

CHAPTER I

Introduction

1.1 Introduction

Interest in the corrosion problem has many technological importances. The increase of wastage of metals due to corrosion has become an important effect in engineering application, because it reduced the mechanical and electrical property of metal. The word corrosion comes from the Latin "corroder" which "means to gnaw". Corrosion is a natural process, occurs as the chemical or the electrochemical reaction between two materials usually a metal and its environment that produced a deterioration of the material and its properties (John, 1994). For example, steel corrodes merely from exposure to moisture in the air (Barbara and Robert, 2006).

Corrosion effects are enhanced by the interactions between the constituents of the steel and the environment (water, moisture, acid, conducting solution an electric current). Corrosion is deterioration of essential properties in a material due to reactions with its surroundings, leading to a loss of strength of the structure and subsequent failure degradation of appearance metal also occurs where corrosion products or pitting can detract from a decorative surface finish. Finally, corrosion can reduce mechanical strength on the steel (Kadry, 2008),

Steel is an alloy contains iron, and carbon (up to 1.7%) with small quantities of elements such as manganese, phosphorous, sculpture and silicon. The steel surface contains both anodic and cathodic sites surface layer of water or other conducting solution. An electric current passes through the anodes and cathodes this forming a close circuit (<http://resense.co.nz>,1999).

Low carbon content has properties similar to iron. As the carbon content rises, the carbon steel becomes harder and stronger but less ductile and more difficult to weld. Steel with higher Carbon content has lowers the melting point and resistance temperature. Therefore, carbon content influences the yield and strength of steel.

Steel has being widely used for infrastructure, fire stations, manufacturing facilities, riding arenas. New design innovations allow for virtually any application of building to use an all-steel system (N.R. Baddoo, 2008). A steel frame system is economical, in large part, due to the economy of production processes. (Memarzadeh, 2005).

The steel products and materials have undergone tremendous technological advances in recent years. This is due in large part to the growth of state-of-the art engineering and design applications which have led to the refinement of steel structural systems that trump traditional building methods. A steel building system can be designed to incorporate glass or simulated rock exteriors, which give the structure an aesthetically pleasing look along with the inherent strength of steel (N.R. Baddoo, 2008), in this work we study the form of corrosion that occurs in the steel.



Figure 1.1 Show corrosion of steel (Kadry, 2008)

1.2 Objective

The main objectives of this research are:

1. To study surface corrosion of carbon of steel using fractal method.
2. To characteristic the corrosion surface morphological using fractal dimension of the espoused time on the fractal dimension of carbon steel.

1.3 Thesis Outline

Chapter 1 presents the introduction and objectives of the study. Chapter 2 gives a brief literature review of related studies overview on corrosion, basic properties steel, and also brief discussion on theory and applications fractals. The method used to analyze surface images of carbon steel & undergoing corrosion in this system in water Chapter 3. Chapter 4 describes the results and discussion on corrosion effect on carbon of steel are the variation of fractal dimension of corrosion surface. Finally, the conclusion and suggestion of future work are presented in Chapter 5.