When a problem arises, the need for specialist skills and resources becomes paramount.

Background to our Test and Consultancy Services

Bolt Science was created with the intention of becoming the recognized worldwide quality provider of independent technical expertise in bolted joint technology.
Bolt Science’s reputation for high quality software products, support and service in the field of bolting technology is reflected in our client list, who include:


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**Consulting**

Bolt Science can assist you in the resolution of structural integrity problems relating to joints containing threaded and other types of fasteners.

Problems can often be solved more effectively with assistance from an outside organization offering a fresh and unbiased view combined with extensive experience of solving similar problems across a range of industries.

We have an extensive library of technical resources including technical reports, articles, research studies and standards on bolting related topics, all of which are indexed.

By having extensively researched the subject and by keeping up to date with the published literature, we can offer state of the art solutions to your fastener and bolting problems.

Our analysis services include:

- Resolution of product service and in-field problems that have fastener related issues.
- Fastener Failure Analysis (fatigue, tensile fracture, thread stripping)
- Determination of forces acting on the fasteners within a joint.
- Torque Tightening Analysis.
- Gasket Leakage Problems.
- Fastener size and strength requirement determination.

We can also assist with:

- Fastener loosening problems.
- Fastener design problems.

We pride ourselves on communicating the resulting analysis and opinions in a concise and easy to understand manner. If you have a problem that you think that we may be able to assist you with, why not contact us for a no fee, initial consultation.

Our approach is analytically based and whenever it is feasible, we quantify the issues we discuss.

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Test Services

Bolt Science can perform a range of tests on fasteners and bolted joints to assist organizations in problem resolution, our test capabilities include:

**Torque-Tension Tests**

Determination of the torque-tension relationship for a threaded fastener allowing the appropriate tightening torque to be determined. Such tests will allow the nut factor (sometimes referred to as the torque coefficient or k factor) to be determined and the overall coefficient of friction. By completing several similar tests, the variation in the torque-tension relationship, due to friction variation, can be established for an application.

**Fastener Friction Tests**

Test fasteners can be set into a test rig to allow the thread and head friction torques to be determined. From these results the thread and nut face friction coefficients can be determined. These values are of importance to allow an assessment of what effect various joint surfaces can have on the bolt torque-preload relationship. Such tests can be completed, for example, to assess the effect that introduction of new fastener finishes will have on a joint performance.
Fastener Failure Tests

Tests can be performed by tightening the fastener to failure. This can be completed on actual assemblies and/or test fixtures to allow torque-angle-force characteristics to be established. From this information torque-angle tightening specifications can be derived, allowing accurate controlled tightening to be completed. Such tests can also be used to determine what is the maximum preload that an assembly will sustain.

Torque-Angle and Torque to Yield Tests

Tests can be performed on actual assemblies to obtain torque-angle graphs that can be used to establish the torque needed to reach the yield strength of the bolt. Such graphs can be used to establish the appropriate torque-angle specification.

Torque-angle test information can also be used, with analysis software such as our BOLTCALC program, to assist in assessing the structural integrity of an assembly. The advantage of measuring the applied torque and angle of rotation of the fastener, is that tests on the actual joint can be completed without having to change the joint stiffness by introducing a load cell.

Torque-angle and bolt preload-angle test information can also be used to establish the onset of thread stripping and joint compression failure. Measuring the angle of turn of the bolt/nut is an indirect way of measuring bolt extension/joint deformation. This can be used to advantage in many joint measurement applications.

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Vibration Loosening Characteristics of Threaded Fasteners

Practically every engineering product with any degree of complexity uses threaded fasteners. A key advantage of threaded fasteners over the majority of other joining methods is that they can be dis-assembled and re-used. This feature is often the reason why threaded fasteners are used in preference to other joining methods and they often play a vital role in maintaining a product’s structural integrity. However, they are also a significant source of problems in machinery and other assemblies. The reasons for such problems are due, in part, to them unintentionally self-loosening.

Fasteners coming loose is a common problem across many industries. We can complete an assessment of a fastener’s self loosening characteristics using a transverse vibration test machine (often referred to as a Junker machine). The fastener preload decay graphs produced can allow an assessment to be made of a fastener’s resistance to self-loosening.

By combining our test and analysis resources together with our extensive experience in solving fastener and joint problems we provide a unique service.

We strive for excellence, therefore we are committed to providing our clients with the best professional service available in this field.