Weight optimization on the Yoke component of a construction equipment using DEP MeshWorks

About the Client

The client is a leading construction equipment manufacturer, headquartered in Europe with manufacturing and engineering facilities globally.

The Challenge

The client was interested in reducing the mass of its YOKE component of its existing product lines. The objective of the project was to achieve a reasonable amount of weight reduction from the component using morphing, parameterization & optimization features of Meshworks. One of the main request from the customer was to maintain the performance from the baseline design during the optimization & consider the casting manufacturability.

The Solution

The 'transformed product development process' using Meshworks was executed for the weight optimization.

Following are the major tasks conducted:

- Performed optimization on the Yoke design using MeshWorks and achieved minimum mass design with the performance same as the baseline design.
- Shape parameters and wall thickness parameters were considered for the minimum mass design creation.
- The casting manufacturability was considered during optimization.
- Yoke and Yoke Extensions were considered as the design objectives.
- The loads considered were TE loads, Suspension Loads, Lateral Outward, Lateral Inward, Front Outward, and Rear Outward.

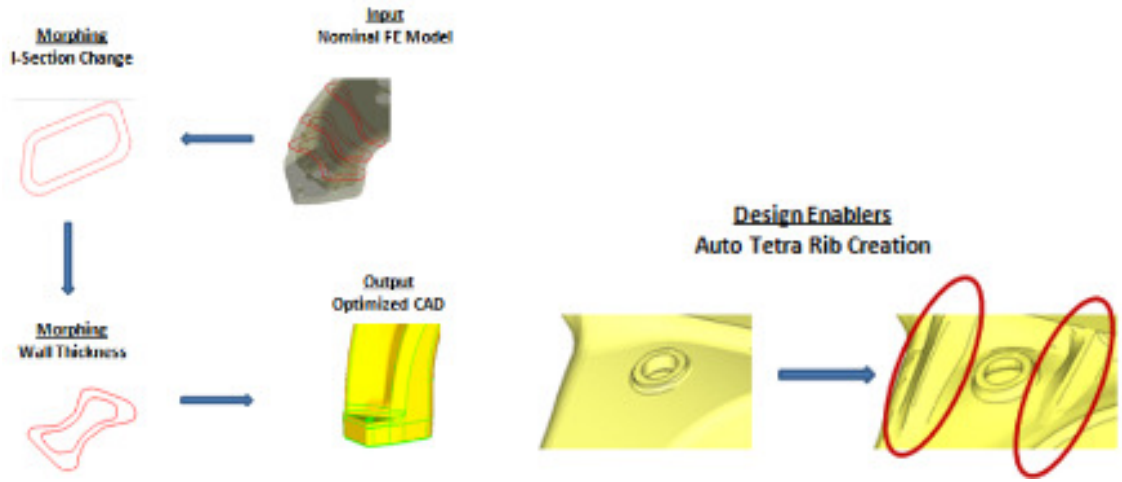
The DEP Edge

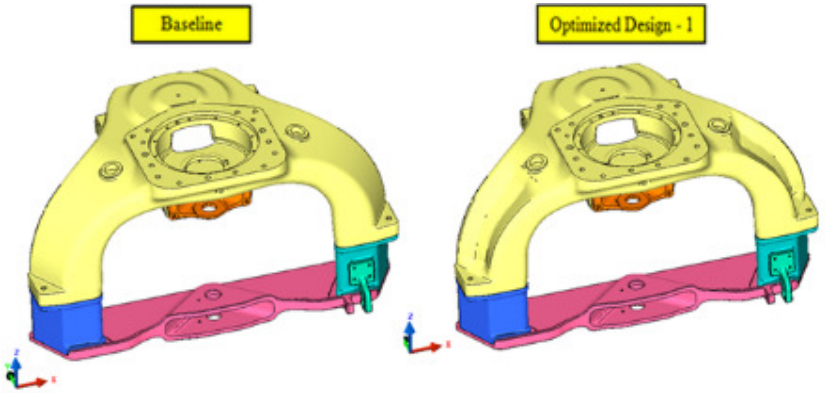
Design enablers from DEP MeshWorks and minimalistic design based approach from DEP was used for the optimization, resulting in considerable time savings.

The Result

- Two designs were optimized in the shortest possible time.
- The optimized design-1 has 4.5% reduced mass as compared to the baseline.
- The optimized design-2 has 12.3% reduced mass as compared to the baseline.
- The baseline performance was maintained.
- The design was generated keeping the casting manufacturing feasibility in mind.

Following are the major changes conducted:





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