

CONCEPTWORKS

# ConceptWorks

A powerful automated modeling tool from DEP MeshWorks



Powered by  
**DEP**  
**MeshWorks**

## The demand for automation in design:

Designers frequently leverage past designs to swiftly generate new designs, in addition to optimizing an existing model. In order to get the required structure, creating the finite element model without the CAD data might take a long time because there are so many stages and functions to be done.

## In pursuit of more effective methods:

Detroit Engineered Products (DEP) is passionate about developing and designing sophisticated CAE solutions by observing customer needs and identifying possibilities for smarter innovation. At DEP, we continuously invent, develop and build better solutions using the rapid and transformed product development process attained through the use of our revolutionary proprietary platform, DEP MeshWorks.

For the past 20 years, DEP MeshWorks core objective is to simplify monotonous, time-consuming processes associated with design changes, and assist in the reduction of the product development cycle. MeshWorks modules includes pre and post processing functions, involving rapid concept CAE and CAD model generation, parameterization and optimization, advanced meshing, process automation, concept modeling and CAD morphing. We employ IPAAM technology to get optimum results by allowing tight linkages between CAE models, automating repetitive CAE procedures, generating multi-functional CAE models, and using automated parametric solutions.

**We are proud to introduce ConceptWorks, our newest and most innovative technology, as an addition to the CAE legacy.** With ConceptWorks, we are pursuing our innovation journey to bridge the gap between model design and analysis.



## Why is ConceptWorks needed?

During the vehicle development stage, CAE engineers are limited in regards to creating concept parts, any ideas to generate new parts that may improve the design needs to be communicated to CAD designers, who will create or redesign the components. After this, the CAE engineers will need to spend time on meshing and assembly, and this back and forth process will continue until an optimal solution is achieved. This process is clearly inefficient and very time consuming, which is why we developed ConceptWorks.

## What is ConceptWorks?

ConceptWorks essentially redefines the concept modeling phase by giving CAE engineers the power to quickly generate Concept members for design and optimization studies by giving the user the ability to make radical changes directly at the CAE level.

ConceptWorks for structures is a tool created for CAE engineers, which allows the user to create concept members and joints without the need of CAD. More importantly, we made sure that the inputs are very simple and it was designed in such a way that engineers at any level can start creating Concept parts after a 3 or 4 hour training.

ConceptWorks can be used by CAE engineers that helps achieve an optimal design much faster without involving designers at every stage. Basically, once the concept design is validated at the CAE level, this can now be presented to CAD designers, thereby drastically reducing the back and forth process that exists in the current design and development cycle.

This new and innovative tool can be used at any stage of vehicle development.

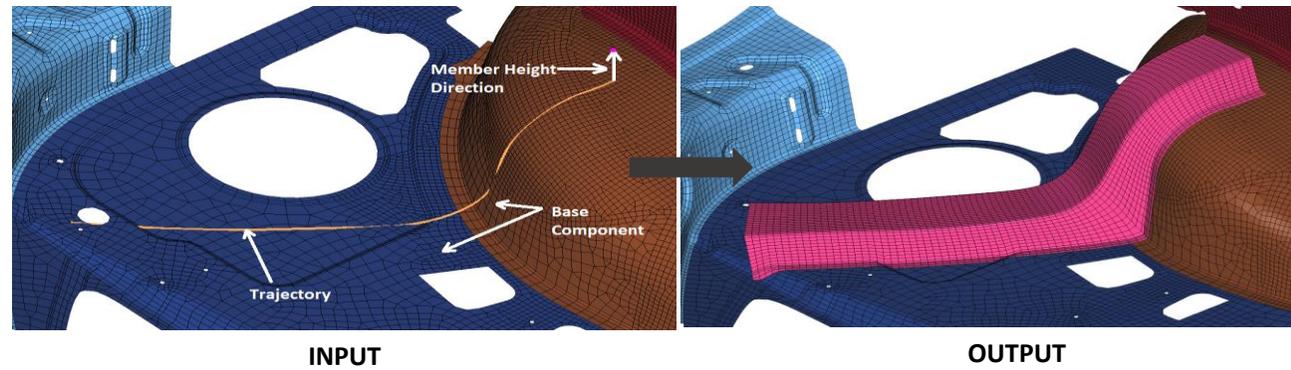


## FEATURES:

DEP ConceptWorks is an automated modeling system that generates concept members and joints with minimal input. This system seeks to bridge the gap between model design and analysis. The modeling system incorporates a computer system that automatically creates elements based on user inputs such as trajectories, axes along height, any basic components, height, width, angle, size, radius, and thickness.

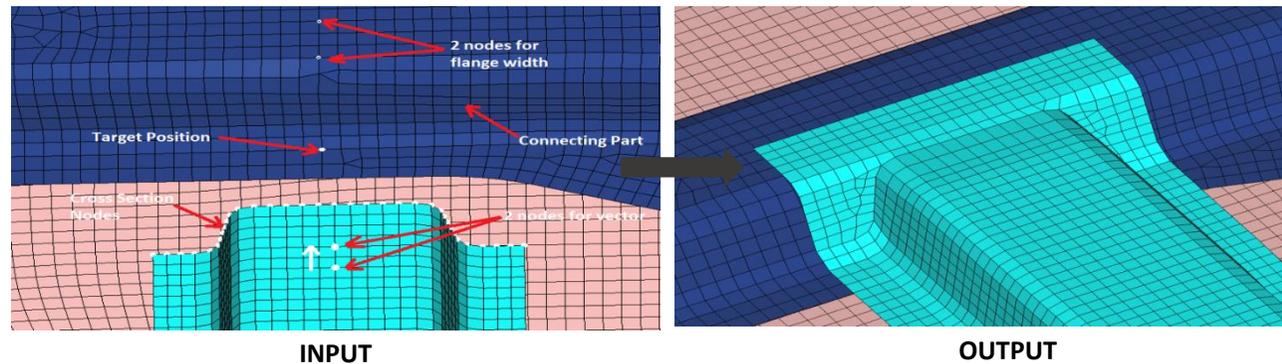
### Member creation :

Under ConceptWorks modules, there is a detailed member creation feature which can help users to create both predefined and user-defined members. For both kinds of members, the criteria of height, width, angle, thickness, element size, etc., can be defined based on requirements. Also, member creation can be done as a new feature, using existing members, direction-based, trajectory-based, etc.



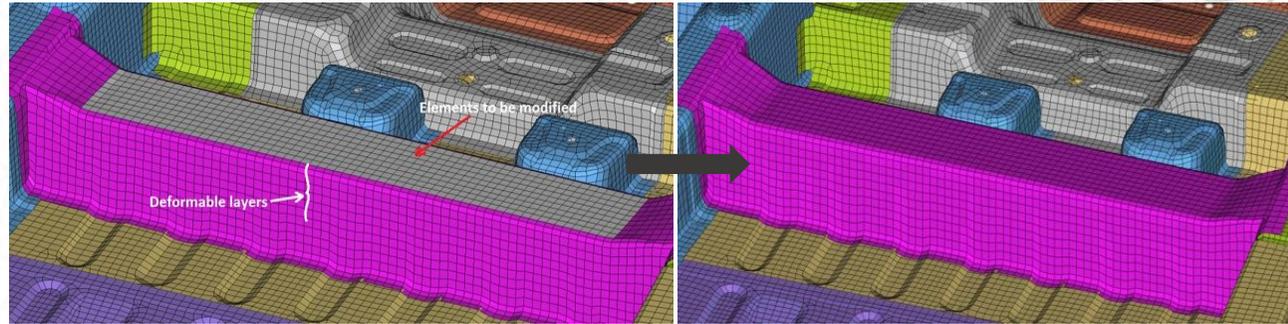
### Joint creation :

ConceptWorks features assist in building suitable joints such as standard joints or special joints based on the given inputs. It automatically creates joints with only a few inputs such as element size, height, cross section nodes, define vector, connecting part, target position, base components.



## Adjustments :

ConceptWorks modelling robustness eliminates framework complexity by allowing users to alter existing members and flanges to meet the desired output by selecting the element to be adjusted and adjusting the range, deformable nodes, and base components accordingly.

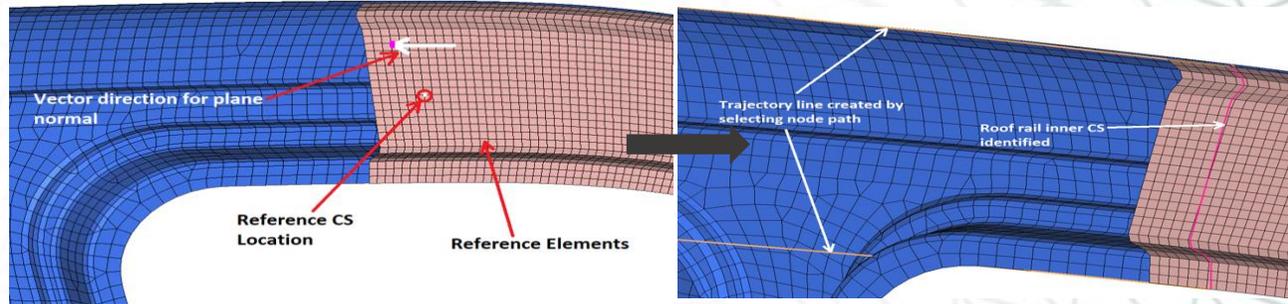


INPUT

OUTPUT

## BSO Inner Parts :

In ConceptWorks, a CAE engineers can find more detailed functionalities to analyze and build sophisticated inner parts such as Roof Rail Inner, Header, Roof Bow, B-Pillar Inner, etc. With minimal user intervention and fewer inputs that specify location, reference elements, thickness, trajectory etc. one can create the Inner Parts for automotive structures.

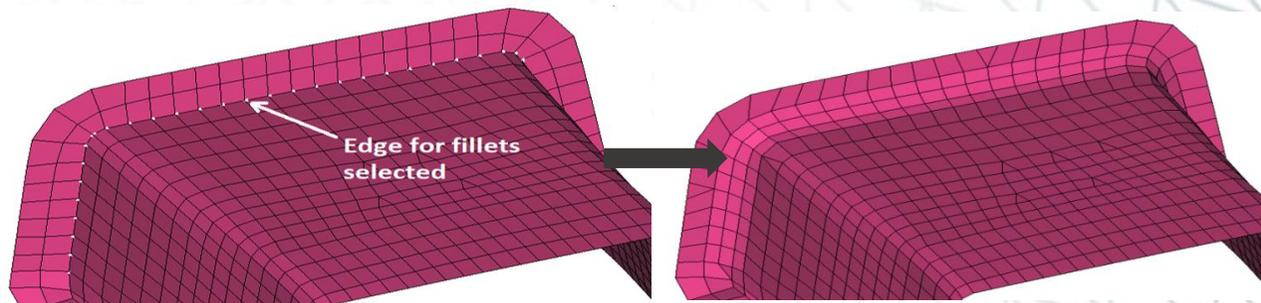


INPUT

OUTPUT

## Special Features :

ConceptWorks assist users in effortlessly constructing various special features such as fillets, holes, and splits by specifying nodes, radius, and elements on the model, with the goal of bridging the gap between model design and analysis.

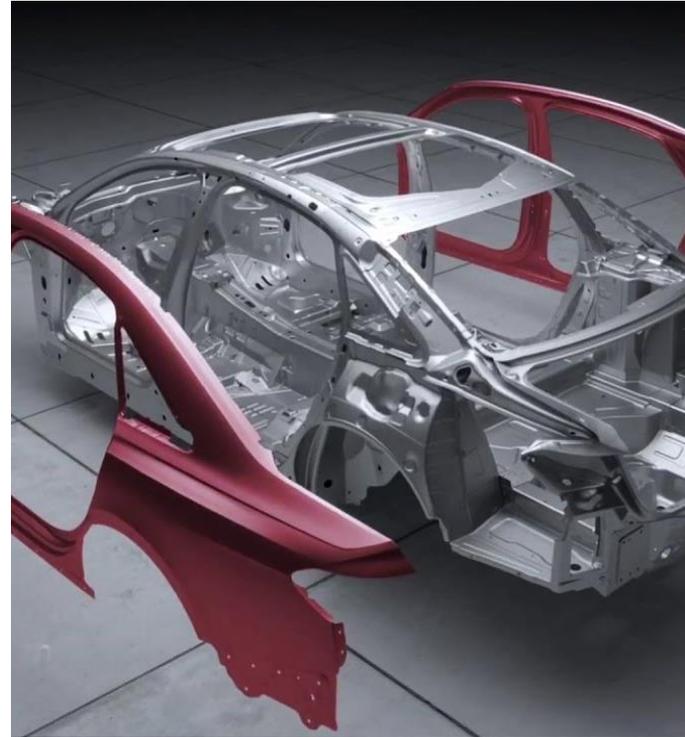


INPUT

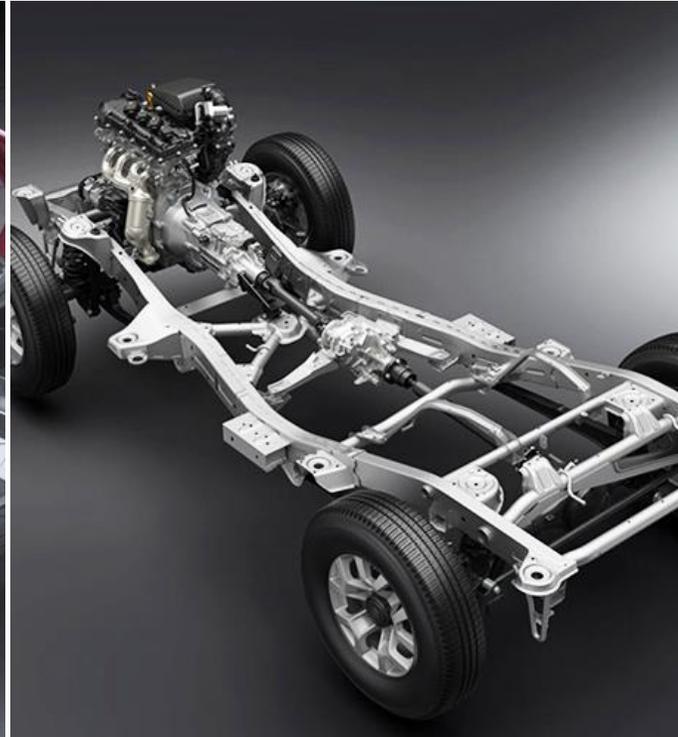
OUTPUT

## Advantages :

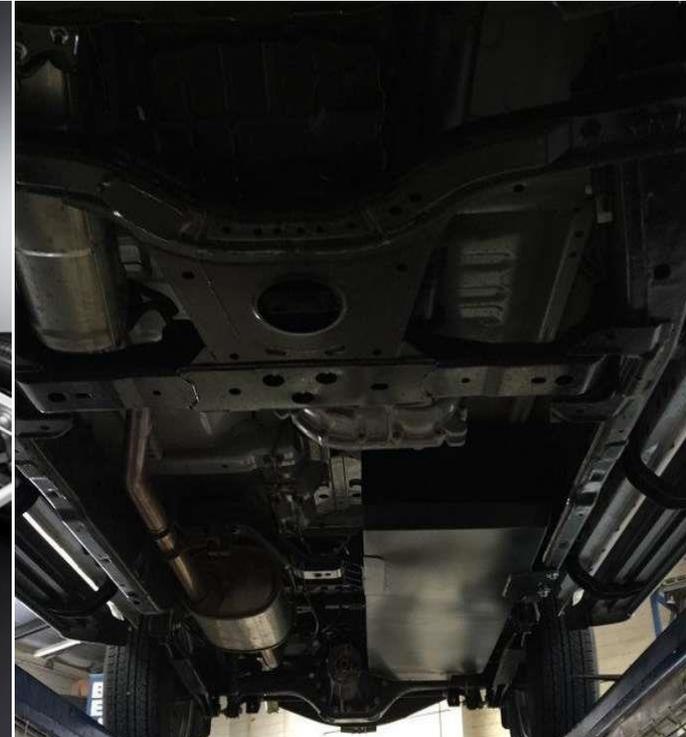
With ConceptWorks we can automatically and rapidly creates a computer-aided-engineering model that has members, braces, and joints using limited inputs from a user. Users can also change existing elements, mesh elements, and parameterize elements using a computer system interface.



**BODY STRUCTURES**



**FRAME STRUCTURES**



**UNDERBODY STRUCTURE**

- Advanced Concepts
- Topology Optimization
- Rapid Designing

- Design Studies
- Automated Functions
- Member Creation

- CAE Modeling
- Design Optimization
- Concept Creation



Smarter Solutions. Realized.

Detroit Engineered Products (DEP) is an Engineering Solutions and Product Development company. Since its inception in 1998 in Troy, Michigan, USA, DEP is now a global company with footprint in Europe, China, Korea, Japan and India. DEP uses the accelerated and transformed product development process, accomplished by utilizing our proprietary platform, DEP MeshWorks, which rapidly reduces the development time of products for all segments.

Rapid time to market of new products across several industry sectors such as automotive, defense, aerospace, energy, oil & gas, electronics, consumer products and heavy equipment is a unique value proposition delivered to clients via DEPs world class engineers and the DEP MeshWorks platform.



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