

**CORROSION BEHAVIOUR OF ALUMINIUM
METAL WHEN EXPOSE TO SEAWATER FROM
TWO DIFFERENT COASTAL AREA**

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**CORROSION BEHAVIOUR OF ALUMINIUM METAL WHEN EXPOSE IN SEAWATER
FROM TWO DIFFERENT COASTAL AREA**

By

NOOR FARAHIDAH BT ZOHARDIN

**Research Report submitted in partial fulfillment of
the requirement for the degree of
Bachelor of Applied Science (Maritime Technology)**

**Department of Maritime Technology
Faculty of Maritime Studies and Marine Science
UNIVERSITI MALAYSIA TERENGGANU
2013**



DEPARTMENT OF MARITIME TECHNOLOGY
FACULTY OF MARITIME STUDIES AND MARINE SCIENCE
UNIVERSITI MALAYSIA TERENGGANU

**DECLARATION AND VERIFICATION REPORT
FINAL YEAR RESEARCH PROJECT**

It is hereby declared and verified that this research report entitled: **Corrosion Behaviour Of Aluminium Metal When Expose In Seawater From Two Different Coastal Area** by **Noor Farahidah Binti Zohardin**, Matric No. **UK 20562** have been examined and all errors identified have been corrected. This report is submitted to the Department of Maritime Technology as partial fulfillment towards obtaining the **Bachelor Degree of Applied Science (Maritime Technology)**, Faculty of Maritime Studies and Marine Science, Unitversiti Malaysia Terengganu.

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DECLARATION

I hereby declare that this thesis entitled **CORROSION BEHAVIOUR OF ALUMINIUM METAL WHEN EXPOSE IN SEAWATER FROM TWO DIFFERENT COASTAL AREA** is the result of my own research except as cited in the references.

Signature : 
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CORROSION BEHAVIOUR OF ALUMINIUM METAL WHEN EXPOSE IN SEAWATER FROM TWO DIFFERENT COASTAL AREA

ABSTRACT

The main purpose of this project is to identify the corrosion behavior of aluminium metal in two different coastal area of peninsular Malaysia. The physical properties of seawater investigated were salinity, pH and temperature. Aluminium alloy is an important subject of research because it is widely used in industry, abundant in nature and represent an important category of their high technology value. Aluminium alloy (AA 5083) show moderate to high strength and an excellent resistance to corrosion in seawater. There are four factors contribute 5XXX series aluminium alloy to corrosion; absorbed water layer, chloride level, sulfides and sulfates and nature of oxide layer. Corrosion behavior of Aluminium metal was investigated by using weight loss method, electrochemical impedance spectroscopy (EIS) test, potentiodynamic polarization test and scanning electron microscopy (SEM). The corrosive media is taken from two different coastal area of peninsular Malaysia. Sample 1 is taken from Pantai Klebang, Malacca and sample 2 is taken from Pantai Tok Jembal, Kuala Terengganu. The YSI 556 multi-parameter is a system use to measure the dissolved oxygen, salinity, conductivity, pH and temperature of sea water. The weight loss test will determine the corrosion rate for the aluminium alloy. Electrochemical experiment contains 2 different types of tests which are potentiodynamic polarization test and electrochemical impedance spectroscopy (EIS) test. Both of these tests are using electrochemical impedance spectroscopy with the same setup but different type of software. Frequency response analyzer (FRA) software will be used for Electrochemical Impedance Spectroscopy (EIS) test, while potentiodynamic polarization test using general purpose electrochemical system (GPES) as a software.

KESAN PENGARATAN LOGAM ALUMINIUM APABILA TERDEDIAH KEPADA 2 PERAIRAN YANG BERBEZA

ABSTRAK

Tujuan utama projek ini adalah untuk mengenal pasti tingkah laku kakisan logam aluminium bagi dua perairan yang berbeza. Sifat fizikal air laut dikaji melalui kemasinan, pH dan suhu. Aloi aluminium adalah satu subjek yang penting dalam penyelidikan kerana ia digunakan secara meluas dalam industri, banyak terdapat dalam alam semula jadi dan mewakili kategori penting bagi nilai teknologi tinggi mereka. Aloi aluminium (AA 5083) menunjukkan kesan sederhana ke kekuatan yang tinggi dan rintangan yang cemerlang terhadap kakisan dalam air laut. Terdapat empat faktor menyumbang siri aloi aluminium 5XXX kepada kakisan; lapisan air diserap, tahap klorida, sulfida dan sulfat dan sifat lapisan oksida. Kelakuan kakisan logam aluminium telah dikaji dengan menggunakan kaedah susutan berat, ujian spektroskopi impedans elektrokimia (EIS), ujian polarisasi potentiodynamic dan imbasan mikroskopi elektron (SEM). Media menghakis diambil dari dua kawasan pantai yang berbeza. Sampel 1 diambil dari Pantai Klebang, Melaka dan sampel 2 diambil dari Pantai Tok Jembal, Kuala Terengganu. YSI 556 multi-parameter adalah penggunaan sistem untuk mengukur oksigen terlarut, kemasinan, konduktiviti, pH dan suhu air laut. Ujian susutan berat akan menentukan kadar kakisan aloi aluminium. Elektrokimia eksperimen mengandungi 2 jenis ujian yang ujian polarisasi potentiodynamic dan spektroskopi impedans elektrokimia (EIS) ujian. Kedua-dua ujian ini menggunakan spektroskopi impedans elektrokimia dengan persediaan yang sama tetapi berlainan jenis perisian. Kekekapan respons penganalisis (FRA) perisian akan digunakan untuk Elektrokimia Galangan Spektroskopi (EIS) ujian, manakala ujian polarisasi potentiodynamic menggunakan tujuan umum elektrokimia sistem (GPES) sebagai perisian.