MECHANICAL MODELLING 3D
Design • Drafting • Modeling

Phone: +91-794-000-3252
Email: info@mechanical3dmodelling.com

Hi-Tech House, B/H V-Murti Complex,
Near Gurukul Tower, Gurukul,
Ahmedabad-380 052, Gujarat, INDIA

Finite Element Analysis to Locate & Analyse Fracture in a Universal Joint

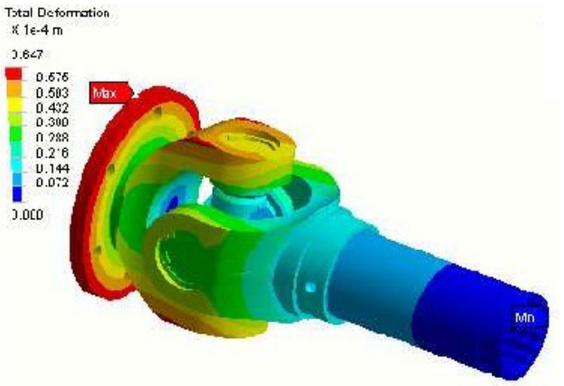
Client Profile

- The client specializes in manufacturing agriculture purpose vehicles.
- The client is one of the leaders in this segment in the Asian market.

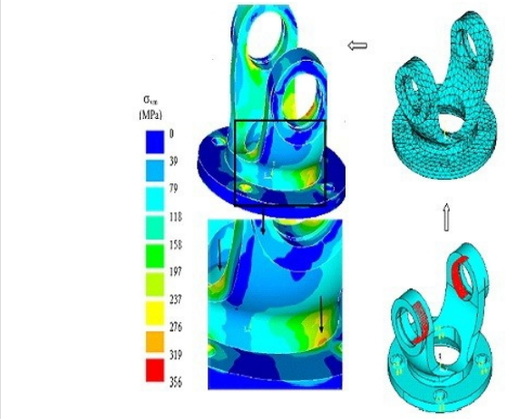
Technology Platform

ANSYS FLUENT v14.0 & Pro/E 5.0

Pro/E modelling & AN-SYS analysis have helped to determine the fracture location and sug-gest remedial measures



Total deformation using ANSYS in modfied model



Static Structural analysis of Universal joint using ANSYS v14.0

Challenges

- Frequent static fracture were observed at the universal joint of a vehicle, resulting in costly downtime.
- The location with the highest stress at the joint was to be determined.
- A comparison of varying load to the stress induced is re-quired to find out how much load can the current design withstand thereby indicating corrective measures.
- An analysis of the remedial measures is to be carried out.

Engineering Solution

- An assembly of the parts was created using Pro/E & the assem-bled model was imported to ANSYS for analysis.
- The analysis was done by using different boundary conditions and selecting the SOLID-92 tetrahedral element.
- The stress, strain and deformation on the ANSYS model of uni-versal joint was checked for varying loading conditions.

Analysis

- The analysis revealed that the maximum stress was occurring at both the yokes of universal joint at the middle span.
- The beginning location of crack corresponds to the point of high-est stress .
- A modification of the design, by a slight increase in dimension was suggested after analysing the parameters for different boundary conditions.

Advantages

- The finite element analysis revealed the exact location where the maximum stress and the maximum deformation was occurring in the part.
- The client was able to examine the exact crack propagation by the point of highest stress.
- The modifications could be done just by examining the findings in ANSYS.

About Mechanical 3D Modelling

Mechanical 3D Modelling is an India based company that caters for global clientele and plans to penetrate deeper into the existing and emerging markets. Proficiency lies in offering qualitative, cost effective and time bound mechanical engineering design services, including 2D, 3D CAD drafting, 3D solid modeling, FEA, CFD, rapid prototyping, reverse engineering. Professional and highly experienced team can handle all kind of CAD projects with the use of AutoCAD, Wildfire, 3D Max, Inventor, Solid Works, Solid-edges and Pro-e tools.