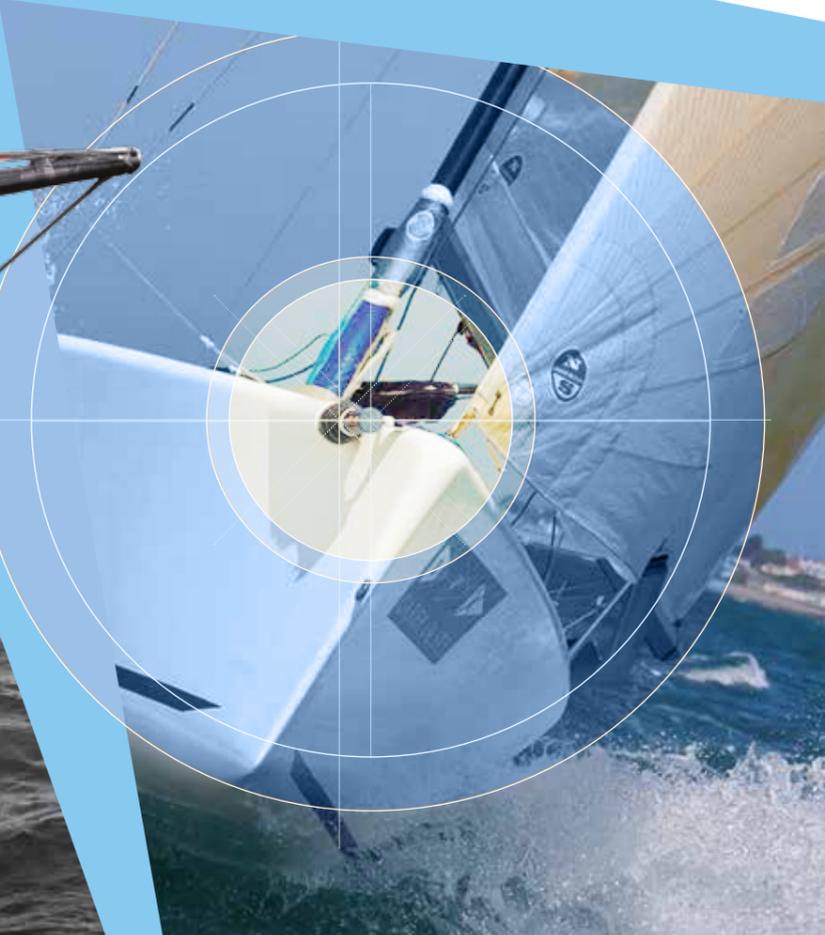
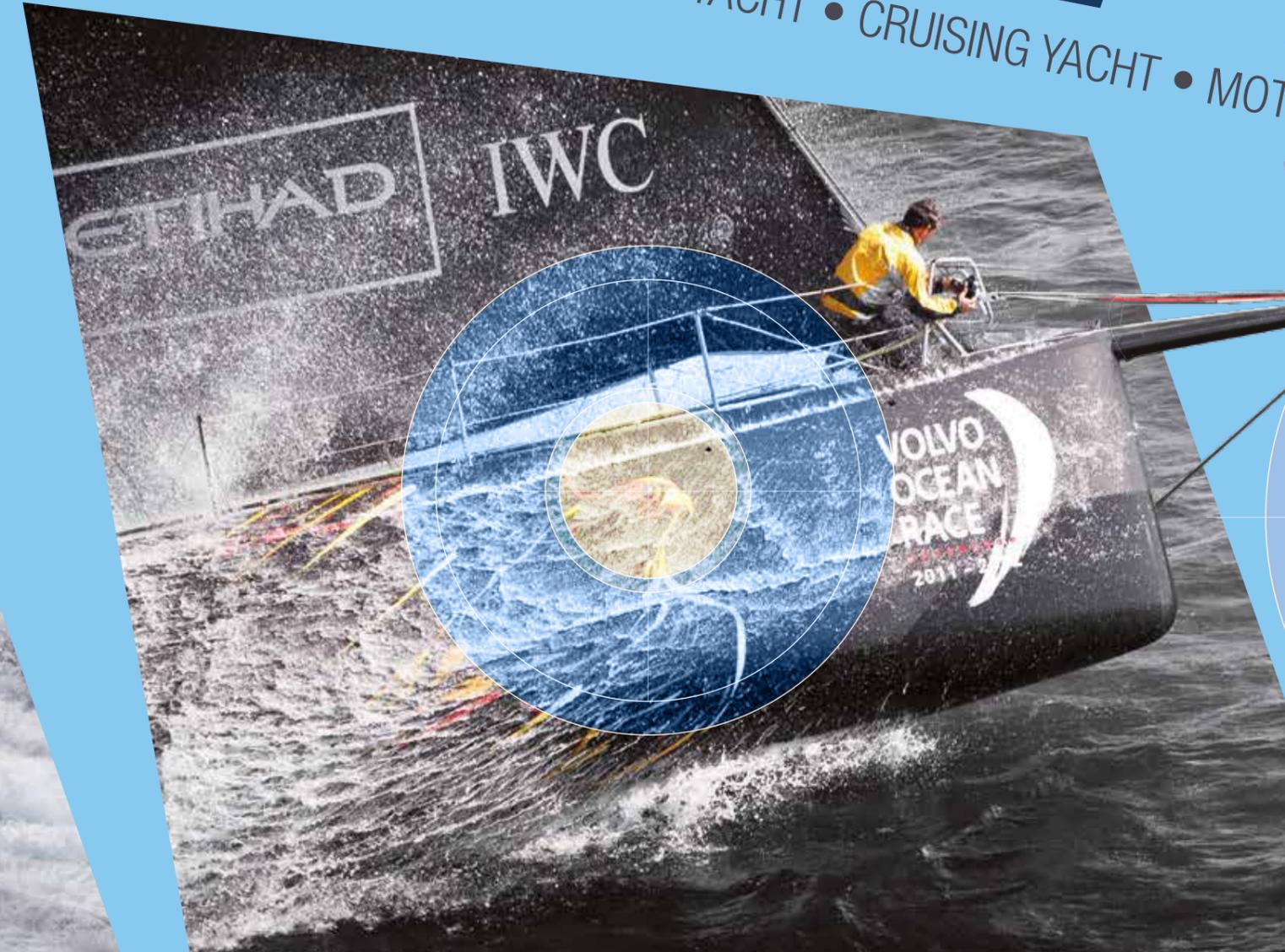


MARINE RESULTS LTD • 23 COMPASS POINT • ENSIGN WAY • HAMBLE • SOUTHAMPTON • SO31 4RA • UK
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SURVEY AND INSPECTION

SUPERYACHT • RACING YACHT • CRUISING YACHT • MOTOR YACHT



MARINE RESULTS OFFERS A WIDE RANGE OF CAPABILITIES IN THE FIELD OF SURVEY, TESTING AND INSPECTION SERVICES FOR ALL TYPES OF YACHTS ANYWHERE IN THE WORLD.

An advanced range of non-destructive testing (NDT) applications include dye penetrant testing and ultrasonic testing to detect internal flaws and cracks not visible to the naked eye. An in-house destructive testing machine evaluates breaking loads on running rigging and components to ensure safe working loads are specified.

Marine Results, through its numerous relationships with designers and manufacturers, can also provide technical services relating to NDT, including modelling, mechanical analysis, expert witness, in depth evaluation and interpretation of NDT results 'effect of defect'.

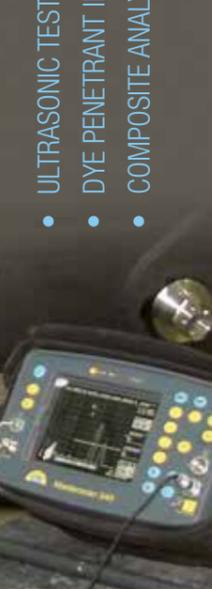
MARINE RESULTS HAS A STRONG TEAM OF EXPERTS FROM DIVERSE BACKGROUNDS INCLUDING AEROSPACE, BOATBUILDING, COMPOSITE CONSTRUCTION, RACE TEAM MANAGEMENT AND RIGGING.

The size and diverse skills of our workforce enable us to respond to a wide variety of yacht and rig damage and inspection issues, and at short notice in any part of the world.

INSPECTORS ARE TRAINED TO AEROSPACE INSPECTION STANDARD AND HOLD LEVEL 2 QUALIFICATIONS INCLUDING:

- **Ultrasound (metallic, welded component, pipe, plate and composites)**
- **Bond testing (cored laminates)**
- **Penetrant testing**

Inspection techniques and procedures have evolved in consultation with designers, manufacturers, race teams, insurers, the Maritime & Coastguard Agency and Germanischer Lloyd.



ULTRASONICS

A METHOD OF ULTRASONIC TESTING IS SELECTED DEPENDING ON THE NATURE OF THE MATERIALS TO BE TESTED AND THE LEVEL OF INSPECTION REQUIRED.

OUR EXPERIENCE AND DEPTH OF KNOWLEDGE IS COMPLEMENTED BY INVESTMENT IN TECHNOLOGY

Most composite monolithic cored laminates and metals can be inspected. Inspections are carried out in minute detail to aerospace grade flaw detection standards, to find a wide range of anomalies and defect types.

VOID DETECTION

Ultrasonic inspection can be used to detect voiding and porosity which can be a result of poor manufacturing or a problem during moulding and curing of the laminate.

IMPACT DAMAGE

Ultrasonics will detect the extent of the damaged area and evaluate the nature of the damage. This provides important data to the designer and manufacturer to decide on the repair needed.

SKIN TO CORE DELAMINATION

Usually detected using acoustic methods which 'listen' to the changes in the natural resonance of the structure caused by defects.

CRACK DETECTION

Cracking or delamination in composites tend to occur in layers parallel to the surface of the laminate, but cracks in metallics can occur in any orientation. Angle beam ultrasound methods detect cracks in complex areas constructed in steel, stainless and aluminium alloys.

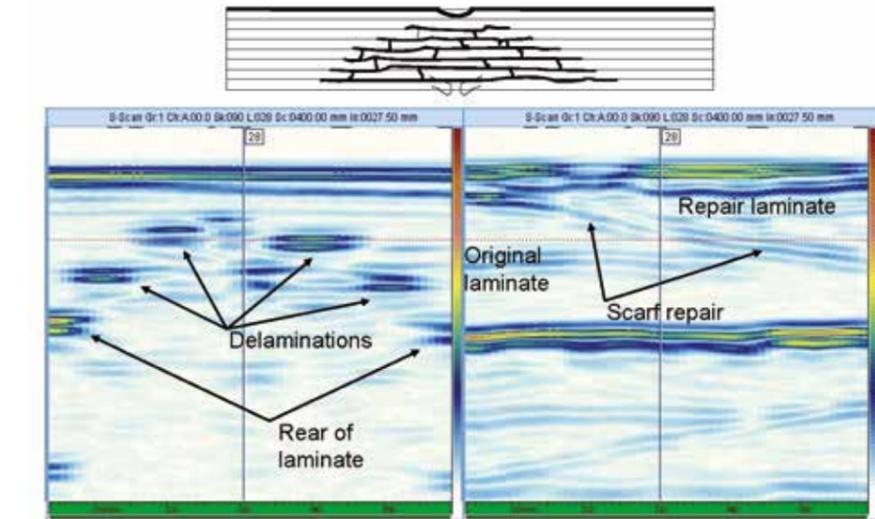
CUSTOM WHEEL PROBE

- Fast coverage for rapid results
- Scans a section of laminate of up to 128mm in width in a single pass
- Carbon and glass fibre monolithic laminates and a wide range of cored laminates
- Custom designed for Marine Results

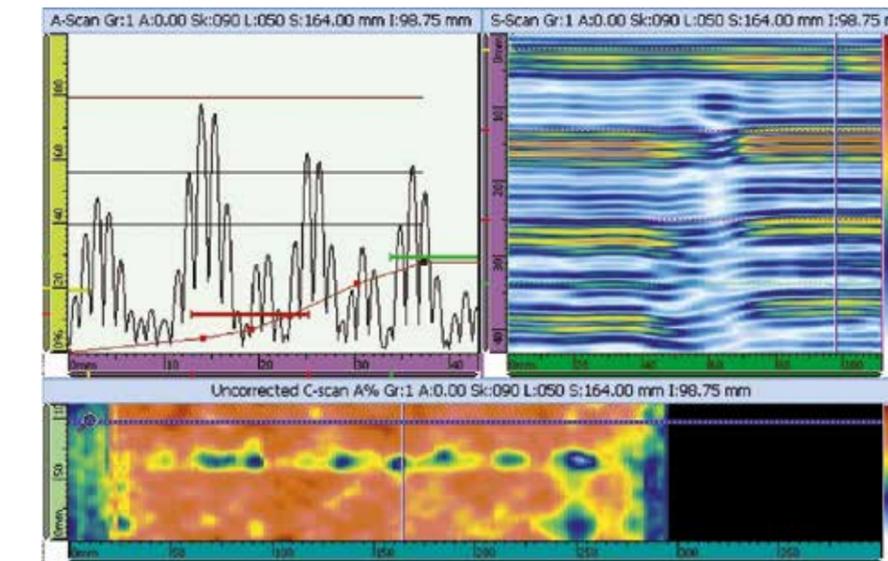
THE MARINE RESULTS CUSTOM WHEEL PROBE



CROSS SECTION (B-SCAN) IMPACT DAMAGE IMAGING



PLAN VIEW (C-SCAN) BRIDGING VOID IMAGING

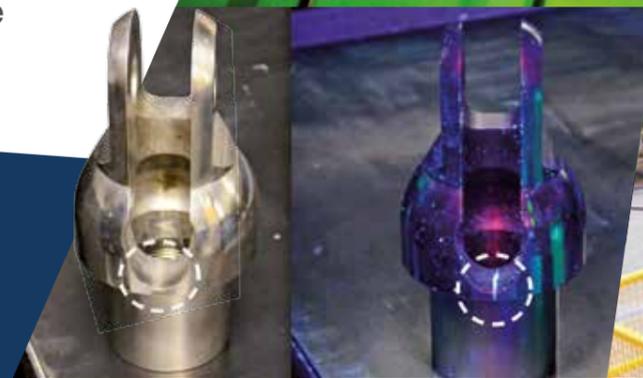


DYE PENETRANTS

PENETRANT INSPECTION DETECTS FLAWS THAT ARE OPEN TO THE SURFACE ON METALS, NON-POROUS AND OTHER SURFACES.

The Marine Results testing workshop is equipped to carry out fluorescent dye penetrant inspections, a more sensitive application than other on site techniques.

Two methods used by Marine Results are fluorescent water washable dye penetrant and visible red penetrant. The red penetrant method is suitable for using on site at the yacht's location.



TEST HOUSE

A 60 TONNE TEST MACHINE PUTS THE WORLD'S LARGEST SUPERYACHT RIG PRODUCTS TO THE ULTIMATE TEST.

The horizontal tensile testing machine enables rigging, spar and lifting equipment to be ultimately and accurately tested to ensure that the design and manufacturing specifications of equipment meet safe working loads.

- **Splices for rope and wire**
- **Hydraulic cylinders**
- **Jammer loads**
- **Tender lifting equipment**
- **Proof loading of safety equipment**

The machine is externally calibrated in accordance with ISO 7500-1:2004.



ACCIDENT/DAMAGE ASSESSMENT AND SURVEY

MARINE RESULTS HAS A SURVEY AND INSPECTION DIVISION TO HANDLE VESSEL DAMAGE ASSESSMENT.

Top marine insurance companies frequently instruct Marine Results to survey damaged vessels, establish the cause and advise the best route to conclusion. Our many years of experience are drawn from a comprehensive understanding of boat construction methods, as well as repair assessment and analysis.

We regularly carry out surveys in Europe, the Mediterranean, US, Caribbean and the rest of the world. Our damage surveys and inspections can include NDT (non-destructive testing) for hull, deck, internal structures, keel and other structural areas. We are also instructed as an independent surveyor if, following a repair, the vessel's owner is not satisfied with the results.

COMPOSITE ANALYSIS

AEROSPACE INSPECTION TECHNIQUES AND PROCEDURES ARE USED FOR ANALYSIS OF MATERIALS.

Testing can be carried out on request to establish the mechanical properties of materials. The results can be used for better understanding of material quality and failure analysis.

PRE-PURCHASE SURVEY

PRE-PURCHASE SURVEYS ARE A VITAL AND ESSENTIAL PART OF THE DECISION-MAKING PROCESS INVOLVED IN BUYING ANY YACHT.

Marine Results are reputable marine surveyors recommended by yacht brokers. Pre-purchase surveys are undertaken on a wide range of sail or power craft. A comprehensive survey can assist a buyer in making that all-important decision whether to buy a particular vessel. A survey will thoroughly evaluate the vessel's sailing systems. When conditions permit, the inspection includes operational testing of all equipment at sea.