

Energy Absorption Systems, Inc.

Highway Safety Systems

United States

ANSYS® Workbench™



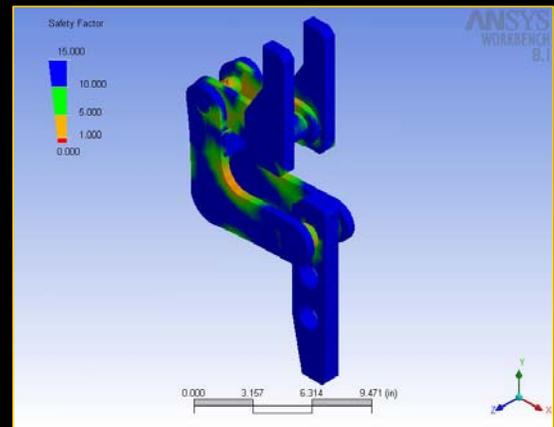
Overview

Energy Absorption Systems, Inc. is the world leader in the design and manufacture of crash cushions, impact attenuators and other energy-absorbing safety devices that protect people and equipment in highway work zones from vehicle traffic impacts. Headquarters are in Chicago, IL, with a dedicated product development lab and accredited testing facility in Rocklin, CA, and supported by manufacturing facilities in Alabama and Indiana. The company engages in extensive research and development of traffic safety technologies and today offers a range of products that utilize energy absorbing materials including sand, aluminum cells, elastomeric cylinders and proprietary steel and foam cartridges. In use in all 50 states in the United States and 60 countries, these safety systems have helped save more than 25,000 lives on highways worldwide.

Testimonial

“The Workbench interface is amazingly simple to use compared to other simulation programs. Also, having Workbench integrated into Inventor enables us to easily go from one program to another, iteratively modifying the design in CAD and performing the simulations in ANSYS. We open up ANSYS just by clicking on a menu box right in Inventor, then hit ‘update’ and the system automatically imports changes to geometry while keeping all the previous loads and constraints. Otherwise, we would have to rebuild the simulation model each time. Tight integration between simulation and design lets us get work done quickly and gives us the freedom to try out different creative ideas. This enables simulation to be a routine part of product development from concept to final design.”

Aaron Cox
Application Design Engineer
Energy Absorption Systems, Inc.



ANSYS Workbench determines stresses in the redesign of a clevis linkage.



Energy-absorbing aluminum baffles in the hinged truck-mounted attenuator serve as crash cushions.

Challenge

The TMA-180 truck-mounted attenuator consists of a hinged steel frame containing energy-absorbing air-filled aluminum baffles. The two halves of the box-like frame extend end-to-end from the back of parked construction vehicles. To minimize length of the apparatus during transit, the back half of the frame folds on top of the other half. In evaluating the performance of the hydraulic cylinder that provides the power for rotating the frame, engineers found a different supplier that could provide a more reliable, economical part. Differences in cylinder geometry and loading required engineers to redesign the clevis linkage connecting the cylinder to the frame. The challenge was to perform this redesign as quickly and reliably as possible to reduce time to market for the improved product.

Solution

The clevis linkage was redesigned using ANSYS Workbench to determine stresses and deflections for a reduced part thickness and evaluate alternative materials for sufficient part strength. Engineers were able to iterate back and forth quickly to converge on an optimal design using Workbench bi-directional CAD associativity. Workbench is integrated into the Autodesk Inventor that Energy Absorption uses as a design tool. So during the design, engineers could open up Workbench, extract part geometry to build a simulation model with a single menu pick, then quickly modify the CAD geometry based on simulation results. This cycle could be repeated multiple times without rebuilding the simulation model. Work was done on a Dell PC with dual 2.9-MHz processors and three gigabytes of RAM.

Benefits

Engineers performing numerous analysis cycles using conventional analysis software must spend time completely rebuilding the simulation model each time. In contrast, multiple iterations can be done more quickly with Workbench. Design changes can be made to the CAD model without having to reapply loads or rebuild the mesh, and simulation is performed without exiting the CAD software. These capabilities to easily iterate between CAD and analysis enabled engineers at Energy Absorption Systems to use a simulation-driven development approach that shaved days off the redesign, allowing the company to bring the modified truck-mounted attenuator to market quickly. Moreover, the approach allowed engineers to develop an improved part design by evaluating various what-if ideas that they would not have otherwise had time to investigate.