

## A Review on Fixture Design and Manufacturing

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**Abstract**— The fixture is most commonly used in all industries to hold the workpiece in required position for performing required operation such as drilling reaming counter-boring etc. This paper gives review of fixture related work which is carried out previously by various authors with their used techniques and software's used for design the fixture.

**Key words:** Design and Manufacturing

### I. INTRODUCTION

The Fixture is defined as a production tool that locates, holds, and supports the work securely so the required machining operations can be performed at required position without any problem. Fixture is always fastened to the table of machine upon which the work is done.

The fixture reduces inspection for accuracy hence reduces operation cycle time. The industries from small scale to large scale mostly uses fixture for performing various operations which indirectly reduces cycle time makes operation easy to perform with no any time consumption as compare to traditional.

### II. LITERATURE REVIEW

- 1) Asso. Prof. A.D.Kachare and et.al. Studied on "First Operation Machining Fixture Design" the fixture for stator case frames. The fixture is designed to reduce time which is required for machining various stators of different sizes. Before the fixture design there are various problems are misalignment & inaccuracy and also there is no provision for avoiding misalignment. Inaccuracy will increase rejection of frames to avoid this new fixture is designed due to which reduced material handling and less work setup time. The fixture consist of spigots which are provided on spigot plate to accommodate different stator case frames.
- 2) Amar Raj Singh Suri and et.al. publish paper on "Development of Gear Hobbing Fixture Design for Reduction in Machine Setting Time", This fixture is manufactured to reduce total machining time and to reduce load and unload time of workpiece. The old fixture takes more timing and for changing old fixture it takes 145 minutes this also includes setting time for new fixture.
- 3) Sandeep Soni and et.al. publish paper on "Design and Modeling of Fixture for Cylinder Liner Honing Operation" this fixture design is designed for cylinder liners honing operation to improve productivity and reduce the rejection rate on honing machine. In mass production of cylinder liners, the industrial honing involves abrasive finishing process, during that liners need to be fixed on honing machine, In this fixture setup relative to honing operation of cylinder liner is proposed, planned and modeled such that the liners can be held in form closure and totally immobilized.
- 4) Vijay Patel and et.al. publish paper on "Development of a Fixture for Robotic Assembly Station for an Automotive BIW (Body in White) Line" This paper present a fixture design for automotive rear axle panel. The fixture design and fixture modeling is done by using catia software. The design rear of axle panel is symmetric about both sides. Using this concept quality of product is improved. The Efficiency of plant increased and reduction in rework and scrap cost.
- 5) Chetankumar M and et.al. publish paper on "Design and manufacturing of 8 cylinder hydraulic fixture for boring yoke on VMC-1050" in this case study they design and manufacture 8 cylinder hydraulic fixture for boring yoke. The design of fixture is created on creo elements / Pro.5 . This fixture is hydraulic type fixture shows great time saving in production, reduce cycle time and also reduces wear and tear of fixture component.
- 6) Shailesh S.Pachbhai and et.al. publish paper on "A Review on Design of Fixtures" this paper represent various reviews on fixture design it include design principles, design considerations of fixture also various types of clamps and fixture functional requirements. The various design are created using NX-CAD.
- 7) Hamad Mohammed Abouhenidi publish paper on "Jig and Fixture" this contains basics of Jig and Fixture it include definations and pupose of jigs and fixtures various advantages and disadvantages. This paper represents various designs which created using CATIA software.
- 8) Kiran Valandi and et.al. publish paper on "Development, Fabrication and Analysis of Fixture" The main objective is to analysis of existing fixture which is used for performing machine operation at an angle of 102.5 degree. The design of fixture is created using Creo software and Analysis is done by using ANSYS . The conclusion this analysis is that it the designed fixture is within safe limit.
- 9) Kumara B. and et.al. publish paper on "Design And Fabrication of lathe fixture for brake drum (cargo) machining" in this case study they design fixture which is modification old fixture. the purpose of new fixture is to hold the brake drum in such way that these should facilitate machining of brake drum bore as well as brake surface diameter in a single set up in lathe. The new fixture is comfortable than old one fixture.
- 10) R.D.Makwana and et.al. publish paper on "A Study On Design Of Fixture For Valve Body For CNC Machine" in this case study they represent basic information about fixture and various types of fixtures , Design principles of fixture and clamping types. This also gives information regarding dedicated and modular fixture design.
- 11) Charles Chikwendu Okpala and et.al. publish paper on "The Design and Need for Jigs and Fixtures in Manufacturing" in this paper they explain need of jig

and fixture this contain brief information about jig and fixture also contains various element information e.g. clamping and locating devices etc. This also gives information regarding material selection for jig and fixture.

- 12) Vipul R. Basha and et.al. publish paper on “Design and Manufacturing Fixture of Flange Lube Oil Pump Filter” this designed fixture is used for performing operations such as drilling , milling, reaming and chamfering. Designed fixture increases productivity with reduction in man power. Utilization this fixture reduces cycle time and also reduces manufacturing cost.
- 13) C.RadhaMadhavi and et.al. publish paper on “Design Of Machining Fixture For Turbine Rotor Blade” they design fixture for Gas Turbine Rotor Blade for machining on VMC. They uses AutoCad And Solidworks for designing and COSMOS software is used for analysis of designed fixture. They also gives brief information regarding various force calculations

### III. CONCLUSION

The above extensive study about literature survey gives the idea about the various techniques used in fixture design and various software used while designing the fixture.

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