

REVIEW ON DESIGN AND DEVELOPMENT OF MULTIPURPOSE FIXTURE FOR VMC MACHINE

Mundhe Sachin G¹, Angre Ajay R², Ambad Ganesh P³, Darade Swati P⁴, Asst Prof Gaikwad Jeevan R⁵

¹ UG Student, Mechanical Engineering, G.H.Raisoni COEM, Ahmednagar, Maharashtra, India

² UG Student, Mechanical Engineering, G.H.Raisoni COEM, Ahmednagar, Maharashtra, India

³ UG Student, Mechanical Engineering, G.H.Raisoni COEM, Ahmednagar, Maharashtra, India

⁴ UG Student, Mechanical Engineering, G.H.Raisoni COEM, Ahmednagar, Maharashtra, India

ABSTRACT

This proposed technique needs to plan and create the Multipurpose Fixture, for that segment which has been to decrease the assembling process duration. At the point when the part delivered on a little size beforehand this is to produces the huge amounts of prerequisites. The particular segments requires for machining activities, for example, step processing, point processing and exhausting and reaming. The couple of tasks where been done in CNC and rest activities are done in Conventional machine device. The proposed technique must be outline and created the mufti-operational Fixture for the total machining activities in a solitary machining focus. The Fixture configuration has will serve for the financial creation for the part.

Keyword: - Component, Work Holding, Manufacturing, Production, Operation, Device, Machining, Work piece.

1. INTRODUCTION

The effective running of all finished large scale manufacturing relies on the exchange capacity to encourage simple to gathering and decrease of unit cost. There is an essential of exceptional reason instruments which are utilized to encourage the generation activity like as machining, amassing, meeting, and so forth to spare the computation time and endeavors, four equations and three investigation models were presented for estimation of conceivable UMFs amid the get together process. For the most brief calculation time configuration process. An adjustment strategy decreased from the falling system connection has been available to align a symmetric gadget with a self-assertive test apparatus by three estimations procedures. The outcome investigation shows the got S-parameters of the test installation have a vast blunder. At the point when the reflection coefficients of the DUT are low, however the adjusted S-parameters of the symmetric DUT is constantly precise and even have bring down mistakes than the outcomes acquired by the TRL strategy.

An arrangement of disparities, which portrays the relations between the diverse quality measures are built up. The disparities strategy demonstrates that the encoded data of both area and precision, the capacity in resting outside burdens. For that the apparatus configuration on general 3-D items, and all fitting quality measures. The examination and configuration can continues well-ordered process the outlined handle arrangement G ought to be unequivocally available; The parameter mixes of (G,d) ought to be chosen that locator setup of GL is L-agreeable the parameter blend (G,w,d) must fulfills the soundness and W-receptiveness conditions. A scientific straight model is produced to depict the engendering of work piece and geometric deviation among them numerous machining stages. This straight model has a State-space frame and the states are the work piece geometric deviations. With this system which incorporates process and item data, demonstrate based blame conclusion can be created to rapidly recognize the deficiencies.

2. LITERATURE REVIEW

Taufik R.S ^[1] : He introduced the plan of dances and installations for hydraulic press machine in assembling industries. The present issue in industry is confronting the usage of hydraulic press machine when the request has expanded which happens on the grasping or holding the work piece safely. The principle target of this examination is to propose another design of fixture for hydraulic press to carry out the gripping issue from existing design. Different ideas were produced and stimulated to examine utilizing ANSYS programming software.

Shrikant V ^[2] : Peshawar find a fixture design of eccentric shaft for ginning machine. It was discovered that conformability and stability can either increment or lessening with the situation of contacts relying upon their nearness to the line of activity of the external perturbation. It was additionally discovered that clamping intensity and the principal stiffness directions have effect the dependability of force controlled and displacement controlled fixtures. The issue of fixture design format outline for a 3D bended work piece. Fixture design support that use technological entities to represent the part. The issue of the re-usability of fixtures. The computerization of fast fixture arranging based on rapid prototype. Optimum plan way to deal with give far reaching investigations and provide a general ideal outline to satisfy the multi-functional and high performance featuring requirements.

Shravan V Murthy ^[3] : He explained the important use of fixture is to find and in the cases hold a work piece during a machining. A jigs varies from fixture as it controls the tool to its right position or towards its right direction during addition to withstanding finding and supporting the work piece.

Mr. Ketul N ^[4] : He displayed the assortment of central research on plasma arc cutting (PAC) process parameters which the creators have performed. Plasma arc cutting procedure is the non- conventional thermal process which perform different tasks, for example, cutting, welding, covering and so on. Plasma arc cutting is machining process where material is cut by plasma curve. In this survey the examination and advance in plasma arc cutting procedure parameters of various materials are basically assessed from alternate points of view. Some essential plasma arc cutting processing parameters and their impacts on MRR and surface roughness are talked about. This paper manages the survey of papers by creators.

K. Nanthakumar ^[5] : He displayed the proposed strategy needs to outline and fabricated the Multipurpose Fixture, for that segment which has reduce the assembling process duration. When the component produced on a small size previously this is to produces the large quantities of requirements. The particular components requires for machining activities, for example, step milling, angle milling and boring and reaming. The couple of activities where been done in CNC and rest tasks are done in Conventional machine tool. The proposed technique must be outline and fabricated the multi-operational fixture for the total machining operation in a single machining centre. The Fixture design has will serve for the financial production for the components.

Jainish A. Patel ^[6] : He exhibited the Plasma cutting is an assembling process is driving in developing in arc cutting process which is higher productivity efficiency and Good in quality. Nitrogen is utilized as a protecting gas in the PAC. The shielding gas an impact the cut strength, flexibility, and toughness and corrosion protection. By Plasma arc cutting slicing is simple. Optimization of the parameter will be completed by Full factorial technique. We will utilize Stainless Steel 304 material which is more use in filler material, Food processing equipment, chemical containers. S.S 304 plates with Dimensions 250mm x 125mm x 6mm with straight cut. The parameters are the most vital components influencing the quality, productivity.

Ezeanyim Okechuku ^[7] : He explained the meaning of fixtures, and further more distinguished the various parameters that are related with the utilization of fixture in manufacturing to include: production increase, cost decrease, interchangeability and high precision of parts, reduction of the requirement for investigation and quality control costs, reduction of accident as safety is improved, automation of machine tool to an obvious degree, simple machining of complex and heavy components, as well a slow variability in dimension which leads to consistent quality of manufactured products. The work likewise clarified that since the design is reliant on various elements which are analyzed to achieve an optimum output that fixture to be made of rigid light materials to encourage simple dealing. For satisfactory strength and rigidity, a mild steel with 16 millimeters measurement was decided for the design of of a sample jig and fixture.

3. OVERVIEW OF FIXTURE

3.1 Fixture

A Fixture is a work holding device utilized as a part of the manufacturing businesses. Fixtures are used to securely locate the position or location and to support the work, ensured that all parts produced using the fixture will maintain conformity and interchangeability. Utilizing this fixture enhances the economy of generation by permitting smooth activity and brisk change from part to part creation.

A fixture basic role is to make a safe mounting point for a work piece, taking into account for support during operation and improve accuracy, precision, quality, and interchangeability in the completed parts. It likewise serves to decrease working time by permitting quick set-up, and by smoothing the change from part to part. It frequently reduces the complexity of a process, considering untalented laborers to perform it and adequately exchanging the skill of the tool maker to the unskilled worker. Fixtures likewise take into consideration a higher level of operator safety by reducing the concentration and exertion required to hold a piece constant.

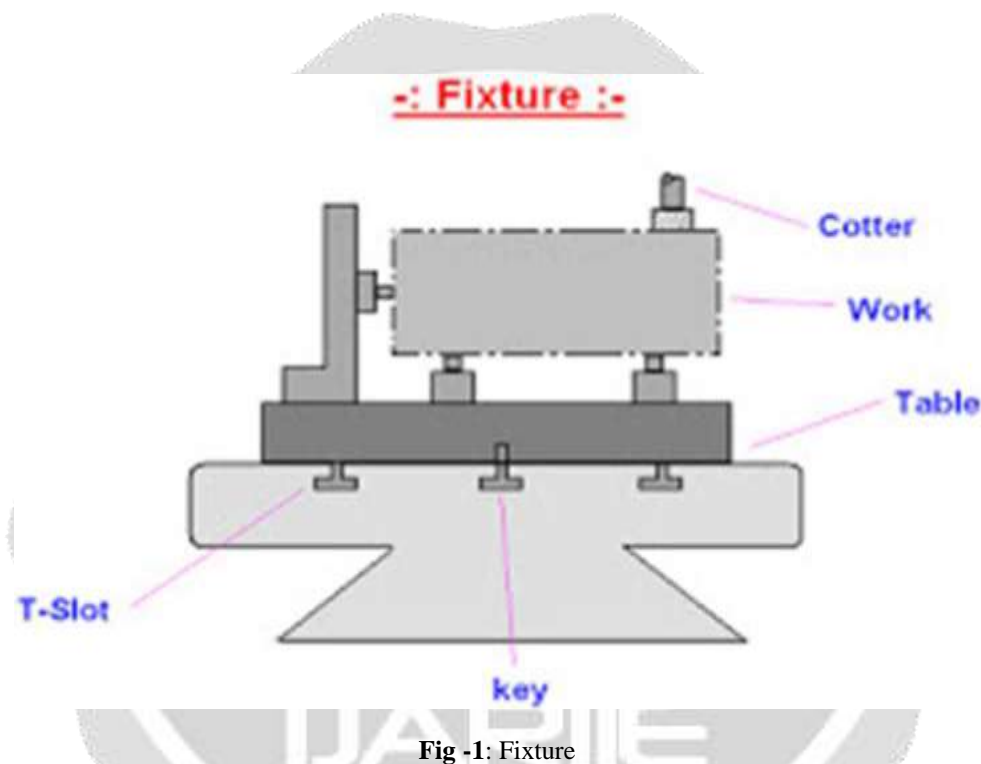


Fig -1: Fixture

The Fixtures having following features,

- a. Reduction of Idle time.
- b. Cleanliness.
- c. Standardization.
- d. Hardened surfaces.
- e. Position of clamps.

3.2 Materials utilized in Fixture:

The Fixture are produced using variety of materials, some of which can be solidified or res. Sometimes it uses nonferrous like as phosphor bronze to reduce the wear of mating parts or nylons or strands to avoid harm. A large portion of high speed material has been utilized for this production.

4. TYPES OF FIXTURES

4.1 Adjustable Fixture

A flexible installation is one which is utilized in lathe where various cutting tools could be obliged in one set up, to turn work piece of various shape and length. The situation of cutting instrument is altering by gages.

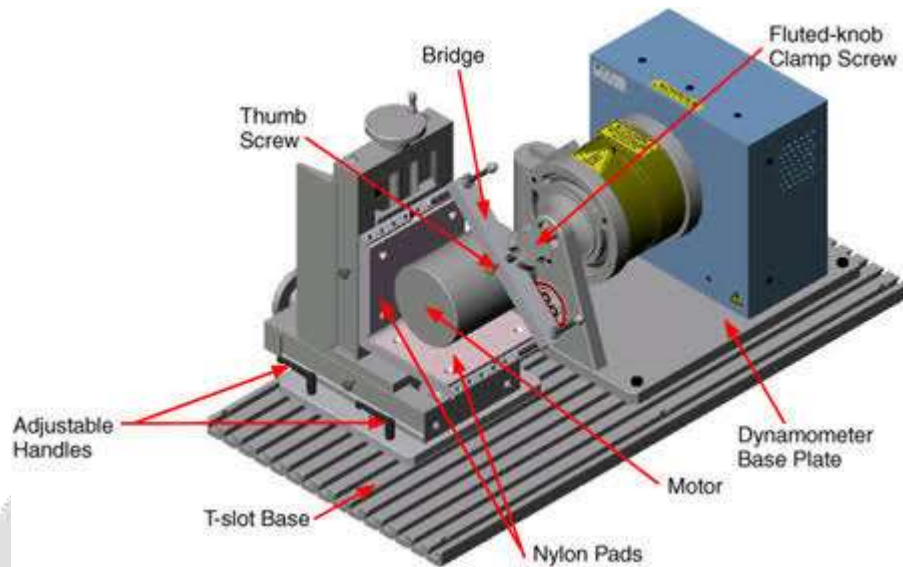


Fig -2: Adjustable Fixture

4.2 Grinding Fixture

When extreme accuracy is obtained for grinding parts like interfacing bars, valve faces or slope gears, grinding fixture are utilized and they hold parts with no distortion. The situating of the parts in the apparatus is important and the clamping should be designed to cover the parts for which machining isn't required

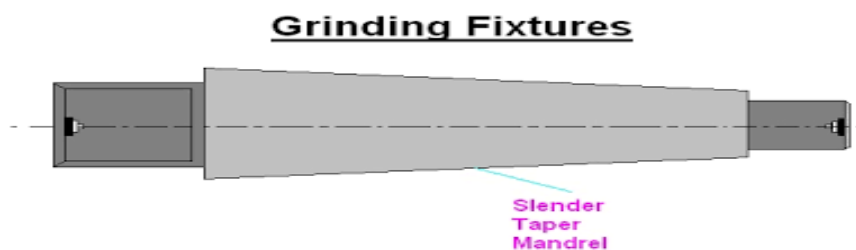


Fig -3: Grinding Fixture

4.3 Milling Fixture

The fixture is designed for vertical milling operations. As indicated by this procedure design there are three surfaces machined. The fixture is utilizing for final activity. The rough milling will be performed with the magnetic bed by keeping 2 mm stock condition. After that drilling and reaming of 25 mm entire will be performed. The locating standards have finds the point and to drill to a right edge condition. The locating refers to the dimensional and position connection between the work piece and the cutting apparatus. The locator builds up and keeps up the position of part in a fixture to guarantee the repeat ability of the work holder.

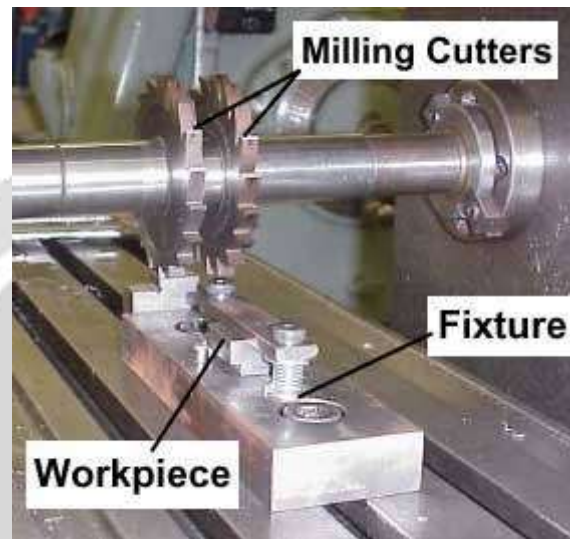


Fig -4: milling Fixture

5. CONCLUSION

The efficiency and reliability of the fixture design has upgraded by the system and the result of the fixture design has made more sensible. To decrease process time required for loading and unloading of part, this approach is helpful. In modern FEA, CAD are utilized as a part of designing the system then significant improvement can be guaranteed. To satisfy the multifunctional and high performance fixture requirements ideal plan approach can be utilized to give far reaching, analysis and determine an overall optimal design. Fixture layout and dynamic clamping forces optimization method based on optimal fixture layout could limit the deformation and uniform the deformation most viably .The proposed fixture will satisfied researcher target and upgraded the effectiveness, milling fixture reduce task time and increases productivity, quality of operation, reduce accidents.

6. REFERENCES

- 1] Taufik, R.S., Hirmanto, S., Sivarao, Hambali, A., and Tajul, A.A Faculty of Manufacturing Engineering, Universiti Teknikal Malaysia. Design of Jigs and Fixtures for Hydraulic Press Machine.
- 2] Shrikant.V.Peshawar, L.P Raut M-Tech (CAD/CAM) Student, Department of Mechanical Engineering G.H. Rasoni college of Engineering Nagpur. Design and Development of Fixture for eccentric shaft: A Review.
- 3] Shravan V Murthy, Varun V N, Vijay Kumar U C, Vikas R Department of Mechanical Engineering, SJB Institute of Technology, Bangalore, Karnataka, India Development of a fixture for Manual Assembly station for Automobile Service Equipments.
- 4] Mr. Ketul N. Prajapati1 Assi.Prof. H. R. Sathavara , Assi. Prof. D. K. Soni , 1PG Student M. Tech. (CAD/CAM),Assistant Professor Department of Mechanical Engineering, UVPCE, ketulprajapati. A Review on Plasma Arc Cutting (PAC).

5] K. Nanthakumar¹, V. Prabakaran², Department of Mechanical Engineering, Assistant Professor, Gnanamani College of Engineering Design and Fabrication Testing of Combined Multipurpose Jig and Fixture.

6] Jainish A. Patel, Karan H. Patel, Chirag .Prajapati, Montu D. Patel, Rakesh B. Prajapati U.G. Student 5Asst.Professor Department of mechanical engineering SAL, Ahmadabad A Review paper on Experimental Investigation of Plasma Arc Cutting by Full Factorial Design.

7] Charles Chikwendu Okpala, Ezeanyim Okechuku C. Department of Industrial/Production Engineering, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria The Design and Need for Jigs and Fixtures in Manufacturing.

