

FEA Services Help Companies Achieve Success

CIRAS provides a wide range of services and resources to help manufacturing companies improve their products. One area of expertise is in Finite Element Analysis (FEA).

Finite Element Analysis is a technique used to predict responses of structures and materials to environmental factors such as force, heat, and vibration, according to CIRAS project manager John Roberts. Benefits of implementing FEA include speeding up development of new products, improving quality, assisting with development of testing processes, and allowing for examination of “what if” design scenarios. Hadar Athletic in Humboldt and Precision Pulley and Idler (PPI) in Pella are among the companies who have used CIRAS as an FEA resource.

Started in 1960 Hadar Athletic manufactures a range of athletic equipment including everything from football practice dummies to gymnastics and wrestling mats. The introduction to FEA grew out of a testing project that was initiated when a junior blocking sled the company manufactures was found to be unsatisfactory.

Joe Hadar, director of research and development, called CIRAS for assistance with testing the L-bars, the plates used to mount the dummies to the sled. The follow-up discussion led to a change in the manufacturing process. As a result, Hadar reported no failures in the last two years. In addition, the company reported an increase in sales by \$100,000 and another \$100,000 retention of sales.

Hadar then raised a question about whether or not the rear attachment of the L-bar to the sled affects the stress experienced in the L-bar. “We wanted to optimize the bolt placement, and Roberts suggested running an FEA comparison to help us accomplish that,” Hadar says.

“We modeled the plate with two restraints, as they were currently doing, and ran the analysis looking at the stress distribution,” Roberts explains. “We then modified the model with just one restraint at the location where it would be mounted. The analysis was run again and compared to the previous results, and the information was provided to the company.”

While work on the blocking sled continues, Hadar says he anticipates the FEA will help them improve their models and

designs. In addition, he plans to follow up with Roberts to talk about FEA software and what the company might do to bring FEA on-site to improve their own engineering capabilities.

PPI Benefits from CIRAS FEA Expertise

PPI designs and manufactures some of the largest conveyer pulleys

used in copper, coal, and iron ore mines around the world. In the late 90s PPI spent a year working with Iowa State on developing and verifying their own FEA program, according to Leo Laughlin, product engineering manager.

“Normal equations don’t work for conveyer pulleys because they make too many assumptions as far as parts being fixed,” he explains.

In 2009 Laughlin contacted Roberts for additional assistance. “The analysis told us our model is right, where it matters,” Laughlin adds, “and where it is a little bit off, it doesn’t affect the quality of the product. Our goal is to get the longest life for our products for the least amount of dollars, and CIRAS is helping us do that.”

Roberts encourages companies that want to learn more about FEA to contact CIRAS. “Our goal is to educate Iowa manufacturers about the technology and help them make decisions about whether to bring FEA in-house or to work with an engineering consultant,” he explains.

