

Different Types of Corrosion

- Recognition, Mechanisms & Prevention

Corrosion Fatigue

Recognition of Corrosion Fatigue

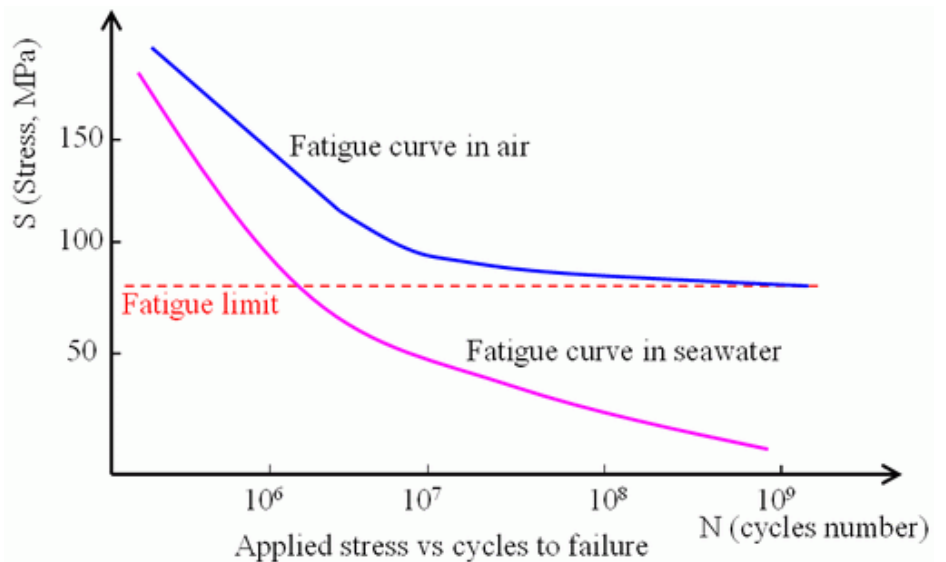
What is Corrosion Fatigue? Corrosion Fatigue refers to the process in which a metal fractures prematurely under conditions of simultaneous corrosion and repeated cyclic loading at lower stress levels or fewer cycles than would be required to cause fatigue of that metal in the absence of the corrosive environment.

Mechanisms of Corrosion Fatigue

What causes Corrosion Fatigue?

Corrosion Fatigue is caused by crack development under the simultaneous action of corrosion and cyclic stress. The usual case involves rapidly fluctuating stresses that may be well below the tensile strength. As stress is increased, the number of cycles required to cause fracture decreases.

As in the case of stress corrosion cracking, corrosion fatigue is dependent on the interactions among loading, environmental, and metallurgical factors.



For a given material, the fatigue strength (or fatigue life at a given maximum stress value) generally decreases in the presence of an aggressive environment. For the majority of engineering alloys, the fatigue limit refers to the stress level below which failure does not occur within a specified number of cycles, usually 10^7 or 10^8 cycles, as shown in the S-N plot.

How to identify corrosion fatigue? Corrosion fatigue cracks are not branched and often contain corrosion products.



Prevention of Corrosion Fatigue

How to prevent Corrosion Fatigue? Corrosion Fatigue can be prevented through:

- reducing the fatigue by minimizing vibration and pressure fluctuation.
- reducing the corrosion by using high-performance alloys resistant to corrosion fatigue
- reducing the corrosion by using coatings and inhibitors to delay the initiation of corrosion fatigue cracks

For more details on Corrosion Fatigue

[Where can I learn more about corrosion fatigue?](#) More details on Corrosion Fatigue are included in the following corrosion courses which you can take as in-house training courses, course-on-demand, online courses or distance learning courses:

Corrosion and Its Prevention (5-day module)

Corrosion and Its Prevention (2-day module)

Corrosion, Metallurgy, Failure Analysis and Prevention (5 days)

Marine Corrosion, Causes and Prevention (2 days)

Materials Selection and Corrosion (5 days)

Stainless Steels and Alloys: Why They Resist Corrosion and How They Fail (2 days)

If you require corrosion expert witness or corrosion consulting service on corrosion fatigue, our NACE certified Corrosion Specialist is able to help. Contact us for a quote.