REVIEW ON FABRICATION OF 3 AXIS SPRAY PAINTING MACHINE

Prof. Dinesh.B.Shinde[1], Anup.A.Waghare[2], Pankaj.V.Yeole[3], Nikhil.D.Thombare[4]

[1] *Assist.Prof.,Department of Mechanical Engineering, D.M.I.E.T.R,Wardha, Maharashtra, India*
[2] *Student,Departmnt of Mechanical Engineering, D.M.I.E.T.R,Wardha, Maharashtra, India*
[3] *Student,Department of Mechanical Engineering, D.M.I.E.T.R,Wardha, Maharashtra, India*
[4] *Student,Department of Mechanical Engineering, D.M.I.E.T.R,Wardha, Maharashtra, India*

ABSTRACT

Nowadays robots are widely used in almost every application like medical application, entertainment, military, factories automobile industries, etc. Though the use of robot is still not widely used in constructional work. Robots are basically design to increase speed and maximize accuracy of construction field work. The preliminary aim of the project is to design, develop and implement Remote Operated Wall Painting Machine which helps for achieving painting equipment at low cost due to which the painting work can be easily done efficiently and most importantly at very nominal cost. The painting machine avoids direct contact of chemicals which can be harmful to the human painters such as eye, skin and respiratory system problems. Also the nature of painting procedure that requires repeated work time and hand rising make it boring, and effort consuming.
In addition, it would offer the opportunity to reduce or eliminate human exposure to difficult and hazardous operated system environments, which would solve most of the problems connected with safety when many activities occur at the same time. This machine is very easy to operate and no need of skilled labour is required to operate. This machine can work efficiently with less human effort. These factors motivate the development of remote operated wall painting machine. The machine is very efficient and all the equipment's are attached by the various joints to perform the operation very smoothly. To overcome various problems occurs while painting manually so that a painting machine is proposed, designed and developed. Testing results shows that the painting by machine is better as compared to the human.

Keyword : - *motor controlling, painting machine.*

1. INTRODUCTION

The automatic wall painting robot is not designed using complex components. This robot is simple and transportable. The robot is designed using 2 steel shaft, 2 lead screw, an spray gun use to paint the wall,an I.R sensor to detect distance between the wall and spray gun, a pair of d.c. motor for the movement of painting robot in X and Y direction.,4 wheels for the movement of the robot with 4 gear motors attached to the wheels. This machine is compact because of high speed and pressure capabilities they have. Due to elegant and simple control systems it can easily control noise, perform silent operation and no vibration is produced. It has longer life, flexibility and it is efficient and dependable, and the installation is simple and the maintenance is also easy. Wall painting is a repetitive, exhausting and hazardous process which makes it an ideal case for automation. Painting had been automated in automotive industry but not yet for the construction industry and also for the house wall painting.

There is a strong need for a movable robot that can move to paint interior walls of residential buildings. The project is about to fabricate and implement Remote Operated Wall Painting Robot which helps to paint the wall easily. This robot is simple and portable. They have a moderate weight and predictable performance i.e., losses are minimum due to less number of moving parts and so give expected performance. Some of the conditions that have to be considered while using this robot is that the system is operated by electric motor. These factors motivate the development of the robotic painting system.

2. LITERATURE REVIEW

Mohamed Abdellatif [1] In this paper author describe the design and working of an autonomous wall painting robot. The conceptual design of a movable painting robot to be used for painting interior walls of residential building had been described. The robot uses roller fed with liquid paint and keeps contact with the wall surface. The robot enables the roller to scan vertically as well as horizontally to the painted walls. The robot can maneuver to adjust itself in front of the wall.

Dhaval Thakar et. al. [2] This paper gives basic information about small and medium scale industries manufacturing components have to paint for protecting from rusting so the spray application consumes maximum time and paint which required the skilled worker emerged with the application. They cannot manage robotic arrangement for higher efficiency so the rise of the such process have to be made which is affordable, gives better accuracy, consumes minimum time for coating so objective has to developed such mechanism which coat the object with the dipping technique having semi-automatic arrangement which is suitable for our requirement and which can be valuable for small and medium scale industries.

P. Keerthanaa et. al. [3] They studied that automatically paint the wall surface of given dimension has been designed and implemented in effective manner. The approach uses Infrared transmitter and Infrared receiver to identify the appearance of wall. The microcontroller unit to regulate the movement of the DC motor. The robot wipes out the hazards caused due to the painting chemicals to the human painters and also the nature of painting techniques that require imitated work and hand rising makes it dull, time consuming. The robot is cost effective, reduces work force for labours, and reduces time consumption. The drawback of the project is that the robot continues painting later the end of the wall so it can be eliminated by adding some indicating objects such as alarms.

Berardo Naticchia et. al. [4] In this paper, they shown that automated painting can be not only aimed at correcting productivity, but also quality checking. A robot arm with high precision is required. An automated system to convert the normalized coordinates of the liquid colors to be reproduced into the movement speed of the robot end tool and valve opening end of the mixing board. Most of the work will be probably necessary to achieve high resolution. Because of the shape of full scale robots, probably also the resolution of the human scale robot will be lower. Another particularity of the small scale arrangement is of course the ability to access some hard places of buildings under construction, where human range robots could not be allowed.

Takuya Gokyu et. al. [5] They have shared that construction of Wall-Surface Operation Robot plan to automate and increase the efficiency a series of restoration works by adding, changing of an attachment, new task for cleaning. Tile separation sensing and repair work to the initial functions of picture painting in a single and multiple colors is also done. The analysis of this example was introduced as a periodic inspection of the 10th year for the office building concerned. And, high profitability is expected because of presence of many similar structures.

Pal Johan et. al. [6] In this paper, they present a technique for increasing the speed at which a standard industrial manipulator can paint a wall surface. The approach is based on the perception that a small error in the direction of the end effector does not influence the quality of the paint job. It is far more important to maintain constant velocity throughout the orbit. In doing this, they cast the problem of finding the optimal orientation at each time step into a convex minimized problem that can be solved efficiently and in real time. They show that aim to allow the end effector to keep higher constant velocity throughout the orbit guaranteeing constant paint coating and substantially decreasing the time needed to paint the wall.
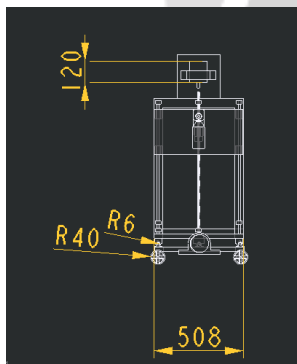
3. 2D Diagram

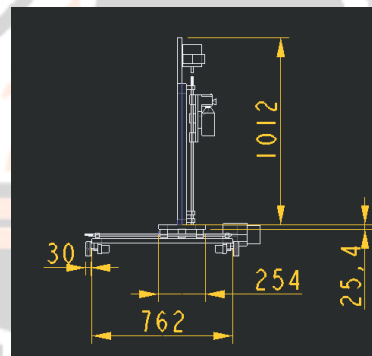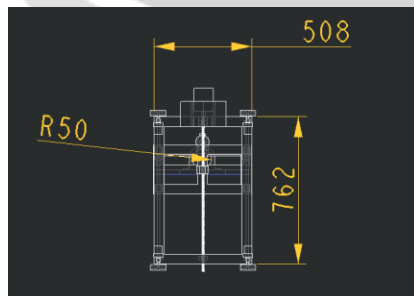

Fig.1.1.1 front view

Fig.1.1.2 side view

Fig.1.1.3 Top View

3.1 ADVANTAGES

The robot eliminates the hazards caused due to the painting chemicals to the human painters such as eye and respiratory system problems and also the nature of painting procedure that requires repeated work and hand rising

makes it boring, time and effort consuming. The robot is cost effective, reduces work force for human workers, and reduces time consumption.

3.2 APPLICATIONS

It can be used for painting in automobile sector.

It can be used to paint furniture's.

It can be used to paint in companies for different types of materials.

It can be used in industries who mass produce wood products.

3.3 TYPES OF SPRAY PAINTING

1. Air Gun Spraying

2. HVLP (High Volume Low Pressure)

3. LVLP (Low Volume Low Pressure)

4. Electrostatic Spray Painting

5. Air Assisted Airless Spray Painting

6. Automated Linear Spray Painting

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5. CONCLUSIONS

The Three Axis Spray Painting Machine is the best system to paint the surface. The approach uses IR transmitter and IR receiver to detect the position of wall. The control is use for the movement of the DC motor. . In the future the painting robot can be improved by using image processing in order to scan the objects and hurdles that existing on the wall so that those objects can be automatically vanished while painting.