

Pitting corrosion



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Pitting Corrosion Corrosion is the deterioration of certain intrinsic properties in mostly metallic material due to reactions with its environment, leading to the damage of original metal. Among the most common and destructive types of corrosion is Pitting. This type of " corrosion is an extreme case of localised attack which results in the development of cavities or pits in the metal surface" caused by a lack of oxygen around a small area. (DME: 1) The holes (or pits) often range from deep cavities of small diameter to relatively shallow depressions. The deterioration which penetrates a significant part of the wall thickness sometimes leaves large parts of the metal surface virtually free and unaffected (DME: 1).

Pitting is most commonly induced very aggressive agents e. g. halides like chloride ions which can destroy protective or passive surface films of aluminium, stainless steels, nickel alloys, etc. The degradation can be initiated by a tiny surface defect; a scratch, local change in composition, or damage to a protective coating. (" Pitting" 4). It occurs when these alloys are exposed to chloride [or halide] containing solutions. (DME: 7) The reaction begins when a passive film or protective surface layer is broken down. After this initiation (local breakdown of the film) an anode forms where the film has broken, while the unbroken film (or protective layer) acts as a cathode, thus accelerating localised attack and pits formation at the anodic spots (DME: 6). Further corrosion will continue due to the high acidification (due to high chloride concentration) of the electrolyte inside the growing crevice (DME: 7).

Pitting can be prevented or slowed down by using " corrosion inhibitors such as hexamine, sodium nitrite and condensation products of aldehydes among others" (" Pitting" 7). An explosion in Guadalajara in Mexico, April 22 1992, <https://assignbuster.com/pitting-corrosion/>

when gasoline fumes accumulated in sewers destroyed kilometers of streets occurred as a result of Pitting corrosion on between a steel gasoline pipe and a zinc plated water pipe (" Pitting" 8).

Thermography

According to Wikipedia, Thermography, or thermal imaging, is a type of infrared imaging (1). According to the black body radiation law the amount of radiation which an object emits is dependent on the temperature of that body. These variations can be detected using a Thermograph (" Thermography" 2006).

Thermographic imaging has a wide range of use in military and other security services. They are also effectively used " by fire fighters to locate smoke, find hot spots; technicians in power lines use them in isolating overheating joints or parts; to spot heat leaks in the building construction industry, and in aiding drivers of certain luxury cars" (" Thermography" 2). A thermographic camera though similar in appearance to a camcorder differs in its use of " micro bolometer arrays instead of the Closed Circuit Device sensors of a camcorder" (" Thermography" 3). Also their resolution is considerably lower than other optical cameras, ranging about 160x120 or 320x240 pixels and are much more expensive than their so-called counterparts therefore require much more attention in regards to monitoring and maintaining (" Thermography" 3)

Infrared imaging can be used as an early warning system tool in many areas of the world as they can be used for rapidly inspecting large areas. Since infrared radiation is emitted by all objects based on their temperature, thermography makes it possible to " see" one's environment with or without visible illumination. This occurs because " the amount of radiation emitted by

an object increases with temperature, therefore thermography allows one to see variations in temperature" (" Thermography" 1).

References

Department of Mechanical Engineering. Pitting Corrosion: High Temperature Technology &

CAE, Dept. M E, Nanjing University of Chemical Technology 22 Nov 2001, 18 Mar 2006,

10: 39 GMT < http://httd.njuct.edu.cn/matweb/corrosie/c_pit.htm > "

Pitting Corrosion." Wikipedia, The Free Encyclopedia. 11 Dec 2005, 08: 23

UTC. 18 Mar

2006, 21: 46