CASE STUDY

OptiStruct Technology Cuts Production and Maintenance Costs of Crop Harvester Reel Assembly

Overview

Using Altair OptiStruct, Germany-based CLAAS was able to significantly reduce the assembly and maintenance costs of their harvester reel hub assembly. Leveraging OptiStruct's topography optimization capabilities, CLAAS designed the optimal reel hub reinforcement bead pattern, which, in turn, reduced the eight-part assembly to two pieces.

Business Profile

CLAAS is one of the world's leading manufacturers of agricultural machinery. The European market leader for combine harvesters and the number one producer of forage harvesters in the world, CLAAS' diverse product line operates in more than 140 countries.

Challenge

Agricultural equipment manufacturers are not immune to today's global market forces, which focus on the need to continually look for ways to reduce production costs while maximizing product performance and reliability. In response, CLAAS identified their existing harvester reel hub assembly system as a redesign candidate to reduce both production and serviceability costs. Although the incumbent system was successful and field-proven, a more efficient design offered an opportunity to improve profitability and customer satisfaction. The primary design objective was to increase serviceability by making an individual reel hub easier to replace without sacrificing the rigidity of the existing assembly design.

"OptiStruct's topography optimization has become an integral part of our design process to find innovative bead patterns in sheet metal components."

Stephan Diekhaus
CAE Manager
CLAAS GmbH, Germany

Fig. 1 Traditional design of the harvester reel hub

Solution

Numerous welded lap joints in the incumbent design provided enhanced stiffness. Therefore, to meet the redesign objectives, a unique reinforcement bead pattern was necessary. Using the same material stock and package envelope, CLAAS applied Altair OptiStruct design optimization software to define the optimal reinforcement bead pattern and meet the stiffness objective.

Results

The OptiStruct topography optimization provided the optimal bead pattern layout for the new reel hub design. CLAAS die engineers used this information to create a release level design. The new design produced displacements that were 70% lower than the existing eight-piece assembly.

Benefits

OptiStruct technology helped CLAAS avoid a costly trial-and-error development process by determining the optimal bead pattern at the beginning of the design stage. The new two-piece assembly cut costly welding processes from production and increased assembly efficiency. Moreover, costly in-service maintenance was greatly simplified, as each reel hub could be removed independently without the need to tear down the entire system.

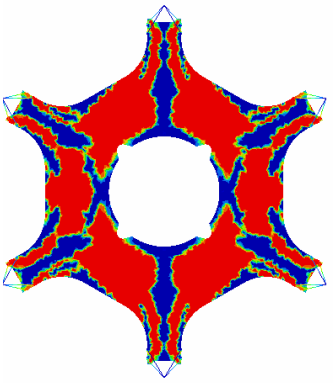

Fig. 2
Bead layout from OptiStruct's topography optimization

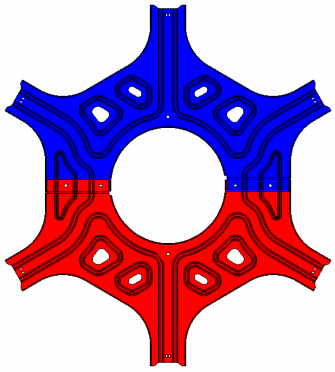

Fig. 3
The final design of the reel hub, with the bead pattern derived from OptiStruct's design proposals

Fig. 4
The new reel assembly

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