



**THE EFFECT OF ENVIRONMENT ON AUTOMOTIVE MATERIALS**

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**“ I declare that I have read this thesis and in my point of view this thesis is qualified in term of scope and quality for the purpose of awarding the Bachelor of Engineering (Hons) Mechanical.”**

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## **ABSTRACT**

The degradation of metals in natural environment is a continuing process by which metals and their alloys, plastics and polymers, glass and ceramics, composites, are returned to their lower energy-level states. This oxidation process is normally referred to as corrosion and is the result of the interaction of a metal with its environment. With increasing concern as to the availability of automotive materials, more emphasis is expressed in the corruption of the materials exposed to corrosive atmospheres. Atmospheric corrosion is one of the principal causes of economic losses in the automotive, construction, machinery, shipbuilding, recreation, and other industries. This report represents the contents of atmosphere and its effects to automotive materials. Many kinds of effects were found. We had analyses all the effects from our industrial visits and surveys all around urban and non-urban area, and coastal area. Then we discuss the solution to all the problems and why it's happen. After that we came with conclusions from our observations. I hope that this report can be a reference for our new generation as a guidance to deal with these effects. I also hope that this report meets the needs of the students and research engineer, so that it will serve its purpose.

## TABLE OF CONTENTS

<b>CONTENTS</b>		<b>PAGE</b>
	PAGE TITLE	i
	ACKNOWLEDGEMENT	ii
	ABSTRACT	iii
	TABLE OF CONTENTS	iv
	LIST OF TABLES	viii
	LIST OF FIGURES	ix
	LIST OF ABBREVIATION	xi
<b>PART A</b>	<b>UNDERSTANDING THE EFFECT OF ENVIRONMENT ON AUTOMOTIVE MATERIALS</b>	<b>1</b>
<b>PART B</b>		
<b>CHAPTER 1</b>	<b>IDENTIFY THE AUTOMOTIVE MATERIALS</b>	
1.1	Metals and Alloys	5
1.12	Specifications of steels used in the automobile industry	6
1.121	Carbon Steel	7
(a)	Low-carbon steel	
(b)	Micro-alloyed steel	8
(c)	Medium-carbon steel	9

## **PART A**

### **UNDERSTANDING THE EFFECT OF ENVIRONMENT ON AUTOMOTIVE MATERIALS**

Environmental effects are including aqueous corrosion and stress cracking and high-temperature gaseous. Instrumented corrosion and stress testing is conducted in a wide range of aqueous and gaseous environments and at low and high temperatures. Automotive materials effects include corrosion and stress corrosion of lightweight transportation materials and creep behaviour of magnesium alloys.

Modelling of materials behaviour is used to identify key processes controlling materials performance and to help guide materials development. We focused in behaviour of materials such as corrosion, colour changing, stress etc. in aqueous and high-temperature environments, and effects on microstructure and mechanical properties of metals and alloys, plastics and polymers, glass and ceramics, composite materials. There are also mechanical properties of materials including tensile, fracture and fatigue behaviour.

The service life of a material must be defined with reference to the environment in which it is exposed. Therefore, in assessing the atmospheric corrosion of metals, knowledge of the service environment is essential.

The broadest sense, the environmental factors, which influence atmospheric corrosion and other kinds of effects to materials, may be divided into the following five categories:

- Weathering
- Biological