Effective Help with Corrosion Protection

New measuring devices help inspection engineers to evaluate components that are prone to corrosion and to monitor corrosion protection activities. This makes it possible to prevent corrosion damage and the resulting depreciation.

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Corrosion is a reaction between a metallic material and its environment. The measurable changes in the material often lead in either the short or the long term to problems with the functioning of the metal component. However, this is only described as damage when the component or the entire system can no longer fulfil its intended technical function as a consequence of corrosion. Therefore, rust on a railway line does not represent damage, because the function of the rail is not impaired. However, a pipe that is leaking as a result of pitting is clearly damaged, because it can no longer safely hold and transport liquids. The same applies to components used in a maritime environment, where corrosion on the surface of materials, such as ships’ hulls, can very rapidly become a safety risk.

2.5 billion dollars of damage

Corrosion on civil engineering structures can have very serious consequences. If steel components corrode and are not carefully monitored, a bridge, for example, can in the worst-case scenario represent a danger to the people using it. This is clearly demonstrated by the disastrous failure of the Polcevera Viaduct (also known as the Ponte Morandi) in the Italian city of Genoa. The motorway bridge, which spanned the railway line connecting Turin and Genoa, a former rail marshalling yard and a residential district, is said to have collapsed because a heavily corroded suspension cable snapped. This emerged in early February 2019 in a preliminary report produced by the Swiss Federal Laboratories for Materials Science and Technology in Dübendorf not long after the disaster. Corrosion protection is important not only for the purpose of preventing fatal consequences of this kind. Financial considerations also play a key role. The statisticians at the NACE Institute in the United States calculated that, in 2018 alone, the dam-
Easy to hold and operate: The coating thickness measurement device can be used even in almost inaccessible areas.

The dew point measuring device can easily be attached to ferrous substrates with a magnet.

The coating thickness measurement with a dual probe

The standard processes that are used worldwide for measuring coating thicknesses are the magnetic induction and eddy current methods. Magnetic induction is ideal for measuring the thickness of non-magnetic coatings on magnetic substrates. The eddy current method operates at higher frequencies than magnetic induction and allows damage to the coating to be identified as a result of differences in the eddy current strength in the conductive, non-magnetic substrate. Modern measuring devices such as the MMS Inspection family of products from Fischer use both the magnetic induction and the eddy current method. The top-of-the-range model, the MMS Inspection DFT High (NF/Fe) (NC/NF), has a high-precision dual probe and produces reliable measurements of coatings on iron/steel and non-ferrous/ferrous metals and coatings on non-ferrous metals such as aluminium. International measurement standards including SSPC PA2 (Level 1-5), IMO PSC, ISO 19840, Australian AS 3894.3-2002 and Swedish IS 1841 60 are integrated into the software as pre-configured batches or measurement regulations. The MMS Inspection DPM dewpoint measurement device, which is part of the same family, is used when a new corrosion protection coating is being applied. It measures the air temperature, ambient humidity and surface temperature, which allows the dew point to be calculated. This should generally be at least three degrees Celsius below the current surface temperature in order to prevent premature corrosion from occurring during the coating process. At the same time, the device allows users to ensure that the paint or other coating which is applied for protection purposes adheres properly to the surface. The third member of the family is the MMS Inspection SPG. This device meets the requirements of the ASTM D 4417-B and US Navy NSI 009-32 standards and measures the surface profile with the peak-to-valley method. This process is used when a corrosion protection coating is being reapplied. The measurement results help to ensure that the surface is homogeneous and durable.

Resistant to dust and water

All three models are highly robust and impact-resistant. They are currently the only corrosion protection measuring devices on the market with an IP65 rating, which means that they are dust- and waterproof. These intelligent devices can be connected to a PC via a USB port for evaluation purposes and are ideal for use in tough conditions. The systems can be operated using only one hand and inform the inspector immediately whether the measurement has been made correctly by means of an indicator light, vibration and an audible signal. The scratchproof, solvent-resistant display rotates to the correct position like a smartphone screen. The three systems have a standardised, intuitive user interface. The software guides users step-by-step through each measurement program and demonstrates how the measurement must be made. This means that the devices can be used reliably even by untrained staff.

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