SIEMENS | SARATECH

AUTOMOTIVE AND TRANSPORTATION

Roush

Global auto engineering company uses Siemens solutions for efficient durability testing

Product

Simcenter

Business challenges

Adopt new testing methods to assess durability earlier in development cycle

Deploy new technologies for rising trends such as electrification and autonomous driving

Accelerate successful deployment of new testing capability

Keys to success

Offer customers turnkey solutions for durability testing

Use unified platform to extend testing capabilities

Integrate scalable and flexible testing solutions with fast and powerful data processing

Results

Developed efficient end-to-end durability testing procedures

Incorporated new testing capabilities on hardware, software and knowledge level

Streamlined interaction, smooth knowledge and hardware exchange between testing teams

Roush opens new end-to-end testing possibilities with Simcenter solutions

Seeking solutions for durability testing

Detroit, Michigan-based Roush Industries, Inc. (Roush) provides engineering, testing, prototype development and manufacturing services to the mobility industry. The company also offers support services to the aerospace, defense, theme park, oil and gas, and motor sports industries.

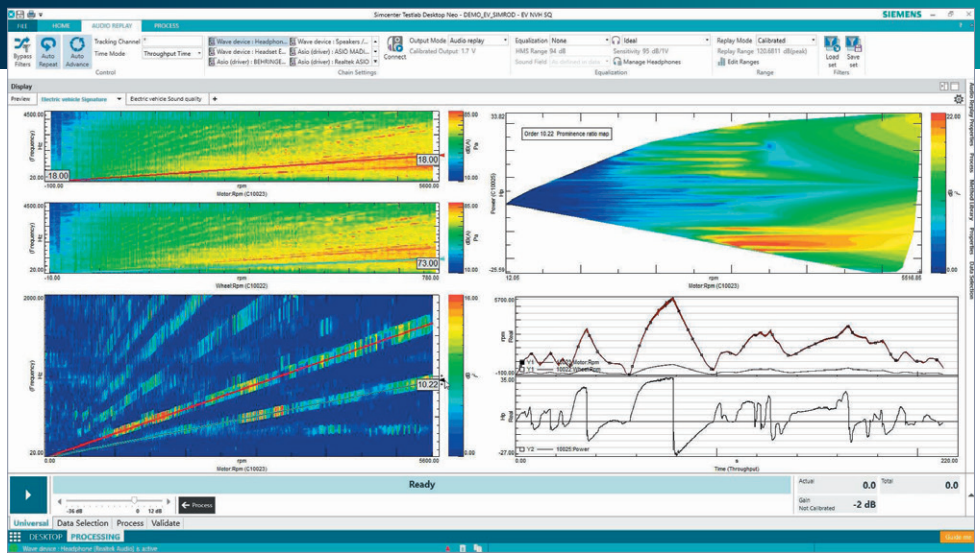
In 2017, Roush completed their portfolio with durability testing capabilities by implementing Siemens Digital Industries Software's Simcenter™ SCADAS hardware to retain their market position and expand their offerings to their customers.

"Most of our work consists of consulting services and providing support to all big three U.S. automotive manufacturers as well as many other international OEMs," says Paul Riehle, Vice President of CAE, NVH, Durability, and Additive Manufacturing at Roush. "Durability seemed like a logical area to expand. There is a shortage in terms of the capacity, which showed us that the investment of the MTS 329 rig made sense. And while we were doing that, it enabled us to expand to another durability-type test rig that we have been traditionally outsourcing to other companies. This brings everything into one location, all under Roush."



"In this advanced durability lab, we also use Simcenter Testlab Neo and its time data acquisition module, which is very useful for us."

Gerald Roesser
Manager
Advanced Durability Lab
Roush



Roush is not a novice user of Simcenter solutions. In fact, the noise, vibration and harshness (NVH) team has extensive experience and knowledge using Simcenter™ Testlab™ software.

"Roush has been using Simcenter tools for about 30 years," says Riehle. "We have been very successful using Simcenter Testlab and experienced very good alignment with our large customers. And as the business grew, we started to use other Siemens products such as Simcenter Amesim, Teamcenter and Simcenter Nastran and added a lot of extensions of Simcenter Testlab. But not only the software, we also added a lot of hardware for data acquisition, which really allows us to streamline our processes and provide turnkey solutions for our customers."

Advanced durability testing facility

Roush recognizes the shifting requirements for durability testing as automotive manufacturers continue to lighten vehicle weight to achieve better energy efficiency while searching for durable materials to increase vehicle life expectancy. And at the same time, the electrification trend results in heavier cars due to battery weight.

"This is changing traditional designs by adding new stresses to the chassis and suspensions," says Gerald Roesser, Manager, Advanced Durability Lab, Roush. "Same as the autonomous vehicles, these are expected to take much higher duty cycles. There will be different durability challenges." In a rapidly evolving market, the demand for accelerated durability testing is increasing.

"Simcenter helped us gain operating efficiency and closer alliances with customers."

Paul Riehle
Vice President of CAE, NVH, Durability, and Additive Manufacturing
Roush



"When a test engineer needs to check and analyze hundreds of different channels, the ability to check the data with time domain in Simcenter Testlab Neo is a significant advantage."

Troy Bouman
NVH Project Manager Engineer
Roush

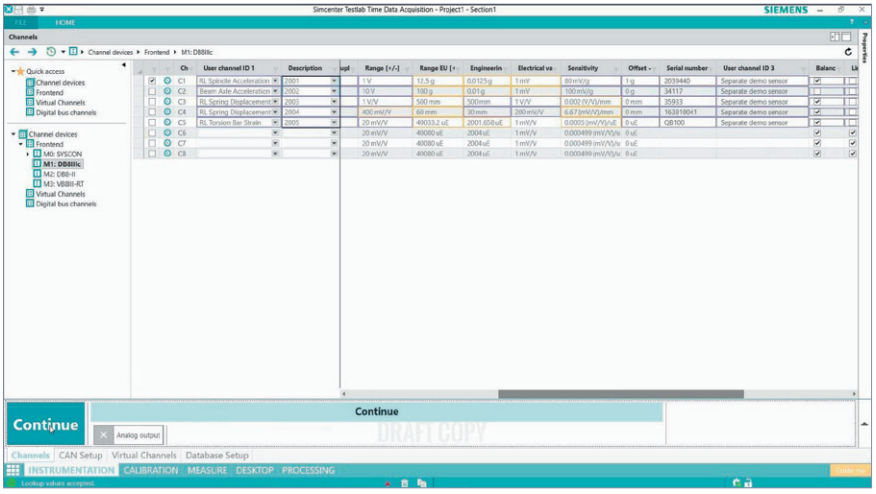
To help their customers, Roush deployed different durability testing systems to provide testing services on different levels: full vehicle, or component level, in all different development phases from prototype testing, production and validation.

"One of the critical advantages of this lab is that we are able to test the full vehicle on the proving ground condition much earlier in the development cycle," says Roesser. "In fact, no running vehicle is needed. We can test either the full vehicle prototype or prototype chassis or suspension on a running vehicle. We collect those road loads, play them out on the rig and match that data."

All testing rigs at Roush, including the new Model 329 road simulator from the MTS corporation, works in conjunction with Simcenter SCADAS hardware and Simcenter Testlab with Simcenter Testlab™ Neo software. This testing platform provides complete end-to-end durability testing capabilities, from data acquisition to a detailed load data analysis. Simcenter Testlab Neo compiles advanced capabilities to gain valuable and precise insights to optimize the durability performance of the next product generation designs. It also supports the damage equivalent creation and accelerated test profiles. And to boost the efficiency of the testing teams, this software embeds standardized procedures reports to ensure consistency and data quality.

"In this advanced durability lab, we also use Simcenter Testlab Neo and its time data acquisition module, which is very useful for us," says Roesser. "We can take the data systems in the field and use the software to set up the instrumentation and all the transducers. Upon completion, we can bring the very same format back into the lab and everything is ready to go. We don't need to reprogram any calibration or sensors. It's just plug-and-play."

Having this framework in place, Roush offers a turnkey solution for durability testing in earlier stages of vehicle development. "It's really about enabling our customers to gain more time to do durability testing, but perform each stage much faster," says Roesser.





One platform, multiple testing teams

Expanding the testing facility requires a strategic decision on the testing platform. Management must evaluate the cost, expected integration and learning curve. To streamline and build upon the existing know-how and positive experience is a crucial factor in the decision-making process.

"We evaluated and owned many other systems for data acquisition and simulation tools," says Riehle. "Over time, it became apparent that it is much more efficient for us to operate under one setup of solution of software and data acquisition tools, such as Simcenter offers. It provided us a lot of benefits. Simcenter helped us gain operating efficiency and closer alliances with customers."

This approach allows Roush to benefit from easier consolidations, trainings and data transfer. Troy Bouman, NVH Project Manager Engineer, Roush, says, "One of the great benefits of Simcenter Testlab is the ability to leverage it across different teams. In our NVH group, where we have extensive experience, the durability team can easily approach us with questions, problems or new ways to process data. When we try to acquire data from hundreds of channels, they have a lot of knowledge in that room. We can leverage that knowledge base across the different teams to execute and bring new value to the customer."

The utilization of unified testing platforms enables easy hardware exchange. Bouman explains, "For example, if the durability colleagues need more channels, I can let them borrow our Simcenter SCADAS front-end hardware, or the other way around."

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> Roush

Solutions/Services

Simcenter Testlab
siemens.com/simcentertestlab

Simcenter SCADAS
siemens.com/simcenterscadas

Customer's primary business

Roush provides testing, simulation and engineering services, as well as prototype building and manufacturing, throughout the entire product development cycle. While Roush is well established as an automotive and transportation leader, the company also serves the aerospace, defense and theme park industries.
www.roush.com

Customer location

Detroit
Michigan
U.S.A.

Software benefits for all teams

Bouman values the extensive functionality span of the software as it can be used for standard as well as complex new tests. "As an advanced user, I can read the technical documentation and understand exactly what the software is doing," says Bouman. "But in the same software I can write a pre-written simplified standard test the technician can follow. To have one software that can tackle both simple standard tests and complex tests is very valuable."

Other benefits of the software that both teams appreciate is its user-friendliness, ease of setup, data quality check and processing speed. With Simcenter Testlab Neo, both teams can efficiently cover the increasing demand for high channel-count testing.

"When a test engineer needs to check and analyze hundreds of different channels, the ability to check the data with time domain in Simcenter Testlab Neo is a significant advantage," says Bouman.

Future outline of durability testing at Roush

Roush has a clear vision for their future plans. They intend to create a testing environment that leverages simulation to acquire road load data without going to the proving ground.

"One of our primary goals is to support hardware-in-the-loop testing," says Roesser. "The idea is to take a scan of the proving ground and plug it into the rig and collect those real-world responses."



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