



DIGITAL INDUSTRIES SOFTWARE

Using Simcenter physical testing to streamline durability testing

Understanding road load data to optimize strength and fatigue

Solution benefits

Increase testing productivity with an end-to-end hardware and software solution dedicated to road and lab testing

Acquire realistic vehicle road load data as input for virtual and physical validation

Set realistic durability vehicle targets by incorporating local road profiles, driving habits and vehicle loading

Combine simulation with integrated test hardware and software platforms to create the comprehensive digital twin

Increasing product durability is a challenge engineers face when combined with the pressure to make products lighter to be more energy efficient. Reducing mass and material often lead to weaker, less durable designs, which can lead to customer dissatisfaction. Balancing the tradeoffs between durability and energy efficiency can be tricky, but you don't necessarily need to sacrifice durability. How can you understand the durability performance of multiple design variants under increasingly shortening development cycles?

Using Simcenter™ software can help you streamline your entire end-to-end durability testing process by integrating rugged and reliable [data acquisition hardware](#) with comprehensive [processing software](#) features. Our solution covers every step of a typical test campaign from channel setup and measurements, to validation, consolidation, analysis and reporting. Simcenter is part of the Siemens Xcelerator business platform of software, hardware and services.

SIEMENS

[siemens.com/simcenter](https://www.siemens.com/simcenter)

Using Simcenter physical testing to streamline durability testing

Understanding smart load data acquisition in all environmental conditions

A durable engineering process starts with gaining a precise understanding of the loads that products will undergo during their anticipated lifetime. To achieve this, it is crucial to have a state-of-the-art data acquisition system. Engineers can use Simcenter SCADAS™ hardware to measure realistic data not only on public roads and proving grounds but also off-road under extreme conditions such as those found in heavy equipment and transportation industries.

Streamline delivery of critical durability insights

Adopting an innovative load and fatigue analysis solution is crucial to speed up time-consuming tasks such as load data classification, damage potential analysis and experimental fatigue analysis. Quickly deliver critical insights when preparing for test rig campaigns and reliable simulations with our load and fatigue analysis solution that integrates instant visualization tools with interactive or automated analysis, performant processing and active reporting.

Set realistic vehicle durability targets that match your customer usage profile

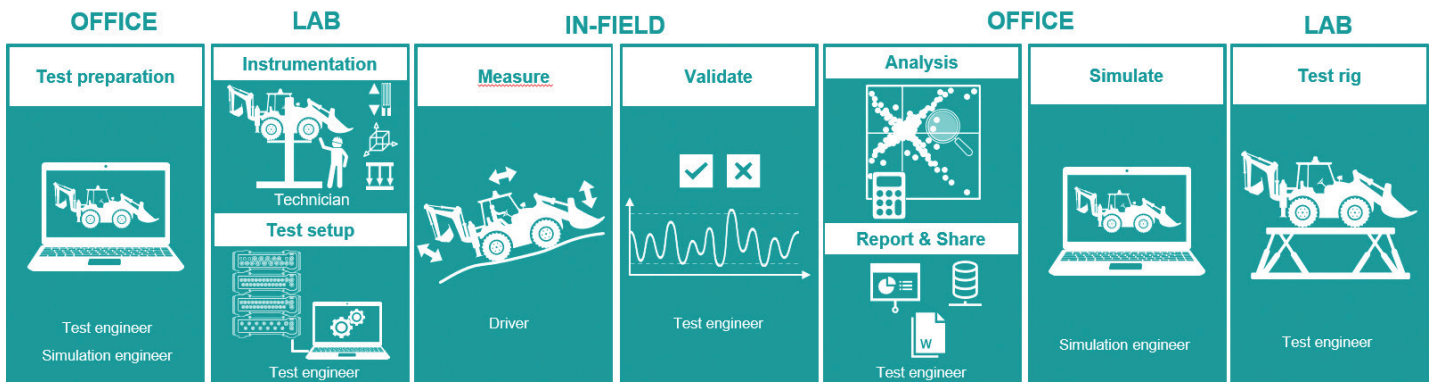
Once you analyze durability-specific characteristics and set durability targets to match the target customer usage profile,

it is crucial to employ realistic, customer-correlated and accelerated test schedules to avoid overtesting. Using Simcenter Testlab™ software offers tools that can help you create damage-equivalent accelerated profiles as input for shakers or CAE-based fatigue life predictions.

Optimize design with test-simulation integration

Many view physical testing and simulation as completely separate functions but there are many benefits to combining simulation with test. You can leverage Simcenter to uniquely integrate physical testing and simulation so you can pass test data, correlate your simulation models and use simulation for pretest planning.

For example, you can gather measurements from a real vehicle on a test track and feed that into your vehicle simulation to perform load prediction in hours instead of days. Engineers can use test data as input to [Simcenter 3D™ software](#), they can build a virtual test rig to excite a model, perform load prediction without characterizing tires and roads, employ an iterative process for early access to vehicle loads and optimize and validate the design by balancing weight, strength and durability.



Industry applications

Automotive and transportation

Almost all parts of a vehicle, including electronics, are engineered for durability. Automotive original equipment manufacturers (OEMs), suppliers and those in the transport industry are using Simcenter testing solutions to access real-life, accurate vehicle loads that impact the durability of a product. With our solution suite, engineers can collect data while driving the vehicle on the proving ground or the test field and make in-depth durability analyses with load and fatigue analysis tools to gain insights into the damage potential. Moreover, customers can process data to make accelerated test schedules that they can use as input for simulation or test benches.

Heavy equipment

Companies in agriculture, construction and mining share many of the same needs as the automotive and transportation industries. As such, almost all of the components of heavy machinery need to be engineered for durability and should operate under harsh environments. Engineers can use Simcenter testing solutions that offer tools to measure real-life loads, perform load data analysis and create accelerated test cycles. Our rugged and connected data acquisition hardware helps you collect precise multiphysics measurements under extreme conditions. Thanks to our data acquisition and analysis software, engineers can make in-depth durability analyses to gain insights into the damage potential of heavy equipment.

Aerospace and defense

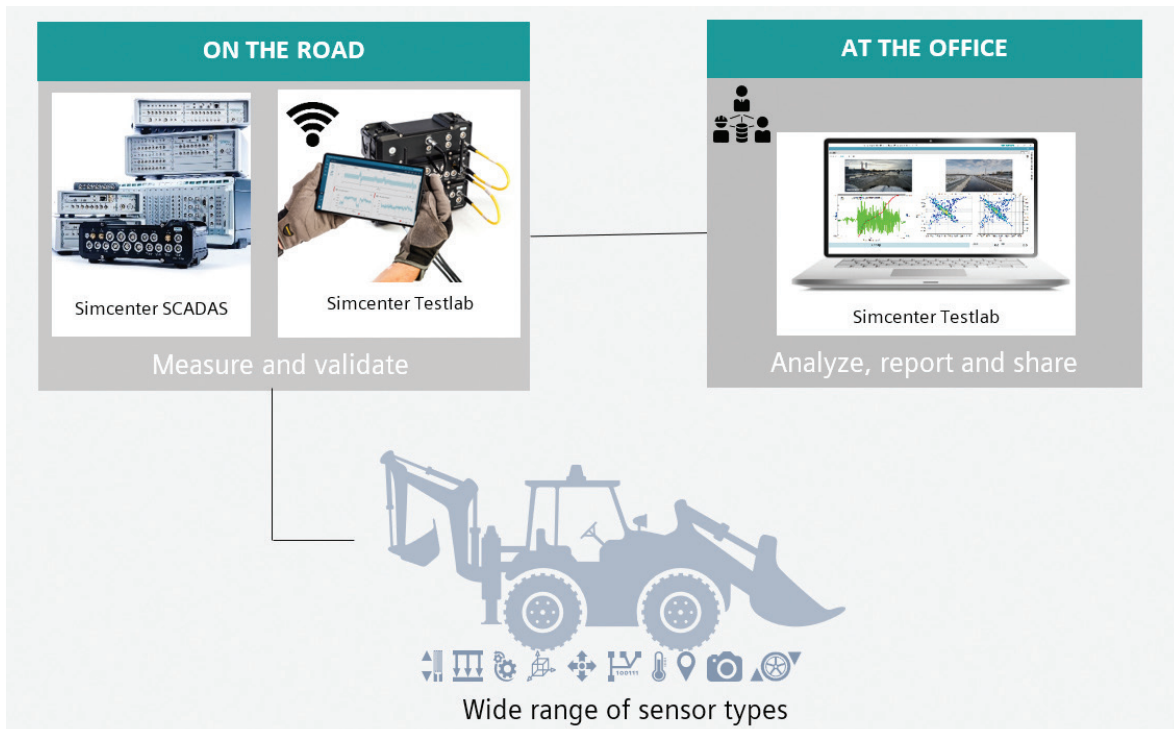
Armored military vehicles contain electronic units that need to survive a certain level of vibration according to military standards. Simcenter testing solutions provide engineers with the tools to collect vibration data and create accelerated testing profiles that they can use in environmental testing labs.

Electronics and semiconductors

Many products nowadays contain sensitive electronic components that need to survive the vibrations experienced during the lifecycle of the product. Using Simcenter, electronics manufacturers can define an accelerated test that accurately represents the vibrations these products will undergo in real life and make sure that they are durable enough.

Energy and utilities

Wind turbines must perform as efficiently and as long as possible without breaking or causing trouble. This requires expert design early in the development process to achieve proper durability. Simcenter provides you with the tools for load data collection on blades, shafts, gearboxes, bearings and towers via strain gauges and force cells to determine critical spots during operation. Engineers can use measured data for fatigue life prediction and as input for realistic finite element models (FEMs).



Simcenter capabilities for durability testing

Road load data acquisition

Rely on a vast amount of high-quality data. Precision and realism of load data collected on proving grounds or public roads are essential for virtual and physical product validation and verification. Our end-to-end road load data acquisition solution allows you to seamlessly integrate test instrumentation, setup, acquisition, validation and reporting to accelerate the delivery of high-quality data.



Rugged data acquisition

Test faster and more cost-effective in harsh environments. Real-world load data collected on agricultural, construction and mining equipment is essential for virtual and physical machine performance validation and verification. Our rugged data acquisition system deploys precise multiphysics measurements anytime and anywhere.



Load and fatigue analysis

You can accelerate delivering critical durability insights when preparing for test rig campaigns or reliable simulations. To speed up time-consuming tasks such as load data consolidation, accurate rainflow counting and experimental fatigue analysis, our load and fatigue analysis solution integrates instant visualization tools with interactive or automated analysis, performant processing and active reporting.



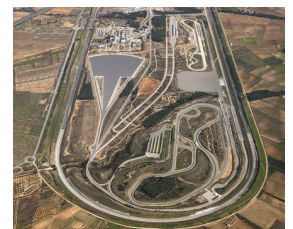
Accelerated life testing

Minimize the time and money spent on validating your product's durability performance based on field tests. Our accelerated life testing solution helps you design shorter and damage-equivalent test schedules for validation on single and multiaxis durability test rigs.



Optimized test schedules

Solve the riddle of mapping your product's real usage to a condensed durability test schedule. Our solution allows you to define tailored test schedules by synthesizing customer-correlated loading targets. It derives the optimal mix of test track sections to emulate the roads of the target market.



Laboratory testing

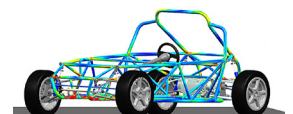
Today's market trend is to use real-time field buses to share measured data, for instance, with testbench controllers. EtherCAT has mainly become an industry standard for this.

Thanks to our sixty-four-channel EtherCAT output module ESO64 and the Simcenter SCADAS RS EtherCAT unit, all Simcenter hardware allows you to make a real-time connection to the test rig controller and replay durability loads in the lab.



Durability simulation

You can use simulation to evaluate and further refine the durability performance. The durability modules within Simcenter 3D give you access to state-of-the-art analysis methods, enabling engineers to interactively assign loads to a model. The solution permits efficient analysis of seam and spot welds as well as new methodologies for composite materials.



Road load data acquisition

Rely on a vast amount of high-quality data. Precision and realism of load data collected on proving grounds or public roads are essential for virtual and physical product validation and verification. Our end-to-end road load data acquisition solution allows you to seamlessly integrate test instrumentation, setup, acquisition, validation and reporting to accelerate the delivery of high-quality data.

Challenges

- Provide accurate data to computer-aided engineering (CAE) and test rigs
- Deliver high-quality data as fast as possible
- Avoid costly test reruns

Solutions

- Fast and accurate setup
- Smart, secure and synchronized recording
- Seamless delivery of high-quality data
- On-the-spot data validation

Results

- Maximize testing productivity
- Fast and accurate road load data acquisition
- Higher measurement flexibility
- Perform test campaigns with complete confidence



Road load data acquisition for auto OEMs and suppliers

Hardware and software configuration enabling durability data collection and validation on the road

Key features

- Suitable for small setups up to large 100-plus channel measurement campaigns through multiframe connection
- Supports various sensors including accelerometers, strain gauges, bridge-based sensors (force, torque, pressure...), potentiometers, linear variable differential transformers (LVDTs), tachos and thermocouples
- Sensor conditioning such as voltage with optional supply, integrated circuit piezoelectric (ICP), TEDS support, Wheatstone bridge completion, choice between direct current (DC) or alternating current (AC) supply, 4-20 mA transmitter support
- Digital bus support: controller area network (CAN), CAN-FD, OBD2 and FlexRay, raw bus information as well as decoded signals can be acquired
- Synchronized measuring of global navigation satellite systems (GNSS) data via embedded chip, video data (dedicated Sony cameras) as well as wheel force transducer data (via Kistler KiRoad Performance)
- Ability to stream data directly to the PC via the Windows-based Simcenter Testlab solution
- Alternatively, autonomous recording on a CompactFlash card is located in the Simcenter SCADAS Recorder hardware. Monitoring and remote control of the measurements via the Simcenter Testlab Control App, running on an Android-based tablet via a wireless connection
- Online and offline validation tools during or right after the measurement
- Start-stop trigger on any channel including virtual channels and logical operators
- Fast and effective signal and sensor validation



Base configuration	
Data streaming directly to PC	
Product code	Product description
SCRx/SCMx	Simcenter SCADAS Recorder/Simcenter SCADAS Mobile
SCM-DB8IIIC ¹	Simcenter SCADAS Mobile 8-channel V/ICP/Bridge input module with 51.2kHz sample rate
TL-DTP-0010	Simcenter Testlab Desktop Neo
TL-ACQ-0010	Simcenter Testlab Time Data Acquisition
Tablet-operated autonomous recording on Simcenter SCADAS Recorder	
SCRx	Simcenter SCADAS Recorder
SCM-DB8IIIC1	Simcenter SCADAS MoObile 8-channel V/ICP/Bridge input module with 51.2kHz sample rate
NA	Simcenter Testlab Recording Workbook
SM-SCR.01	Simcenter Testlab Control App
SCx-TAB	Tablet for XS, Recorder or Pass-by Noise

Recommended options	
Simcenter SCADAS Mobile modules	
SCM-CIM2	Simcenter SCADAS Mobile 2-camera interface module
SCM-WF12-KR	Simcenter SCADAS Mobile 2-channel wheel force interface module with KiRoad and RoadDyn support
SCM-CN4-II	Simcenter SCADAS Mobile 4-channel CAN and CAN FD bus interface module
SCM-T8A	Simcenter SCADAS Mobile 8-channel thermocouple input module
SCM-CIM2	Simcenter SCADAS Mobile 2-camera interface module
Track-side post-processing with Simcenter Testlab Desktop Neo	
TL-GPR-0080	Simcenter Testlab Process Designer
TL-DUR-0060	Simcenter Testlab Track-side Validation

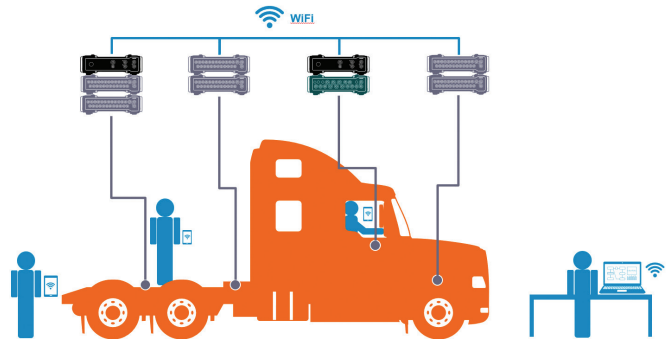
¹ Number of conditioning units to be configured

Road load data acquisition for trucks and buses

Hardware and software configuration including embedded web apps for flexible rugged data acquisition

Key features

- Suitable for small setups up to large 500-plus channel measurement campaigns
- Supports various sensors: accelerometers, strain gauges, bridge-based sensors (force, torque, pressure), potentiometers, LVDTs, tachos and thermocouples
- Sensor conditioning such as voltage with optional supply, ICP, Wheatstone bridge completion, pulse counters, choice between DC or AC supply, 4-20 mA transmitter support
- Wired or wireless (Wi-Fi or cellular) system access via any device (pc, tablet, phone) and any operating system (Windows, Android, iOS)
- Digital bus support: CAN, CAN-FD, J1939 and OBD2, raw bus information as well as decoded signals can be acquired
- Synchronized measuring of GNSS data via embedded chip and video data (via USB-based cameras)
- Multiple user access from any device for setup, verification, sensor calibration, measurement and data validation
- Stable and uninterruptable power supply (UPS) and buffer mechanism for reliable multiphysics measurements
- Operation in various temperatures (from -40 C to +65 C / from -40 F to +149 F), humidity, shock and vibration levels
- Web-based application allowing you to quickly and easily configure, take, visualize, analyze and upload measurements
- Centralized or distributed configurations (over distances up to 50 meters thanks to single cabled-daisy chaining)



Base configuration	
Hardware configuration	
Product code	Product description
SCRS-REC	Simcenter SCADAS RS Recorder Unit (includes embedded web-based application)
SCRS-UPS	Simcenter SCADAS RS Uninterruptable Power Supply Unit
SCRS-B24-x ²	Simcenter SCADAS RS 24-channel Bridge Unit (120 or 350 Ohm)
SCRS-S24 ²	Simcenter SCADAS RS 24-channel Sensor Unit
Data streaming directly to PC	
TL-DTP-0010	Simcenter Testlab Desktop Neo
TL-ACQ-0010	Simcenter Testlab Time Data Acquisition
Autonomous recording on Simcenter SCADAS RS	
NA	Simcenter Testlab Recording Workbook

Recommended options	
Simcenter SCADAS RS conditioning units	
SCRS-DI	Simcenter SCADAS RS Digital pulse and CAN Unit
SCRS-TC20	Simcenter SCADAS RS 20-channel Thermocouple Unit
SCRS-U12	Simcenter SCADAS RS 12-channel Universal Unit
Remote monitoring and measurement control	
6GK1720-0AP03	SCALANCE Modem and Sinema RC Server
Track-side postprocessing with Simcenter Testlab Desktop Neo	
TL-GPR-0080	Simcenter Testlab Process Designer
TL-DUR-0060	Simcenter Testlab Track-side Validation

² Number of conditioning units to be configured

Rugged data acquisition

Test faster and more cost-effectively in harsh environments. Real-world load data collected on agricultural, construction and mining equipment is essential for virtual and physical machine performance validation and verification. Our rugged data acquisition system deploys precise multiphysics measurements anytime and anywhere.

Challenges

- Harsh environments and demanding test conditions
- Speed up test campaigns by optimizing operational processes from start to end
- Test in remote areas offering monitoring from a distance
- Meet scalability needs in terms of channel count and measurement topology
- Testing in multiple domains such as durability, noise, vibration and harshness (NVH) acoustics

Solutions

- Requires rugged design for use in harsh environments
- Extreme flexibility to optimally match the device under test
- Ensures performance for best possible accuracy
- Unparalleled connectivity simplifies data collection and provides access from anywhere

Results

- Achieve faster and more cost-effective execution of the most demanding test campaigns
- Acquire precise multiphysics measurements anytime and anywhere
- Enable access in remote locations

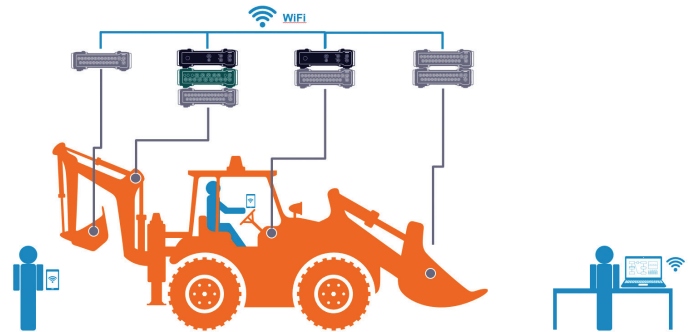


Rugged data acquisition for high-channel count measurements

Hardware and software configuration including embedded web apps for flexible rugged data acquisition

Key features

- Suitable for small setups up to large 500-plus channel measurement campaigns
- Supports various sensors: accelerometers, strain gauges, bridge-based sensors (force, torque, pressure...), potentiometers, LVDTs, tachos and thermocouples
- Sensor conditioning such as voltage with optional suppl ICP, TEDS support, Wheatstone bridge completion, pulse counters, choice between DC or AC supply, 4-20 mA transmitter support
- Digital bus support: CAN, CAN-FD, J1939 and OBD2, raw bus information as well as decoded signals can be acquired
- Synchronized measuring of GNSS data via embedded chip and video data (via USB-based cameras)
- Multiple user access from any device for setup, verification, sensor calibration, measurement and data validation
- Stable and uninterruptable power supply and buffer mechanism for reliable multiphysics measurements
- Wired or wireless (Wi-Fi or cellular) system access via any device (pc, tablet, phone) and any operating system (Windows, Android, iOS)
- Operation in various temperatures (from -40 to +65 C / from -40 F to +149 F), humidity, shock and vibration levels
- Web-based application allowing you to quickly and easily configure, take, visualize, analyze and upload measurements
- Centralized or distributed configurations (over distances up to 50 meters thanks to single cabled-daisy chaining)
- Remote connection via 4G/5G to Simcenter SCADAS RS allowing users to access channel setup, sensor validation and calibration for test preparation
- Data streaming and download made possible from anywhere



Base configuration	
Hardware configuration	
Product code	Product description
SCRS-REC	Simcenter SCADAS RS Recorder Unit (includes embedded web-based application)
SCRS-UPS	Simcenter SCADAS RS Uninterruptable Power Supply Unit
SCRS-B24-x ³	Simcenter SCADAS RS 24-channel Bridge Unit (120 or 350 Ohm)
SCRS-S24 ³	Simcenter SCADAS RS 24-channel Sensor Unit
Data streaming directly to PC	
TL-DTP-0010	Simcenter Testlab Desktop Neo
TL-ACQ-0010	Simcenter Testlab Time Data Acquisition
Autonomous recording on Simcenter SCADAS RS	
NA	Simcenter Testlab Recording Workbook

Recommended options	
Simcenter SCADAS RS Conditioning Units	
SCRS-DI	Simcenter SCADAS RS Digital Pulse and CAN Unit
SCRS-TC20	Simcenter SCADAS RS 20-channel Thermocouple Unit
SCRS-U12	Simcenter SCADAS RS 12-channel Universal Unit
Remote monitoring and measurement control	
6GK1720-0AP03	SCALANCE Modem and Sinema RC Server
Track-side postprocessing with Simcenter Testlab Desktop Neo	
TL-GPR-0080	Simcenter Testlab Process Designer
TL-DUR-0060	Simcenter Testlab Track-side Validation

³ Number of conditioning units to be configured

Rugged data acquisition for multiphysics measurements

Hardware and software configuration including embedded web apps for flexible rugged data acquisition

Key features

- Suitable for small setups up to large 500-plus channel measurement campaigns
- Supports various sensors: accelerometers, strain gauges, bridge-based sensors (force, torque, pressure...), potentiometers, LVDTs, tachos, microphones and thermocouples
- Sensor conditioning such as voltage with optional supply, ICP, TEDS support, Wheatstone bridge completion, pulse counters, choice between DC or AC supply, 4-20 mA transmitter support
- Digital bus support: CAN, CAN-FD, J1939 and OBD2, raw bus information as well as decoded signals can be acquired
- Synchronized measuring of GNSS data via embedded chip and video data (via USB-based cameras)
- Multiple user access from any device for setup, verification, sensor calibration, measurement and data validation
- Stable and uninterruptable power supply and buffer mechanism for reliable multiphysics measurements
- Wired or wireless (Wi-Fi or cellular) system access via any device (pc, tablet, phone) and any operating system (Windows, Android, iOS)
- Operation in various temperatures (from -40 to +65 C / from -40 F to +149 F), humidity, shock and vibration levels
- Web-based application allowing you to quickly and easily configure, take, visualize, analyze and upload measurements
- Centralized or distributed configurations (over distances up to 50 meters thanks to single cabled-daisy chaining)
- Remote connection via 4G/5G to Simcenter SCADAS RS allowing you to access channel setup, sensor validation and calibration for test preparation
- Data streaming and download made possible from anywhere



Base configuration	
Hardware configuration	
Product code	Product description
SCRS-REC	Simcenter SCADAS RS Recorder Unit (includes embedded web-based application)
SCRS-UPS	Simcenter SCADAS RS Uninterruptable Power Supply Unit
SCRS-U12 ⁴	Simcenter SCADAS RS 12-channel Universal Unit
Data streaming directly to PC	
TL-DTP-0010	Simcenter Testlab Desktop Neo
TL-ACQ-0010	Simcenter Testlab Time Data Acquisition
Autonomous recording on Simcenter SCADAS RS	
NA	Simcenter Testlab Recording Workbook

Recommended options	
Simcenter SCADAS RS Conditioning Units	
SCRS-U12-E	Simcenter SCADAS RS 12-channel Universal Unit Extended Bandwidth
Remote monitoring and measurement control	
6GK1720-0AP03	SCALANCE Modem and Sinema RC Server

⁴ Number of conditioning units to be configured

Load and fatigue analysis

Accelerate the delivery of critical durability insights when preparing for test rig campaigns or reliable simulations. To speed up time-consuming tasks such as load data consolidation, accurate rainflow counting and experimental fatigue analysis, our load and fatigue analysis solution helps you integrate instant visualization tools with interactive or automated analysis, performant processing and active reporting.

Challenges

- Set accurate durability targets
- Get more insights from load measurements
- Optimize durability engineering processes

Solutions

- Use Simcenter Testlab load and fatigue analysis to rely on a wealth of analysis methods
- Use the Simcenter portfolio for data collection, analytics and modeling

- Save analysis and calculation time by using accurate, appropriate methods
- Better understanding of the fatigue content of load data, providing more insights into the behavior of the component being tested
- Streamline the test and analysis process to gain confidence in the data

Results

- Obtain valuable and precise insights to optimize the durability performance of your next designs
- Improve consistency and quality with standardized processes and reports
- Automate and run analysis on large amounts of data up to 50 percent faster than traditional solutions
- Raise team effectiveness by reducing learning effort for novice and nonexpert users

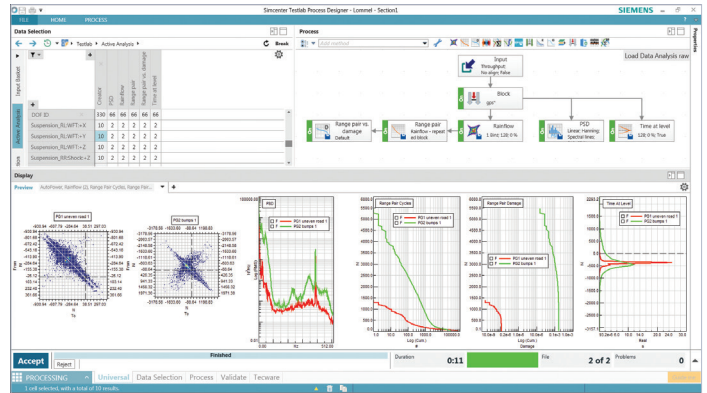


Load data analysis

Software configuration including counting and spectral analysis methods to perform process-driven analysis of road data

Key features

- Intuitively create and modify processes graphically by using method boxes
- Automatic storage of process parameters for full traceability of data
- Pivot table and preview picture features to easily organize and visualize multiple channels and measurements
- Data consolidation made possible via display- or process-driven interactive analysis and anomaly correction
- Counting and spectral analysis methods including rainflow, range pair, rotating moment histograms, pseudo damage, level crossing, peak-count-I and III, time at level counting, combined with power-spectral density (PSD) analysis
- Template-based Microsoft Office reports with Active Pictures for multiple channels and runs



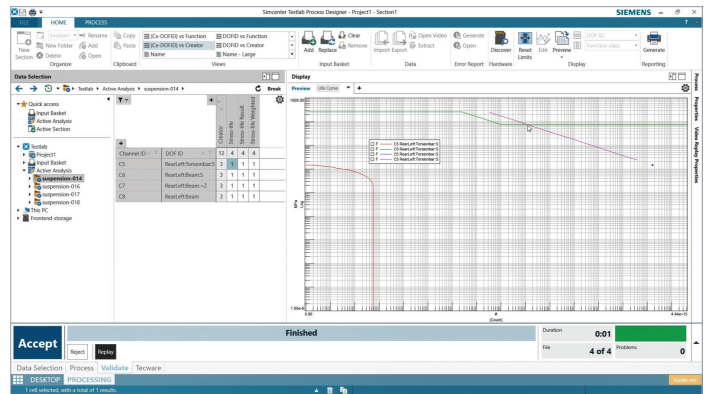
Base configuration	
Product code	Product description
TL-DTP-0010	Simcenter Testlab Desktop Neo
TL-DTP-0011	Simcenter Testlab Interactive Analysis
TL-GPR-0080	Simcenter Testlab Process Designer
TL-DUR-0023	Simcenter Testlab Load Data Analysis
TL-DUR-0030	Simcenter Testlab Anomaly Library

Experimental fatigue analysis

Software configuration to perform fatigue analysis based on stress-life and strain-life approaches

Key features

- Intuitively create and modify processes graphically by using method boxes
- Pivot table and preview picture features to easily organize and visualize multiple channels and measurements
- Use stress-life approach and strain-life approach to predict the fatigue life of a component from given load histories, materials properties and stress concentration factors or from strain gauge histories and materials properties
- User extensible databases for S-N curves, materials and method parameters
- Automatic storage of process parameters for full traceability of data
- Template-based Microsoft Office reports with Active Pictures for multiple channels and runs



Base configuration	
Product code	Product description
TL-DTP-0010	Simcenter Testlab Desktop Neo
TL-DUR-0023	Simcenter Testlab Load Data Analysis
TL-GPR-0080	Simcenter Testlab Process Designer
TL-DUR-0040	Simcenter Testlab Fatigue Life Analysis

Accelerated life testing

Minimize the time and money spent on validating your product's durability performance based on field tests. Our accelerated life testing solution helps you design shorter and damage-equivalent test schedules for validation on single and multi-axis durability test rigs.

Challenges

- Time-consuming and costly field tests to validate the durability performance
- Risk of under or over testing

Solutions

- Remove nondamaging events from long-duration measurements

- Creation of damage-equivalent constant amplitude tests
- User-defined mix of ranges, mean values and number of repetitions - from a uniaxial, variable amplitude loading

Results

- Reduction of real load data to shorter time signals while ensuring the same damage potential
- Speeds up both physical testing on block cycle test machines as well as CAE-based fatigue life predictions

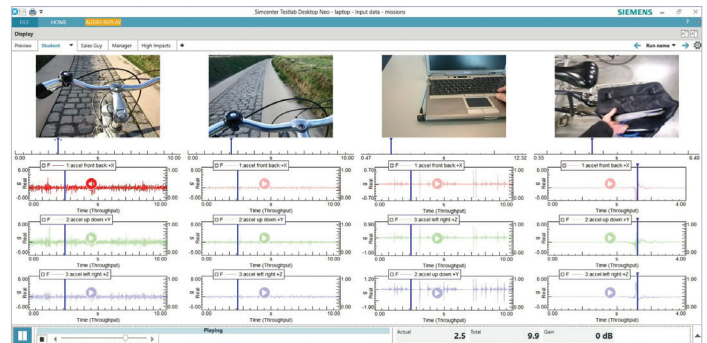


Mission synthesis

Software configuration allowing users to create test specifications using fatigue damage theory and exporting directly random or sine profiles for laboratory shaker testing

Key features

- Calculate maximum response spectrum (MRS), fatigue damage spectrum (FDS) and shock response spectrum (SRS) to calculate the fatigue potential
- Definition of damage-equivalent test specifications for random and swept sine vibration testing from measured load data
- Usage of test tailoring methods as described in industry standards such as GAM EG-13, MIL-STD 810G and NATO AECTP 200
- Template-based Microsoft Office reports with Active Pictures for multiple channels and runs
- Graphical user interface (GUI) to create break point table



Base configuration	
Product code	Product description
TL-DTP.21.1	Simcenter Testlab Desktop - Advanced
TL-ENV.39.9	Simcenter Testlab Mission Synthesis

Accelerated life testing

Software configuration allowing users to create damage-equivalent accelerated tests

Key features

- Omission of nondamaging events in uniaxial and multiaxial directions thanks to rainflow projection (RP) filtering
- Creation of accelerated and damage-equivalent block-cycle or constant amplitude tests
- Automatic calculation of filters to keep a user-defined threshold



Base configuration	
Configuration with Simcenter Testlab Neo	
Product code	Product description
TL-DTP-0010	Simcenter Testlab Desktop Neo
TL-DTP-0011	Simcenter Testlab Interactive Analysis
TL-GPR-0080	Simcenter Testlab Process Designer
TL-DUR-0050	Simcenter Testlab Rainflow based Test Definition
Configuration with Simcenter Tecware	
D-P06.01.1	Simcenter Tecware Load Data Processing
D-P06.72.2	Simcenter Tecware Test Definition

Optimized test schedules

Solve the riddle of mapping your product's real usage to a condensed durability test schedule. Our solution lets you define tailored test schedules by synthesizing customer-correlated loading targets. It derives the optimal mix of test track sections to emulate the roads of the target market.

Challenges

- Avoid guesswork when mapping test track data to a durability target
- Minimize the cost of field tests while replicating the target usage

Solutions

- Calculate optimal mix of test track sections that match the target customer usage for all the channels considered

Results

- Defines an endurance test program equivalent in terms of fatigue but in a much shorter amount of time
- Can be used for the component as well as for full vehicle testing
- Improve the correlation between testing on the track and testing on the rig



Optimized test schedules

Software configuration allowing to calculate via an optimization procedure the optimal mix of test track sections that match the target customer usage

Key features

- Applicable to uni- and multiaxial rainflow matrices and rotating moment histograms
- Allows you to take additional PSDs into account in the optimization
- Perform optimization in terms of total test time or pseudo damage optimization (global or partial-based)



Base configuration	
Product code	Product description
D-P06.01.1	Simcenter Tecware Load Data Processing
D-P06.72.2	Simcenter Tecware Test Definition

Laboratory testing

Today's market trend is to use real-time field buses to share measured data, for instance, with test-bench controllers. EtherCAT has mainly become an industry standard for this.

Thanks to our sixty-four-channel EtherCAT output module ESO64 and the Simcenter SCADAS RS EtherCAT unit, all Simcenter hardware allows you to make a real-time connection to the test rig controller and replay durability loads in the lab.

Challenges

- Re-instrumentation of vehicles subassemblies when moving from the field onto the test rig

Solutions

- Use Simcenter SCADAS RS EtherCAT unit or SCADAS SCM/LAB ESO64 module to establish a real-time connection with any test bench controller

Results

- Maximize testing productivity by avoiding sensor rewiring



Laboratory durability testing with Simcenter SCADAS RS

Hardware configuration including Simcenter SCADAS RS EtherCAT unit for real-time test rig connection

Key features

- Plug-and-play: limited configuration required in software
- Up to 96 channels per EtherCAT unit – connectors UNIT1, UNIT2, UNIT3, UNIT4
- Connection to the EtherCAT bus – connectors IN and OUT
- Real-time end-to-end latency < 100µs and real-time bus “sample” rate up to 10kHz
- Setup transferred via CANopen



Base configuration	
Product code	Product description
SCRS-REC	Simcenter SCADAS RS Recorder Unit (includes embedded web-based application)
SCRS-UPS	Simcenter SCADAS RS Uninterruptable Power Supply Unit
SCRS-B24-x	Simcenter SCADAS RS 24-channel Bridge Unit (120 or 350 Ohm)
SCRS-ECAT	Simcenter SCADAS RS EtherCAT Unit
SCRS-S24	Simcenter SCADAS RS 24-channel Sensor Unit

Laboratory durability testing with Simcenter SCADAS Mobile

Hardware configuration with Simcenter SCADAS Mobile for real-time test rig connection

Key features

- Selection a sub-set of channels for output on EtherCAT
- Up to 64 channels per ESO64 module
- Real-time end-to-end latency of 300 usec
- Real-time bus “sample” rate up to 10 kHz
- Smart Channel name available over CANopen



Base configuration	
Product code	Product description
SCMx	Simcenter SCADAS Mobile
SCM-VB8III-RT	Simcenter SCADAS Mobile 8 channel NVH Input Module with Ethercat
SCM-ESO64	SCADAS Mobile 64-ch EtherCAT output module

Siemens Digital Industries Software

[siemens.com/software](https://www.siemens.com/software)

Americas 1 800 498 5351

Europe 00 800 70002222

Asia-Pacific 001 800 03061910

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