

Electronics

TSC Inspection Systems

Solid Edge helps deliver dramatic improvements in speed and productivity, resulting in a 40 percent increase in sales two years running

Product

Solid Edge

Business challenges

Prove that results delivered are far more reliable than from any other technology

Ensure test probes fit into restricted spaces, such as acute tube intersections called saddle welds

Meet and exceed clients' inspection schedules and deadlines

Keys to success

Implement Solid Edge, which is consistent with the company's own advanced technology

Use synchronous technology to import a customer's model and edit without needing to recreate model history

Results

Immediately identified accurate electronic mark-ups of any defects detected during actual inspection process

Eliminated remodeling of customer's saved models

Using Siemens PLM Software technology, company achieves 95 percent compliance across industry/company standards, procedures and rules required for saddle welds

Using Solid Edge to pursue new frontiers

TSC Inspection Systems (TSC) is a world-leading company and the pioneer of Alternating Current Field Measurement (ACFM®) – an electromagnetic technique for detecting and sizing surface-breaking defects in metal. The ACFM method is typically used in the oil and gas industry, but its practice can easily be applied to other sectors, such as rail, nuclear power, defense and infrastructure.

As the founder of ACFM technology, TSC remains the sole supplier of ACFM equipment, producing, selling and supporting all products from its United Kingdom (UK) head office. This encompasses everything from the design and manufacture of the instrument systems and probes to writing the computer software used to analyze the data gathered from an inspection. TSC also models the inspection regimes. Recently, TSC started offering clients a fully inclusive onsite inspection service using its own highly skilled engineers.

"The failure of a metallic component or structure through defects can be catastrophic for human life, for the environment and for business," notes Alan Wilson, chairman of TSC. "When we have

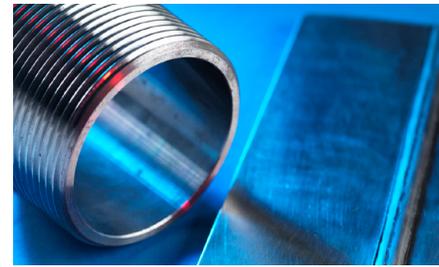
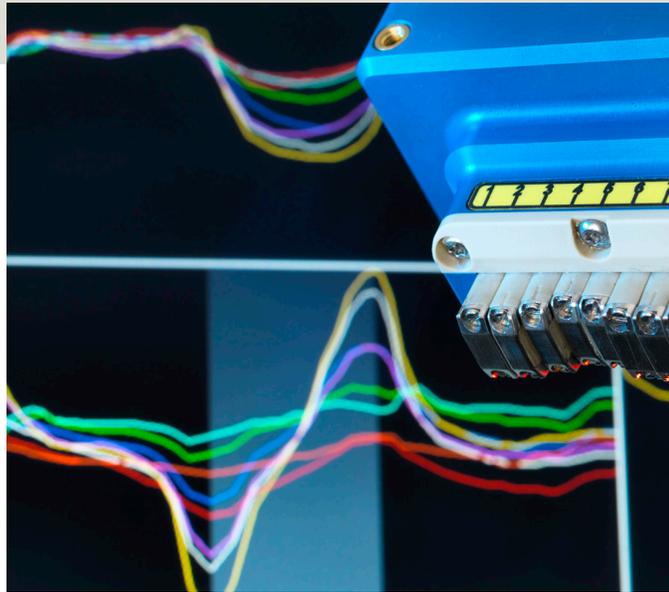


Results *(continued)*

Achieved 95 percent compliance across standards, procedures and rules required for saddle welds

Dramatic reduction in time needed for inspections, including in one case reducing the overall process from 4 weeks to 6 days

40 percent increase in sales over 2 consecutive years



“I sat there and watched as their application engineer modeled up a couple of tubes and welds. Within 20 minutes, he had already done 80 percent of what I needed, so we immediately acquired licenses and implemented Solid Edge.”

Dylan Osborn
Senior Design Engineer
TSC Inspection Systems

schedules and deadlines to meet, we can't afford to spend time with a CAD (computer-aided design) package that just can't deliver.”

Space age technology – underwater

As structures such as bridges, oil rigs and pipelines age, they are battered by wind, waves and other environmental conditions. As a result, small cracks develop on the surface and work their way into the steel structure until eventually the defect causes structural failure. ACFM is based on the monitoring of an electromagnetic field. When applied to metallic components and structures, changes to the field signals indicate the presence of defects, which are subsequently analyzed using an advanced mathematical technique. As the ACFM technique is non-destructive and since there is no electrical contact with the

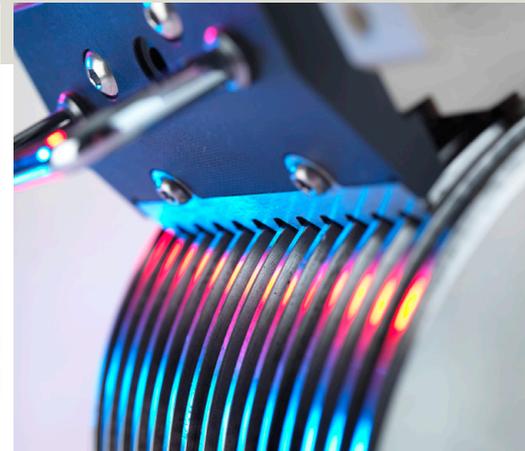
structure being inspected, the technique is particularly valuable in subsea applications for the oil and gas industry.

Independent testing has shown that ACFM can find defects through surface coating better than any other traditional technology on the market. For more than 20 years, ACFM has been accepted, proven and certified by such authorities as Lloyd's Register, Det Norske Veritas and ABS.

“The probes we make induce into the component an electromagnetic field, which can find surface-breaking cracks,” Wilson explains. “We can even determine the length and depth of the crack. Alternative technologies can give 50 percent or more spurious readings. If you are paying over \$100,000-a-day for a diving boat and diver, you won't want to spend time under

“If I had to do all that in our previous CAD software, I'd probably be looking at four weeks of work. Using Solid Edge, it took just six days.”

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Senior Design Engineer
TSC Inspection Systems



water finding defects that don't exist. The probability of our technology indicating a defect when there isn't one is very much lower than other technologies."

World-leading ACFM technology enhanced with Solid Edge

In today's competitive environment, Wilson strongly advocates the need for companies such as TSC to be able to meet and even exceed high client expectations. "One of our challenges is to convince the customer to convert to our technique by proving that the results we deliver are far more reliable than they are from any other technology," says Wilson. "Part of this is in showing that everything we do is about being at the forefront of technological advancement. As a brand, we aspire to NASA-like qualities and aren't afraid of pursuing new frontiers. To this end, we must be seen using CAD technology that is congruent with our world-leading technology, so that customers can continue to have complete confidence in us. That is why we use Solid Edge."

3D geometry is the key

Dylan Osborn is a graduate design engineer with more than 20 years of engineering design experience in the military and civil sectors. He has been at TSC for 15 years and has used a wide range of CAD software. "The 3D geometry of what we are designing here is key," notes Osborn. "We are generally inspecting subsea

structures that were designed maybe 30 years ago, so our customers usually have only 2D drawings. As a result we usually have to use CAD to model the structure we are to inspect, to ensure that our probes fit into any restricted spaces such as acute tube intersections."

One common configuration is where two tubular parts, with different diameters and wall thickness, intersect at different angles, generating a unique weld geometry called a saddle weld. Osborn recalls, "Our initial move to 3D some years ago was a huge step for the company, and the 3D CAD software we used could model these weld caps. However, to generate just one saddle weld took about six to seven hours to work out, then it took maybe four hours per weld after that. When you consider there are hundreds of welds in a typical subsea structure, you can see how long it was taking."

Looking to update to a new version of the existing CAD software, Osborn thought there might be an alternative. He visited Majenta PLM, a Siemens PLM Software solution provider and the only Platinum Partner within the UK, and asked them to generate a saddle weld. "I sat there and watched as their application engineer modeled up a couple of tubes and welds," says Osborn. "Within 20 minutes, he had already done 80 percent of what I needed, so we immediately acquired licenses and implemented Solid Edge."

"One of our challenges is in convincing the customer to convert to our technique by proving that the results we deliver are far more reliable from us than they are from any other technology. Part of this is in showing that everything we do is about being at the forefront of technological advancement. As a brand we aspire to NASA-like qualities and we aren't afraid of pursuing new frontiers. To this end, we must be seen using CAD technology that is congruent with our world-leading technology so that customers can continue to have complete confidence in us. That is why we use Solid Edge."

Alan Wilson
Chairman
TSC Inspection Systems

Over 95 percent compliance achieved

So does Solid Edge® software live up to its promise? “There are industry and company standards, procedures and rules to follow when making the saddle welds in the fabrication yard,” says Osborn. “Solid Edge allows me to use those rules to achieve over 95 percent compliance, which is fantastic. This is important because we then have to put our probes on these welds. If you’ve ever tried to control an ROV (remotely operated vehicle) at depth, you’ll know it’s not easy. Being able to model the limited spaces we have to get our probes into and being able to generate the fillets accurately is key.”

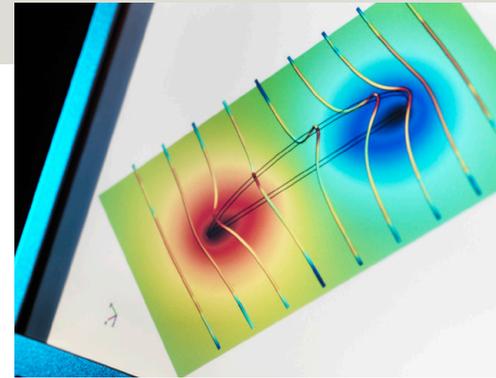
To illustrate the value of Solid Edge to the business, Osborn talks about a recent project using its prior approach: “We had to generate five subsea structures, fully modeled. From those five different structures, we had to pull out 73 junctions where the brace tubes intersect with the main legs. We then had to model every one of the saddle welds to be inspected by our probes. Each junction has its own identifier, platform name, depth and so on. I

then had to cut out all the sections required, and put those into a reference document for the engineers to take to the site. The downside of this is that any defects found during the inspection had to be re-drawn by the engineer post-inspection, which meant precision could be compromised.

“However, using Solid Edge, I can provide the inspector with multiple 3D PDFs of the structure that allow immediate and accurate electronic markup of any defects detected during the actual inspection process. Now, no more drawing while bobbing around on a dive boat trying to remember where you are in the sequence. If I had to do all that in our previous CAD software, I’d probably be looking at four weeks of work. Using Solid Edge, it took just six days.”

Huge impact of synchronous modeling

Osborn recalls, “Some of our customers provide us with model and part files from other CAD packages. With our previous CAD software, we could not easily edit an imported model, so I’d have to spend a day



Over the last two years, TSC has developed from a pure product design and manufacturing business to a services company, and as a result has experienced exceptional growth with sales amassing around 40 percent year-over-year. Management credits Solid Edge as a critical part of this improvement.



Solutions/Services

Solid Edge
www.siemens.com/solidedge

Customer’s primary business

TSC develops and manufactures non-destructive testing and stress measurement instrumentation typically used in the oil and gas industry, but its practice can easily be applied to other sectors such as the rail, nuclear power, defense and infrastructure segments. TSC is the pioneer of Alternating Current Field Measurement, or ACFM®, an electromagnetic technique for detecting and sizing surface-breaking cracks in metal.
www.tscis.com

Customer location

Milton Keynes
United Kingdom

Partner

Majenta PLM

or two on remodeling. However, synchronous modeling changed my whole way of thinking. I can import a customer’s model and edit it without needing to re-create the model history. Being able to work on the customer’s model without having to do any remodeling saves us so much time.”

Osborn concludes, “We now provide equipment, expertise and live support in those cutting-edge applications where there is a lot of customization and, over the years, we’ve developed an extensive range of ACFM probes and ancillary equipment. If we need to further develop our legacy products, we just pull them into Solid Edge and use synchronous modeling. There is remodeling to do and no history tree to re-create. I can work on them immediately. This way, everything will move across in time. This is where Solid Edge is so important to the business.”

Solid Edge vital to TSC’s success

Over the last two years, TSC has developed from a pure product design and manufacturing business to a services company, and as a result has experienced exceptional growth with sales amassing around 40 percent year-over-year. While the primary focus remains on oil and gas, expansion into other industry sectors is anticipated. Wilson and Osborn agree that to sit down with a new customer, show them stunning models of the probes created using Solid Edge that TSC designed with the inspection regime proposed, along with the ability to rapidly change the design, will be vital in future endeavors.

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