Fujifilm Scans the Market With 3D

SITUATION

FUJIFILM Electronic Imaging Limited (FFEI), based in the United Kingdom, is Fujifilm's first hardware design and manufacturing facility outside Japan. To establish itself quickly as an innovator in the pre-press printing industry, FFEI decided to introduce a stylish, new fixed platen flatbed scanner that would provide high resolution copies, while reducing the need for user interaction. (Flatbed scanners, in which the original is placed on a glass surface like a photocopier, are easy to use, but offer lower resolution. In contrast, high quality, high resolution scanners usually require the user to precisely position the originals on a drum that rotates.) During the project, the company also intended to prove the value of its recent investment in 3D CAD/CAM/CAE by getting this new product out the door on schedule and at less expense.

OBJECTIVES

✔ Design a stylish, multi-purpose, flatbed scanner combining high quality scanning with ease-of-use.

✔ Optimize the design to minimize manufacturing costs, while maintaining precision and accuracy.

✔ Get the product to market quickly to capitalize on the innovation.

PROCESS VISION

Achieve these product objectives by fully implementing I-DEAS Master Series™ 3D CAD/CAM/CAE software as an enabling technology to:

✔ Visualize and create highly sculpted exteriors.

✔ Analyze and optimize structural components.

✔ Simulate product performance to improve predictability and ensure manufacturability.

✔ Accurately communicate the developing assembly.

✔ Eliminate the need for drawings by passing the 3D CAD information directly to the toolmaker.

ACTIONS

✔ Using I-DEAS™ software, the designers created 3D models of the critical mechanical components and built them into an assembly. They then modeled the scanner covers and checked for interferences.

✔ Leveraging the same geometry, they conducted finite element analysis on the major components to minimize weight while ensuring structural integrity. The vibration analysis capabilities of I-DEAS were used to study

"Our scanner development team has really taken to I-DEAS™ software. The powerful features and high level of integration among the CAD and CAE tools helped produce a higher quality, lower cost product with fewer design changes between engineering confirmation and pre-production models."

- Malcolm Shaw
Head of Technology Development
FUJIFILM Electronic Imaging Limited

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moving components, particularly the carriage and the CCD camera, which have to remain rigid to ensure the highest quality image output. The designers used the results of these analyses to guide and then verify further design modifications.

✔ FFEI discussed manufacturing and cost issues with suppliers using the I-DEAS assembly. As a result, they adjusted some draft angles; added new features to simplify assembly; and eliminated some features to reduce cost.

✔ Master model data was also leveraged by the CNC model maker who machined one-off components to prove CAD data and perform fit and finish tests. From the soft tools generated by these models, prototype components were made and fitted to fully working machines.

✔ Once the design was finalized, FFEI sent the I-DEAS software 3D model data directly to the toolmakers for production tooling.

RESULTS

✔ The scanner was taken from concept to production design in 18 months compared to a previous time scale of two years, a time saving of 25%. Working in 3D enabled the designers to be accurate the first time, and there were fewer modifications at the tooling stage.

✔ Tooling modifications on this project came to less than 1% of the total tooling budget. Tooling modifications on previous projects typically amounted to 10% of the tooling budget.

✔ Since I-DEAS allowed analysis to be conducted at an early stage, there were minimal structural and vibration problems at final test stage.

✔ Using 3D CAD technology allowed a prototype scanner to be displayed at an exhibition earlier in the development process, building demand for the product before it was even completed.

✔ Using 3D modeling resulted in a much more stylish product, which has curved lines in contrast to the block shape of traditional scanners. The bold new look is helping FFEI to position itself as an innovator in the marketplace.

✔ Transmitting 3D data directly to the model and toolmakers eliminated the time and cost involved in generating 2D drawings.

PLANS

FFEI is now expanding its I-DEAS installation and is extending its use of integrated design, engineering, and manufacturing to other new product development programs.

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