CASE STUDY

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X-MET8000 Optimum

OBJECTIVES

- Investigation and characterisation of materials.
- Determine conservation strategies.
- Damage prevention and remediation.

RESULTS

- Bypass external testing sources.
- Rapid on-site analysis of artefacts.
- Catalogue of objects recovered within the Mary Rose ship.

Securing the future of the Mary Rose Trust's unique collection

The Mary Rose Trust was formed in 1979. It's responsible for conserving and displaying the Mary Rose hull and her artefacts for current and future generations. The Mary Rose is a Tudor war ship that was built in 1510 at the request of King Henry VIII. She was in service for 34 years, taking part in the First French war (1512-1514), the Second French war (1525-1542), and the Third French war (1543-1546), during which she eventually sank. Hundreds of men aboard the Mary Rose drowned as she went down, with only around 35 survivors. Her wreck was rediscovered in 1971, and after years of planning, preparation and excavation, she was finally raised in 1982. Following meticulous stages of conservation, her hull is now displayed in the Mary Rose Museum, in Portsmouth Historic Dockyard in the UK.

Though over 19,000 artefacts were recovered in relatively good condition, excavation and subsequent exposure to air threaten their stability, making it essential to develop conservation treatments. The Mary Rose collection includes a variety of artefacts made of inorganic (e.g. coins, guns, chain mail, pewter bowls) and organic (e.g. wood, fabric) materials. In order to develop successful conservation strategies, understanding the original material, any degradation products and how conservation materials react over time is critical.

> **"XRF technique is ideal for testing of items of historical value. The X-MET allows for fast and reliable elemental data in-situ."**

Dr Eleanor Schofield, Head of Conservation and Collections Care at the Mary Rose Trust, uses Hitachi High-Tech Analytical Science's X-MET8000 Optimum handheld X-ray fluorescence (XRF) analyser on a regular basis in the investigation and characterisation of materials in the Mary Rose's collection.

X-MET8000 is used to help identify objects from different eras. Because the ship was sunk close to the coast of England in what subsequently became a major shipping route for passenger, freight and military vessels, many objects amassed at the bottom of the sea in that area over the years. The X-MET can identify materials and contaminants, and help establish which objects were not manufactured in the Mary Rose era.

DETERMINING CONSERVATION STRATEGIES

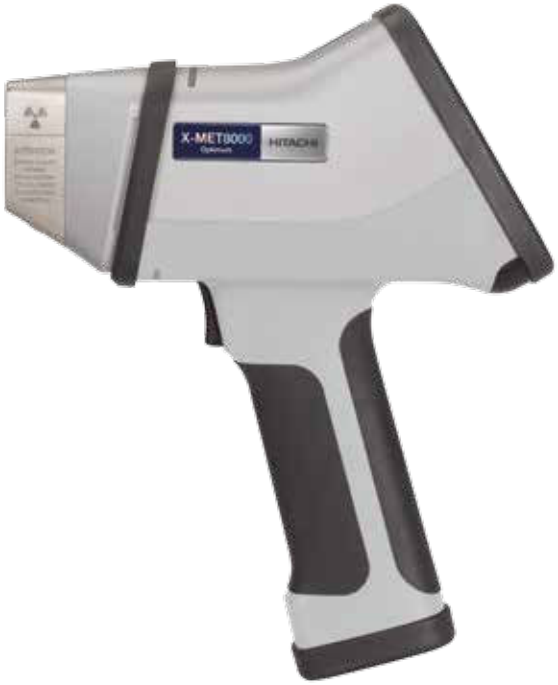
Polyethlene Glycol (PEG) is a water soluble compound commonly used in the preservation of waterlogged wood. However, if iron and sulfur (often accumulating in the wood while under water for long periods of time) are present in the wood, and the wood is exposed to oxygen and humidity, sulfuric acid is likely to form and damage the wood further. PEG will not protect against this effect. The X-MET allows quick determination of the presence of iron and sulfur, so that damage can be prevented or remediated by applying suitable treatments. Often treatments are costly and lengthy; therefore it is critical to only proceed with them when strictly necessary.

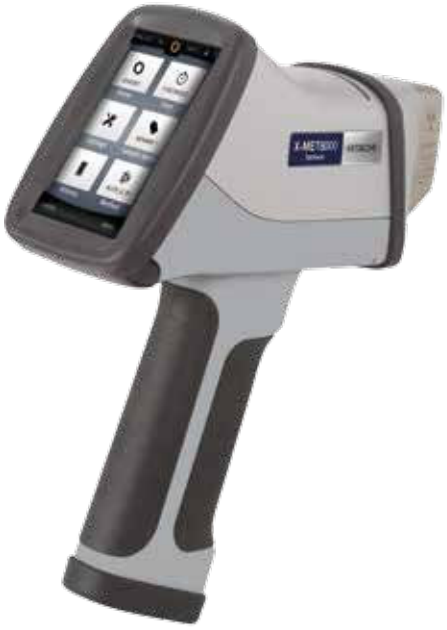
ANALYSING AND CHARACTERISING ARTIFACTS

The Mary Rose Trust's conservation department uses a variety of techniques to analyse and characterise the ship's artefacts. As XRF is a non-destructive technique, it is ideal for the testing of items of historical value.

Dr Schofield said: "The X-MET allows us to obtain fast and reliable elemental data in-situ e.g. in large stores and display cases. The only way to perform these tests previously would have been to take the entire object to a testing facility. With very large objects this was very difficult and costly and sometimes not possible. Alternatively, samples would be taken, which is not always feasible with precious artefacts."

Having the analyser on-site also removes the need to source external help and helps to secure the future of the Mary Rose Trust's unique collection.





If you would like to see the X-MET8000 analyser in action visit www.hitachi-hightech.com/hha or book a demo.

X-MET8000 SERIES

Our range of handheld XRF analysers, the X-MET8000 series, delivers the speed and performance required even in the most demanding applications. Suitable for all analysis needs from scrap metal analysis, precious metals and jewellery analysis to positive material identification (PMI) for inspection and manufacturing applications, and regulatory compliance screening.