



Design development for fixture

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Abstract - A fixture design system of eccentric lever for VMC machine. Fixture is required in various industries according to their application. Designer design fixture according to dimension required by industry to fulfill our production target. The fixture is helpful for machining process performing operation on eccentric in lever period. In traditional so holding a work piece in proper position during a machining operation fixture is very necessary and important. Because the lever is eccentric so for this requirement of machining process Designer design proper fixture for eccentric lever. Fixtures reduce operation time and increases productivity and high quality of operation is possible.

Keywords- Fixture, Computer Aided Design (CAD), Lever .

I. INTRODUCTION

The fixture is a special tool for holding a work piece in proper position during machining operation. It is provided with device for supporting and clamping the work piece. Fixture eliminates vibration, individual marking, waver uniform quality in manufacture. This increase productivity and reduce operation time. Fixture is widely used in the industry practical production because of feature and advantages. The design of a fixture is a highly complex and intuitive process, which require knowledge. Fixture design plays an important role at the setup planning phase. Proper fixture design is crucial for developing product quality in different terms of accuracy, surface finish and precision of the machined parts In existing design the fixture set up is done manually, so the aim of this project is to replace with hydraulic fixture to save time for loading and unloading of component. Hydraulic fixture

provides the manufacturer for flexibility in holding forces and to optimize design for machine operation as well as process function ability. Reducing manufacturing cycle time and achieving high quality of operation fixture design is very important. Designer design a compact type fixture for eccentric shaft for fulfilling production target and high quality of work and increases productivity.

II. LITERATURE REVIEW

Chen Luo, LiMinZhu, Han Ding[1] In his paper Two-Sided Quadratic Model for Work piece Fixturing Analysis, 2011 proposed that presents a novel model for work piece positioning analysis. Existing fixturing models may under estimate the positioning error due to neglect of the curvature of one or both contacting bodies.

S. Kashyap W.R. DeVries[2] In their paper Finite element analysis and optimization in fixture, proposed with minimizing deformation of the work piece due to machining loads about fixturing support positions, especially in thin castings. International Journal of Engineering Research and General Science Volume 4, Issue 2, March-April, 2016 ISSN 2091-2730 137.

Y. Zheng & Y. Rong & Z. Hou[3] In their paper, A finite element analysis for stiffness of fixture units, proposed a systematic finite element model to predict the fixture unit stiffness by introducing nonlinear contact elements on the contact surface between fixture components.

M. Y. Dakhole, Prof. P.G. Mehar, Prof. V.N. Mujbaile[4] In their paper, Design And Analysis Of Dedicated Fixture With Chain Conveyor, gives a feasible solution on conventional

roller chain conveyerised arrangement with dedicated moving fixture with conveyor for the tractor components like rear axle career, bull gear and shaft of a tractor model.

J. C. Trappey and C. R. Liu [5] This paper gives a review of fixture-design research, most of it done in the 1980s. the major topics of the review are the fixturing principals (supporting ,locating and clamping), automated fixtures design (configuration, assembly and verification) and fixtures hardware design (delicated, modular and electric /magnetic type).

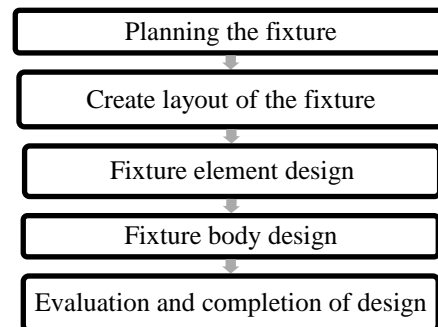
Shrikant.V.Peshatwar, L.P Raut [6] this paper present a fixture design system of eccentric shaft for ginning machine. Fixture is required in various industries according to their application .Designer design fixture according to dimension required by industry to fulfill our production tar gate. In traditional manufacturing process performing operation on eccentric shaft is critical. so holding a work piece in proper position during a manufacturing operation fixture is very necessary and important. Because the shaft is eccentric so for this requirement of manufacturing process Designer design proper fixture for eccentric shaft. Fixtures reduce operation time and increases productivity and high quality of operation is possible.

III. IDENTIFIED GAPS IN THE LITERATURE

In existing design the fixture set up is done manually, so the aim of this project is to replace with fixture to save time for loading and unloading of component. Fixture provides the manufacturer for flexibility in holding forces and to optimize design for machine operation as well as process function ability.

Researcher give the main lines of their process, that fixture design support system is developed on the basis of an expert system shell. Researcher show how the use of that kind of tool is determinant factor for reactivity in the fixture design process in concurrent engineering. The paper focuses of the development of fixture designer.

IV. METHODOLOGY



i. Identify the problem

The Horizontal Machining Center (HMC) machine require different fixture during different machining process.

And also it takes more time, more storage space for different fixtures, high cost for design and fabrication for different fixture. A fault in fixture reduces the manufacturing of its respective products, accuracy. HMC machining requires different fixture during different process (angle drilling, slot, face machining) as shown below.

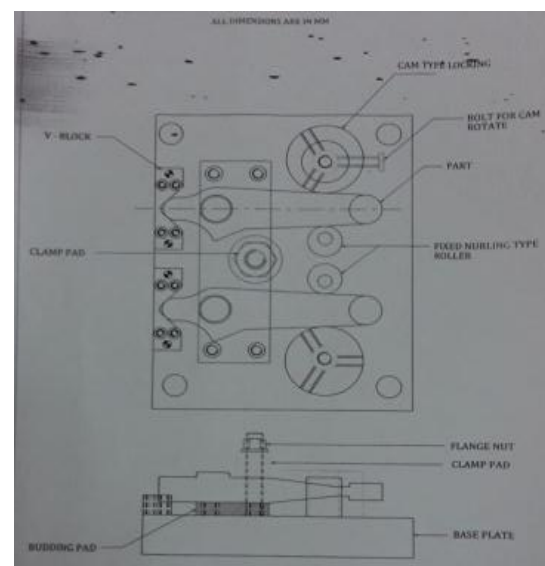


Fig. 1 Face machining process

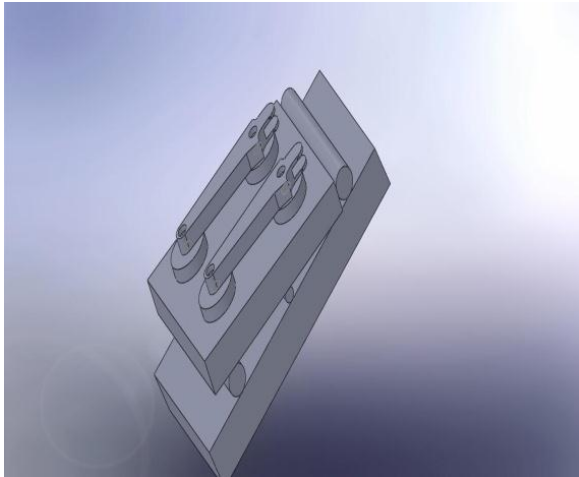


Fig. 2 Angle drilling process

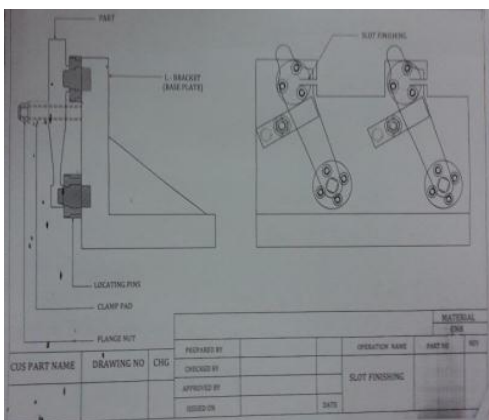
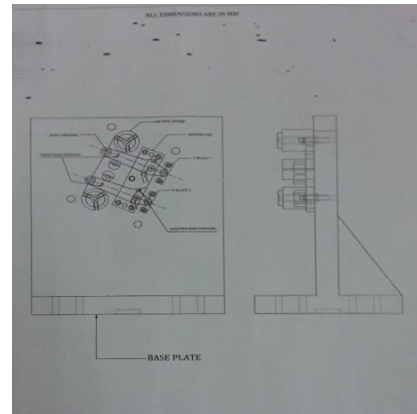


Fig. 3 Slot machining process

ii. Solution of the problem identification

We can change the design and improve machining efficiency. Increases machining accuracy because of precise location with fixtures. Decreases expenditure on quality control of machined parts as fixtures facilitate uniform quality in manufacturing. Widens the technology capacity of machine tools and increases the versatility of machining operations to be performed. It requires single fixture during slot, angle drill, face machining in VMC machining (fig. 4).

Fig.4 Solution diagram



V. CONCLUSION

So we have finally designed a machine which performs all the operations in a single fixture and results in time reduction, fabrication cost, gives more accuracy and high level production when compared to Horizontal Machining Center (HMC) fixtures.

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