

Corrosion Protection of Offshore Platforms

The use of high performance coatings to protect offshore structures is the common method to prevent excessive corrosion. Three coat paint systems (to ISO 12944, or NORSOK M501 standards) can give a proven 15 years' service life without major maintenance, however to reduce operating costs, platform operators are looking at new coating systems to extend this period, due to the high cost of carrying out any re-painting offshore. The cost of this maintenance painting on an offshore platform can be up to 100 times more expensive as land based maintenance, so when coatings fail it costs the owner enormous amounts of money due to loss of production.

The Oil & Gas Technology Centre (OGTC), in Aberdeen has been carrying out trials of a new anti-corrosion coating on two North Sea offshore platforms in collaboration with SPI Performance Coatings in the UK (the supplier). OGTC, which is jointly funded by the UK, Scottish, and Aberdeen governments, was established to develop a culture of innovation that will consolidate Aberdeen and North-East Scotland's position as a global hub for oil and gas technology and innovation.

This novel spray applied inorganic coating (1) was applied initially on one N Sea platform which undergoing planned fabric maintenance. The coating was applied to areas of the platform's lower deck that were suffering from severe corrosion. The existing three coat system which had required repair roughly every 3 to 5 years was completely removed from structural steel tubulars and flat plate. Initially, the surface was power washed and degreased to remove contaminants, and all tubulars were blasted to SA2.5, and flat plate mechanically prepared to ST3. While rust rashing was visible on areas prior to spray application of the anti-corrosion coating, this was deemed acceptable by the manufacturer due to its tolerance of damp substrates with this level of rust rashing/flash rusting. One coat of the anticorrosive coating was applied at 500 micron, and after curing an aesthetic topcoat was applied.

The novel coating is a 100% solids water based inorganic phosphate "ceramic" coating, which according to the manufacturer, reacts with the steel surface to form a 2 micron protective layer of iron magnesium phosphate, and a barrier ceramic-type layer which also acts as a phosphate "reservoir" to repair the protective layer when damaged, to give long-lasting corrosion protection. This trial is due to finish in December and the initial findings will be available at the beginning of 2019. In addition a further trial on another N. Sea platform began in in June 2018. Again, a single 500 micron coat of the novel coating plus an aesthetic topcoat were applied to pipework and some flat plate after surface preparation to SA2.5.

Reference

(1) EonCoat, Raleigh, North Carolina, USA.

LATEST LITERATURE

Unmasking corrosion to design better protective thin films for metals

Metals are commonly protected from corrosion by naturally forming, super-thin oxide films.

Traditionally, these protective films have been viewed as simple oxides of well-known compounds, but new work from scientists at Northwestern University, the University of Virginia and the University of Wisconsin-Madison has revealed new insights into these oxide films.

Using state-of-the-art experimental techniques and theoretical modelling, the scientists were able to analyse oxide films at the atomic level, deciphering how the atoms are arranged in the oxides, and found that the protective films develop new structures and compositions that depend on how fast the oxide film grows. The study's authors say their findings could provide clues about how to make the protective films better. The team studied the oxides that form on alloys composed of nickel and chromium, which are widely used in a variety of products.

This study is published in, "Non equilibrium Solute Capture in Passivating Oxide Films"; Phys. Rev. Lett.; 2018.

Market Study Paints & Coatings – Europe (3rd Edition)



This report from Ceresana analyses the revenues, production, import, and export of paints and coatings, as well as demand split by the applications, eg construction, transportation, general industry, and others. Data are provided for Europe as a whole and the 24 major countries. Furthermore, demand is split by paint and coating types (vinyl, acrylics, alkyd, epoxy, PUR, polyester, and other resins), as well as by technologies (waterborne, solvent borne, powder) for the 8 largest countries.

According to the report, architectural paints are the largest application area of paints and coatings. Residential construction has a rising demand for facade and interior wall paints, yet, large commercial construction and infrastructure projects provide for a positive development of revenues. The market researchers of Ceresana forecast that about 58% of all paints and coatings will be utilised in the construction industry in 2025. Application for industrial goods is decisively affected by the economic situation of individual countries. In this segment, Ceresana expects a growth of European demand for paints and coatings by, on average, 1.4% per year.

Another important application is the transportation segment. This industry is characterised by several innovations such as finishes offering thermal insulation or self-healing effects. Production and upstream manufacturing processes are being relocated from Western European to Eastern European countries, due to more favourable general conditions; research and development, on the other hand, remain in Western European countries.

Besides the division by various application areas, the market report also analyses the demand per product type: ranging from paints and coatings based on acrylics, vinyl, alkyd, epoxy, polyurethane (PUR), and polyester up to products based on other materials. Paints and coatings based on acrylics and vinyl account for the largest share of the European market: the share amounts to about 53%. The increased focus on sustainability and environmental protection in Europe supports consumption of waterborne paints and coatings as well as other environmentally friendly alternatives.

Further details can be obtained from, info@ceresana.com

AETOC 2019

The 11th International workshop on Application of electrochemical techniques to organic coatings, AETOC, will be held at Canet de Berenguer near Valencia, Spain, from 2nd-5th April 2019. This will be an opportunity to discuss the latest research topics and find industrial partners. More information can be found at, <http://www.aetoc.uji.es/>

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