SIEMENS
Ingenuity for life

Providing safe and efficient vibration qualification testing

Solution brief

Siemens Digital Industries Software

The Simcenter™ portfolio offers scalable solutions for dynamic environmental testing. For your vibration qualification tests, the unique combination of Simcenter SCADAS™ hardware and Simcenter Testlab™ software delivers outstanding performance for all standard and advanced testing requirements. This includes tests based on tailored profiles, interfaces with test cells or climatic chambers, and tests based on newer techniques such as the military standard (MIL-STD) 527 method. The solution also takes advantage of the superior analysis and reporting capabilities of Simcenter Testlab to improve productivity and efficiency.

Improve quality and decrease costs

The engineering discipline of environmental testing verifies if an object can withstand the rigors of harsh environments (extreme temperatures, humidity, exposure to salt, etc.), thus impacting its operational conditions. Dynamic environmental testing focuses on the response of a product when exposed to a tough vibration environment.

End users expect and demand reliable product performances, so how do you ensure the reliability of products and product parts that will be exposed to high levels of vibration during operation or transport? Vibration qualification testing is an important step to validate any prototype design, including hard-disk drives, car clutches, dishwasher pumps or airplane altimeters. Lack of or improper testing could result in mechanical failure and customer dissatisfaction, thereby damaging the brand image. A test that fails or encounters unexpected behavior often results in expensive troubleshooting campaigns followed by equally expensive redesign, prototyping and production phases, hence the need for analysis tools that ensure flawless test execution.

Vibration qualification testing is more demanding today than it used to be. Test laboratories around the word have to deal with growing productivity requirements. Prototypes are scarce and valuable and test teams need to minimize setup and testing time. The calibration,

Challenges

- Perform standard qualification tests efficiently, safely and quickly on valuable prototypes or production parts
- Respond to nonstandard test requests and easily add tailored tests to your qualification campaigns
- Efficiently share data, results and reports

Solutions

- Use Simcenter SCADAS Mobile hardware, a scalable solution for both field and lab testing
- Leverage the Simcenter SCADAS DAC shut down control unit to conduct safe test operations
- Use Simcenter Testlab Vibration Control for efficient testing from setup to reporting

Solution focus

Results

- Rely on one platform to conduct safe, automated standard vibration tests and advanced tests based on tailored profiles, interfacing with test cells, climatic chambers or multi-exciter tests according to MIL-STD 527
- Increase efficiency in every test phase from setup to reporting with easily printed, relevant graphs and easily shared active pictures
- Ensure proper test execution and exploit the extensive analysis capabilities of Simcenter Testlab to investigate unexpected issues

Simcenter SCADAS DAC shut down control unit.

maintenance or repair of test devices should also require as little time as possible in order to minimize vibration control system downtime and avoid increased costs and impaired operations. This is why more than 400 laboratories worldwide prefer to rely on a robust control solution such as the combined Simcenter SCADAS and Simcenter Testlab system.

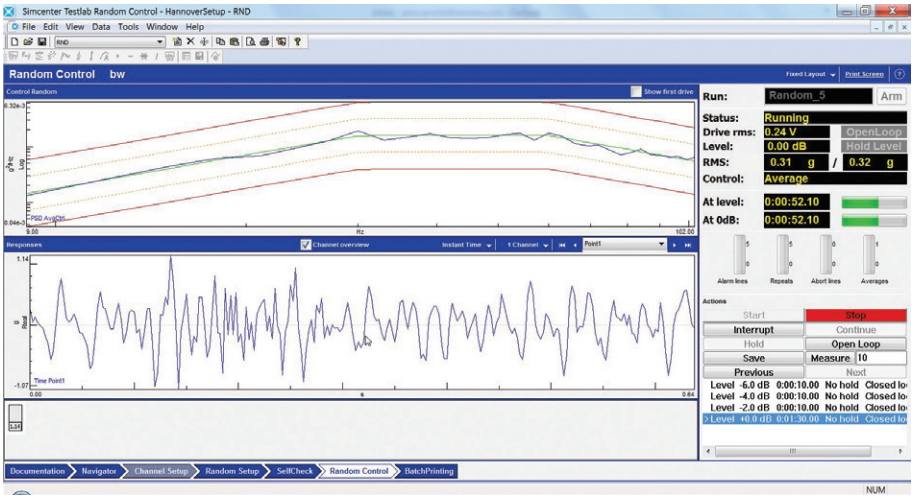
Simcenter SCADAS SCM201V with eight-channel acquisition module.

The Simcenter SCADAS SCM201V is also available with four channels and BNC connectors.

Simcenter SCADAS fits the purpose

The Simcenter solution for vibration qualification testing offers a unique hardware and software integration for optimal performance. Simcenter SCADAS Mobile is well suited for qualification tests, offering safe, traceable and efficient results with flawless data acquisition and signal processing for optimal measurement precision. Simcenter SCADAS Mobile for vibration control has two output channels, a digital/analog inter range instrumentation group (IRIG-B) input that can be switched to tacho mode, and a controlled emergency shutdown port and slot for a four- or eight-channel acquisition and conditioning module. It has a standard Ethernet unshielded twisted pair (UTP) interface, a battery life of at least 150 minutes and is certified according to the MIL-STD-810F standard and ingress protection (IP) 32 code.

The integrity of scarce and expensive prototypes is never compromised with the Simcenter SCADAS DAC shut down control unit (DSDCU). It enables users to remotely shut down and serves as a hardware backup for the software-controlled shutdown. A removable key prevents unauthorized use after a shutdown. Simcenter SCADAS DSDCU also includes two Bayonet Neill-Concelman (BNC) connectors with normally open and closed contacts for enhanced safety conditions.



Follow every step of the test with a clear online graphical representation.

Delivering efficiency at every step of the test

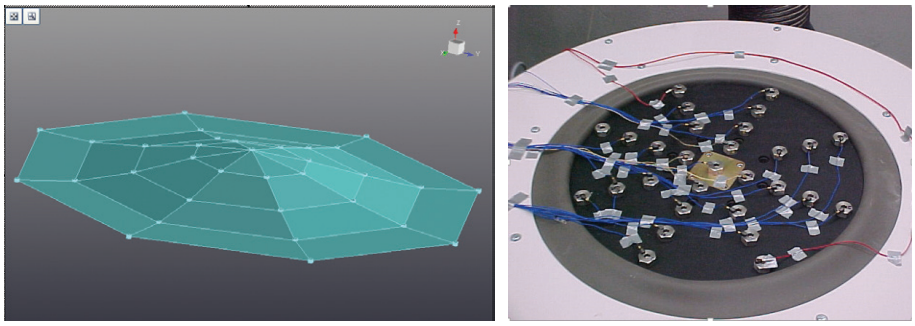
Simcenter Testlab optimally supports your test campaign at every step of the test. In the beginning, you can easily define and annotate the setup for optimal efficiency and traceability of the test, even offline. The interface allows users to easily configure channel functions by specifying in a click which channels are to be controlled and which are to be measured. Note all your test parameters, such as operator, test item and version, and you are nearly ready to start.

The software also allows you to easily define the test profile. You can lock parameters for fast and easy setup, allowing even nonexperienced users to safely and effortlessly operate the tests. If the test goes beyond standard measurements, enter the advanced menu to define tailored setups and stay in control of every execution step.

Simcenter Testlab Vibration Control software gives you a broad selection of control strategies to choose from for your test: sine, random, shock, combined modes, sine dwell, multiple input multiple output (MIMO) and acoustic. The online analysis provides you with immediate graphical feedback on tests with a user-definable alarm or abort levels for automatic test interruption if necessary.

The test sequencing software lets you schedule fully secured and automated test runs. You can use the option to mix all test modes, conduct loops and pause commands, and perform a variety of automated pretest options. Through the digital input/output (I/O) based remote control, you can control other equipment in the lab and synchronize vibration testing with functional or climatic testing.

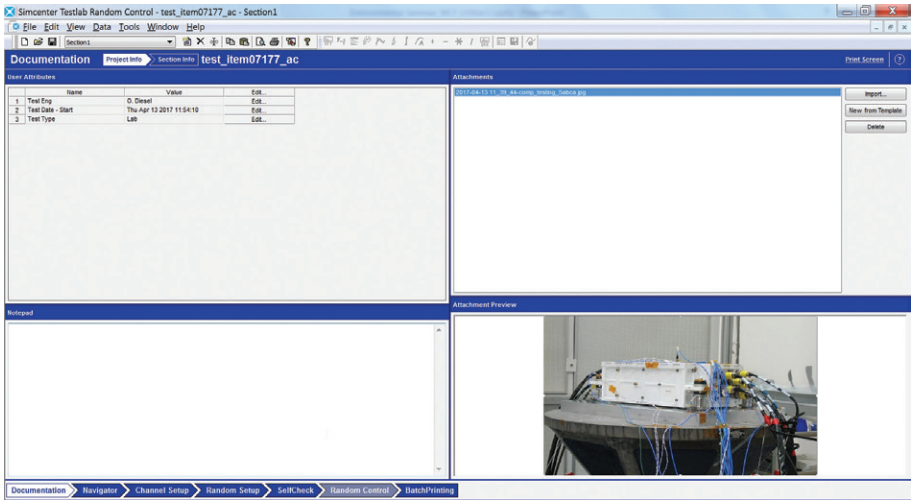
What if the test doesn't execute according to plan? Using Simcenter Testlab enables you to rely on its wide-ranging portfolio to guide users to solutions when unexpected issues arise. To prevent incorrect instrumentation from ruining your test, use geometry displays and animation to visualize instrumentation issues or understand dynamic phenomena. Or use Simcenter Testlab Structures Analysis when you need to characterize your shaker installation.



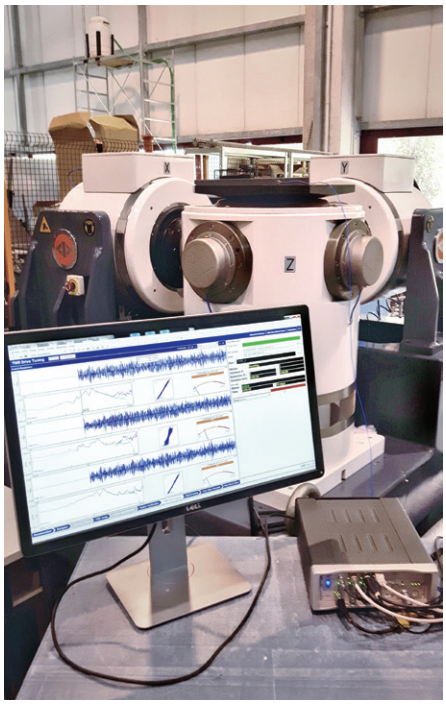
Get better insight into your shaker's behavior by performing an operational deflection shape study.

Beyond vibration-qualification testing

The qualification procedure doesn't end when the test is completed. The importance of reporting is sometimes underestimated, but it plays an important part in a successful test run. Being able to quickly and effortlessly describe and share the results of a qualification test can save significant time and bring tremendous value. Simcenter Testlab lets you easily print preformatted graphs at high speed (160 pages per minutes) or export them to Microsoft Office. Moreover, geometry animations can be exported as active pictures to your report file, which is a powerful and dynamic way to share test outcomes with colleagues, management or customers.



Test documentation for traceable results and user-friendly reporting.



Using Simcenter SCADAS and Simcenter Testlab for MIMO 3D shaker control.

Using Simcenter provides a unique hardware and software solution for dynamic environmental testing. From standard to advanced vibration qualification tests, the solution offers a streamlined, efficient workflow and outstanding reporting capabilities, providing all the tools you need to validate the physical design and understand the physics behind the test.

Simcenter Testlab is part of a software suite that has been developed to take into account product innovation and quality throughout the lifecycle, and bridges the gap between virtual testing and simulation. It certainly lets you focus on performing safe and efficient testing of limited prototypes, but also enables you to retrieve more high-quality data from a single test run so you can enhance simulated prototypes with more insights into the item's physical behavior.

Siemens Digital Industries Software's Simcenter family of products reflects more than 30 years in vibration testing, and is backed by an engineering consultancy team that provides expertise and dedicated services, offering a global presence with local customer support where and when you need it.

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