Research and Reviews: Journal of Engineering and Technology e-ISSN: 2347-226X
p-ISSN: 2319-9857

External and Internal Types of Corrosion Engineering

Ehab Gomaa*

Department of Electronics and Communication Engineering, Rajasthan Technical University, Rajasthan, India

Commentary

Received: 01-Jun-2022, Manuscript No. JET-22-68673; **Editor assigned:** 06-Jun-2022, Pre QC No. JET-22-68673(PQ); **Reviewed:** 23-Jun-2022, QC No. JET-22-68673; **Revised:** 01-Jul-2022, Manuscript No. JET-22-68673(R); **Published:** 08-Jul-2022, DOI: 10.4172/2319-9857.11.5.001.

***For Correspondence:**

Ehab Gomaa, Department of Electronics and Communication Engineering, Rajasthan Technical University, Rajasthan, India

E-mail:Ehabgomaa@gmail.com

ABOUT THE STUDY

Designing and implementing materials, structures, devices, systems, and processes to manage corrosion is the domain of corrosion engineering, which employs scientific, technical, engineering, and knowledge of natural laws and physical resources. It also applies scientific, technical, engineering, and knowledge of natural laws and physical resources. When viewed holistically, corrosion is the process through which metals revert to their natural state. Metals' transitory existence as metallic substances is the driving force behind corrosion. It takes a certain amount of energy to produce metals from naturally occurring minerals and ores, such as iron ore in a blast furnace. The reversion of these metals to their natural state when exposed to varied conditions is therefore thermodynamically inevitable.

Types of corrosion situations

Internal or external corrosion situations are often the areas of expertise for corrosion engineers and consultants. Both can offer failure analysis investigations, sell corrosion control goods, install corrosion control systems, and design corrosion control and monitoring systems. Every substance has a flaw. Brass, copper, galvanized/zinc-coated materials and aluminium do not fare well in settings with very high or very low pH levels. High levels of nitrate or ammonia make copper and brasses less likely to survive. Low soil resistivity and high chloride conditions do not support carbon steel and iron effectively. Even steel embedded in ordinarily protective concrete can be overcome by high chloride environments and attacked. Acidic and high-sulfate conditions do not support concrete effectively. And in conditions with corrosive bacteria and high sulphate and low redox potential, nothing thrives well.

This process is known as biogenic sulphate corrosion.

External corrosion

Underground soil side corrosion: In order to assess the corrosive properties of the soil, underground corrosion control engineers collect soil samples. These samples are then tested for pH, minimum soil resistivity, chlorides, sulphate, ammonia, nitrates, sulphate, and redox potential. Because soil qualities might differ from one stratum to the next, they take samples from the depth where infrastructure would be located. When evaluating a site's corrosively, the wenner four pin methods are frequently used to assess the minimal test of in-situ soil resistivity. The test, however, might not reveal actual corrosively during a dry period because subsurface condensation can make the soil next to buried metal surfaces moisture. This is why it's crucial to measure a soil's minimum or saturated resistivity. Testing the soil for resistivity does not always reveal corrosive substances.

Underwater external corrosion: The same principles employed in underground corrosion control are applied by underwater corrosion engineers, however for condition assessment, corrosion control system installation, and commissioning, they require highly trained and licensed scuba divers. The primary distinction is in the type of reference cells used to measure voltage. The legs of oil and gas rigs as well as pile corrosion are of special importance. This applies to rigs in the Gulf of Mexico and the North Sea off the British coast.

Atmospheric corrosion: In a general sense, atmospheric corrosion refers to corrosion that occurs in any environment. Materials selection and coatings standards are often used to prevent air corrosion. The application of zinc coatings, commonly referred to as galvanization, to steel structures is a method of cathodic protection in which the zinc serves as both a coating and a sacrifice anode. Over time, it's normal for the galvanized coating to get a few tiny scratches. The corrosion products fill the scratch, limiting additional corrosion, and the zinc, which is more active in the galvanic series, corrodes instead of the underlying steel. Condensation moisture shouldn't corrode the underlying steel as long as the scratches are fine and the zinc is in touch with the steel.

Internal corrosion

General corrosion, pitting corrosion, microbiological corrosion, and fluid corrosively are the four types of material deterioration that combine to cause internal corrosion. Internal corrosion can be controlled using the same principles as external corrosion control, but different methods may be used depending on accessibility. As a result, unique instruments that aren't used for external corrosion control are employed for internal corrosion control and inspection. For internal inspections, video scoping of pipes and sophisticated smart pigs are utilised. The clever pigs can be introduced into a system of pipes at one point and "caught" several miles down the line. For the most part, internal coatings, corrosion inhibitors, and material selection are used to control corrosion in pipelines, whereas anodes and coatings are used to control corrosion in tanks.