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Design of Fixture for Pitch Circle Diameter Check

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Abstract: ***Fixture is designed and built to hold, support and locate the work piece to ensure that each work piece is machined within the specified limits. The design of fixture is a highly complex process. Fixture design plays important role in preparation phase. Fixture is widely used in industries due to their quality and increasing accuracy and minimizing cognitive operation time. Fixture provides the manufacturer to optimize design for machine operation as well as process function ability. The old setup is to set up fixture manually, so the aim of this project is to replace with fixture to save time for loading and unloading of component. The fixture is fundamentally used to check pitch circle diameter of gears.***
Keywords: Fixture, Gear, Pitch circle diameter, Locators

I. INTRODUCTION

Fixtures are device for holding work piece in proper location during manufacturing operation. To support and clamping the work piece, device is provided. Continuous checking, positioning, marking and non-uniform quality in manufacturing process is eliminated by fixture. It leads to increase productiveness and reduce operation time. Fixtures are widely used in the industry practical production because of lineament and advantages. To locate and block work pieces for machining, inspection, assembly and other operations fixtures are used. The old process was to take mandrel put the gear on it and after that put it in between tailstock and headstock. After setting it in between the PCD was been checked on dial gauge. The pointer is put between two dog teeth. This process was time consuming and hard for operator to work on it. The PCD of gears of diameter 50,65 was to be checked.

II. LITERATURE REVIEW

Poonam D. Chavan, Komal M. Barge have studied that fixtures are widely used in industries due to their quality of increasing the accuracy and minimizing the operational time. Inspection in manufacturing includes measuring, examining, testing, or gauging one or more characteristics of a product or process and comparing the results with specified requirements to determine whether is the requirements are met for each characteristic. Inspection fixtures are used to check the quality of the workpieces, parts and components of machines. This paper presents the solution in the form of a special purpose 'Runout Checking Fixture', which can be useful for checking the runout of a component up to the desired tolerance with increased precision."A Study of Ring Gear Run out Checking Fixture", published in the International Journal for Research in Applied Science & Engineering Technology, Vol-3, Issue V, May-2015, ISSN 2321 9653.N. P. Maniar, D. P. Vakharia from there paper we have studied that fixture design is one of the most important design tasks during process design for a new product development since it involves defining the locations and orientations of parts during assembly processes as well as providing physical support, which can greatly affect product dimensional variations and process yield. Generally, fixture design process can be divided into three stages. Fixture planning: In the fixture planning stage, issues related to the number of fixtures needed, the type of fixtures, the orientation of fixture corresponding to orientation, and the joining or machining operations, which fixtures have to handle are identified. Fixture configuration: The fixture configuration stage determines the layout of a set of locators and clamps on a work piece surface such that the work piece is completely restrained Fixture construction: Finally, the fixture construction stage involves constructing fixture components and then installing them to support the work piece. The paper name is "Design & Development of Fixture for CNC – Reviews, Practices & Future Directions", and published in International Journal for Scientific and Engineering Research, Vol-4, Issue 2, Feb-2013, ISSN 2229-5518.
Satyajeetsinh Raijada, Amit Dudhatra have studied fixtures are normally classified by the type of machine on which they are used. If fixtures are designed to use on a milling machine, it is called a milling fixture. If it is use to perform is straddle milling, it is called a straddle-milling fixture. The same principle applies to a lathe fixture that is designed to machine radius; it is called a lathe-radius fixture. The paper is "Design of a Fixture of Connecting Rod for Boring Operation", published in International Journal of Engineering Research and Development, Vol-2, Issue 09, 2014, ISSN 2321-0613.

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K.V.S. Seshendra Kumarhave studied the design of gear fixtures for L200 and H250 CNC gear hobbing machines. The task on hand was to design fixture for the components, namely Reduction ideal gear and 4th and 3rd speed gear for gear box used in HMT Tractors."Selection and fixture design starts with the component and manufacturing operation. Clamping forces and ease of construction have also been accounted for design. The proposed design was then checked for safety under the action of the involved stresses. Cutting force calculations are shown and demonstrated that the forces in various vital points in the design are well below safety limits. The paper name is "Design of Gear Cutting Fixture for CNC Gear Hobbing Machine" and published in International Journal of Engineering Research and Publication, Volume 2, Issue 9, September 2012, ISSN 2250-3153

III. METHODOLOGY

A. The Old Method Was

It consists of fixing the gear into the mandrel and then fixing the mandrel into the headstock and tailstock. After fixing it was rotated by one hand and another hand was to slide the link on which pointer is attached. The pointer was placed in between the gears dog teeth and the reading was noted on dial gauge. So it was time consuming and hard for operator to work on it. So to reduce this time consumption and to make process simpler, we had to design a fixture and remove the mandrel operation. The below diagram is of old process

Figure 1: Old Setup

B. New Design Method is

We have designed a fixture and locators of different diameters such as 55 and 65 which are used to put on the fixture to check pitch circle diameter of gears and run out. So by this idea we only need to fix the gear on locator and put the locator on fixture and checking of pitch circle diameter is done. And the reading on dial gauge whose pointer is attached to spring are noted. So by this the operators work become easy, time reduced, easy to handle and space got reduced. The below diagram is of new process

Figure 2: New setup

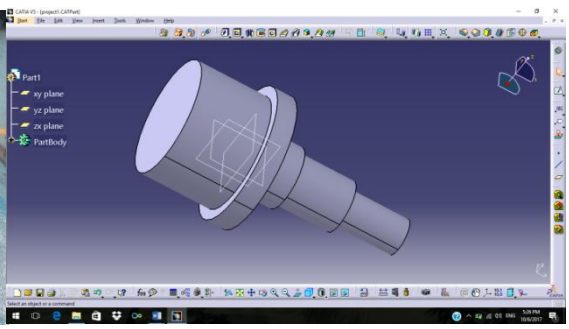

Figure 3: Locator

IV. CONCLUSION

We refer all the above papers and we have found the data which is important to design a fixture for pitch circle diameter check. By applying the important information from the above papers we designed a fixture. So by designing this fixture we made the operation simpler, time was reduced, space required compared to old process became less, inspection became easier.

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REFERENCES

[1] Poonam D. Chavan, KomalM. Barge, "A Study of Ring Gear Runout Checking Fixture", InternationalJournal for Research in Applied Science & Engineering Technology, Vol-3, Issue V, May-2015,[PP 208-212].
[2] N.P. Maniar D.P. Vakharia, "Design &Development of Fixture for CNC – Reviews, Practices &FutureDirections", International Journal for Scientific and Engineering Research, Vol-4, Issue 2, Feb-2013,[PP 1-10].
[3] SatyajeetsinhRaijada,AmitDudhatra, "Design of a Fixture of Connecting Rod for Boring Operation",International Journal of Engineering Research and Development, Vol-2, Issue 09, 2014,[PP 538-549].
[4] K.V.S. Seshendra Kumar, "Design of Gear Cutting Fixture for CNC Gear Hobbing Machine"International Journal of Engineering Research and Publication, Volume 2, Issue 9, September 2012,[PP 1-2].

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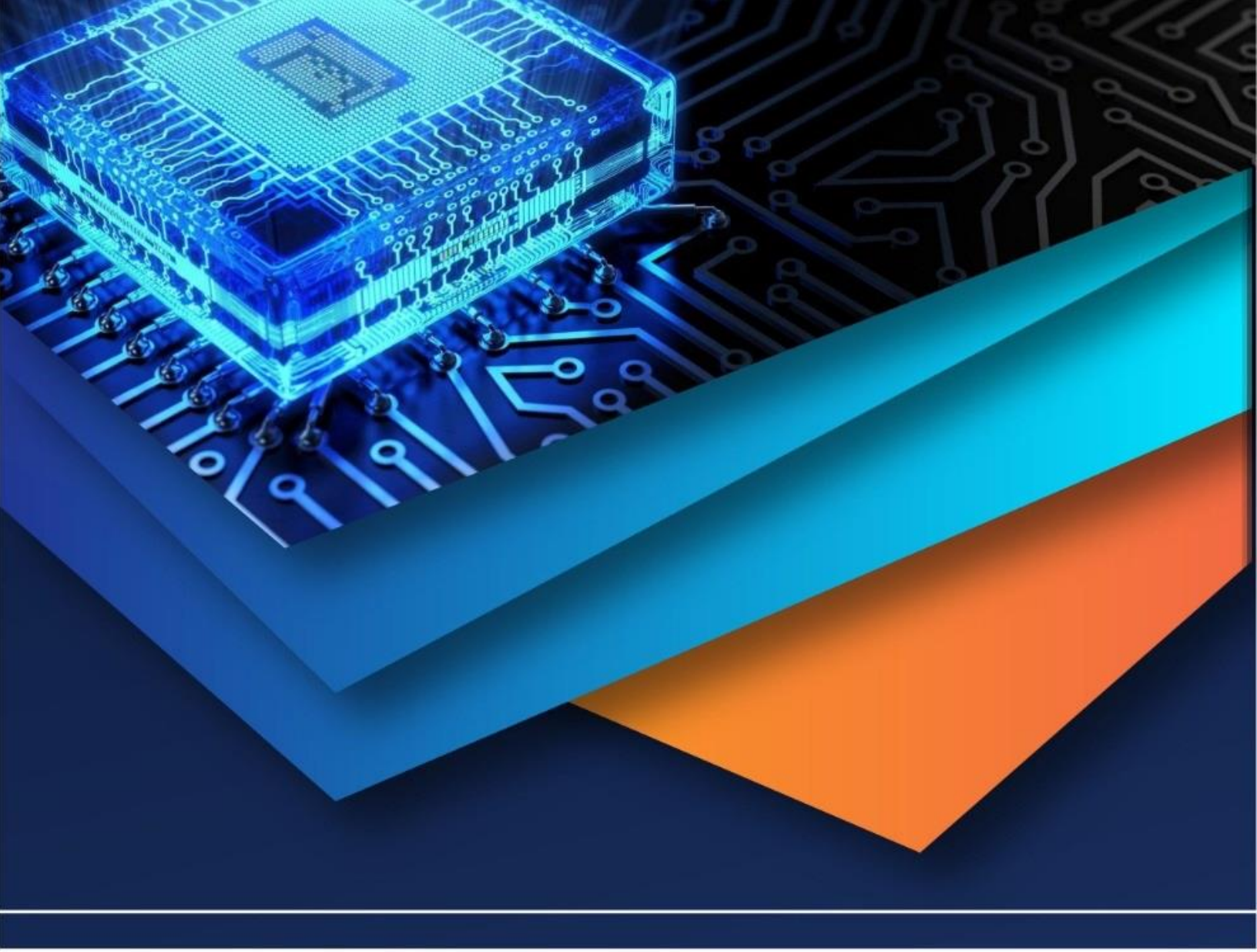

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