Mahindra & Mahindra Shrinks Tool Design Time With I-DEAS™

SITUATION

Mahindra & Mahindra is the largest tractor manufacturer in India. Annual sales exceeded Rs.3620 crores ($1 billion U.S.) in 1996-1997. The company has two major divisions: an Automotive Sector and a Farm Equipment Sector. The Farm Equipment Sector, also known as the Tractor Division, sold more than 57,000 tractors in 1996-1997, helping them retain a market leadership position for the 14th consecutive year in the Indian tractor industry. To satisfy the changing needs of customers, existing models are continuously upgraded and new models are introduced through dedicated product development teams. Each time the division introduces a new tractor or upgrades existing product, hundreds of new parts must be machined. Before this can happen, new jigs and fixtures must be made to hold the parts in place during machining. Also, new gauges are needed to check the precision of machined parts.

OBJECTIVE

Support fast introductions of new tractor models by reducing cycle time for jigs, fixtures, and gauges by 50%.

PROCESS VISION

✔ Replace their standalone CAD seats with an intuitive, networked drafting system that supports a team approach to product design.

✔ Expand on productivity gains of CAD by automating the creation of standard parts.

ACTIONS

✔ The Tractor Division replaced its incumbent 2D CAD system with I-DEAS Drafting™ because its ease-of-use provided a strong foundation for the targeted productivity improvements. Also, I-DEAS Team Data Manager™ software supported the team approach they wanted to institute.

✔ Once everyone was trained on the new software, cycle time decreased 30% from the previous CAD system. This was due to:

– I-DEAS Drafting's intuitive user interface. Reduced commands using the Dynamic Navigator™, minimized menu selections, and reduced picking guide users through geometry-creation and dimensioning.

"We experienced a 30% improvement in productivity when we switched to I-DEAS Drafting software, but our objective was to reduce design time by a total of 50%. Using I-DEAS Drafting Programming Language, we automated the creation of many common parts. That brought us to an overall productivity increase of 45%, so we are well on our way to achieving our goal."

- Mahesh H. Nashikkar
Senior Design Engineer & System Administrator
Tractor Division
Mahindra & Mahindra Ltd.

I-deas™

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– I-DEAS Team Data Manager's drawing management capabilities. The software and network provided for effective data sharing within the team engineering environment, making it possible to import part drawings from R&D in order to design jigs and fixtures around them.

✔ The department performed a time study and found that much time was spent with designers recreating standard parts and annotations.

✔ They used I-DEAS Drafting Programming Language to automate the drawing of allen screws, screw holes, dowel pins, liner bushes, polar or circular special arrays, and bar knobs. One employee wrote the programs in-house in just a few weeks.

RESULTS

✔ The department wrote programs for many of the standard parts, and also automated production of the title block and a table that lists x, y coordinates of selected circles in a drawing. The use of these custom programs has improved overall design productivity by 45% by condensing lengthy and repetitive tasks into a single command.

✔ Drawing an allen screw from scratch took 3 minutes and required 60 mouse clicks and/or keystrokes. The I-DEAS™ program generates an allen screw in 7 seconds and requires 7 mouse clicks and/or keystrokes. This time savings of 2 minutes 53 seconds for each allen screw represents a huge overall productivity gain, because allen screws are used extensively in jigs, fixtures, and gauges.

✔ An I-DEAS program generates a screw hole in 10 seconds compared to 1 1/2 minutes needed to draw it by hand. A conventional metric size dowel pin takes 3 minutes to draw by hand versus 7 seconds with the I-DEAS program.

✔ Jig plates and cluster plates contain many holes, and dimensioning all of them was a very time-consuming task. To dimension 40 holes took 10 minutes using the conventional approach of generating a table for their x, y coordinates, compared to 25 seconds when done with the I-DEAS program.

✔ The use of these programs has helped standardize drawing and design practices, and has also reduced errors.

PLANS

Mahindra & Mahindra plans to drive further productivity improvements by automating other repetitive design tasks with I-DEAS Drafting.

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