# CONTEMPORARY METALLIC MATERIALS

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Chapter 034

# Corrosion Behavior of Duplex Stainless Steel in Sea Water

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**Keywords:** Duplex stainless steel, corrosion, seawater

**Abstract:** Corrosion behavior of duplex stainless steel in seawater is interesting to discuss. The discussion includes corrosion rate, microstructure before and after corrosion test and corrosion potentials of duplex and austenitic stainless steels. The corrosion studies of austenitic stainless steel and duplex stainless steel in seawater have been carried out at room temperature for 78 days (1892 hours). In the exposure to seawater, duplex stainless steel was more corrosion resistance compare to austenitic stainless steel. From the weight loss and tafel extrapolation test, the corrosion rate of duplex stainless steel smaller than the austenitic stainless steel. These indicate that duplex stainless steel exhibits better corrosion resistance than austenitic stainless steel.

## Introduction

Corrosion can occur in all types of metal at different temperatures. Corrosion can be described as a destructive result of chemical reaction between a metal or metal alloy and its environment. Corrosion can cause a variety of problems, depends on the applications such as:

- ✓ Perforation of tanks and pipes, which allows leakage of fluids or gases,
- ✓ Loss of strength where the cross section of structural members is reduced by corrosion, leading to a loss of strength of the structure and subsequent failure,
- ✓ Degradation of appearance, where corrosion products can detract from a decorative surface finish,
- ✓ Can produce scale or rust which can contaminate the material being handled; particularly in the case of food processing equipment.

Most materials corrode because they are used in environments where they are chemically unstable. Some major problems of corrosion are on buried oil and the gas transmission pipelines. Millions of dollars are lost each year because of corrosion. Much of this loss is due to the corrosion of iron and steel, although many other metals may corrode as well. The problem with iron as well as many other metals is that the oxide formed by oxidation does not firmly adhere to the surface of the metal and flakes off easily causing pitting corrosion [1].

## Duplex Stainless Steels