

Salzgitter Mannesmann Forschung accelerates FEM model preparation using SpaceClaim

Salzgitter Mannesmann Forschung GmbH, the research subsidiary of the Salzgitter Group, specializes in processes for working and using metallic materials. This enterprise uses the 3D direct modeler SpaceClaim to prepare CAD data in all formats for analysis using the finite element method (FEM), redesign existing CAD models and regenerate them using just a few simple commands.

EVEN NON-CAD EXPERTS CAN RAPIDLY PREPARE MODELS

Customers provide CAD data to Salzgitter Mannesmann Forschung that cannot be transferred one-to-one to the FEM software, for example, because tolerances between the systems are not identical, gaps appear in the geometry or surfaces are duplicated. "So we were looking for a system that would let us prepare models for FEM quickly without having to be CAD experts," explains Dr.-Ing. Alexander Häse, Research Associate in the Structural Mechanics and Forming Technology department. Salzgitter Mannesmann Forschung also needed a software solution that it can use to design new tools for use in the production of seamless or welded pipe. These tools subsequently determine not only the form but also the mechanical properties of the products.

DESIGNING SIMPLY

"Designing is really simple with SpaceClaim: I can shape objects directly in three-dimensional space and see the effects immediately," says Häse, who obviously enjoys working with SpaceClaim. "It's like moving and changing parts in real space. I grab an edge and modify it the way I want, without having to use any input dialogs,"

he explains. "And I can still operate the system even when I haven't used it for a month or two. In my experience, that's not the case with other CAD systems."

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Purchasing a large CAD system would have entailed extensive training, and occasional users in particular tend to forget how to operate a complex system after a couple of weeks. "With SpaceClaim, the learning curve is very short," the calculation engineer explains, "and the help function, supported by video tutorials, is very well structured." Häse was able to use the system with just one day of training with SpaceClaim sales partner Lino GmbH, and after just a few hours of additional practice he was utilizing SpaceClaim to prepare FEM models in a first project.

ABOUT SALZGITTER MANNESMANN FORSCHUNG

Salzgitter Mannesmann Forschung GmbH is the central research subsidiary of the Salzgitter Group. With a staff of around 320 employees in eight main departments located in Salzgitter and Duisburg, this organization conducts extensive research and development into all aspects of steel as an industrial material. The R&D activities are mainly focused on the development of new materials and application areas, as well as on processes for manufacturing, working and using metallic materials. Areas of interest include material and component characterization including testing procedures and application engineering from component design to forming and joining technology. In addition to subsidiaries of Salzgitter AG, customers include leading companies from numerous industrial sectors, such as the automotive, machinery and plant equipment, energy technology and construction industries.

For more information about Salzgitter Mannesmann Forschung, please visit www.szmf.de

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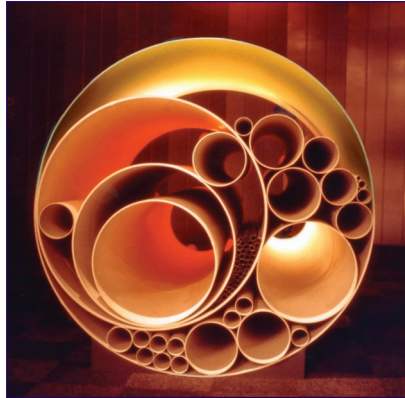
When customers design a new machine or component, they commission Salzgitter Mannesmann Forschung to perform a strength or service-life analysis. Before the CAD-neutral or native data can be analyzed in an FEM system, holes and roundings must be removed from the CAD model, or the geometry must be repaired. To facilitate calculation, it is useful to simplify the components or zones not relevant to the bearing capacity. "SpaceClaim provides explicit tools for this that exactly covers our needs," remarks Häse. Depending on the model, this could take a long time in the past; now it's just a matter of a few mouse clicks. "Before SpaceClaim, it took four or five hours to completely clean up and prepare a model. Now we can do this job in five minutes."

MEASURING AND OPTIMIZING GEOMETRY IN SPACECLAIM

In forming simulations, Salzgitter Mannesmann Forschung imports analyzed geometries back into SpaceClaim to measure them. This provides the basis for an iterative process, for example in adapting the form of a pipeline to optimally match the ambient conditions and the intended purpose through the integration between the simulation tool and SpaceClaim.



"Before SpaceClaim, it took four or five hours to completely clean up and prepare a model. Now we can do this job in five minutes," says Dr.-Ing. Alexander Häse from the Structural Mechanics and Forming Technology department at Salzgitter Mannesmann Forschung.



Tool design is another application for SpaceClaim. Salzgitter Mannesmann Forschung supports Mannesmann Röhrenwerke in the quality assurance and further development of their products.

Tool design is another application are for SpaceClaim. "The initial design or redesign of optimized tools for pipe production is extremely simple in SpaceClaim. That is all the more important because the FEM software is equipped with only rudimentary CAD tools," Häse explains. For example, SpaceClaim proved its effectiveness in one instance in which a production facility welded additional plates into a welded structure, and Häse's department had to subsequently redesign this module in order to perform a service-life calculation. "That was one of those projects that would have consumed a great deal of time and effort without SpaceClaim," says the engineer. "The savings from this project alone amortized our investment in SpaceClaim almost completely," providing yet another reason for Häse to look for other applications in order to leverage the investment in this flexible direct modeler even more.

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