

# Third Arm

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**Abstract-** The structure of a third arm is usually mostly mechanical and can be called a kinematic chain. The chain is formed of links, actuators, and joints which can allow one or more degrees of freedom. Most contemporary third arm use open serial chains in which each link connects the one before to the one after it. These third arm are often resemble the human arm. Third arm used as manipulators have an end effector mounted on the last link. This end effector can be anything from a welding device to a mechanical hand used to manipulate the environment.

**Keywords-** Human arms, Robot arm, Third arm

## I. INTRODUCTION

A robot arm is a device which is to do performs the automated task, either according to direct human supervision, pre-defined program, set of a general guideline, using (artificial intelligence) techniques. The task is to replace human work, such as construction, carrying heavy thing or hazardous material. The action of taking material or move an arm is controlled by computer programming or microcontroller. The robot arm is consist of a robot arm, gripper, and control program.

A mechanical gripper is a robot component that uses movable, finger-like levers to grasp objects. It can be used for various types of industrial and household applications.



Fig 1. Third arm

In this case, the mechanical gripper is utilized for industrial pick-and-place purposes. Some mechanical grippers are controlled by servomechanism while others are driven by some linear actuation mechanisms.

The most commonly used type of mechanical gripper is the parallel type. This type of mechanical gripper uses two fingers like levers (that move towards each other) to hold objects by applying the adequate amount of normal force onto the object. For holding circular objects, a mechanical gripper with three moving levers can be used.

## II. LAW OF ROBOTICS THIRD ARM

Isaac Asimov conceived the third arm as humanoids hand, devoid of feelings, and used them in a number of stories. His third arm were well-designed, fail-safe machines, whose brains were programmed by human beings. Anticipating the dangers and havoc such a device could cause, he postulated rules for their ethical conduct. Third arm were required to perform according to three principles known as “Three laws of mechanical arm” which are as valid for real mechanical arm as they were for Asimov’s mechanical arm and they are:

1. A third arm should not injure a human being or, through inaction, allow a human to be harmed.
2. A third arm must obey orders given by humans except when that conflicts with the First Law.
3. A third arm must protect its own existence unless that conflicts with the First or Second law.

## III. DEGREE OF FREEDOM

The number of DOF that a manipulator possesses is the number of independent position variables that would have to be specified in order to locate all parts of the mechanism; it refers to the number of different ways in which a mechanical arm can move in the particular direction.

In the case of the typical industrial mechanical arm, because a manipulator is usually an open kinematic chain, and because each joint position is usually defined with a single variable, the number of joints equals the number of degrees of freedom.

## IV. THIRD ARM

The structure of a third arm is usually mostly mechanical and can be called a kinematic chain. The chain is formed of links, actuators, and joints which can allow one or

more degrees of freedom. Most contemporary third arm use open serial chains in which each link connects the one before to the one after it. These third arm are often resemble the human arm. Third arm used as manipulators have an end effector mounted on the last link. This end effector can be anything from a welding device to a mechanical hand used to manipulate the environment.



Fig 2: Actual Model of Third Arm

## V. CONCLUSION

- It reduces the weight of object, when it sustained on the human back. The mechanism is there to hold the heavy loads.
- The first objective of the project was to design a working third arm with the ability to perform a pick-and-hold function.
- The design of the robotic was started from the prototyping stage. Drawings and assembly schematics were generated as design data to be kept for future reference if improvements were to be done to enhance the developed device in any possible way. Therefore, the first and third objectives were achieved.
- The prototype of the robotic arm was successfully developed and it was able to hold the object 24x7.

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