

Termesus - I

sub: Basic Mechanical Engineering.

Name : Krishnaraj P Thadesas

Roll : 109059 - DIV. 9

Experiment - 4

Batch - I<sup>3</sup>

Name of Experiment : Demonstration of Robot Assisted Welding Process.

Performed on : 23<sup>rd</sup> September 2021

Submitted on : 17<sup>th</sup> October 2021

Aim : To study the working principle and applications of Robot assisted Welding Process.

Theory :

Welding is a fabrication process where two or more parts are fused together by means of heat and pressure. A strong joint is formed as the part cools. It is generally used on metals and thermoplastics. The parts that are joined are known as parent metals.

Need of Robot Assisted Welding :

Welding is a hazardous process and precautions are required to avoid burns, electric shocks, vision damage, inhalation of poisonous gases and fumes, exposure to radiation. Therefore, it is desirable to automate inbow

the process to require minimal human interaction.



### What is Robotic Welding?

It is the complete automation of welding process by the use of mechanised programmable tools. It can perform welding, and hold the part by itself. This system has filled the gap due to shortage of labour and has improved the accuracy and productivity. It has a wide range of application in automobile, manufacturing, fabrication etc.



### Components of Robotic Welding:

The robotic welding system consists of a wide range of pieces working together to weld metals. Some of them are listed below:



Welding Power Source: It provides power to the system for working of all components.



Welding Robot: This robot is the main component that performs the welds. It has an arm that can move in three directions for rectilinear types and through more planes in articulating versions. Its selection depends upon its reach, weight, carrying capacity and speed of operation. It is equipped with various mechanical systems, electronic hardware, and cables and sensors.

(3) Robot controller and Interface: The controller is the brain of the system. It has a software program that controls the robot. It processes the data and gives instructions like parts movement, robot tooling, gripping etc. The interface allows the user to set and monitor parameters that affect the weld.

(4) Wire Feeder:

It supplies the wire to the torch for the welding process. Its supply rate depends upon the speed of operation.

(5) Torch: It uses the power flowing in the electrode to heat up and join the materials together. Shielding apparatus and cooling unit is also included in it.

(6) Work Area: The parts are placed here and held for the robot to weld.

(7) Safety Features: Robotic welding machine has safety features like fencing, access doors, shields, alarms, interlocks etc, to prevent any harm to operators and workers.

(8) Wire cleaner: The cleaner is used to remove spatter from the torch between work cycles prolonging equipment life span.



## Advantages of Robotic Welding over Manual Welding.

- (1) Increased efficiency due to longer working hours and high speed.
- (2) Better accuracy due to no human errors.
- (3) Less waste due to precision.
- (4) Enhanced safety due to no human contact and safety features.
- (5) Once Installed, Robotic welding is more cost effective due to less manpower requirement and more efficiency.



## Disadvantages

- (1) Very high investment cost for setting up the machinery.
- (2) Less flexibility due to fixed programs.
- (3) Not feasible for small projects.



## Future of Robotic Welding.

Since the market of manufacturing is continuously growing, the demand for robotic welding is

also increasing. There is immense scope for development in this field. Artificial Intelligence and sensing may be embedded so that the robot would determine the parameters for welding. Collaborative robots may also be possible that work side by side with people to accomplish the work. But this can lead to decline in jobs for manual workers. The investment cost may also lower due to new developments in the technology.



### Conclusion :

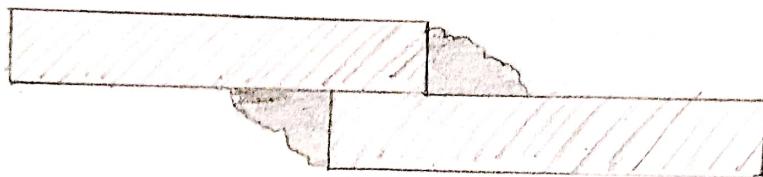
Robotics is playing a very important role in improving our standard of living. It is becoming crucial in the manufacturing sector also to meet the new standards of accuracy, quality and speed. A substantial opportunity in technology exists to relieve people from monotonous work. It cannot completely replace manual labour, but it is still sought after widely. It has transformed the industry towards a better future, yet a lot more is left in this field to make it more feasible and affordable for more applications.

# Types of Welding Joints

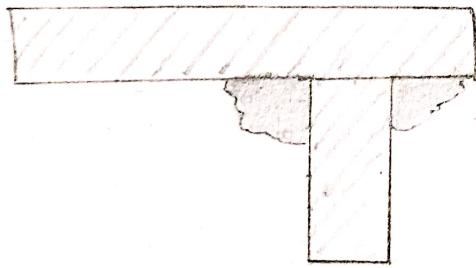
① Butt Joint



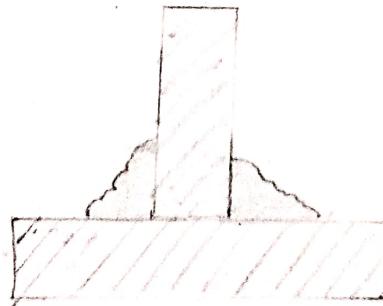
② Lap Joint



③ Corner Joint



④ Tee Joint



⑤ Edge Joint

