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DESIGN & FABRICATION OF DOUBLE AXIS WELDING MACHINE

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Abstract - *Industrial robots are essential components of today's factory and even more of the factory of the future. The demand for the use of robots stems from the potential for flexible, intelligent machines that can perform tasks in a repetitive manner at acceptable cost and quality levels. The most active industry in the application of robots is the automobile industry and there is great interest in applying robots to weld and assembly operations, and material handling. For the sake of competitiveness in modern industries, manual welding must be limited to shorter periods of time because of the required setup time, operator discomfort, safety considerations and cost. Thus, robotic welding is critical to welding automation in manyindustries. It is estimated as much as 25% of all industrial robots are being used for welding tasks.*

1. INTRODUCTION

Modern manufacturing faces two main challenges: more quality at lower prices and the need to improve productivity. Those are the requirements to keep manufacturing plants in developed countries, facing competition from the low salary regions of the world. Other very important characteristics of the manufacturing systems are flexibility and agility of the manufacturing process, since companies need to respond to a very dynamic market with products exhibiting very short life-cycles due to fashion tendencies and worldwide competition.

1.1 Problem Statement

The current state in small scale industries is that they still resort to manual welding and machining methods due to lack of economic resources and infrastructure. In addition to that the uniformity and quality of the weld cannot be ensured, not to mention the work hours put in and the expenditure spent on the labors. Also there is a persistent risk of causing hazards to the operator through fumes, fires, spatter flying off those machines.

1.2 Objectives

The idea behind fabrication of low cost Automatic welding machine is to full fill the demand of welding machines for small scale to large scale industries with optimized low cost.In addition to that the quality of the weld is also quite paramount therefore using an optimisation technique we try to optimise the different weld parameters and get a good quality of weld.

2. METHODOLOGY

a. Market survey: During this period detail market survey has been done to learn available systems and their utility also their literatures of different types of our systems and its difference between have been observed.

b. Problems in existing systems: The problems regarding the existing system have been found such as, Complicated programming, High budgets, Unfeasible design, high end robots, etc.

c. Conceptual Design: Taking problem statement from above and studying the fundamental engineering concepts various concepts regarding modern system are prepared and amongst those best concepts design has been selected for further phases. Testing phase includes testing of the Prototype model under real environment.

d. Modeling in software: Putting the ideas on the modeling software for visualization of the prototype and making it more and more compatible so that there will be less complexity in designing.

e. Fabrication: This phase includes fabrication of prototype in the workshop from the procured material and preparing the Prototype model from the software model.

f. Assembly & Testing: This include Assembly of all the sub parts, also the arrangement of the motor and its wiring is done, all finishing operations like grinding, trimming, painting is done here. Testing phase includes testing of the Prototype model under real environment.

3. MODEL AND ANALYSIS

The metal frame is generally made of mild steel bars for machining, suitable for lightly stressed components including studs, bolts, gears and shafts. It can be case- hardened to improve wear resistance. They are available in bright rounds, squares and flats, and hot rolled rounds. Suitable machining allowances should therefore be added when ordering. It does not contain any additions for enhancing mechanical or machining properties. Bright drawn mild steel is an improved quality material, free of scale, and has been cold worked (drawn or rolled) to size.

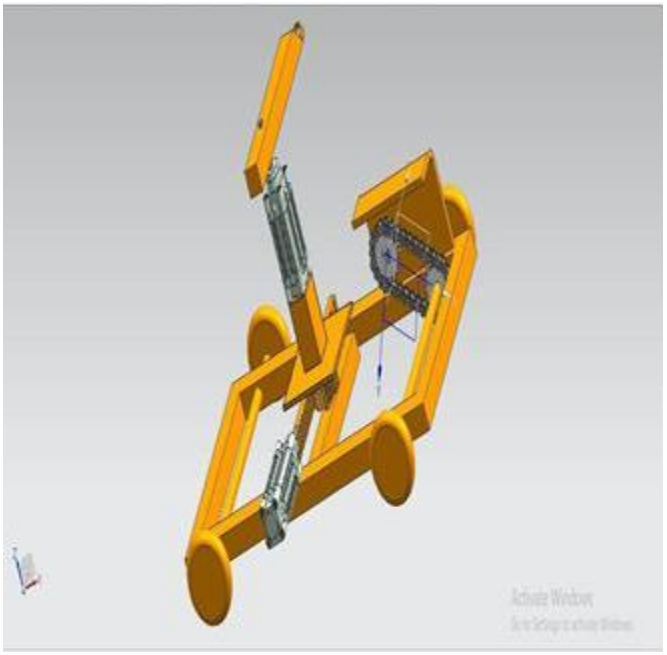

Fig.1 Actual Experimental Setup

It is produced to close dimensional tolerances. Straightness and flatness are better than black steel. It is more suitable for repetition precision machining. Bright drawn steel has more consistent hardness, and increased tensile strength. Bright steel can also be obtained in precision turned or ground form if desired.

The main aim of project is to fabricate the pneumatic operated welding machine. Welding is a fabrication process that joins materials, usually metals or thermoplastics. This is often done by melting the work pieces and adding a filler material to form a pool of molten material that cools to become a strong joint, with pressure sometimes used in conjunction with heat, or by itself, to produce the weld. The pneumatic operation consists of pneumatic cylinder, compressor, control unit, solenoid valve etc… which are used to actuate the piston rod. The compressor is used to compress the air and it is passed to the solenoid valve. This solenoid valve controls the direction of flow of air to the cylinder. This pressurized air is actuating the piston rod to forward and return position. At the pistonrod the welding rod is fixed. This welding rod makes forward motion and reverse motion in order to make or weld the two different plates. The welding rod is otherwise known as electrode which is connected to the power supply terminals. The work piece also connected to the power supply. This setup requires a heavy electrical arrangement to make the welding.

A] Design and Manufacturing of Non-Standard Part:

In our attempt to design a gear train we have adopted a very careful approach. Total design work has been divided into two parts mainly,

1. System Design: System design mainly concern with the various physical concerns and ergonomics, space requirements, arrangements of various components on the main frame of machine, number of controls, positions of this controls, ease of maintenance, scope of further improvements, height of machine components from the ground etc.
2. Mechanical design: The components are categorized into two parts,

a. Design Parts
b. Parts to be purchased

4. ADVANTAGES

I. Small in size.
II. Cost is less compared to other welding machine.
III. Due to the nature of portable it can be easily handled.
IV. Due to portable ability it is easily handled.

5. CONCLISION

This project is made with pre planning, that it provides flexibility in operation. This innovation has made the more desirable and Economical. This project "Fabrication of automatic pneumatic double axis welding machine" is designed with the hope that it is very much economical and help. This project helped us to know the periodic steps in completing a project work. Thus we have completed the project up to designing and material selection successfully.

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