Electric Motors
DEP MeshWorks as a rapid model building and assembly tool for Electric Motor Systems

Hex meshing tools in MeshWorks helps build rotor and stator sub assemblies. MeshWorks Parametric FE Modeling engine is a great value add for What if scenario and optimization for electric motor housing. Integrated modeling in MeshWorks save time to prepare NVH and Durability models of complete electric motor.

CAD Clean up , meshing, modeling for stator and rotor. Mesh Modeling for motor housing → Use integrated modeling for creating NVH and Durability model of E Motor → Parameterization of mesh model of housing for what if scenario and optimization

Work Flow – Driven by MeshWorks

## Challenge faced to study what if scenarios quickly.

- Hex mesh modeling for rotor and stator geometries. Tetra meshing for electric motor housing. It is also very important to build different solver attribute models of electric motor in shortest possible time and keeping the model in sync is also very important. Optimization and what if scenario studies also needs to be accelerated.

Solution

- MeshWorks has best in class hex meshing tools that help capture rotor and stator sub assemblies in shortest time. Feature based Tetra meshing in MeshWorks helps build parametric FE model for electric motor housing. Integrated modeling feature in MeshWorks is useful to build NVH and Durability models with different solver attributes keeping the models in sync. The parametric model of the electric motor housing is very useful for what if scenarios and optimization without having to wait for CAD data.

Value

- Combination of tool sets like hex meshing, tetra meshing and connections options help prepare solver attributes resulting in analysis ready model. The integrated modeling approach helps build in sync NVH and durability models taking care of relevant solver attributes. The parametric mesh model built in MeshWorks helps in quick what if scenario studies and optimization studies without waiting for CAD. Integrated modeling option, parametric modeling and hex meshing in MeshWorks are right way to save more than 50% time towards virtual validation of electric motor from NVH and Durability perspective. Additionally MeshWorks could be used to model the cooling paths for motors as well.
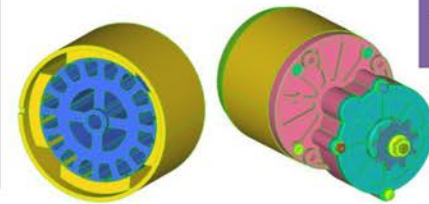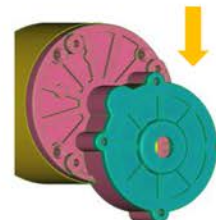
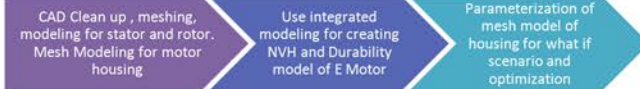
Import CAD and Create Mesh in MeshWorks
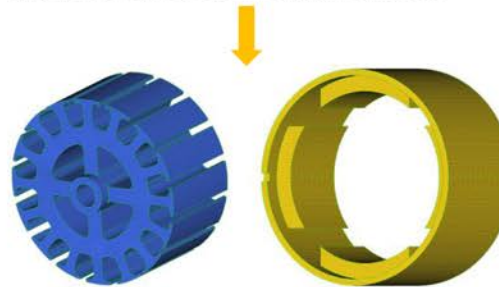
Hex mesh created for rotor and stator
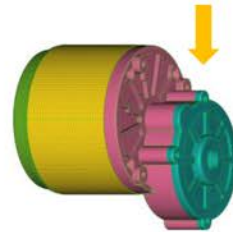
Complete electric motor assembly for Durability and NVH.

FE Parameterization to optimize housing features like wall thickness, ribs.

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 · — · CAE/CAD MORPHING
MULTI- DISCIPLINARY OPTIMIZATION · — · CAE PARAMETRIZATION
PROCESS AUTOMATION · —

DEP MeshWorks