CHAPTER I

INTRODUCTION

1.1 Introduction

Coatings technology is both an art and a science. A coating is used to describe any material that may be applied as a thin film layer to a surface. Paints are used to describe pigmented materials different from clear films which are more properly called lacquers or varnishes. The purpose of paints, is to give protection against corrosion or to be required for decorative [1].

The following is the composition of paint, which also indicates the function of the main components .

(1) Vehicle or binder (film forming main constituent) provides the basis of continuous film, sealing or otherwise protecting the surface to which the paint is applied.

(2) Pigment provides opacity, color, and other optical or visual effects.

(3) Additive minor components (film forming sub-constituent) have a wide variety and effects e.g. catalysts, driers, flow agents.

(4) Solvent (film forming assistant constituent) used to dissolve the vehicle and to adjust the viscosity to make the paint application easier. The solvents evaporate and do not remain in the paint film after application.

Major different occurrence between the polymers or resins is used in paints formulation for different purposes [2]. There are the differences between the methods of application and cure, the substrate, and the conditions of use.

Prior techniques for improving corrosion resistance of metal have used heavy chromate treatment, however chromium is highly toxic, carcinogenic and environmentally unfriendly. The propose of this study is, consequently; to improve the corrosion resistance and adhesion performance and eliminate the use of chromate. The application of organic coating onto steel is aimed at protection steel surface from corrosion. Epoxy resin is commonly used as the organic coating onto steel due to its strong adhesion, good chemical resistance, excellent toughness, hardness and flexibility. However, epoxy based coating generally does not have good resistance to weathering in sunlight. The exposure to the ultraviolet light component of sunlight results in a surface degradation phenomenon, known as chalking, which changes both the gloss and color of the original coating. To overcome this problem, silane coupling agent has been used for improving adhesion between the surface of inorganic material treated with silane coupling agents and organic resin. Silanes, in the presence of water, hydrolyze to silanols, which spontaneously condense to oligomeric siloxanes capable of forming covalent " oxane" bonds to the mineral surface. The oligomeric siloxane layer is modified by its reactions with the resin during fabrication of composites. The siloxane layer must diffuse into the resin phase and copolymerize or form an interpenetrating polymer network (IPN) with the matrix resin during fabrication [3]. The resulting interphase region must have certain characteristics for optimum performance, i.e. the interphase region should have low water absorption, high rigidity of crosslinking reaction between siloxane and reaction with the resin.

1.2 The Objective of Research

In this study, the use of silane coupling agent and epoxy resin based coating and flooring materials is for improved properties of corrosion protection, adhesion,

compressive strength and elevated temperature resistance. Also investigated, the optimum ratio of silane coupling agents to epoxy, such as, application is determined.

Coating composition was prepared containing of IPN formations epoxy resin by the reaction of an amine curing agent and inorganic network was formed by hydrolyzing and condensing of silane, the INP's can be applied onto steel surface to be treated by spraying. The benefits of this work is to improve physical properties of epoxy resin by silane coupling agent, which has been applied on the surface of the steel.