

Testing

Developing Fastener Testing Strategies for Product Improvement & to Secure Competitive Advantage

A clear fastener testing strategy offers a wide range of benefits, from basic compliance to securing confidence from downstream original equipment manufacturer (OEM) customers. Astute fastener manufacturers can turn their investment in testing from being a cost to an opportunity to generate new sales and profits, particularly during periods when market demand for fasteners is depressed. An effective test strategy enables fastener manufacturers to continuously improve their products and to develop a source of competitive advantage. Key elements of a testing strategy are to identify and correctly brief a test laboratory on what tests to conduct, then interpreting the results to provide maximum return on investment.

“Some fastener manufacturers complain about the requirement for increased testing, and the costs associated with test programs,” explains **Morten Schiff**, CEO of **Vibrationmaster**. “However, far-sighted fastener manufacturers embrace and welcome demanding test strategies, as they recognize that testing and certifying fasteners to international standards can open up new markets and be a profitable source of competitive advantage.”

Schiff also highlights that it is essential to maintain investment into testing during periods when market demand for fasteners is depressed: “It may be tempting for manufacturers seeking to cut overheads to look at their testing program as a source of cost savings. But continuous product innovation underpinned by a testing strategy during an economic downturn enables companies to increase market share at the expense of competitors that have chosen to cut their test budgets.”

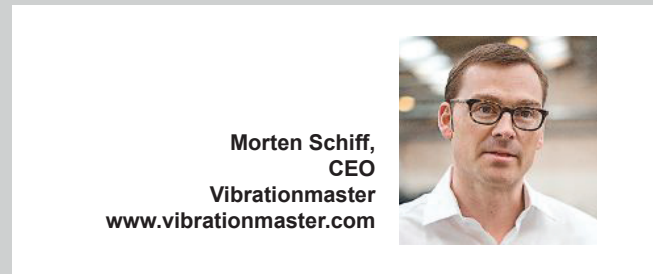
What Do You Want to Test?

According to Schiff, the first stage of creating a testing strategy is to identify the principal objectives: “Although it seems like an obvious point, before embarking on a test program fastener manufacturers should be clear about what they wish to achieve by testing their products, as the objectives of the program will dictate what testing is required.”

Based on his dealings with numerous fastener manufacturers, Schiff identifies two principal reasons that companies create and implement test strategies:

1. Testing to improve products, so that fasteners can perform better in their existing applications, or for fastener products to be readied for new applications and markets.
2. Testing to validate products, so that fasteners comply with specific standards, enabling them to be specified by end-user engineers for specific applications.

“When testing to improve products, the emphasis of a test strategy is generally less focused on compliance and certification, and more on testing the performance of a fastener in



real-life applications such as in a bolted joint configuration,” continues Schiff.

Product improvement tests can be conducted under less stringent laboratory conditions, potentially within a manufacturer’s own research facility. Conducting such tests in-house enables a manufacturer to test a fastener’s performance on an iterative basis, and is a cost-effective approach to develop a product to the point where external validation, possibly to a standard, can be completed.

“When testing to validate products, a fastener and locking element must meet or exceed the requirements of the specific standard. In such cases, tests could be conducted by a certified laboratory. Alternatively, if fasteners are tested within a manufacturer’s in-house facility, the testing should be conducted according to the exact requirements of the standard that the fastener product is being designed to meet.”

How to Choose a Test Laboratory

The **International Laboratory Accreditation Cooperation (ILAC)**, a global umbrella organization dedicated to validating testing organizations to internationally accepted standards, has accredited over 40,000 laboratories worldwide. Not all of these test houses will deliver fastener testing, and not all test laboratories are accredited by ILAC, but that still leaves fastener manufacturers without in-house test facilities with an enormous choice of potential test partners.

So, how best to choose? “When selecting a test laboratory, ideally fastener manufacturers should look for a supplier with a track record of testing fastener products and bolted joints,” advises Schiff. “A laboratory experienced in conducting tests on fasteners and bolted joints will be able to proactively advise on a suitable test strategy. So, for example, the laboratory should not only have the facilities to conduct a program of tests to *ISO 898-1: 2009*, which covers all the principal tests for threaded fasteners, but should also be able to demonstrate that they have successfully done so before.”

An alternative to using an external test laboratory is to acquire the test equipment and expertise to conduct in-house testing. This strategy may be more cost effective for fastener manufacturers seeking to rapidly develop multiple new fastener product ranges. The speed and convenience of having an in-house facility can outweigh the initial capital cost of acquiring test equipment and the costs of test technicians to operate the equipment.

How to Monitor a Fastener Testing Program

Having determined which test strategy to adopt—using an external test laboratory supplier or developing test competencies in-house—the test program must then be regularly checked to ensure it is delivering the testing objectives. “The

fastener manufacturer has commissioned the tests with specific aims in mind, and the test program should be carefully monitored to ensure these objectives are being met,” notes Schiff.

Close monitoring of a test strategy during implementation will also flag any issues. Schiff explains: “If the fastener or bolted joint is not performing according to specifications during the test process, then the fastener manufacturer needs to know as soon as possible so that remedial action can be taken. This might require further development of the fastener product, or, if the product is performing very differently from expectations, a more fundamental review may be required.” And not all abnormal test performance results are negative. The testing process may identify unexpected performance criteria which make the fastener product suitable for unexpected markets and applications. Significant product development breakthroughs can occur during the implementation of a testing strategy.

How to Interpret Your Test Results

The final and most crucial stage of the fastener product testing strategy is interpreting the test results. “Fastener manufacturers seeking to certify their products will be looking for a straightforward pass or fail according to the specific standard that the product is designed to meet,” says Schiff. “Greater insights can come from the results of ongoing testing during the product development process, particularly when a manufacturer is seeking to create a fastener with very specific performance characteristics.”

The test results must also be reproducible, which is a feature of standards such as the *DIN 25201*², which is widely used within the fastener sector to evaluate how a fastener and locking element in a bolted joint will behave under vibration conditions. “There is an added cost associated with re-testing. However, the return on the investment in testing as a result of being able to demonstrate the fastener product’s performance characteristics are consistent provides customers within downstream OEMs with confidence and reassurance in the fastener product’s safety and quality.”

Schiff concludes: “Fastener manufacturers that create and implement a testing strategy for their products, whether it is implemented in-house or using a test laboratory partner, can demonstrate that their products meet demanding international standards. This can also create a source of competitive advantage that helps combat the threat of low cost market entrants that are competing on the basis of cost, and are unable or unwilling to develop and implement their own testing programs.”

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References:

¹ *British Standards Institute (BSI). Benefits of Product Testing. [Online]. Available from <http://www.bsiamerica.com/en-us/Product-Testing/Benefits-of-Testing/> [Accessed 7 May 2013].*

² *DIN 25201-4: 2010-03 Annex B Test specification for demonstrating the resistance to self-loosening of secured bolted joints, Deutsches Institut für Normung c.V., Berlin 2010*

The Benefits of a Test Strategy

The **British Standards Institute (BSI)** has identified the benefits of product testing as¹:

- **Market Access:** enabling fastener manufacturers to enter new, and potentially highly regulated markets
- **Market Development:** allowing ongoing product development to increase fastener product penetration of existing markets
- **Speed to Market:** certification can allow a fastener product manufacturer to enter new markets and to quickly gain traction and acceptance for a new product
- **Risk Management:** minimizing “risks and liabilities”, by ensuring that fastener products are verified as compliant
- **Product Differentiation:** providing fastener manufacturers with a stream of new products that have been tested to prove performance criteria in specific applications
- **Managed Compliance:** ensuring that testing lies at the heart of the fastener product development process, with compliance built into new product development
- **Competitive Edge:** providing fastener makers with a source of competitive advantage, particularly against new low-cost market entrants with less rigorous testing strategies
- **Customer Confidence:** reassuring downstream OEM customers that fastener products conform to specific international standards.

About the Contributor...

Vibrationmaster designs and manufactures advanced testing technology and delivers specialized test services. Our products include Junker Test machines to analyze and demonstrate the self-loosening behavior of fasteners and bolted joints to *DIN 65151* and the new *DIN 25201*. With a head office and R&D function in Luxembourg and advanced manufacturing facilities in Denmark and India, we operate globally. Our customers span the commercial, academic, research, public, government and not-for-profit sectors. We offer highly reliable test solutions to organizations seeking innovative, market-proven and cost-effective technology to test and prove the reliability, consistency and safety of their products. www.vibrationmaster.com