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Standing Desk Rotary Axis Welding Table

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ABSTRACT: A welding table is a platform that is at waist level, and it works like a workbench. This table is used when working in metal fabrication with welding. A welding table is very useful because it gives the welder a stable place to work and can aid with both squaring and measuring. After some analysis, it was found that there were some problems experienced by the respondents while using the welding table. Among the problems experienced are such as back pain, table being too heavy, no safety features. Objective to build this project is to design a more efficient welding table which is better than the current version. Besides, it will be more comfortable for the operator and hence will result in better efficiency. For methodology research, we use Hydraulic systems to adjust the height of the table. Next, we use lighter material than usual and equipped it with wheels, so it is easier to move. A survey has been conducted to identify the problems about the existing welding table and things that need to be upgraded. We analyze the survey and determine the important parts that need to be upgraded on the welding table. What we get from this project is, it makes it easier to carry out welding operations. But the disadvantage of our project is that it cannot weld large items due to the small size of the table we created. We plan to create larger adjustable welding in the future.

KEYWORDS: workbench, problems faced, better efficiency, hydraulic systems, survey

I. INTRODUCTION

You may have heard of a welding table previously, and how beneficial it is to have one. A welding table is a platform that is at waist level and it works like a workbench. When you are working in metal fabrication with welding, you utilize it. A welding table is extremely helpful because it provides the welder a steady location to work and likewise can offer support with both determining and squaring. No matter what size they are, all welding tables are made from steel that can endure the rigors and intense heat that comes with welding. When you use a welding table, you can perform many different tasks. Many jobs require a welder to be able to square corners, gauging, and measuring. A welding table neither is an ideal platform for doing all of that without needing to endure extra tension nor included troubles. You can likewise use a welding table for mounting purposes, such as flexing brakes and jigs.

Welding tables are often made of steel because welding on a wooden surface can trigger a fire hazard. Technically, using a steel table, the clamp can be attached to it, and the workpiece placed on the table will be electrically connected with the surface of the table. There are two types of welding table commonly used in fabrication workshops: adjustable and fixed. The adjustable type offers several advantages such as the table can be tilted/inclined so that the welders can place the work pieces on the table in various orientations. To date, an adjustable welding table has been designed with multiple functions such as lifting (adaptable table height), tilting table, and rotating table to help welders to perform SMAW process in an efficient manner. These function allow welders to set the height, orientation, and position of the work piece according to their preference. On the other hand, an adjustable welding table could be associated with high cost as it uses a hydraulic cylinder, a foot pedal actuation, and requires maintenance

For our project, we want to innovate to make this welding table more usable. Firstly, we want to make this adjustable welding table comfortable for users. So, we make a welding table that can adjust the height according to the user's suitability. Furthermore, we want to make this adjustable welding table easy to carry. So, we put the wheel at each foot



of the table. In future we could perform larger operations by enlarging the size of the table but it would require adding more hydraulic cylinders. We could also place a bench vice on the other side of the rotary disc to carry out other clamped type operations for even better efficiency and carrying out various operations simultaneously would reduce the cycle time.

II. LITERATURE REVIEW

1. Mohamad Faizuddin Bin MD Rafi and Muhammad Nurhadi Bin Mohd Nori, (2020)

Design of welding table in 2011

This welding table does have a more stable leg structure and is significantly higher in quality, being able to bear a much heavier load. However, for a portable table, it's heavy and doesn't have a tilt function. They are designed well, in an Xshaper at her than parallel lines. This layout allows a useful range of clamping positions. It also lasts much longer than the other table due to higher quality components. It eliminates the need for locking and clamping devices, which are generally the first to break.

2. Mohamad Faizuddin Bin MD Rafi and Muhammad Nurhadi Bin Mohd Nori, (2020)

Design of welding table in 2012

It suits the most diverse range of welding applications, has the largest surface area, and comes with high quality and heavy-duty materials. A downside is that it's one of the heaviest tables available at 318 pounds. Once its setup, it can either remain stable on its six legs or become a hub for your welding and cutting needs, orbbed move around its four caster wheels. These make it easy to move around your workshop or garage. It comes at a higher cost than most of the other tables available, but it includes the most diverse range of features and suits both hobbyists and industrial workshops alike.

3. Mohamad Faizuddin Bin MD Rafi and Muhammad Nurhadi Bin Mohd Nori (2020)

Design of welding table in 2013

This welding table gives you a convenient place to weld small components. It's taller than most tables available, which is useful when you want to see your welding close-up while protecting your back. There are no fixture points on it unless you make your own. However, the included torch loop is handy for resting your torch in.

A. Conclusion of Literature Review

To overcome the problems detected through the referred papers such as pain in the back because of irregular posture during welding, carrying the job to the welding table instead of its opposite, it is difficult to rotate circular objects while welding. Hence, to overcome these problems we are implementing the hydraulic system and rotary disc to the welding table for adjustment as per the requirements.

III. OBJECTIVE & SCOPE

A. Existing System -

The design and structure of the welding table remains the same as we add a hydraulic cylinder, geared motor and wheels. Nowadays workers are facing severe problems of back pain and because of that they can't concentrate on their work. Because of that their efficiency is decreased which is directly proportional to the industry profit. We just provided the linear and a rotary motion to the table and rotary plate as per the user's requirement.

B. Problem Description-

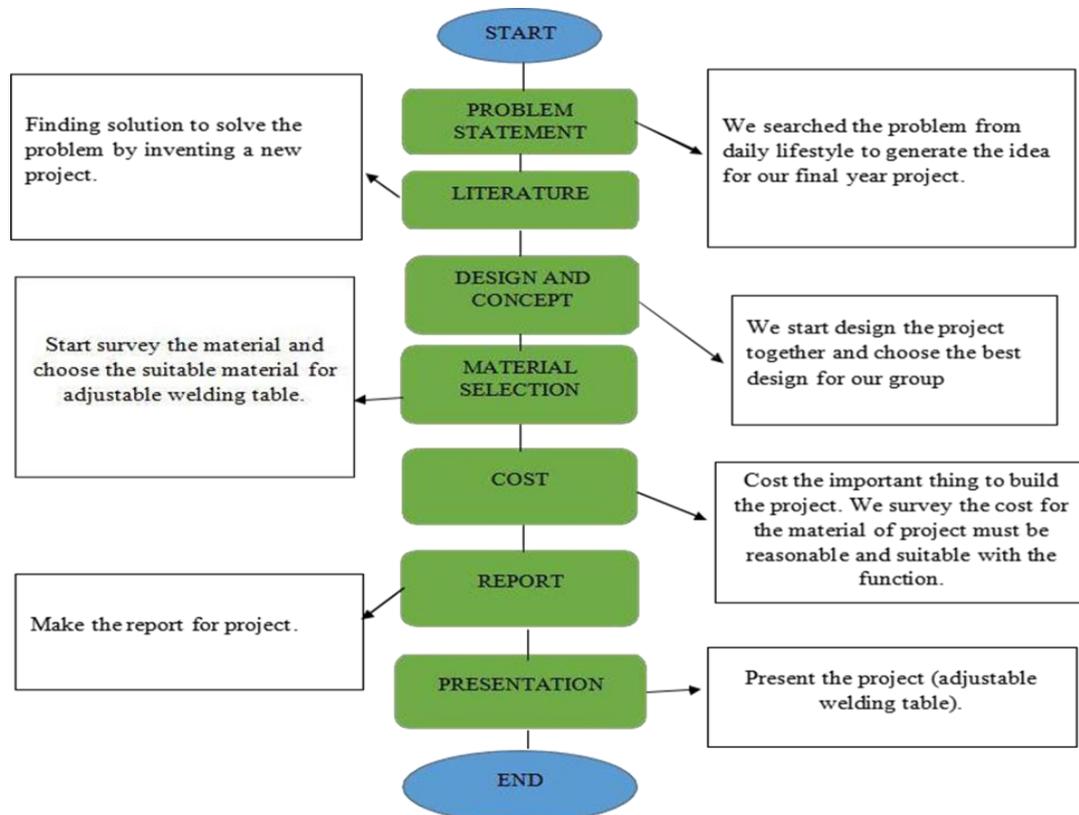
Nowadays, the industry is growing very rapidly because of technical advancements. Therefore, workers must be comfortable while working and should reduce the cycle time of the job. The workers are facing problems like severe back pain due lack of height adjustment, and difficulty carrying the current welding table to required application because it is heavy to lift.

C. Objectives-

1. Objective to build the adjustable welding table is to design a more efficient welding table compared to the current practices.
2. The adjustable welding table can be used by many people, especially workers and students. This project is to make the user more comfortable and less hurt back pain.
3. This adjustable is also lighter than the current welding table and easy to carry anywhere. And critical circular operations can be performed with ease.
4. We could also add a bench vice to the other end to allow performing multiple operations simultaneously and reduce the cycle time.
5. The size of the welding table and its load carrying capacity could be increased by increasing the number of cylinders.

D. Proposed Work-

We have developed a hydraulic system on an existing welding table for its linear motion as per the operator's requirement. And we have fixed a geared motor for the rotary axis to perform operations on circular components. The linear as well as rotary adjustment is controlled by valves and switches. The linear motion is fully operated by the pressure of hydraulic oil by the centre situated cylinder. For future scope we have placed a bench vice in the design of the welding table.

IV.METHODOLOGY**A. Flow Chart**



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V. ADVANTAGES AND LIMITATIONS

A. Advantages

1. Height adjustability results in better posture and comfortable working.
2. The control system is fairly easy to use.
3. The Rotary part of the table would reduce the labor requirement because normally it would take one person to rotate the job and other to weld it.
4. It has multiple workstations, and many jobs can be carried out simultaneously.
5. Simultaneous processes will reduce cycle time and will result in better efficiency.
6. The system being hydraulic has high bearing/lifting capacity.
7. Increasing the number of cylinders would allow increased workspace.
8. Not only welding but many kinds of jobs could be produced, if proper equipment are provided.
9. Wheels are provided and thus it's easy to reposition.

B. Limitations

1. High initial investment
2. Complex construction.
3. This prototype needs a hydraulic power pack.
4. This prototype can lose its trajectory as it relies on only one cylinder.

VI. CONCLUSION

It can be concluded that "Standing desk rotary axis welding table" was a success. This system consists of a hydraulic cylinder, geared motor MS bars, pipes and plate and wheels. It is user friendly. Also, it can be concluded that the objectives of this project have been successfully met and they are as follows:

- Constructed a hydraulic based welding table which is user friendly.
- Designed a welding table on which three processes can be carried out simultaneously.

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