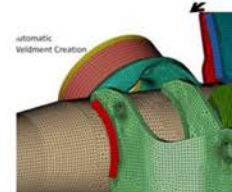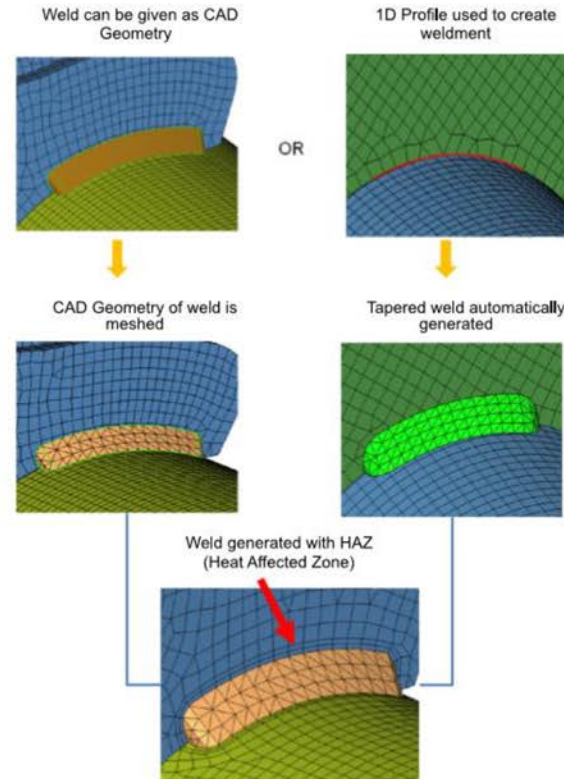## Challenge faced in Meshing and Welding for Axles

- Users expect strong hex meshing, tetrameshing and seam welding tools to set up complete axle sub system for durability analysis.

Solution

- MeshWorks has state of the art tetra meshing, and hexa meshing tools that help model axle assemblies. MeshWorks also has one of the best SEAM Welding tool that caters to modeling different weld profiles with / without HAZ. Auto contact definition and fix tools help save significant build and debug time for the users. MeshWorks Process Automation does save lot of time for weld creation.

Value

- Creation of SEAMS welds in MeshWorks is easy, it requires minimal inputs, and takes less time to create welds. The welds are parametric and hence easy to evaluate multiple scenarios. Not only welds even the axle housing, carriers meshes could be parameterized and this Coupled with structural mesh modeling efficiency, user can expect at least 50 % time saving besides acceleration in what if scenario studies as they are now independent of CAD when driven by MeshWorks due to parametric FE technology.

Automotive –
Axle Systems

Weld can be given as CAD Geometry

1D Profile used to create weldment

OR

CAD Geometry of weld is meshed

Tapered weld automatically generated

Weld generated with HAZ (Heat Affected Zone)

MeshWorks Process Automation for
Automotive Axle Systems

CAD Clean up and Meshing in MeshWorks → Welding and Assembly in MeshWorks → Solve using FE Solvers and post process in MeshWorks

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 parameteric CAE models.

PRE/POST PROCESSING
MULTI- DISCIPLINARY OPTIMIZATION
PROCESS AUTOMATION
CAE/CAD MORPHING
CAE PARAMETRIZATION

DEP MeshWorks