Corrosion protection coatings

Surface with a smile

A new series of instruments has been developed specifically to meet the demands of testing protective coatings for porosity, cracks and other openings that could cause corrosion

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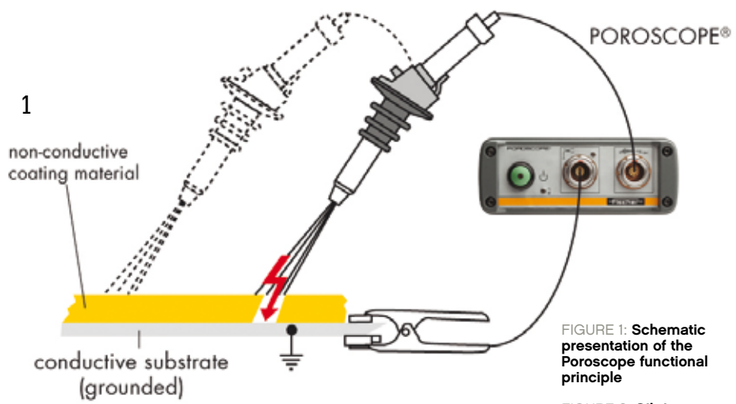

FIGURE 1: **Schematic presentation of the Poroscope functional principle**

FIGURE 2: **Oil rigs need protection from rugged environmental influences**

MARINE MAINTENANCE WORLD EXPO 2013
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FIGURE 3: **The protective coatings on shipping vessels, cranes and containers must be checked regularly for damage and gaps through which corrosive sea water could enter**

FIGURE4: **Porosity testing instrument Poroscope HV40**

FIGURE 5: **Fischer's porosity-testing electrodes cover a wide variety of applications and surface geometries, making measuring more effective and efficient**

Germany-based company Helmut Fischer has developed the Poroscope series of instruments – devices that are colloquially referred to as 'holiday detectors'. The principle uses a high voltage (HV) source connected to an electrode that is guided across the surface to be tested. Every gap the electrode encounters results in a sudden voltage drop, which is signaled both optically and acoustically.

Three different models with varying voltage levels are available, depending on the requirements at hand: voltage values on the different models can be set in ranges of 0.8-5kV, 4-20kV and 8-40kV, respectively. This allows for covering applications from thin films to coatings with thicknesses of several millimeters. Because they have been built according to the highest safety and engineering standards, all design features on the Poroscope instruments meet the ISO 2746 safety standard.

Porosity testing with Poroscope HV40

Intact corrosion-resistant coatings are the most important prerequisite for ensuring long-term protection of components under extremely rugged offshore conditions: any deficiency in the coating can significantly affect performance.

Fundamentally, all offshore structures, such as shipping vessels, drilling rigs, cranes, containers and pipelines, are surface-coated to protect them from the harsh environments found on the high seas.

Since the smallest hole can compromise the protective function, it is essential to monitor these coatings thoroughly for consistency. Even the most careful visual inspection cannot detect all pores, cracks and thin areas in the coating. High voltage (HV) porosity testing is the only truly reliable method for verifying the intactness of corrosion-protection coatings on marine structures.

The test method is based on the fact that all electrically insulating materials – including those from which the protective coatings are typically made – have a much higher dielectric strength than air. High voltage is applied using an electrode that is moved slowly across the surface to be analyzed. If the electrode passes over a flaw (pore, scratch, etc), an electric arc-over occurs; this momentary drop in voltage is indicated by the instrument both optically and acoustically.

The new Poroscope series has been developed specifically to meet the demands of porosity testing in offshore environments. The measuring head HV40, with a test voltage range of 8-40kV, allows for checking even thick coatings.

The portable HV40 is a very robust instrument designed for practical applications in tough working environments. The high voltage is generated directly in the measuring head, which increases both operator safety and user-friendliness: meaning no more unwieldy HV cables on wet decks or run through water tanks.

Instead, the HV test instrument operates via a direct connection to electricity mains or via the installed high-capacity battery in the portable base unit, which offers a working capacity of approximately eight hours at 40kV or 20 hours at 20kV.

Accessories are available for a wide variety of measuring applications: the spectrum of HV electrodes includes sweeper electrodes, flat and roller electrodes for plane surfaces, and rotating and brush electrodes for testing the insides and outsides of pipe walls.

About the author

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For more information, visit: www.helmut-fischer.com