Qualité Endeavour

Quarterly Newsletter from Équipe Qualité Consultants, Issue No. 26, 1st July 2018

About EQC India

Équipe Qualité Consultants *(EQC India) comprises of a team of quality professionals engaged in providing quality management and welding services for the infrastructure sector and manufacturing units.*

EQC's areas of Operation of are:

- *Supplier assessment, audits and development*
- *Review and approval of Quality Plans and Field Quality Plans*
- *Field Quality Audits*
- *Consultancy for PED certification/ CE Marking*
- *Welding Qualifications as per ASME and EN/ISO*
- *ISO: 9001-2015, ISO: 14001-2015 and ISO-45001*
- *Quality Improvement Studies*
- *Documentation & Implementation of ISO: 3834 Series for Quality requirements for fusion welding of metallic materials, EN: 15085-2/ BS EN 1090*
- ***Responsible Welding Coordinator (RWC Services)***
- *Technical Support and Training on Codes and standards on Steels including Chinese, Russian, Indian, EN and ASME codes.*
- *Technical Support, Consultancy & Training on Welding Technology, NDT, Industrial Painting, Dynamic Balancing & Engineering Materials.*

EQC India was started in 2009 to provide value added to Industry.

Inspiring Quality Since 2009

Dear Reader,

In the present issue of Qualité Endeavour, we cover In brief corrosion of equipment's and structures in power/ cement/ oil and gas and other infra projects.

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Corrosion: nature's great destroyer – and the bane of any project organisation.

In power and process plants, corrosion is the primary factor leading to costly and critical downtimes. Further water-steam circuits in fossil and nuclear power plants are inherently prone to corrosion, as metal components are constantly in contact with water. Measures to monitor or prevent corrosion are crucial in this context and are covered in our article.

EQC provides consultancy and training for industrial painting systems. Our scope includes paint specification writing, coating field inspections and training.

Happy Reading!

Please do send in your comments & suggestions for improvement of the newsletter.

Editor, 2nd July 2018

NEW CLIENTS/ CONTRACTS/ PARTNERS DURING THE LAST QUARTER

AE Energy At Work

HF HYPER FILTERATION

TIPL

Methods of Corrosion Control

The battle against corrosion

Corrosion: nature's great destroyer – and the bane of any project organisation.

In 2016, NACE International released its report on global corrosion, "International Measures of Prevention, Application and Economics of Corrosion Technology (IMPACT)". Put together over two years, the study came to some staggering conclusions about the price of corrosion, and the room for improvement when it comes to preventing it.

IMPACT estimated the annual global cost of corrosion to be $2.5 trillion: equivalent to almost 3.5 per cent of global GDP and **slightly less than India's GDP**. By implementing best-practice corrosion protection, the study said, this cost could be reduced by up to a third, or between $375 and $875 billion. With such huge amounts of money at stake, it's little wonder that companies around the world are investing so heavily in developing more effective corrosion protection strategies.

What is corrosion?

Corrosion is a complex phenomenon that can occur in a variety of ways, but essentially, it is the dissolution of metal due to a chemical reaction with its environment. The metal loses electrons through an electrolyte, such as seawater, as it breaks down at an atomic level. Some metals corrode more readily than others, but under the right conditions, even the most chemically inert metals can corrode. This even applies to the noble metals such as gold, silver and platinum, and can be seen in tarnish, in which corrosion creates a dull outer layer on objects made from silver.

Corrosion can be a problem in air, but it is a far more significant issue in seawater. Here the process is initiated by the presence of oxygen and greatly exacerbated by the prevalence of chlorides, which makes the seawater an excellent conductor.

Common Methods of Corrosion Control

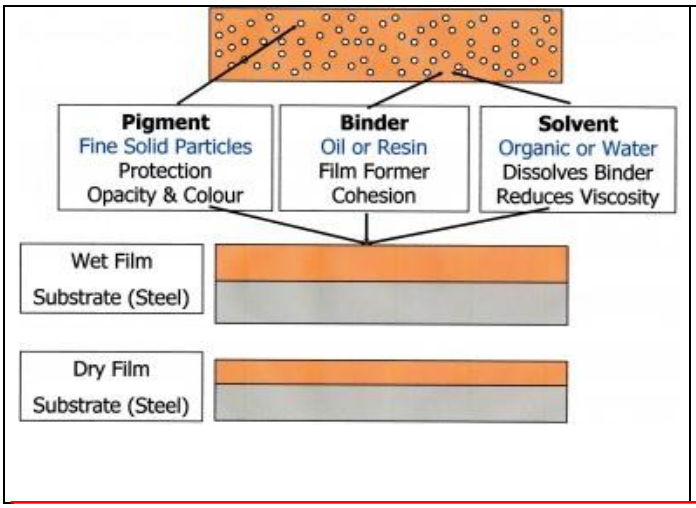
1. Materials selection and design	**2.** Protective coatings
3. Cathodic and anodic protection	**4.** Inhibitors

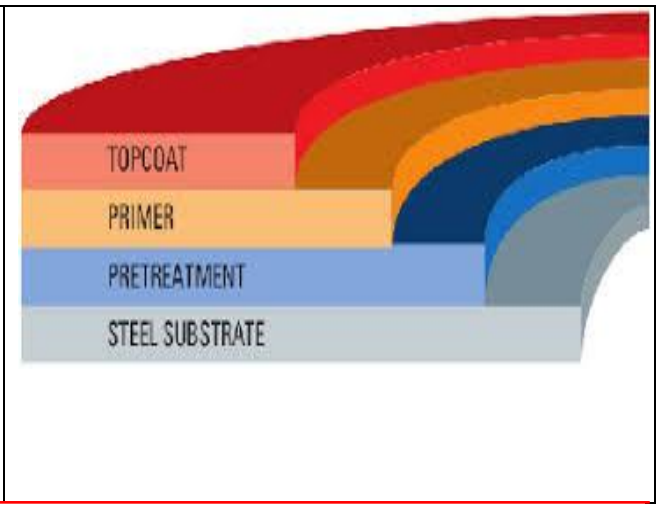
Materials selection and design

No material is resistant to all types of corrosive situations, but materials selection is critical to preventing many types of failures. Factors that influence materials selection are corrosion resistance in the environment, availability of design and test data, mechanical properties, cost, availability, maintainability, compatibility with other system components, life expectancy, reliability, and appearance.

Protective coatings

Paint is the most commonly used material to protect steel. Paint systems for steel structures have developed over the years to comply with industrial environmental legislation and in response to demands from bridge and building owners for improved durability performance. Modern specifications usually comprise a sequential coating application of paints or alternatively paints applied over metal coatings to form a 'duplex' coating system. The protective paint systems usually consist of primer, undercoat(s) and finish coats. Each coating 'layer' in any protective system has a specific function, and the different types are applied in a particular sequence of primer followed by intermediate / build coats in the shop, and finally the finish or top coat either in the shop or on site.





Taking one for the team: cathodic protection

At sea, the primary form of corrosion mitigation is cathodic protection. Typically this involves the use of a galvanic or "sacrificial" anode: a piece of metal connected to the structure requiring protection, and made from a more electrochemically active material. The structure serves as the cathode, while the sacrificial metal serves as the anode. Because in corrosion it is the anode from which electrons are lost, the structure – the cathode – is thereby protected from deterioration. The galvanic anode corrodes in its place, disintegrating in the process, and sacrificing itself to protect the structure. Cathodic protection systems are often used together with a protective barrier coating on the main structure, which reduces its exposure to the seawater and effectively reduces the size of the electrochemical cell's cathode. A smaller cathode allows a smaller sacrificial anode, which means less material and reduced cost.

A different approach: combining the coating and the anode

With barrier coatings providing one aspect of corrosion mitigation, and cathodic protection another, one potential way to improve the two approaches' cost-effectiveness is to combine them into a single function.

This is where thermally sprayed aluminium (TSA) comes in. In this process, microscopic droplets of molten aluminium are fired at very high speed onto a substrate – such as a steel wind turbine foundation pile – where they bond with the underlying structure, and with each other, creating a high-integrity barrier that doubles up as a "distributed" anode should any of the underlying steel become exposed to the seawater.

Aluminium is a perfect material to serve as a protective barrier, as it possesses the extraordinary ability to repair itself. As soon as it corrodes, an impermeable oxide layer forms on its surface, protecting the underlying metal from further corrosion. Should the metal beneath become exposed, an oxide layer will quickly form to plug the gap. A TSA barrier may remain effective for up to 50 years at sea, with minimal maintenance costs. There are big savings to be made here: one company's decision to replace its conventional paint and sacrificial anode corrosion protection system with TSA for two offshore turbine foundation piles is expected to lead to savings of approximately 30 per cent.

Inhibitors

A corrosion inhibitor reduces the corrosion rate of a metal exposed to that environment. Inhibition is used internally with carbon steel pipes and vessels as an economic corrosion control alternative to stainless steels and alloys, coatings, or non-metallic composites, and can often be implemented without disrupting a process. The major industries using corrosion inhibitors are oil and gas exploration and production, petroleum refining, chemical manufacturing, heavy manufacturing, water treatment, and the product additive industries.