

VICURA Drives Improved Simulation and Analysis with SpaceClaim

THE CHALLENGE: SIMPLIFY CAD MODELS FOR ANALYSIS WITHOUT TIME-CONSUMING ITERATIONS WITH THE CAD DEPARTMENTS

VICURA has a long track record of complete virtual development of Manual Transmissions and dry Dual Clutch Transmissions as well as powertrain integration in a large amount of Front Wheel Drive and All Wheel Drive applications.

Martin and his team are responsible for a broad range of complex simulation and analysis testing, including system, structure and fluid mechanics. Martin performs critical simulation and analysis to ascertain the strength, stiffness, thermal and dynamic behaviors of all possible transmission assemblies and components (housings, shafts, gears, synchronizers, clutches, etc.)

Designs created in CAD software are sent to Martin for simulation and analysis. Before importing the designs into a meshing program, the geometry has to be simplified and this process was difficult and time consuming. Often Martin would have to send files back and forth to CAD experts, losing precious time – usually days for each iteration.

SPACECLAIM STREAMLINES MODEL PREPARATION AND ACCELERATES GEOMETRY OPTIMIZATION

Martin starting using SpaceClaim®'s 3D Direct Modeler more than a year ago and found it to be a software solution that solved many of his simulation and analysis challenges. When designers send him CAD models, he uses SpaceClaim to sort out what to include in the analysis, saving time and improving the simulation process.

For each design, Martin starts by opening the CAD data in SpaceClaim. He uses SpaceClaim to remove features that would complicate the mesh, such as rounds, small holes, and geometry outside the region that needs to be analyzed. When performing CFD, SpaceClaim extracts volumes to be analyzed. Once ready, Martin sends a Parasolid file to SimLab or to HyperMesh to create a mesh and add couplings, contact information, and boundary conditions. Finally, he saves the mesh as an Abaqus input file and finishes the preprocessing and runs the simulation in Abaqus.

ABOUT VICURA

VICURA was founded in January of 2011, having formerly served as the global Powertrain Division of General Motors and the Powertrain group for Saab. VICURA is an engineering company providing driveline design through manufacturing services to automotive, marine, construction and commercial customers. The company's goal is to be the leading provider of transmission systems globally, and it certainly has the pedigree to make that happen.

There are 60 engineers at VICURA. Martin Schagerlind is a Simulation Engineer in a group of 20. Martin performs finite element analysis on the structure of the driveline and its many components.

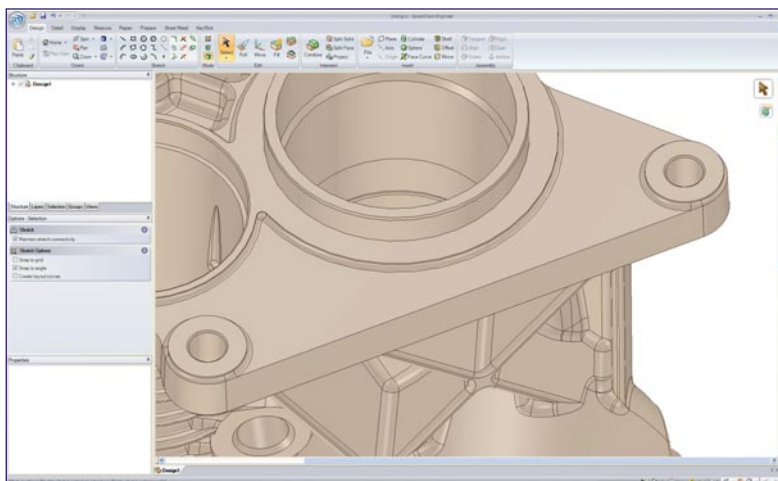


Figure 1: The original design fulfills the requirements, but Vicura had to reduce as much mass as possible.

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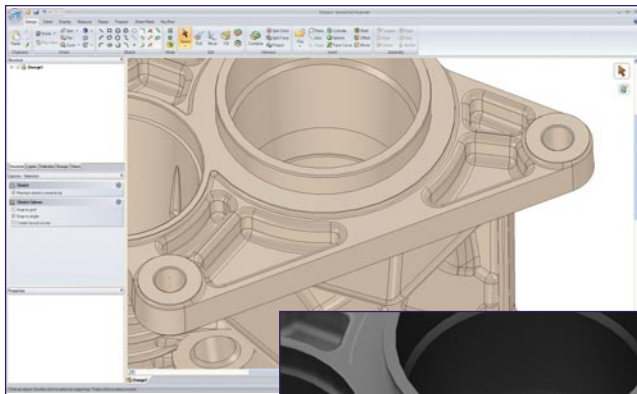


Figure 3: Rendered image of the final design using SpaceClaim and KeyShot.

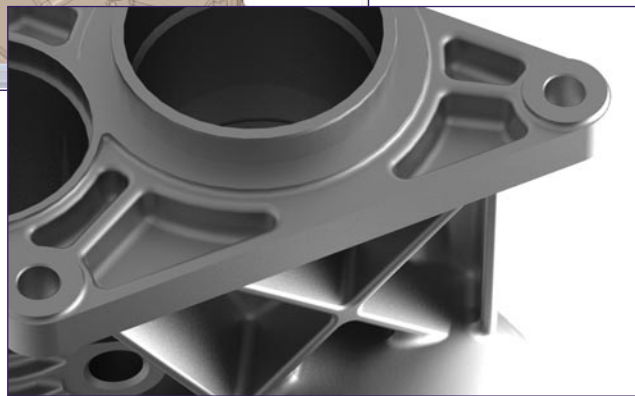


Figure 2: A modified design, with lower mass than the original design, and still fulfilled requirement.

Once Martin has results, he uses SpaceClaim to modify the geometry; for example, adding material, fillets, and bolts until he is confident that the concept will address issues discovered in the simulation. Once he has optimized the design, he sends the CAD team his version of the model where they can reconcile the changes in the detailed model.

"SpaceClaim is very efficient in helping me sort out what I need to test and I am saving about 80% of my time that otherwise would have been spent in iterative loops with the CAD designers," Martin Schagerlind, Simulation Engineer, VICURA.

VICURA offers customers design and optimization services to ascertain durability, noise and vibration issues and efficiency. Martin and his team focus on analysis to optimize structures for manufacturing feasibility, stress analysis and casting optimization. Prior to SpaceClaim, if Martin found that concept work had to be done (almost always) on the model, he would have to send it back to the designer. Now with SpaceClaim he has much more flexibility and can conduct a quick simulation, identify high stress areas and make design changes himself.

"It used to take days for me to have to request design changes from the CAD team. Now I can make those changes and it takes an hour, and I have much better control over optimizing the final design," Martin Schagerlind.

Customer communications have been vastly improved, leveraging SpaceClaim with KeyShot to create realistic renderings. Martin uses this approach in the bidding process and when they are presenting design proposals to the customer. It has provided VICURA with a strong competitive edge.

"Customers are very impressed when they can see the proposed product design realistically through SpaceClaim and KeyShot and it clearly highlights the work we have done. It provides confidence to the customer that we have invested significant time and applied our expertise. Before we used SpaceClaim, when we showed our concepts as ordinary CAD models, the customers always felt there was a lot more work to do," Martin Schagerlind.

For cross section views of large assemblies, Martin has found that SpaceClaim enables clarity for discussions with the designers.

"I use SpaceClaim every day and it works really well. The software has provided us with a tool that makes our engineers more productive, helps to win business and gives us a strong competitive edge. SpaceClaim saves me time and it is extremely cost effective compared with other products on the market"

Martin Schagerlind
Simulation Engineer, VICURA



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