Detroit Engineered Products (DEP) is a global engineering solutions and product development company, founded in 1998 in Troy, Michigan. Over the years, DEP has expanded its footprint to Europe, China, Korea, Japan, and India. At the core of DEP's innovation is its proprietary platform, DEP MeshWorks, which enables accelerated product development by drastically reducing design and simulation cycle time. Leveraging a unique combination of engineering expertise and digital transformation, DEP supports customers across automotive, aerospace, healthcare, energy, and industrial domains.

The Modelling module in DEP MeshWorks is a fully integrated environment for developing complex system level models. It provides a comprehensive set of interactive and automated tools to define geometry, mesh, and assembly connections including welds, adhesives, bolts, and contact interfaces. The module supports modelling for various component types such as sheet metal, cast, machined, and plastic parts, enabling efficient and consistent creation of high-fidelity simulation models. Its advanced automation capabilities, intelligent feature recognition, and seamless handling of model assembly make it one of the most efficient and versatile tools available for simulation model development.

Powered by MeshWorks, DEP enhances the engineering process through advanced modeling, seamless integration, and comprehensive simulation capabilities. This enables organizations to address complex design challenges with greater precision, ensuring robust and reliable product outcomes.

DEP MeshWorks

DEP MeshWorks Advantages

- AI/ML-Powered
- HAZ-Modeling
- Connector Transition
- Assembly-Parameterization
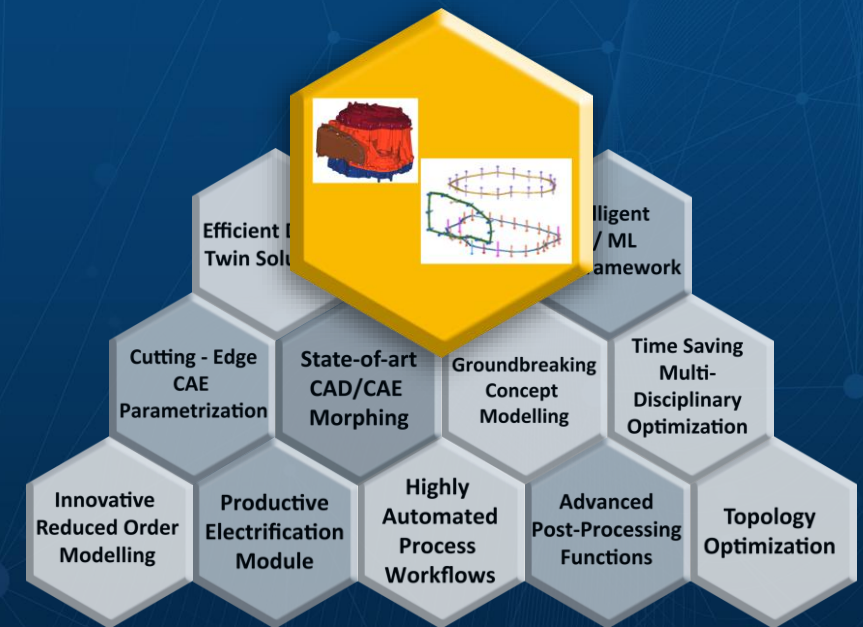- Geometric Adaptability
- Auto-Contacts
- 3D Bolt Creation
- Contact Integrity

Data-Intelligent Modelling Platform

Automate intricate model assembly -
From CAD to full-system CAE in minutes

- Parametric Modelling
- Simulation-Optimized
- Physics-Driven

Hexagon diagram:
- Efficient Digital Twin Solution
- Intelligent AI / ML Framework
- Cutting - Edge CAE Parametrization
- State-of-art CAD/CAE Morphing
- Groundbreaking Concept Modelling
- Time Saving Multi-Disciplinary Optimization
- Innovative Reduced Order Modelling
- Productive Electrification Module
- Highly Automated Process Workflows
- Advanced Post-Processing Functions
- Topology Optimization

Comprehensive Model Assembly with DEP MeshWorks Modeling Module

DEP MeshWorks Modeling module provides a wide range of model assembly capabilities, including seam welds, spot welds, adhesives, bolt connections, and contact definitions. Each connection type is available in various forms such as solid bolt, 1D bolt, and rigid bolt connections, offering flexibility and precision. With these advanced features, DEP's engineers are able to efficiently assemble highly detailed and complex models within significantly reduced timeframes.

Modeling platform Feature Breakdown

Spot Welding

- Creates spot welds by selecting flange nodes and applying chosen weld types.
- Auto-generates weld attributes for crash, NVH, and durability with advanced failure and HAZ modeling.
- **Uniqueness:** MeshWorks auto-detects contact points and creates spot welds without connector data, with pitch and pattern control for efficient assembly.
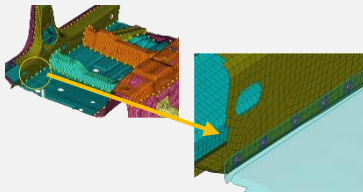
Seam Welding

- Creates seam welds using selected flange nodes, master/slave elements, and defined weld types.
- Supports multiple element types and enables detailed node-to-node connections for precise weldments.
- **Uniqueness**: MeshWorks auto-creates seam welds, supports weld types, and enables length control for efficient design.

Seam Welding With Solid Elements
Seam Welding with Quad Elements
Heat Affected Zone (HAZ)

Adhesive Bonding

- Selects flange nodes to bond parts with specified adhesive.
- Auto-generates solid elements with connection equations and contact definitions.
- **Uniqueness:** MeshWorks creates and morphs adhesive layers as geometric features, optimizing bond lines for strength and manufacturability.
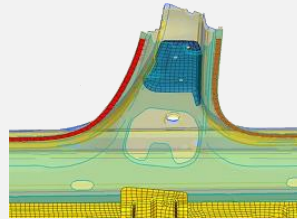
Bolted Connections

- Auto-generates bolts, screws, and metric models using defined nodes and dimensions.
- Supports connections with beams, rigids, and solids for efficient bolted assembly simulations.
- **Uniqueness:** MeshWorks auto-creates 3D bolt meshes without geometry and parametrizes features for fast, accurate assembly simulations.
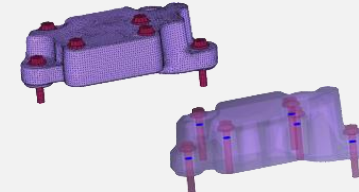
Contact creation

- Automatically generates contact surfaces between assembly components for comprehensive contact modeling.
- Automatically forms contact pairs with friction and thermal properties using the Auto Contact Creation tool for quick setup, control, and pre-tension definition.
- **Uniqueness:** MeshWorks automates contact creation across assemblies, detects gaps or over-closures, and ensures simulation readiness.
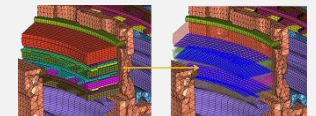
MeshWorks Value Proposition to Users

Automation & Efficiency

- Automated workflows streamline model assembly, cutting processing time by up to 60%.
- AI-powered, intuitive interface minimizes user intervention and training needs.

Integrated Co-Creation

- Simultaneous generation of 3D bolts, contact definitions, and pre-tension conditions.
- AI-driven algorithms ensure consistent and accurate assembly setup.

Optimization & Cost Reduction

- Weld and adhesive optimization using ML-based parameter tuning
- Connector parameterization for reduced manufacturing costs.

Precision Modeling

- Utilizes advanced high-fidelity modeling methods, such as Heat Affected Zone (HAZ) simulation
- Results in superior accuracy and reliability of simulation outcomes