

ABB Turbo Systems Ltd.

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from IBM and Dassault Systèmes

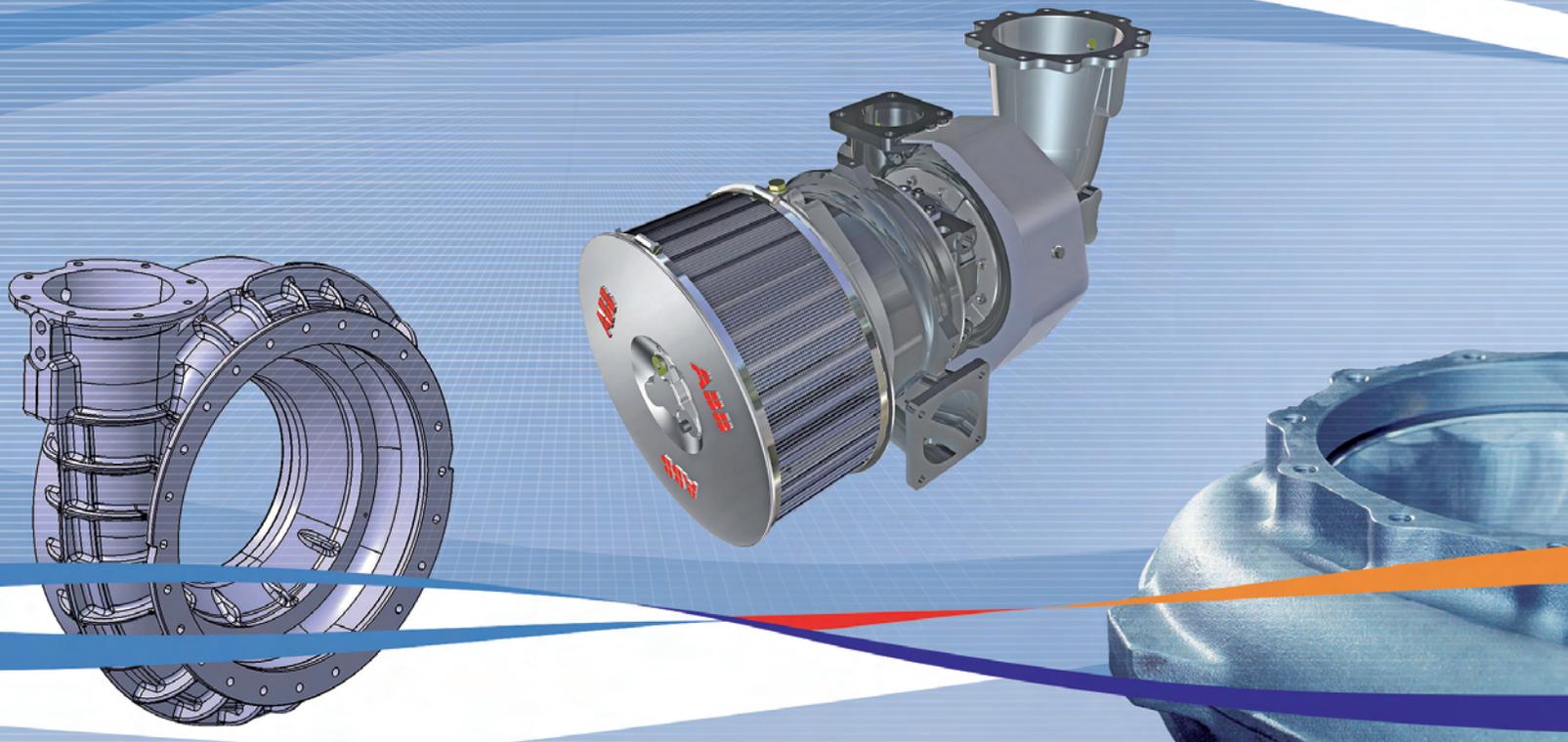


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Challenge

- ABB Turbo Systems Ltd. wanted to integrate its end-to-end processes by moving its design process from 2D to 3D and more effectively manage large numbers of parts to eliminate geometric redundancy.

Solution

- With CATIA, ENOVIA SmarTeam and 3DVIA Composer, ABB Turbo Systems Ltd. moved its design processes to 3D and, in conjunction with IBM, developed new processes for redundancy-free geometric modeling.

Benefits

- PLM solutions from IBM and Dassault Systèmes have allowed ABB Turbo Systems Ltd. to reduce its design cycle for parts from weeks to days, while improving quality and reducing costs.

“The quality of the geometric modeling is much better. We can model things now that we couldn’t even imagine before.”

Albert Meyer, CAx Manager, ABB Turbo Systems Ltd.

Putting 3D to work end-to-end

ABB Turbo Systems Ltd. (ABB) is the world’s premier supplier of turbochargers for diesel and gas engines in the 500 kW-plus power range. Worldwide, more than 180,000 ABB turbochargers are in operation, on ships, in power stations, on locomotives and in heavy-duty construction and mining vehicles.

“If you’re shipping bananas from South America to Europe, you want to be able to rely on the vessel not being delayed because of a problem with one of the turbochargers on your ship’s main engine,” explains Albert Meyer, CAx Manager, for ABB Turbo Systems Ltd. Turbochargers multiply the power output of the engine up to four times.

Up until 2002, the company used CATIA and primarily 2D drawings to design and build its highly complex turbochargers. Only a few key parts were modeled in 3D.

So as ABB’s vast line of parts continued to grow, it became more and more difficult, Meyer says, to maintain the change process for design and manufacturing. “We had difficulties maintaining our drawings correctly,” he recalls. “So the idea was to make a 3D part and use it for assembly and drawings. We wanted to get our database free of geometric redundancy and to eliminate changing the same part more than once.”



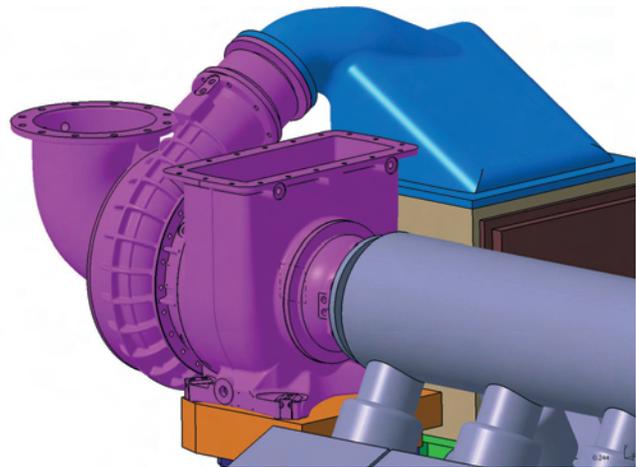
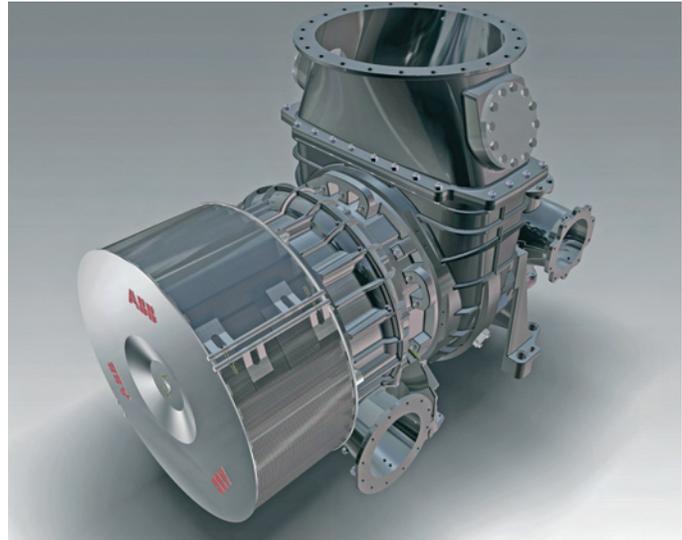
After completing a study in conjunction with the Gartner Group and extensive tests of the 3D modeling solution options, ABB chose to upgrade and further invest in CATIA.

Saving time in geometric modification

Knowing that it might get difficult keeping tabs on ABB's growing list of parts and assemblies without a product data management system, ABB chose ENOVIA SmarTeam. All the complex CATIA data structures with object links were managed with the efficient functionality of ENOVIA SmarTeam.

"We had no idea how to maintain a PDM system," Meyer recalls, "so we had to really invest in our processes. We wanted redundancy free modeling, but at that time it really wasn't easy. Together with IBM, we developed the processes."

Although the number of parts in a turbocharger is fairly small—something in the neighborhood of 1,000—the circumference of the linked models is enormous, Meyer says. "Our R&D department calculates the precise aerodynamic channels for the turbochargers in a nominal size. These complex surfaces need to be modeled in CATIA exactly. The surfaces are linked into all subsequent geometries down the design process. Where applicable, they will be scaled from the nominal to the different functional sizes of turbochargers. The idea of redundancy free geometry means that from the 'aerodynamic surfaces' in nominal size via the scaled size of the casting, the machined part, the input model for the FEM analysis, the FEM model, to all the fixtures, and finally to the solids for the customer's fitting simulation, all models in the design process are dependent on each other. Building up this fairly complex structure requires clever geometric processes and a disciplined modeling culture. The great benefit is that geometric modifications are done more or less by pushing the update buttons on all the subsequent models, and that saves us a lot of time."



"With our PLM environment, if we make a change to a part, we can update all of the following steps by just pushing a button, so we know that we're always working with the right version of the design," continues Meyer. "Because of the vast numbers of families of parts that are differentiated only by small features, such as diameter or number of holes, ENOVIA SmarTeam object linking capabilities are critical to ABB's operations."

Making good processes better

Using CATIA enables ABB to have all of its designers on a Microsoft Windows-based platform. And although its PLM solutions are not linked directly to its SAP system, Meyer says, transferring data back and forth with CATIA and ENOVIA SmarTeam has proved to be a simple task.

The company also is considering employing one of the newest components of the PLM solution suite, 3DVIA Composer, for the production of marketing media. Meyer says ABB also plans to use 3DVIA Composer producing movies to help train its service personnel.

“CATIA assists in designing better concepts and, thereby, more efficient turbochargers, it’s helping us work with customers to make a contribution to improving the environment,” he points out.

Meyer says he’s pleased with the improvements the solutions have allowed ABB to make in its development and production processes.

“We definitely are able to generate much more than before and have a complete process from the initial layout of the turbocharger, until the final calculation is complete,” he says. “For some parts we can do ten design cycles in two weeks now. Before, where we needed three or four weeks to go through one cycle, this is now done within one day. We are able to model parts that we couldn’t even imagine before as the quality of the modeling is much more precise.”

**For more information contact your IBM Representative,
IBM Business Partner, or visit the IBM PLM Web site at:**

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