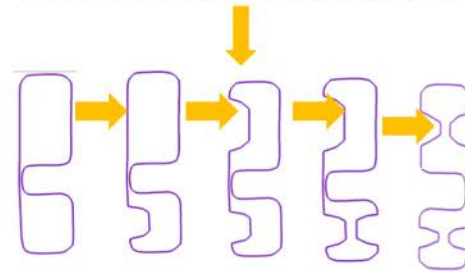
- Comprehensive mesh modeling, model assembly options and parameterization tools come in handy to model and tune the bumper systems. Parameterization tools help to tune bumper crush can efficiency in terms of energy absorption and stroke length. For Virtual Validation related to bumper, MeshWorks tool sets are comprehensive and certainly saves beyond 30% time.



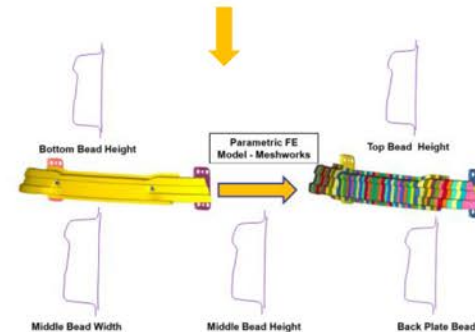
Import CAD and Create Mesh in MeshWorks



Mesh Model and Assembly for the bumper system



Parameterization of bumper beam to study the performance under impact conditions



Shape Optimization of bumper beam



## Work Flow – Driven by MeshWorks

### Complete Pre & Post Processor

- Comprehensive FE/CFD pre & post processor with powerful tools for CAD clean-up, meshing (shell, tetra, hexa, hybrid etc.), highly automated model assembly and results processing.
- Complex FE/CFD can be generated 30% faster and with better quality than other competitor products.

### Customized Engineering Process Automation

- Customer CAE processes can be rapidly automated using a fast Record>Create-GUI>Plumb>Publish process.
- 2X to 10X time reduction can be expected for processes that are repeatable.

### CAD & CAE Morphing Technology

- Reduces Finite Element (FE) & Computational Fluid Dynamics (CFD) model building time by 50% to 80%.
- Generated morphed CAD models representing optimized designs very rapidly and form the main link between CAE & Design teams.

### Parametric CAE Technology

- Rapidly converts FE & CFD models to intelligent parametric CAE models, enabling fast design iterations & Design of Experiment (DoE) studies.
- Most comprehensive parametrization engine addressing several categories of parameters such as shape, gage, material, spot welds, seam welds, adhesives, design features, etc.

### Multi-Disciplinary Optimization (MDO)

- Enables Multi-Disciplinary Optimization to meet design targets, minimize product weight, and minimize manufacturing cost using parametric CAE models.

