

ABSTRACT

The purpose of the present dissertation is to investigate the phenomenon of the corrosion and the evaluation of the corrosion of metals with the ultimate purpose to identify ways of dealing with the corrosion of metallic materials.

In the theoretical section the phenomenon of the corrosion of metals is described while distinguishing the mechanisms of corrosion, the factors which influence it, the kind as well as the shape of the corrosion and the corrosion environment. According to the type of each of the above definition, measures of prevention or reduction of the phenomenon are provided.

In the experimental section, with the aid of the experimental device potentiostat and the software Nova 1.10 as well as the measurement techniques for the electrochemical corrosion, the Linear Polarization method, the Tafel method and the EIS – Electrochemical Impedance Spectroscopy, the trials of soft steel AISI 1050, aluminium 1050 and stainless steel 304 are tested in sea water by obtaining relevant results and reaching some conclusions and proposals for reduction or near total elimination of the corrosion. With the Tafel method all three trials are tested without coverage while with the EIS method the trial of soft steel 1050 is tested, initially without cover and later with varnish cover.

Keywords: electrochemical reaction, corrosion rate, the marine environment, organic coatings.