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OVERVIEW OF FIXTURE DESIGN FOR INDUSTRY

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ABSTRACT:

Mechanical industries are grown at the rate of 5% in last decade and which is supposed to grow in future at faster rate with the supporting policies of Indian government such as make in India. The mechanical industries are acting as the backbone of all sectors as without mechanical industries it is highly impossible to manufacture any product at large scale. Many operations in mechanical industries need to work on the piece of materials. For the operations such as cutting, shaping, turning and many more, fixtures are used so that the piece of material will be fixed at a place in order to complete operations with precision. Fixture is one of the basic elements in mechanical operations of industry for converting the raw material to product.

KEYWORDS: Pneumatic Cylinders, Direction Control Valve, Solenoid Valve.

INTRODUCTION:

Fixture is the most important equipment used in mechanical industries to hold, locate and support the work piece during the operation. The purpose of the project is to reduce the human effort. This project has been selected as an issue of safety and failure of worker in an industry. The completion of this project will drastically reduce fatigue of the worker and also provide safe working conditions to worker.

The fixture needs the electromechanical components to operate. The operating parts include valves to control direction, movements, cylinders to control pressure etc.

The product development process should be very fast and bendable with the minimum scope for any accident during operations. The mechanical parts are processed to give them a final shape of product with mechanical operations. These operations will be performed with more precision if a structure to fix the piece of material is used. Fixtures plays important role in production of mechanical parts with effective performance of operations on it.

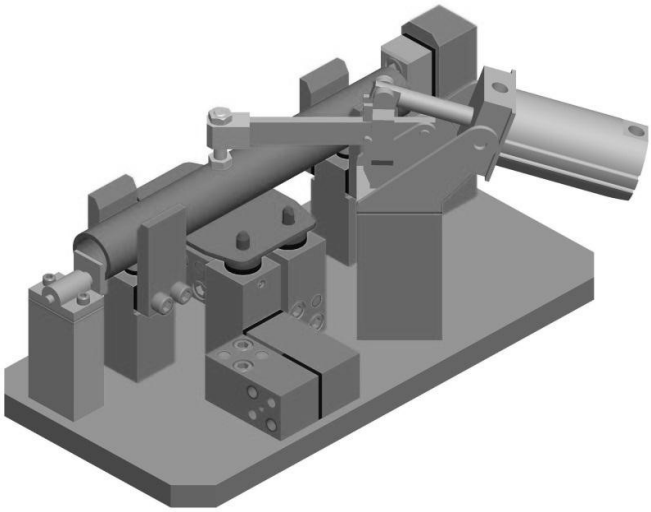


Fig.1: Basic structure of Fixture

The mechanical industries have grown over last 25 years at faster rate all over the world with the development of applications of physics. Even though electronics industries and software industries are growing much faster that mechanical, still the manufacturing operations are mainly mechanical for most of the products. Figure drawn above shows basic structure of fixture used in mechanical industry.

PROCESS OF FIXTURE DESIGN:

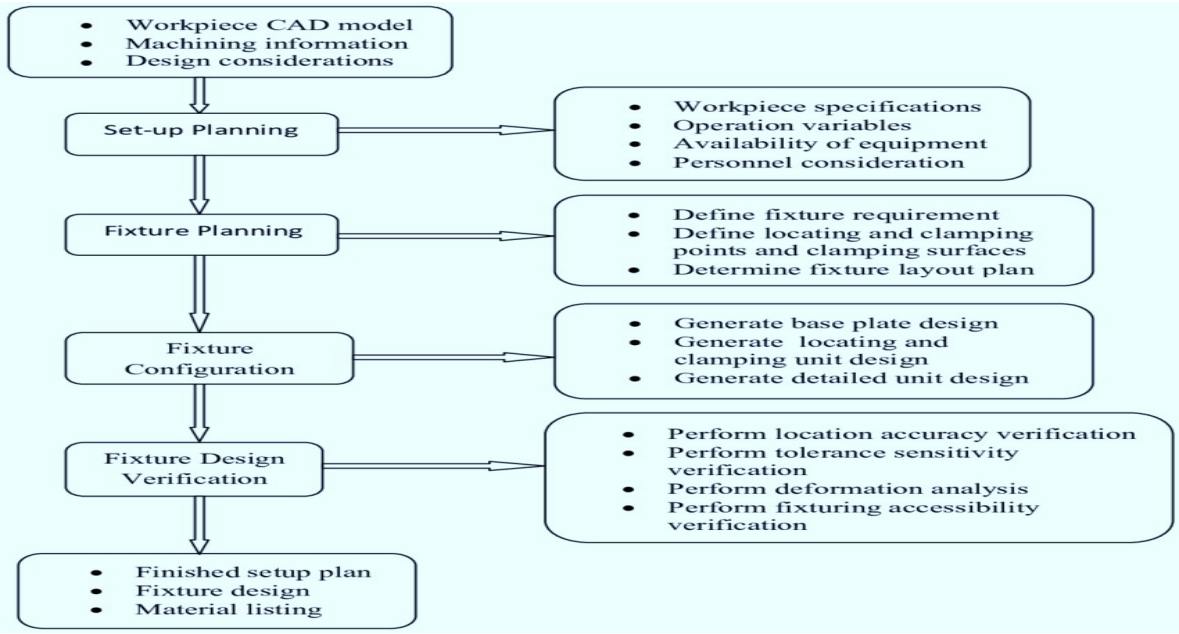


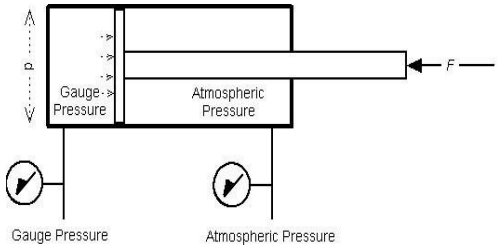
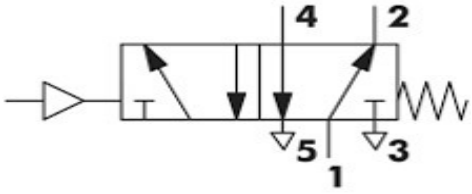
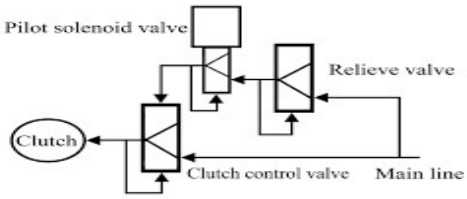
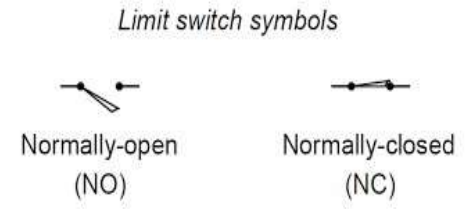
Fig.2: Process of Fixture Design

The flowchart for the process of designing a fixture is shown in above figure. In the first stage of developing a fixture availability of the equipment's for developing a structure with objectives of design are considered. In next stage requirements such as place, purpose and layout of fixture are studied and considered for manufacturing. Then the design is verified for accuracy of operation performance. Finally it is manufactured and set up. The general steps for fixture design can be stated as follows.

1) Defining requirements.
2) Gathering Information.
3) Developing Options.
4) Choosing best Option.
5) Implementing the Design

COMPONENTS USED IN FIXTURE:

Table.1: Main Components of Fixture

Sr. No.	Component Details	Purpose	Picture of Component
1	Cylinder	Pneumatic cylinder is used to carry out the task with force developed	
2	Direction Control Valve	It is used to change the direction of force to be applied.	
3	Solenoid Valve	It converts electrical energy to mechanical movement	
4	Limit Switches	It operates as a safety interlock to cout passing point of object.	

CONCLUSION:

Fixture is very important to be used in mechanical industries. Many operations such as tuning, grinding, and shaping are carried out on small piece of material. In these operations high accuracy is expected for final finishing of product. If the operations are not carried out with precision, then the product may be rejected by the quality engineer. At the same time, if the material is not fixed at a place, the worker operating the machine has high chances of accidents. As most of the operations on mechanical parts are operating with rotating machines and other tools, there are chances of occurrence of accident. Authors have presented the overview of manufacturing process for fixture. The steps for manufacturing of fixture are discussed in this paper.

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