Simcenter Road Load Data Acquisition solution

Solution brief

Siemens PLM Software

Understanding loads

How do engineers figure out just how many potholes, mud puddles, bumpy gravel roads and kilometers of highway driving your car or truck can withstand over a lifetime? This is where road load data acquisition (RLDA) comes in. A critical starting point for successful vehicle durability engineering, RLDA is an excellent method for measuring the precise vehicle response either on public roads in the anticipated market or on proving grounds by replicating specific driving profiles. Road load measurements take into account all types of essential vehicle and driving parameters, such as mass, inertia, air and rolling resistance, road characteristics, engine loads and vehicle speed. This vital load information is key input for downstream computer-aided engineering (CAE) and laboratory testing activities.

Sounds easy, right? Not necessarily. Most RLDA testing teams are under tremendous pressure to deliver high-quality data as fast as possible for as many vehicles as possible. Using complicated and time-consuming traditional systems can make life a bit stressful at times. This is why more and more teams are switching to state-of-the-art methods, such as the advanced Simcenter RLDA solution from Siemens PLM Software. It not only enables you to acquire reliable data under extreme testing conditions, but it also includes embedded universal signal conditioning for easy setup of various test types. Compact and easy-to-install, it interfaces with a wide range of analog and digital sensors, and offers a flexible channel count. The solution is technician friendly and provides accurate measurements the first time, seamlessly guiding both first-time and experienced users through the entire durability acquisition process.

Enhancing test productivity
- Guides you seamlessly through an entire durability acquisition process
- Automatically synchronizes analog data streams from road load sensors and digital data streams from wheel force, GPS, vehicle bus and video sources

Speeding up the testing process
- Accelerates configuration and setup with one button click by copying sensor parameters from in-house sensor databases or reading them from a TEDS
- Measures and validates in real time, avoiding costly test reruns and making RLDA a one-man operation

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Solution focus

Delivering high-quality data

- Automatically annotates measurements with all setup parameters and organizes your tests in an orderly fashion

- Documents key findings during or after the measurement, and detects and corrects anomalies in your data on a channel-by-channel basis or with fully automated standardized processes

Raising the bar on productivity

A typical RLDA campaign consists of three distinct steps. During the first setup step, the test vehicle is instrumented with various sensors that typically measure wheel force, displacement, accelerometer, strain gauge and temperature. The data acquisition system is configured, mounted in the vehicle and all sensors are checked for consistency. In the second measurement step, multi-channel road load data is recorded according to the test specifications on a proving ground or public road. The final validation step focuses on sharing the results with downstream test and simulation teams. During this step, the solution is used to inspect the collected road load data, detect and correct anomalies and document key discoveries.

This efficient and convenient RLDA solution is not only about rugged and robust data acquisition equipment with flexible, built-in universal signal conditioning or synchronized road load time, video and vehicle bus data; it is about making sure that every single step of the RLDA campaign is tuned and optimized for testing productivity. Future-focused durability testing departments around the world rely on Siemens PLM Software's durability engineering expertise to execute RLDA campaigns more confidently, in less time and with fewer errors.

Fast and accurate setup

Any way you look at it, configuring a RLDA campaign takes time, especially with high-channel-count setups. Very often analog data streams from road load
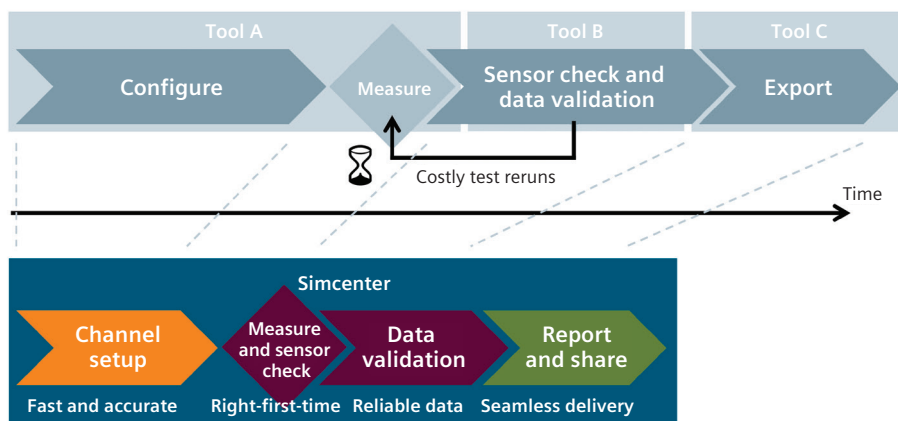

The Simcenter RLDA solution lets users acquire reliable data under extreme conditions and avoid needless test reruns.
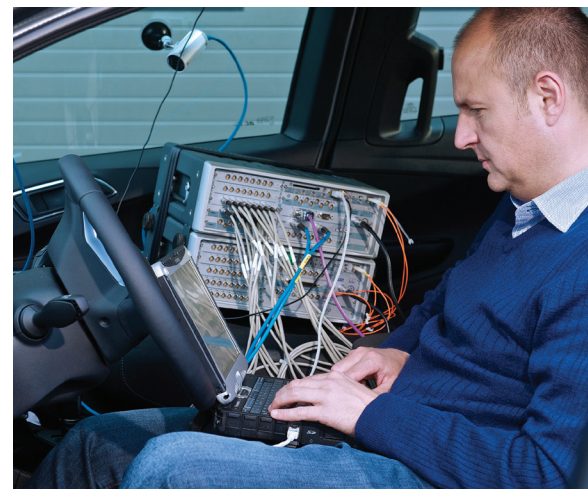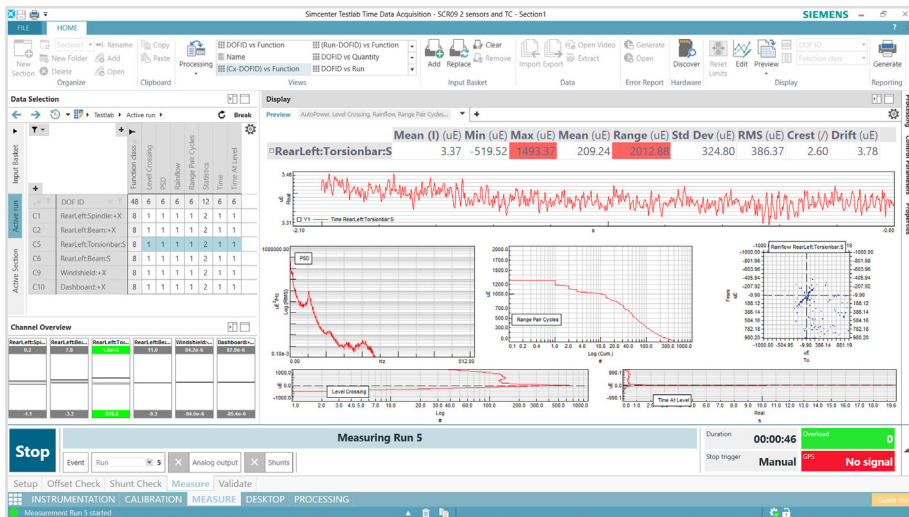
sensors and digital data streams from wheel force, Global Positioning Systems (GPS), vehicle bus and video sources need to be configured and then synchronized after recording using a multitude of tools. All this can be quite tedious.

What is impressive about the Simcenter RLDA solution is that a single spreadsheet-based environment, Simcenter Testlab™ software, accelerates the configuration and setup of Simcenter SCADAS™ Recorder hardware. Productivity enablers, such as automatic transducer calibration from in-house sensor databases, enable you to copy and paste parameters directly from Microsoft® Office Excel or a transducer electronic data sheet (TEDS) to seamlessly integrate Simcenter SCADAS. This results in setups that are 5 to 10 times faster than legacy systems. Digital interfaces with the Kistler RoaDyn 2000 Wheel Force Transducer system or high-definition quality (720 pixels/30 frames per second) video cameras save configuration time and automatically produce synchronized data streams. Finally, the Simcenter SCADAS Recorder comes with an integrated GPS receiver for instant time, speed and position measurement, and supports controller area networks (CAN) and FlexRay vehicle bus interfaces.

To double check sensor consistency during setup, Simcenter SCADAS has a number of embedded verification features to ensure measurement integrity. This includes overload detection, bridge cable and integrated control panel (ICP) cable checks. This reduces setup errors and lets you start measuring with confidence.

The Simcenter RLDA solution maximizes testing productivity on all levels. You will acquire data faster, benefit from more measurement flexibility and perform test campaigns with complete confidence.

Simcenter Testlab is an integrated, end-to-end solution for RLDA. Using only a single software platform, you have complete control of the full load data acquisition process.

Each Simcenter RLDA solution can be tailored to budget and easily expanded for future testing requirements.

Smart, secure and synced recording

You normally only have one shot at measuring multi-channel road load data during durability testing scenarios on public roads and proving grounds. This is why secure recording with on-the-spot validation is a must.

RLDA becomes a one-man operation with the Simcenter Testlab Control App application that runs on an eight-inch touchscreen tablet and wirelessly connects to the Simcenter SCADAS Recorder. It's compact, smart and ideal for mobile usage under challenging conditions. Test drivers can cycle through test setups, start and stop measurements, monitor in real time, and instantly validate recorder data quality during and after each measurement right on site. This way test drivers and technicians can return to the office with all the right data and without fear of having to rerun expensive test campaigns.

Simcenter SCADAS Recorder stores the acquired data on high performance, solid-state compact flash memory cards. All analog or 24-bit data and digital data, such as wheel force, vehicle bus, video and GPS (even over multiple Simcenter SCADAS units) is automatically synchronized and collected into a single measurement file per run. This speeds up downstream analysis since it is not necessary to waste time merging multiple files or aligning different channels. The data is immediately ready to go.

Seamless delivery of high-quality data

During the validation step, the solution is used to inspect and collect road load data, detect and correct anomalies and document key findings so they can be seamlessly shared with downstream test and simulation teams.

Simcenter Testlab helps test engineers efficiently manage and validate giga-bytes of raw data. A multitude of measurements are consolidated, either interactively on a channel-by-channel basis or fully automated through stan-dardized processes. During data consolidation, signals are scanned for anomalies (spikes and drifts), channels are renamed, base statistics are pro-cessed, new channels are derived using mathematical operations, data is low-pass filtered, specific sections are extracted and consolidated data is stored and ready to deliver the final test results.

When sharing test results between departments, Simcenter Testlab helps document your data to prevent losing vital information in the process. By consistently organizing and annotating your tests, you can streamline the delivery of the results. Simcenter Testlab lets you manually add key information to raw data, such as opera-tor details, test object descriptions or testing conditions, relating measure-ment results to product structure. The software automatically annotates all measurements with a complete description of all setup parameters. Better documentation means your data will retain its value long after the test-ing phase has been completed.

Delivering maximized testing productivity

The Simcenter RLDA solution maximizes testing productivity on all levels. You will acquire data faster, benefit from more measurement flexibility and perform test campaigns with complete confidence. Your RLDA test expertise will certainly contribute to the creation of a durable, quality product.

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