

Automotive and transportation

Volvo Trucks Brazil

Volvo Trucks Brazil uses Simcenter durability testing solutions to realize significant time and cost savings

Product

Simcenter

Business challenges

Develop durable vehicles that require minimal operational downtime

Deliver customers' vehicle requirements

Decrease the time and expense of detailed durability testing

Keys to success

Select suppliers who can provide future-proof solutions

Use solutions built to deliver value and efficiency

Deploy versatile, multi-domain solutions

Results

Realized significant time savings of 30 hours per measurement

Increased time available for innovation

Enhanced supplier relationships by leveraging greater value from solutions

South American heavy truck manufacturer uses Siemens solution to optimize product evaluation

Understanding customer operational demands on heavy vehicles

Volvo Trucks Brazil has been delivering buses and heavy trucks throughout South America for over 40 years, establishing itself as a market-leader on the continent. These vehicles are used in construction and farming as well as for residential use. Volvo Trucks Brazil is a leader in the bus segment in electrification as it produces fully electric and hybrid models. The company is also spearheading a significant development push in the truck segment where electrified models are being designed with a focus on city and urban area deployment.

Dr. Pablo Kubo, the durability and ride comfort feature leader at Volvo Trucks Brazil, focuses on durability testing alongside ride and comfort projects. Kubo prioritizes durability, understanding how essential it is for customers to drive and use the bus or trucks. For Kubo and his team, driving habits, road conditions and loading conditions are key factors that need to be understood early in the design stages.

Durability testing at Volvo Trucks Brazil

The small team at Volvo Trucks Brazil responsible for durability testing uses a variety of methods, including proving grounds and accelerated testing in lab conditions, on the component, system and vehicle levels. Each team member takes responsibility for all elements of the testing project, from instrumentation, test execution and final data analysis.



“We are really pushed hard to minimize testing time as physical tests are really expensive, and durability tests are even more expensive. That’s why we are trying to work a lot with simulation and frontloading the physical tests.”

Dr. Pablo Kubo
Durability and Ride Comfort
Feature Leader
Volvo Trucks Brazil



Volvo Trucks Brazil uses Simcenter SCADAS hardware to understand customer usage.

The durability team uses Simcenter™ SCADAS™ hardware and Simcenter Testlab™ software from the Simcenter portfolio. These solutions are also used by Volvo Trucks Brazil’s noise, vibration, and harshness (NVH) team.

Delivering durability with these Simcenter testing solutions, Volvo Trucks Brazil uses Simcenter SCADAS hardware to measure any durability-related data such as force, acceleration, displacement and strain while also possibly extending road load data acquisition (RLDA) to campaign to a more multiphysics level.

Volvo Trucks Brazil uses Simcenter Testlab for data acquisition and processing. Simcenter Testlab is a complete software solution that enables durability acquisition, load data analysis and reporting in a single software environment with increased efficiency.

Simcenter is a part of the Xcelerator™ portfolio, a comprehensive and integrated portfolio of software and services from Siemens Digital Industries Software.

Sharing solutions for Volvo Trucks Brazil enables knowledge sharing and greater interaction and collaboration across teams. No longer working in isolation, the teams exchange ideas and insights on different ways to improve vehicle performance.

“It’s challenging if each engineer works separately because when somebody does instrumentation, another one does measurements, another one does analysis and then another one does the report,” says Kubo. “You’re in danger of losing important information during the transfer of knowledge from one engineer to another.”

“Whenever I have questions, the Simcenter customer support team always responds quickly and knowledgeably.”

Dr. Pablo Kubo
Durability and Ride Comfort Feature Leader
Volvo Trucks Brazil



Different road conditions in Brazil effect the durability lifetime of components.

Globally, there has been an upturn in the electrification of both passenger cars and buses, but this is far more difficult to apply to trucks. Heavy trucks often operate in rugged environments and not on the smooth road surfaces of passenger vehicles. The vehicle's batteries are not designed for the extreme shaking that can be found on construction sites or mining operations.

Vehicle downtime is also a concern. Volvo Trucks Brazil's customers require trucks that don't break down. If a truck does need repair, it is imperative the truck is back in operation as soon as possible because of the expense the owner incurs for every day he is without the vehicle.

Modern trucks are incredibly complex and are offered in many variants. As a result, testing every single permutation becomes almost impossible. The large variety of possible configurations for Volvo trucks increases vehicle complexity and presents the difficult challenge of testing so many variables and combinations of variables. When this increased complexity is coupled with the drive to reduce testing time, the durability team's challenge becomes even greater.

"We are really pushed hard to minimize testing time as physical tests are really expensive, and durability tests are even more expensive," says Kubo. "That's why we are trying to work a lot with simulation and frontloading the physical tests."

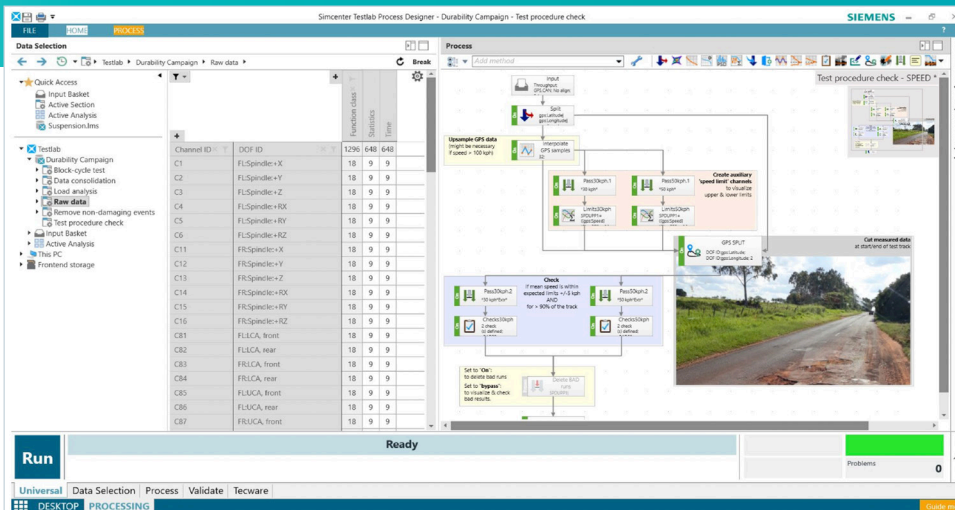
Delivering durability with Simcenter testing solutions

With tremendous time pressures and only a limited team of expert engineers, Volvo Trucks Brazil looks for partners and solution providers who can increase testing efficiency.

For durability measurements, Volvo Trucks Brazil uses Simcenter testing solutions, both hardware and software. Simcenter solutions allow users to easily automate some tasks and enable engineers to concentrate on more valuable research. One of the tasks that has been automated is to split data files. No longer a manual operation, this has saved Volvo Trucks Brazil 30 hours per measurement, resulting in yearly savings of 720 hours and almost \$62,000. Kubo says these savings are significant as they offer engineers the opportunity to consider the more complex challenges durability testing faces.

"You need to have free time in order to think outside-the-box," says Kubo. "If our time is consumed with repetitive activities, then you never have time to think about something different."

Durability engineers have many different, complicated tasks, such as acquiring data from different road conditions, analyzing the loads for their durability potential and creating damage-equivalent accelerated test procedures. Prior to using Simcenter, Volvo Trucks Brazil's engineers needed to acquire the data, conduct data



Volvo Trucks Brazil uses Simcenter Testlab to automatically split test data based on GPS coordinates and validate test procedures effectively.

consolidation and further prepare the data before they could begin doing the advanced durability analysis. At that point, they needed to clean the data and split the measurements based on the truck's location. Consolidating these measured runs manually requires considerable time and effort and is tedious, repetitive work.

Deploying Simcenter to automate this process allows Volvo Trucks Brazil to use the same process for different projects; they do not need to recreate the whole process when the next vehicle needs testing. Replicability delivers greater efficiency for the durability team.

The engineers also face the challenge of maintaining their own knowledge and expertise and investing time in exploring new testing technologies and techniques. Automating parts of the testing process enables the engineers to spend more of their time on valuable research.

Finding time for out-of-the-box thinking and research is very important to Volvo Trucks Brazil. "More than just saving the company money, I think we can use this time to

investigate something more complex, or to guarantee the quality of our activity," says Kubo. "This is priceless. We can't measure it."

Future vision

The Volvo Trucks Brazil team needs to execute performance evaluations on their new products to fulfill ever-changing customer expectations. With the increasing number of variants, limited access to proving grounds and finished vehicles, Kubo's team has yet to complete physical testing for every possible scenario. As virtual validation of vehicle performance increases, testing and durability engineers need to make greater use of the comprehensive digital twin to deliver their insight.

This doesn't mean the need for physical testing is decreasing. Simulation models and simulated data still need to be correlated with real-life measurements to achieve realistic results. This approach shift from test-centric development to model-based development (MBD) provides better engineering insight by tightly integrating and balancing testing and simulation to increase vehicle development productivity.

"More than just saving the company money, I think we can use this time to investigate something more complex, or to guarantee the quality of our activity. This is priceless. We can't measure it."

Dr. Pablo Kubo
Durability and Ride Comfort
Feature Leader
Volvo Trucks Brazil

Solutions/Services

Simcenter SCADAS
siemens.com/simcenterscadas
Simcenter Testlab
siemens.com/simcentertestlab

Customer's primary business

Volvo Trucks Brazil possesses extensive experience in the delivery of heavy vehicles, including buses and trucks to the South American market. www.volvogroup.com.br

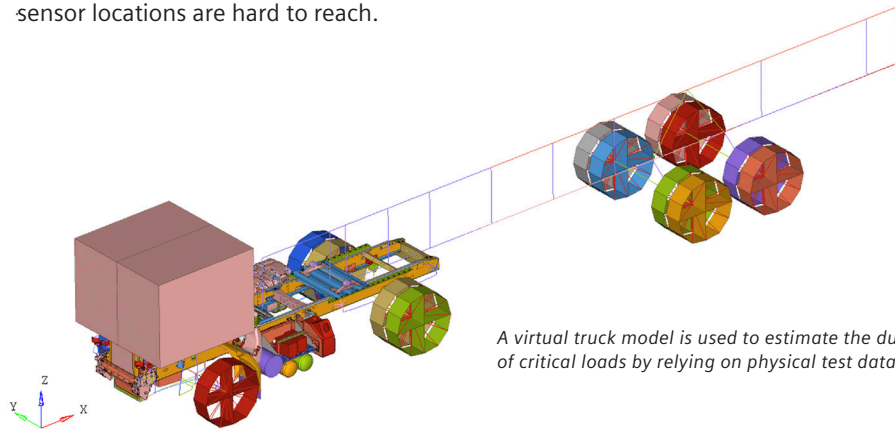
Customer location

Curitiba,
Brazil

Working with the Simcenter engineering team, Volvo Trucks Brazil is looking to further close the gap between simulation and testing. They are using virtual sensing to deploy more model-based system testing (MBST). With this technology, Volvo Trucks Brazil can extend their measurement with new channels, or new virtual sensors, which can be obtained from correlated simulation models. This technology can be used when testing resources are limited or when the sensor locations are hard to reach.

Kubo values the expertise and support offered by the Simcenter team. "Whenever I have questions, the Simcenter customer support team always responds quickly and knowledgeably," says Kubo.

Working with a team that understands and supports their endeavors enables Volvo Trucks Brazil to be a leading manufacturer of durable heavy vehicles.



A virtual truck model is used to estimate the durability of critical loads by relying on physical test data.

Working with a team that understands and supports their endeavors enables Volvo Trucks Brazil to be a leading manufacturer of durable heavy vehicles.

Siemens Digital Industries Software

Americas +1 314 264 8499
Europe +44 (0) 1276 413200
Asia-Pacific +852 2230 3333

© 2020 Siemens. A list of relevant Siemens trademarks can be found [here](#). Other trademarks belong to their respective owners.
81279-C3 9/20 A

siemens.com/software