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DESIGN AND MANUFACTURING OF RELATION GAUGES

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Abstract - *Gauges are the tools which are used for checking the size, shape and relative positions of various parts but not provided with graduated adjustable members. Gauge perform an essential services in any scheme of quantity production on an interchangeable basis. The different types of inspection methods involves CMM (co-ordinate measuring machine) and various type of gauges are used. A gauge is a tool or instrument to measure or compare a component. Gauges are understood to be single-size fixed-type measuring tools. This project leads to focus on inspection of items. Relation gauge is a gauge that has an inside measuring surface for testing the size and counter of the male part. The gauge is designed as per standards that checked the dimensions is concerned.*

Key Words: Gauge, Design, Manufacture, Inspection, Relation Gauge.

1. INTRODUCTION

A gauge or gage, in science and engineering, is a device used to make measurements or in order to display certain information, like time. A wide variety of tools exist which serve such functions, ranging from simple pieces of material against which sizes can be measured to complex pieces of machinery. Depending on its usage, a gauge can be described as a device for measuring a physical quantity, for example to determine thickness, gap in space, diameter of materials.

1.1 Relation Gauge

The relation gauge is specially designed and manufactured for inspection purpose. It measures the job very accurately and precisely as per the job standards and specification. It can be used in metrology area as well as production floor. They give the operator the possibility to perform dimensional inspection of the part without having to rely on a coordinate measuring system. Receiving gauge used for checking dimensions precisely as per the standards.

1.2 Purpose of Relation Gauge

- For accuracy, reliability and repeatability with strong focus on ergonomics.
- To reduce measuring time and its cost.
- For accurate and precise inspection.
- Increase production rate.
- Initial cost low.
- Requires less cycle time.
- Coordinate measurement.
- No need of skilled worker.

2. Various gauges used for measuring dimensions

Plug Gauge:-A plug gauge is a cylindrical type of gauge, used to check the accuracy of holes. The plug gauge checks whether the whole diameter is within specified tolerance or not. The 'Go' plug gauge is the size of the low limit of the hole while the 'Not-Go' plug gauge corresponds to the high limit of the hole.

Pin Gauge:-When the holes to be checked are large than 75mm, such as automobile cylinder, it is convenient to use a pin gauge as shown in During measurement, the gauge is placed lengthwise across the cylinder bore and measurement is made. These gauges are especially useful in measurement of width of grooves or slots.

Snap Gauge: A snap gauge is a U-Shaped frame having jaws, used to check the accuracy of shafts and male members. The snap gauge checks whether the shaft diameter is within specified tolerances or not. The 'Go' snap gauge is the size of the high (maximum) limit of the shaft while the 'Not-Go' snap gauge corresponds to the low (minimum) limit of the shaft.

3. DESIGN DATA

3.1 Diagram-

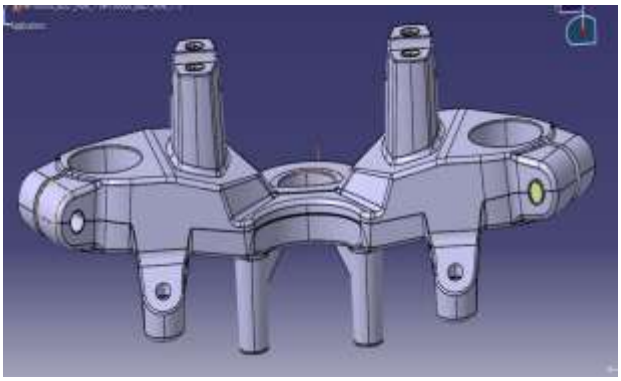

Figure shows the front view of job

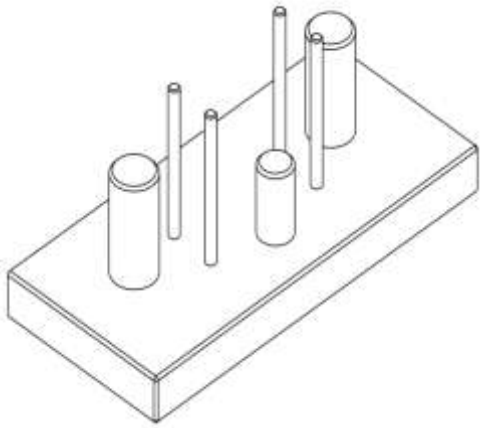

Figure shows top vies of relation gauge

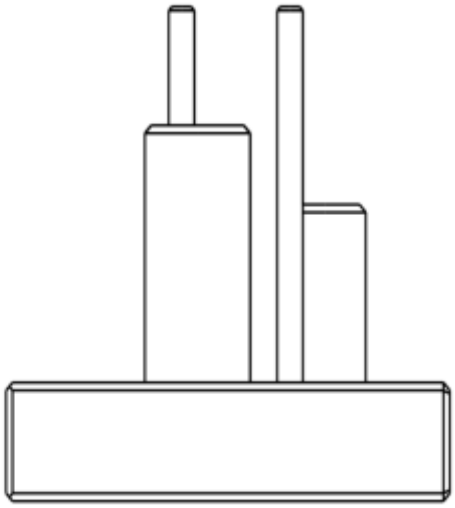

Figure shows side view of relation gauge

4. PROBLEM STATEMENT

- In traditional way all types of Automobile CNC Components are Calibrated or checked in GO NOGO gauges which is time consuming process, and also in GO NOGO gauges we cannot measure all dimensions which is required.
- we can only measure dimensions which are related to ID (inner diameter) only. And time by time traditional gauges starts to wear and tear due to which the quality of Components starts to decreasing.

5. PLAN OF ACTION OF PROJECT

- Develop a new DWG as per the IGS of Casting.
- To make this type of gauge it required design analysis machining & CMM
- It required Grinding to be Precise surface finish and also Heat treatment to gate a better life of Gauge.
- Then the main process will be started is the assembly.

6. METHODOLOGY

- The Methodology of this system is that we required to collect all the data for project in various stage.
- We require two to three weeks to learn all types of gauges and also take the feed back from the operators related to the problems occurring with the handling of gauges and give them the chance to suggest the ideas to overcome with these problems from their work experience & Knowledge.

7. PROCEDURE

- Set the relation gauge properly.
- Locate the job on receiving gauge by locating pins.
- Insert the plug gauges in the holes which to be checked.
- Check the co-ordinates of the job.
- Check the offset of drills and depth.

8. ADVANTAGES

- This project aims to developing a highly cost effective inspection purpose.
- Very rapid inspection and requires less time for inspection as compared to coordinate measuring machine (CMM).
- Mainly designed for mass production inspection purpose.
- It is very easy to operate and even unskilled operator also operate it easily.

9. DIS-ADVANTAGES

- This types of relation gauges are comparitively costly.
- It used for only one job.

10. CONCLUSION

By checking the job on relation gauge we conclude that this is time saving and cost effective method of inspection. Also it is one go checking depth, co- ordinates. Also it is time reducing method which helps to increase the productivity. It will helps to increases the accuracy and reduce the wear and tear.

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