Corrosion – fighting a losing battle

The ability to turn down a boiler in response to varying heat loads is a useful way to reduce energy consumption. However, it is essential to align the burner turn-down to the working capacity of the boiler, says Riello's technical director, Bernard Dawson. Corrosion is a perpetual problem against which engineers globally are fighting a losing battle with, at the end of the day, nothing to show other than the expense of tackling the problem. Tried and tested means to control corrosion have been around for many a year, but the issue continually remains a thorn in any engineers or technicians side as there is no clean or safe way to limit the damage caused by corrosion.

Fact – ‘The fight against corrosion, costs the UK around 4% of GNP per annum.’ Quote from ICORR; the UK Institute of Corrosion

Fact – ‘On North Sea production platforms, 60% of all maintenance costs are related to corrosion.’ 2003, Saudi Aramco global study

Fact – ‘The annual cost of corrosion worldwide is US$1.8trillion, which is over 3% of the world’s GDP.’ Extract from NACE, National Association of Corrosion Contractors

Key to this fight are the establishment and promotion of sound corrosion management practice, the advancement of cost effective corrosion control measures, and a sustained effort generally to raise corrosion awareness at all stages of design, manufacture and operation, explains Richard Woodward of Oxifree Ltd.

Engineers, designers and managers alike, must fight these costs and an imperative in the fight against corrosion is the implementation of corrosion management practices and effective planned preventive maintenance (PPM) schedules to ensure measures to fight corrosion, and raise awareness of the problem at all stages of design, manufacture and operation. There is no escaping the simple fact that paint and epoxy coatings of varying types and degrees are the ultimate coating system for coating pipes, flatworks and support structures, but what happens to flanges, pipe unions and bolts that require periodic torque tightening? Flanges or unions used to join two pieces of pipe together are hugely important in the successful transfer of the material within the pipe, however, in modern piping and transfer systems, the nuts and bolts used to hold the flange together are purposely designed to be the sacrificially anode – is that not an oxymoron of design, the fundamental structure is actually designed to rot!

In today’s engineering mind-set, retrospective application of resins, pastes and wraps seem to be in vogue for integrity engineers, to protect and prolong the life of vital, pivotal components, to save money and to save and preserve asset integrity and longevity. However, the truth remains that these means are not 100% effective and they simply mask a problem that demands control and delay the inevitable.

Certain tapes and pastes are now becoming old hat with the introduction of thermoplastic resin coating systems into the market, as the old tape and grease option leaves the age old disgusting residue behind that makes inspection and identifying defects impossible, and the putty type corrosion prevention system, simply falls off. The molten, plasticised corrosion prevention systems are currently taking the offshore engineering environment by storm, with the bulk of the major oil companies identifying the benefits of joint encapsulation as a viable alternative to costly, messy archaic methods.

This encapsulation method is pure and as simply as it states; it is a plastic polymer that is heated to melting point via a purposely designed hopper, then pump fed through a heated hose and gun directly onto the substrate as a jet of liquid. This liquid cools instantly and forms directly around any shape and form to create an impervious cocoon around the substrate. This plastic has impregnated inhibitor oil within the polymeric compound, which is designed to bleed onto the surface of the substrate to actively create a barrier to prevent any capillary action of moisture and electrolytic particles, thus actively preventing corrosion rather than delaying it.

Being an oil secreting polymer, these plasticised methods do not adhere to the substrate and can easily be removed; better still, the formed plastic coating can simply be cut and pulled away, re-melted and reused – thus it is only purchased once. There are different formulation of the same idea, but only the original Oxifree TM198 is VOC free, environmentally friendly and is fed via a motorised airless pump system, thus when it is applied it can actually be ultrasonically tested.

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