

## SITUATION

Industrial Packaging Systems (IPS) provides custom containers used by auto makers to ship parts such as body panels and engines from fabrication sites to assembly plants. The containers are typically made of steel and engineered plastic components called dunnage that hold parts securely in place. To establish itself as a preferred supplier to the auto companies and to set itself apart from its competitors, IPS knew it needed to do things differently than other packaging companies. That meant two things: 1) designing higher-quality and more cost-effective systems, and 2) finding a faster way of delivering them that didn't involve having prototypes built by an outside service.

## OBJECTIVES

- ✓ Provide packaging systems optimized for cost, strength, and durability.
- ✓ Work directly from customers' CAD models rather than hand measurements of products to be packaged.
- ✓ Improve the engineering process and accelerate product delivery by implementing a master model concept so that design data can be re-used by analysis and manufacturing applications.
- ✓ Use finite element analysis to simulate the performance of containers and the response of customers' products to the rigors of shipping.
- ✓ Establish in-house rapid prototyping system to quickly make dunnage available to customers for fit testing.

## PROCESS VISION

- ✓ Implement a process and the enabling technology required to ensure—as early in the design process as possible—that the company's packaging system designs will survive the customers' manufacturing, environmental and shipping requirements, while meeting their cost and timing demands.
- ✓ Differentiate the company in the marketplace through the use of advanced engineering technology.

## ACTIONS

- ✓ IPS engineers import the customer's product design into I-DEAS® software, and then design the container and dunnage around the customer's part.
- ✓ The engineers then transfer the solid model to I-DEAS Finite Element



# Industrial Packaging Systems Wins With Technology

*"When auto makers are at the point when the gun is to their heads and parts must ship because a vehicle is ready to be built, they can't wait 12 weeks while a packaging supplier gets a prototype made. The fact that we can have a prototype ready in three days makes us very popular—and very successful."*

- David Wahl  
President  
Industrial Packaging Systems



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There  
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Modeling™ for structural analysis. Results from these analyses indicate where material can be removed without jeopardizing product strength. In some cases, the finite element model of a customer's part is also analyzed to make sure it can withstand simulated shipping hazards such as bumps and drops.

- ✓ Once the part is proven and optimized, I-DEAS Generative Machining™ software is used to create toolpaths directly from the surface geometry. The toolpaths are downloaded to IPS's CNC router which cuts "three-pocket mockups," the prototypes used by customers for fit testing.
- ✓ The prototype is then demonstrated to the customer. Design modifications are easily incorporated, and downstream applications automatically updated.

### RESULTS

- ✓ IPS estimates that the integrated master model approach cuts cycle time for a typical packaging system by 40% compared to the use of separate design, analysis, and manufacturing applications. With I-DEAS, project members don't waste time or risk data degradation passing information from one piece of software to another.
- ✓ Time required for design changes has also been minimized because the software master model automatically communicates changes and updates element models and toolpaths. This eliminates the weeks of rework normally required after each customer review.
- ✓ By downloading master model data directly to in-house prototyping equipment, IPS is now able to make dunnage mockups available almost immediately, creating CNC toolpaths directly from solid models. The time savings in this area is also impressive. For example, prototypes of "saddles" that hold engines during shipment are ready in three days, compared to 12 weeks formerly required.
- ✓ The application of finite element analysis to optimize material usage is helping IPS decrease its packaging system costs anywhere from 10% to 200%, depending on the system.
- ✓ Packaging system quality is also improving, since IPS can now simulate the response of its customers' products to shipping situations such as vibration and impact.

### PLANS

IPS plans to further enhance its engineering capabilities in the short-term, by incorporating Mechanical Dynamics' ADAMS motion analysis software into its design cycle. By using I-DEAS' direct interface to ADAMS, IPS will be able to simulate the effects of road and rail transport on package contents.

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