

For the questions that won't go away

Where else but The Lab at Brookes Bell
for tailor-made forensic testing

Home of forensic investigations

 **The Lab**
at Brookes Bell



The truth is here

About The Lab

The home of world-class forensic analysis and investigative services, The Lab caters to businesses, organisations and institutions of all kinds across the marine, energy, and manufacturing industries worldwide.

Our team of expert scientists, analysts, consultants and other specialists are trusted by businesses large and small to carry out a range of investigations. That's thanks to our team's credentials and experience in disciplines as diverse as materials engineering, non-destructive testing, advanced non-destructive testing, inspection engineering and more.

This expert team is matched with cutting-edge testing technology including advanced digital

microscopy, eddy current array and pulsed eddy current array technology and more. We're continually investing in new technology too – to ensure we can provide you with the most accurate answers you are seeking.

Don't think our services are confined to our laboratory either. We are able to offer a wide range of on-site testing and analysis services, some of which can be carried out whilst assets are in operation, eliminating the need for downtime.



Materials Testing

The Lab’s failure investigations and materials testing services are there to help when incidents occur – to help you to find the answers you need to prevent the worst from happening again.

The Lab’s materials science experience

Our materials scientists are experienced in all aspects of failure investigation, including securing and documenting samples, laboratory analysis and forensic analyses to determine the cause of failures.

Aside from our team of highly experienced and expert materials testing professionals, The Lab is also kitted out with industry-leading technology and equipment enabling us to provide:

- Advanced digital microscopy (ADM)
- Scanning electron microscopy (SEM)
- Differential scanning calorimetry (DSC)
- Fourier transform infrared spectroscopy (FTIR)
- Laser induced breakdown spectroscopy (LIBS)

Choose The Lab and you can be assured that our recommendations and investigations use the very best equipment available.

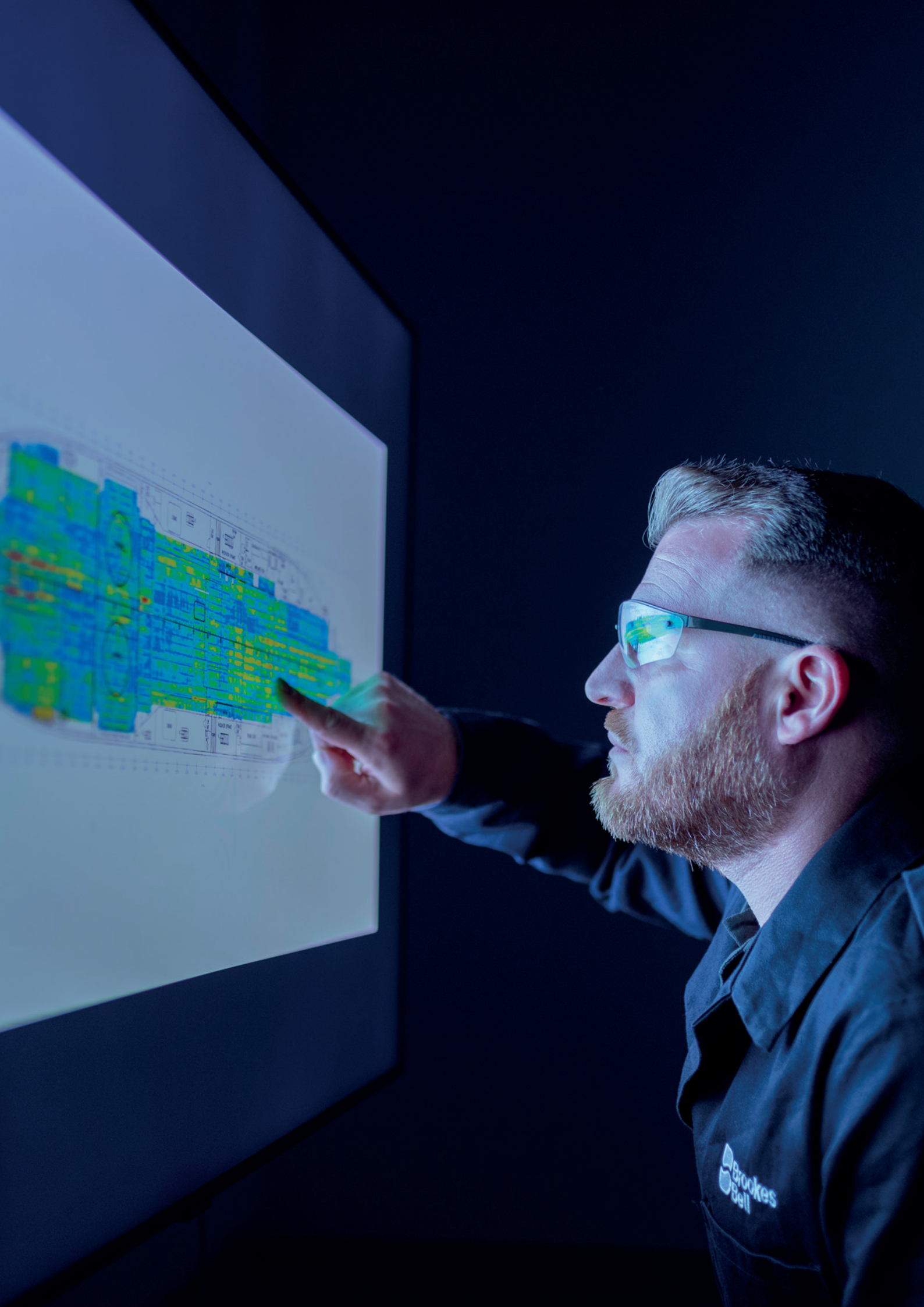
With this blend of expertise and technology at hand, The Lab is able to offer a very broad range of failure investigations and materials testing services.

No matter what industry you operate in – be it the maritime, energy, manufacturing, or fabrication industries – The Lab will have a service that covers your failure investigations and materials testing requirements.

The Lab’s materials testing and technical engineering capabilities

The range of advice and support we can provide includes:

- Materials testing
- Positive material identification (PMI) and mechanical testing
- Polymer testing
- Support for large-scale fabrication projects
- Quality and manufacturing disputes
- Technical consultancy in relation to weld repair and inspection techniques
- Corrosion analysis and advice on corrosion management
- Analysis of ferrous and non-ferrous metals, including rebar, steel coils, aluminium sheet/ingots and various finished products, as well as galvanised steel
- Assessment of the quality of raw materials and finished products and the effect of using contaminated/defective products in proven production processes
- Sample handling, preparation and sectioning
- Secure and professional storage
- Third party review and witness testing
- Paint and coatings analysis



Non-destructive Testing

When you need to inspect, test and evaluate a material, component or assembly without destroying its serviceability, then you'll want to make use of The Lab at Brookes Bell's metallurgical survey, inspection and non-destructive testing services – whether that's on-site or at our engineering facility.

The Lab brings together the world's finest state-of-the-art equipment and technologies with highly-experienced experts to provide the very best inspection and testing services in the industry.

Our highly-trained experts, using bespoke technology and proprietary software are well-versed in identifying anomalies, analysing the results and providing you with the information required to help identify issues before they happen saving costs and time in repairs and downtime.

Advanced non-destructive testing using electromagnetic and ultrasonic technologies

Today, businesses across multiple industries want inspections to yield greater levels of detail, data and information. Advanced non-destructive testing offers exactly that.

Using cutting edge electromagnetic and ultrasonic technologies, The Lab's non-destructive testing experts can provide the high resolution and high-quality data that asset owners and operators need when faced with making crucial decisions.

More specifically, inspection technologies such as eddy current arrays (ECA) and phased array ultrasonics (PAUT) feature greater coverage of the target area and fully recordable and robust datasets. Couple this with The Lab's ability to present these datasets in an unparalleled, intuitive and highly visual format, asset owners gain the clarity and confidence required to assess condition, manage risk and take decisive action.

– Weld testing methods.

Welding is one of the most common hot-work processes used in the maritime, energy and industrial sectors. But not all welding methods are suitable for all applications.

Our weld testing methods cover all aspects of surface and subsurface weld and joint fabrication testing and inspection.

– Heat Exchanger Inspections.

When you need to ensure the integrity of your heat exchangers and condenser tube bundles, The Lab at Brookes Bell can help with our full-lifecycle electromagnetic testing, inspection and analysis tools.

– Surface Inspection and Pitting.

Used to detect discontinuities such as cracks, stresses, corrosion and more, the best surface inspection technologies will provide a true picture of the real condition of your asset.

Here at The Lab, our electromagnetic surface inspection technologies are ideal for inspecting assets such as decking, superchargers and turbines, gears, pressure vessels, cargo tanks and tanktainers – whether that's direct to metal or through coatings.



Corrosion Analysis & Reporting for the Maritime Industry (CMAP)

Corrosion costs time and it costs money. In fact, the collective global cost of corrosion to shipowners has been estimated between \$50bn and \$80bn according to The Association for Materials Protection and Performance (AMPP).

For vessel owners and operators and those involved in the management or maintenance of vessels, corrosion presents a number of significant challenges, from compromised structural integrity and the consequential safety issues which can culminate in the need for expensive repairs. Added to this is the loss of earnings from vessel downtime.

However, there's an innovative new solution that will:

- Identify corrosion across all areas of a vessel - not just spot checks.
- Allow this corrosion data to be interpreted and understood in a visual format derived from a digital twin: a virtual representation of the ship enabling real-time monitoring, analysis and simulation.
- From there, a comprehensive understanding of the corrosion issues affecting the vessel can be attained, helping to identify critical areas requiring immediate attention and forecasting repair costs, prior to the vessel entering dry dock.

Our innovative corrosion mapping service (CMAP) service consists of a highly refined PECA inspection technique, the results of which are modelled in The Lab at Brookes Bell's 3D data visualisation software and then married to a visual dashboard that creates a CMAP global overview report highlighting the condition of a vessel's steel, the remaining wall thickness and material loss.

The Lab's CMAP service allows vessel owners to:

- Better understand the extent of corrosion present on their vessel.
- Accurately understand the required repairs.

- Develop an accurate understanding of the cost of repairs, and thus benefit from improved cost management.
- Better plan out required repairs, leading to less downtime.
- Ensure class compliance with Lloyd's Register through use of detailed CMAP analytical data.

Our PECA technology is arguably the most thorough corrosion mapping and detection solution on the market due to its ability to assess through myriad surfaces and thick coatings or coverings, such as:

- SynDeck, Camrex and hull fairing compounds.
- Wooden teak or composite Bolit-deck coverings.
- Ceramics.
- Antifouling and other cementitious screed and underlays.

It's also equally effective on steel surfaces and can penetrate steel through thin paint coatings.

The technology has been tested and honed on the Royal Navy's Type T23 frigate vessels, landing platform docks (LDPs), and on several Ro-Pax ferries and superyachts in the commercial sector. These ship types all exhibited the range of corrosion that continuously plagues vessel owners and operators around the world.

An accredited service

Based on accuracy of our reporting, The Lab's CMAP service has received accreditation from Lloyd's Register and is endorsed for the utilisation of PECA and CMAP on naval vessels and now the entire commercial and merchant fleets.



Paint and Coatings

The Lab at Brookes Bell offers expert advice on flake sampling and coating failure inspection. Using our modern inspection equipment, we can identify the key causes of coating breakdown in a sample.

Paint flake samples can be measured and examined using advanced digital microscopy. This includes documenting the profile of the top and bottom surfaces of the sample to identify contamination, inclusions and the presence of rust and scale. Powerful information can be obtained from microscopic samples, such as the degree of surface preparation used during the initial application of the paint.

A cross-section of the flakes examined shows the number of coats, colour and individual coating thicknesses. Voids, vacuoles and penetration of rust staining, if present, can also be seen.

The Lab's paint and coatings capabilities

We can respond to any investigative, analytical and troubleshooting enquiries, providing independent, accurate advice on:

- Root cause analysis of coating failures on yachts and ships, with specific areas including underwater hull, chemical tanks,

cargo holds, ballast tanks and grey water tanks

- Vessel inspections and surveys
- Maintenance and repair coating recommendations
- Technology advice
- Coating selection and specification
- Cleaning technologies (such as hull cleaning)
- Regulatory advice (such as BPR)

Further investigatory analysis of coating samples, including paint flake analysis, can be carried out in-house utilising our SEM and FTIR equipment.

Our state-of-the-art laboratory enables us to independently inspect, test and analyse your paint and coating samples, whether in The Lab or on your site. Our quick and efficient methodology saves you valuable resource on costly and time-consuming methods, where plating or panels need to be removed before inspection can take place.

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Materials testing / NDT and ANDT /
Corrosion analysis and reporting /
Paint and coatings

Marine / Energy /
Industrial / Manufacturing

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