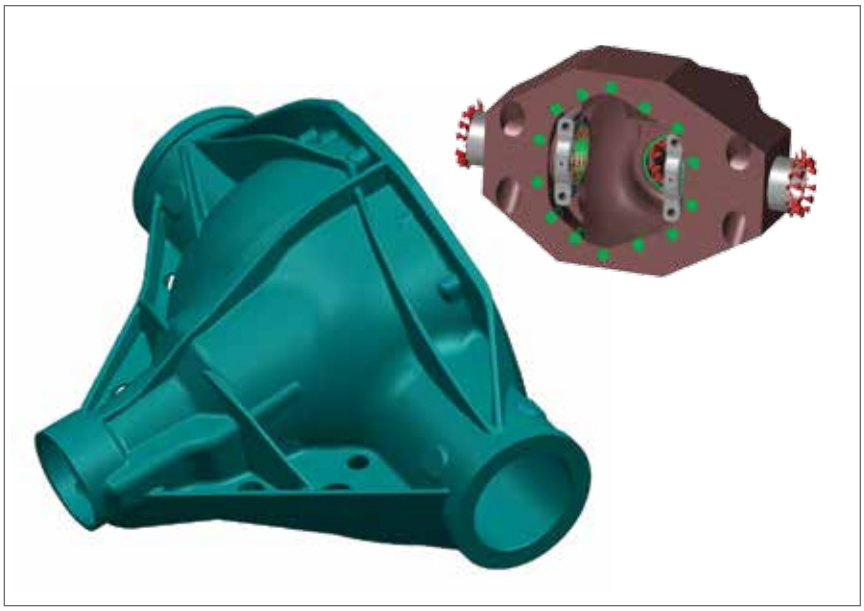
CUSTOMER STORY

AAM

Automotive Components



Images courtesy of AAM

"Inspire helped us to reduce the mass of the part by 20%. Our baseline design for this carrier weighed 48Kg, while the new design weighed in at 38.3Kg."

Jerry Chung, Ph.D
Senior Manager, Analytical Engineering, AAM

AAM is a Tier-One global automotive supplier of driveline and drivetrain systems for light trucks, SUVs, passenger cars, crossover vehicles and commercial vehicles. Based in Detroit, Michigan, AAM has offices in 13 different countries. It specializes in the design and manufacturing of axles, chassis modules, driveshafts, transmission parts, and metal-formed products.

AAM was an early adopter of Inspire and has been using it for many years, "I think we were one of the first users of Inspire, we have used it on multiple projects over the years," noted AAM Senior Manager of Analytical Engineering, Jerry Chung.

When tasked with redesigning an optimized carrier for one of its customers, AAM naturally thought to use Inspire to help generate the lightest possible design that would still meet strength targets. Lightweight design is particularly important in the automotive market to not only help improve performance, but also help increase efficiency and fuel economy.

SOLIDTHINKING INSPIRE IN THE DESIGN PROCESS

AAM started the process by creating a basic design space in CAD. This was essentially the maximum volume that the redesigned carrier could occupy. The next step was to apply all of the loading conditions. "Using Inspire, we applied vertical beaming and gear forward and reverse loading conditions, as well as manufacturing constraints," mentioned Jerry.

Utilizing the supplied loading conditions, Inspire then generated the ideal shape for the new part. Jerry noted, "Using the results from Inspire, we were able to create an optimized ribbing design for the part. Structural components were optimized for bending and deflection performance."

INDUSTRY

Automotive Components

CHALLENGE

Redesign an automotive carrier with less weight and material usage than the original.

SOLUTION

A process incorporating solidThinking Inspire to generate the optimal design for the redesigned carrier.

RESULTS

- Ideal concept generation in Inspire utilizing multiple loading conditions.
- Creation of an optimized ribbing design with mass reduction of 20%.
- Addition of vertical ribbing to improve internal component supports to reduce system deflection.

After further testing, interpretation, and validation of the new design, AAM determined that the new design was 20% lighter than the original. "Inspire helped us to significantly reduce the mass of the part. Our baseline design for this carrier weighed 47.97Kg, while the new design weighed in at 38.34Kg. With the new design we also achieved a gear deflection improvement," noted Jerry.

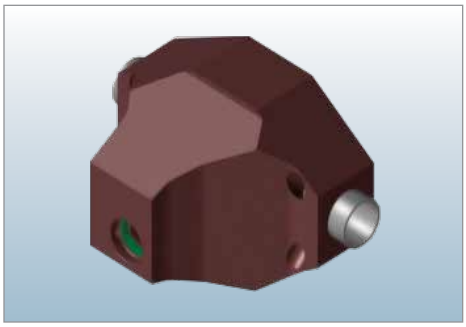
"We are super users of Inspire."

WHAT'S NEXT?

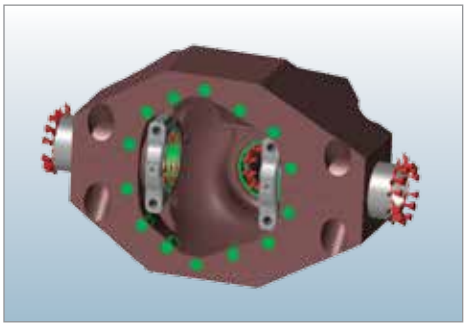
AAM is currently using Inspire to generate concepts for many of its designs. Jerry noted, "we are super users of Inspire." AAM plans to continue to use Inspire to assist with its structural designs to not only reduce mass, but also increase part stiffness.

Baseline Design – Current production part weighing 48Kg

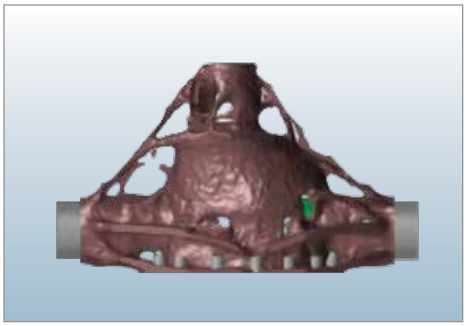
New Design – solidThinking Inspire influenced design concept weighing 38.3Kg



Carrier design space



Loading conditions applied to design space



Ideal concept generated in Inspire

ABOUT AAM

Based in Detroit, Michigan, AAM was founded in 1994, with manufacturing expertise rooted in more than 90 years of experience. Today, AAM is a leading, Tier-One global automotive supplier of driveline and drivetrain systems and related components for light trucks, SUVs, passenger cars, crossover vehicles and commercial vehicles.

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