Review on Salt Spray Humidifier

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Abstract— In today's world, corrosion is the most important factor in the automobile sector. Many different methods have been developed to stop such corrosion. These methods differ in their theoretical basis and performance under the change in the various environment conditions. In this paper we review the fabrication of salt spray humidifier. We study here about the salt spray corrosion test, problems, future scope, methodology and objectives of salt spray humidifier etc. in this paper. Thermal corrosion Cycling is an innovative and cost effective process of enhancing the mechanical properties of many materials commonly used in commercial and industrial technologies. By using the salt spray humidifier, we can determine the corrosion rate of the materials or time taken to corrode the various materials. This can be used at various places such as sea water to check the corrosion resistance of the materials which are used them in sea water or in the ocean.

Key words: salt spray, Humidifier

I. INTRODUCTION

Corrosion is the deterioration of materials by chemical interaction with their environment. Humidity is the amount of water vapors present in the air [1]. Humidity indicates the likely hood of precipitation, dew or fog. Humidifier is a chamber where humidity generates [1]. It is a device for increasing the amount of water vapor in the air of a room or building, consisting of a container for water and vaporizer [1]. Thermal corrosion Cycling is an innovative and cost effective process of enhancing the mechanical properties of many materials commonly used in commercial and industrial technologies [2]. Thermal Cycling has been determined to significantly increase the corrosion properties of many ferrous alloys.

The salt spray test used to check the corrosion resistance which is a standardized test method [2]. Test duration depends on the corrosion resistance of the tested material. Nevertheless, salt spray test is widely used in the industrial sector for the evaluation of corrosion resistance of finished surfaces [3]. Nevertheless, salt spray test is widely used in the industrial sector for the evaluation of corrosion resistance of finished surfaces.

II. PROBLEM STATEMENT

Now-a-days, there are problems of corrosion on the different metal surfaces due to improper selection of materials [4]. Due to such corrosion of metals, machines or parts of it become of no use and because of such a corroded part accidents may occur & life of machines and instruments decreases [4]. To stop happening such cases, it is necessary to check the corrosion resistance of metals.

III. SCOPE

The machines have been designed to support human beings by helping them to do tedious and back breaking works. However, the industry has made only the limited use of high technology production concept. There is general need to nature the development program in automation and robotics. Machines have been employed in various tasks including material handling various interior and exterior finishing task, including material handling the high expectations of the stemmed from the very serious problems the industry is facing

- Continuous declining productivity
- A high accident rate.
- Low quality
- In sufficient control of construction site
- Vanishing of skilled work force.

In recent years the use of new technologies within the industry has shown great potential although little has been implemented. For example robotic systems and other programmable machines are needed to perform tasks that involve hazardous of rate or in some way physically dangerous to human the development of robotics systems in construction advance very slowly owing to several challenges one of the obstacles in the development of the required software component such development for highly trained programmer and export software engineers.

IV. METHODOLOGY

This chapter will cover the details explanation of methodology that is being used to make this project complete and working well. Many methodology or findings from this field mainly generated into journal for others to take advantages and improve as upcoming studies. The method is use to achieve the objective of the project that will accomplish a perfect result. In order to evaluate this project, the methodology based on System Development Life Cycle (SDLC), generally three major step, which is planning, implementing and analysis.

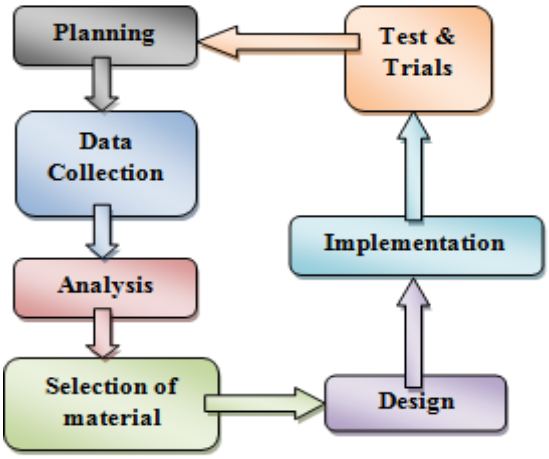

Fig. 1: System Development Life Cycle Phase

A. *Planning*

To identify all the information and requirement such as hardware and software, planning must be done in the proper manner. The planning phase has two main elements namely data collection and the requirements of hardware and software.

B. *Data collection*

Data collection is a stage in any area of study. At this stage, I planned about the projects resources and requirements, literature studies and schedule to get more information in this study [5]. All the materials are collected from journal, texts book and research papers gathered from libraries and Internet. Within the data collection period I have found the study about Fabrication of Salt Spray Humidifier in the Internet and do some research about the project related [5]. Once I got the project manual, I tried to find out the electronic component and other materials and some of equipment to be used. While planning, I have done the research about the project related, which including with study about the mechanical & electronic components such as nozzle, humidity sensor, temperature sensor, heater etc. The study is not just for the function of the component but the types of small circuit build by each component related.

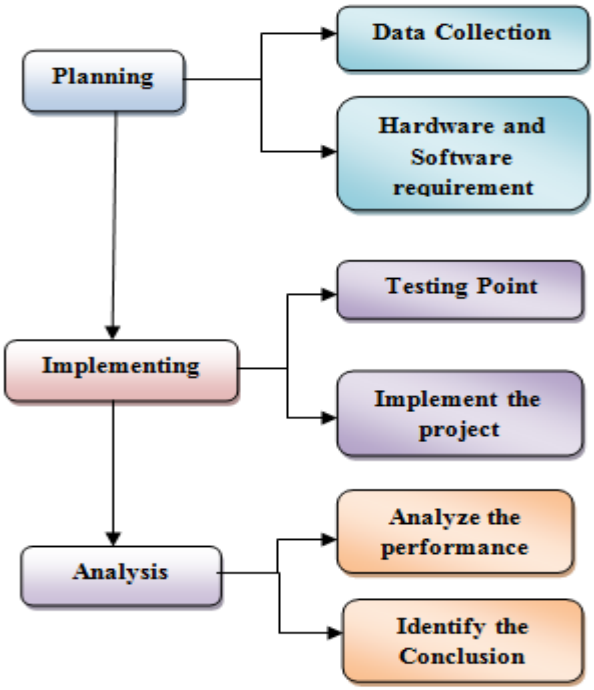

Fig. 2: Steps of Methodology

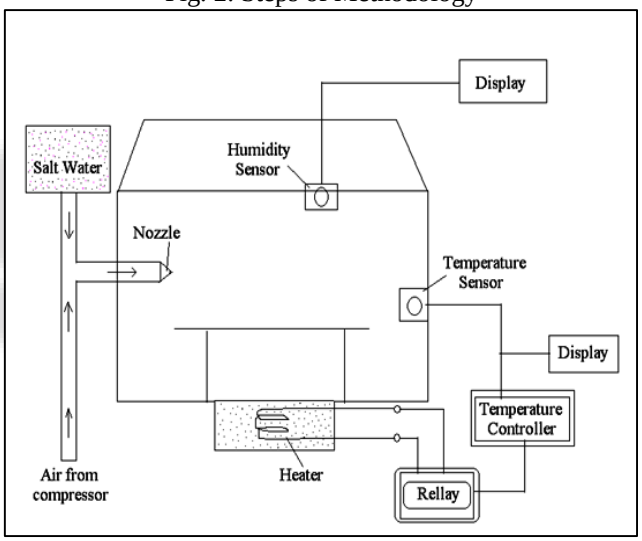

Fig. 3: Block Diagram of Salt Spray Humidifier

V. Literature Review

Salt spray was first used for corrosion testing around 1914. In 1939, the neutral salt spray test was incorporated as ASTM B117 [2]. This traditional salt spray specifies a continuous exposure to a 5% salt fog at 35oC. During the course of 80 years of use, there have been many modifications and refinements to B117 [6]. Never¬theless, B117 has been generally accepted as the standard corrosion test method and is still widely specified for testing painted and plated finishes, military components and electrical components [6]. In England, during the 1960's and 1970's, Har¬rison and Timmons developed the cyclic Pro¬hesion TM test, which has been found especially useful for industrial maintenance coatings. More recently, the Society of Automotive Engineers (SAE) and The American Iron and Steel Institute (AISI) have been studying cyclic testing for au¬tomotive applications [7].

VI. DESIGN

A. Tank

We can construct a tank of capacity in litres as we required.
Size of tank 1 – 600X600X600mm
Size of tank 2 – 200X150 X150 mm
Material – G. I. sheet
Capacity of tank –

C_1= LXWXH
= 610X590X510
= $183.55X10^6$ mm^3
= $183.55X10^6X10^{-6}$ m^3
= 183.55 litres

C_2= LXWXH
= 375X160X130
= $7.8X10^6$ mm^3
= $7.8X10^6X10^{-6}$ m^3
= 7.8 litres

Total Capacity of Tank = C_1+C_2
= 183.55+7.8
= 191.35 litres
≈ 190 litres

Where,
L=Length
W=Width
H=Height
C_1=Capacity of Tank 1
C_2=Capacity of Tank 2
C_3=Capacity of Tank 3
Salt Water Tank

C_3= LXWXH
= 200X150X150
= $4.5X10^6$ mm^3
= $4.5X10^6X10^{-6}$ m^3
= 4.5 litres

Nozzle

$$\tan\theta = \frac{\text{Vertical Distance}}{\text{Horizontal Distance}}$$

$$\tan\theta = \frac{500}{300}$$

$\tan\theta = 1.667$
$\theta = \tan^{-1}(1.667)$
$\theta = 59.0362^0$
So we select standard value,
Spray angle, $\theta = 60^0$

VII. ADVANTAGES

- Operating cost is low
- Maintenance is low
- We can find the corrosion resistance of various materials, alloys and coatings
- Easy to operate
- We can calculate corrosion rate.

VIII. DISADVANTAGES

- More time required to perform.

IX. APPLICATIONS

Typical coatings that can be evaluated with this method are:
- Phosphated (pre-treated) Surfaces
- Zinc and zinc alloy plating
- Electroplated chromium, nickel, copper, tin
- Coatings not applied electrolytically, such as zinc flake coatings according to ISO 10683
- Organic coatings, such as rust preventives
- Paint Coating

X. CONCLUSION

From this project we conclude that we can find out the corrosion rate of various materials. We can make some prevention to stop corrosion of such materials. We can test various coating of metals on part which will corrode. Because of such test, we can able to decide which coating is best for corrosion resistance. And we can stop that material to be corroded. We can stop accidents which are happening because of corrosion. This is really good method to find out corrosion resistance.

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