Gloucestershire, UK. Wednesday, 13th June 2108: In this article, Rockatek director James Crowley looks at the importance of mechanical testing, its benefits and how his company has become an important part of its customer's development strategy.

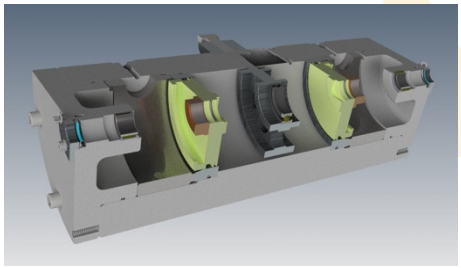
Mechanical testing can often be deemed as unnecessary, costly and time consuming and, in today's world of vast computer modelling and simulation power, it can be hard to argue against this. To cut costs, companies may decide to reduce time and budget spent on testing. However, unanticipated failures of in-service products will have far greater cost and time implications.

Test verification is a vital part of any engineering design and, in some sectors – and depending on the product and its application – it is often a mandatory requirement. But in all sectors and prior to release to production and service, it is a critical part of the design and manufacture process.

Some of the key benefits of physical test verification include the characterisation of material properties, validation/confirmation of product function, validation of computer (FEA) simulations, provision of empirical data to refine and improve simulations, proof of iterative product improvement and clear, visible evidence of product integrity to clients.

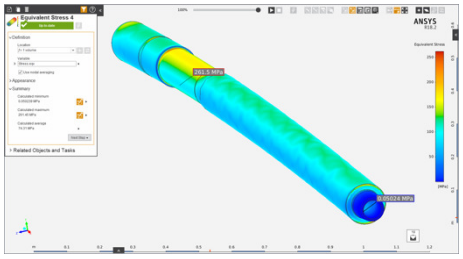
So, is testing worth the investment? A significant amount of product testing requires specialist or bespoke equipment and skilled engineers to design the test, its equipment and to accurately analyse the results; and this upfront investment for companies can be off putting. However, using a dedicated test house can provide a cost-effective option for companies looking for a professionally-executed, reliable and accurate test program.

At the heart of Rockatek's core offering is an ability to 'Engineer Value' for its clients, to optimise their products and develop new technologies. The company is working with several clients to refine their existing products and extract every bit of value; whether that be making the product more reliable, or increase the product's operational capability. Both ultimately improve the client's bottom line on the return from its products and services.

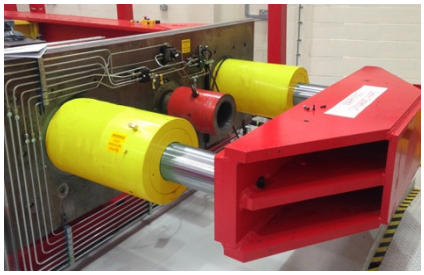


Rockatek's 'Integrated Engineering' approach to design, analysis and testing offers clients a complete service. Based on the client's design specification and brief, Rockatek can deal with every aspect of an engineering project.

Rockatek's expertise is often utilised by its clients to fix products that are unreliable, break or fail, or sometimes are just not capable of functioning how they should. Where a completely new design is not feasible, Rockatek can often work within the confines of the original product but, when required, can develop completely new designs from a blank piece of paper to full working prototypes. Both scenarios often benefit from mechanical testing to demonstrate how the improved or new product performs when subjected to the conditions it must operate in.



While its own analysis and computer modelling usually confirms what the outcome of a test will be, testing in a controlled laboratory environment to prove functionality is not only cost effective, but often a real eye opener to the client. And you simply cannot beat the impact of seeing the product working in a real load condition rather than just as a 3D model or an assembly on screen.



One of Rockatek's key test rigs is the Large Scale Combined Load Test Rig, which is capable of testing combined loading conditions of tension/compression, torsion and bending. At 18m long and 1.1m wide between uprights, the test rig was originally designed to test full scale downhole tools – specifically drilling tools – for the oil and gas sector, with the rig capable of subjecting the tools to the conditions seen downhole. As those in this sector know all too well, the loads are severe and can render large and robust mechanical tools useless and badly broken in very short times.

A summary of the test rig capability is given below.

- **Tension / compression load capability** – 20kN to 10MN
- **Bending load capability** – 120 kN at multiple locations
- **Torque capability** – Fully reversed torque up to 120kNm
- **Power capability** – 50kW electrical motor or 400kW hydraulic power

There are few test rigs available with this level of capability anywhere in the world. And for Rockatek to have this capability in-house is a huge asset to the company, with them seeing enquiries to use the test rig from major companies all around the world and in various sectors, including aerospace, O&G, industrial and motorsport. In fact, a recent enquiry came from Cougar Drilling Solutions in Edmonton, Canada.

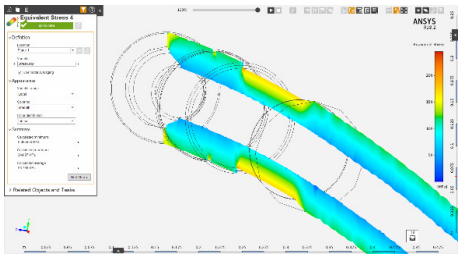
COUGAR
DRILLING SOLUTIONS

Cougar Drilling Solutions design, manufacture and deliver downhole drilling tools, services and solutions to oil companies around the world. They are dedicated to delivering creative solutions and improving existing products to meet the ever-evolving demands of the drilling industry.

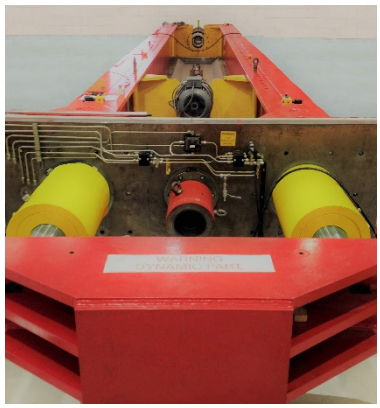
Commenting for Cougar Drilling Solutions, engineering director Dan Marson explains that Rockatek is fast becoming a crucial part of Cougar's development strategy. "A current project is critical to our business plan and strategy for 2018/19 and we are trying to develop and optimise a core product to meet an increased capability requirement for some of our key customers in the Middle East.

In doing so, we are developing new technologies to meet the client's demands and a key part of this is to demonstrate first-hand that the equipment is designed correctly and mechanically up to the job. In layman's terms, it's not going to fall apart or fail whilst under load downhole.

“In our industry, downhole failures are the worst possible outcome and the associated lost time and cost is huge. If we can demonstrate to our client first hand that the product is capable of operating under the conditions it will experience downhole, with physical testing that they can witness in person, their confidence level in the product rises massively and we increase our chance of securing the lucrative contract.” says Dan.



He goes on to say that the complete and integrated consultancy service that Rockatek can offer really ticks all the boxes. “They investigate the problem with detailed mathematical and computer analysis, design suitable solutions and develop the technology with excellent engineering principles at the core of everything they do.



But the real bonus here is their ability to carry out tests of this nature with their own in-house equipment to verify analysis and to demonstrate first-hand the way the products will function and survive under the extreme loads products in our industry are subjected to every day.”

Replicating the loading conditions seen in the downhole environment in a controlled laboratory environment is extremely challenging. Many have tried, and the reality is many have also failed because the equipment required is complex, expensive and requires expert engineers to operate and utilise it correctly.

“Rockatek has this capability and, as director of Global Engineering for Cougar DS, it is my responsibility to execute this project. And having spent many weeks looking at other options for the test, I could not find any other company capable of executing this test in the way Rockatek is able, from a technical, price and lead time perspective.”

To satisfy Cougar’s test requirements, Rockatek submitted formal proposals, which have been accepted with the project now underway. The company is currently commissioning the test rig, manufacturing test specific components required for the test, writing risk assessments and method statements for the test plan and preparing to begin the test in July 2018.

Preparation for a test of this nature is key to a successful outcome. The test will be executed to a set plan, results will be logged with data acquisition equipment and final test reports will be generated and supplied to Cougar DS within one week of test completion.

Rockatek design, analyse and test products to optimise capability and add value to its client’s technology portfolio. They are committed to becoming a leading engineering consultancy in both the UK and beyond, especially in the O&G sector and specifically with design, development and optimisation of downhole tools.

About Rockatek

Cheltenham-based Rockatek Ltd is an engineering consultancy that offers design, analysis and physical testing services that set it apart from others. Its directors have over 40 years' experience in complex engineering product optimisation and development; and its engineers specialise in engineering solutions for harsh environments and value improving reliability and performance.

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