ISSN (ONLINE): 2454-9762
ISSN (PRINT): 2454-9762
Available online at www.ijarmate.com

International Journal of Advanced Research in Management, Architecture, Technology and Engineering (IJARMATE) Vol. 3, Special Issue 9, March 2017

DESIGN OF FIXTURES FOR TESTING OF SHAFT WITH BEARING ASSEMBLY

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Abstract- **The aim of my project is to design a fixture to reduce time for mounting on the shaft with bearing assembly test rig machine. The exiting method consumes 2 hours for loading the shaft on the fixture. This method is time consuming and requires more man power. The suggested method is designed it consumes only 45 minutes for loading on the fixture. Its time consumption is less, to reduce man power and man labour wastage, and reduce the fixture cost.**

I. INTRODUCTION

The current state of knowledge in the area of fixture design and optimization is reviewed in this chapter. However, the Literature on fixture configuration system requires the details in the following areas:

Machining errors. Fixture design Work piece model - rigid body model, work piece-fixture elastic contact model and work piece elastic model Fixture stability analysis

Finite Element Method (FEM) Fixture configuration / Layout design Friction at work piece-locator contact point Fixture layout optimization methods clamping force Optimization. Number of fixture elements optimization. Genetic Algorithm (GA). Artificial Neural Networks (ANN). Design of Experiments (DOE)

II.FIXTURES

Fixtures are workholding devices designed to hold, locate and support workpieces during manufacturing operations. Fixtures provide a means to reference and align the cutting tool to the work piece.

A. Fixture Economics

Of major concern in fixture design is the cost-to-benefit ratio. Fixture costs are amortized by production quantities, part quality requirements and tooling accuracy. Also to be considered are:

1)Tool life.

2)Work piece location.

3)Support and tool referencing.

4)Clamp requirements.

To justify fixture cost and the lowest cost per part, the fixture must exhibit:

1)Fast operational characteristics.

2)Ease of part loading and unloading.

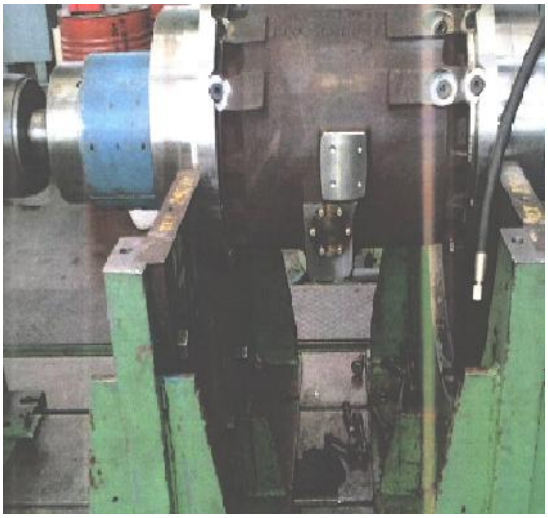
III.EXISTING METHOD

The machine shaft with bearing assembly test rig is used for testing various shafts which are used in boilers for thermal power plant.

The complete arrangement for the machine operation to take place is done manually. It consists of fixture that needs to be varied to the required length using manual operators.

The fixture is manufactured by investment casting method. The casting obtained by this method have very smooth surfaces and possesses high dimensional accuracy, hence it is called as precision investment casting. Here the investment means the layer of refractory material with which the pattern is covered to make fixtures.

EXISITING FIXTURE DIAGRAM



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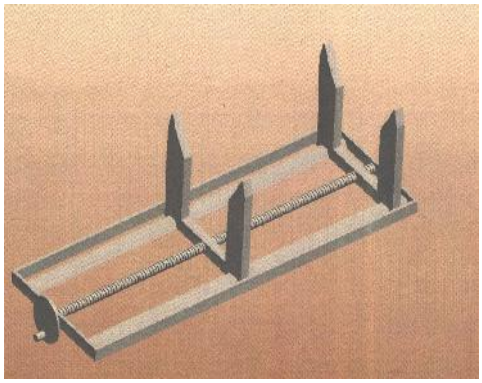
IV.MANUFACTURING OF FIXTURE FOR SUGGESTED METHOD

A manufacturing fixture holds parts during the manufacturing process.

Fixtures come in a wide range of types.In their simplest form they may be a series of pins sticking up from a flat surface to keep a part from sliding. They can also be much more complicated , with a series of mechanical or hydraulic clamps to lock a part down into an automated rotating frame.

For lean application, think simplicity first. Most often, manufacturing fixture is simply a way of adding an extra set of hands. The need for precision in those cases is minimal. When precision requirements are low for a manufacturing fixture, teams should attempt to build them on their own. Tooling groups normally build the manufacturing fixture when more sophistication is needed.

SUGESSTED METHOD DIAGRAM



V.ANYSIS CALULATION AND DIAGRAM

Existing method

Man hour cost per hour = Rs. 300
Three shift per assemble = 3x8 =24 hrs
Total assemble hours per year = 1704 hrs
Total cost per year = Rs. 511200

Suggested method

Man hour cost per hour = 300
Half shift per assemble = 0.5 x 8 = 4 hrs
Total assemble hours per year = 1704 hrs
Total cost per year = Rs. 85200

TOTAL COST

Existing method

Total cost = material cost + labour cost
= 122500+ 511200
=Rs. 6,33,700

Suggested method

Total cost = material cost + labour cost
= 73,500+ 85200
=Rs. 1,58,700

VI. COSTS OF SAVING

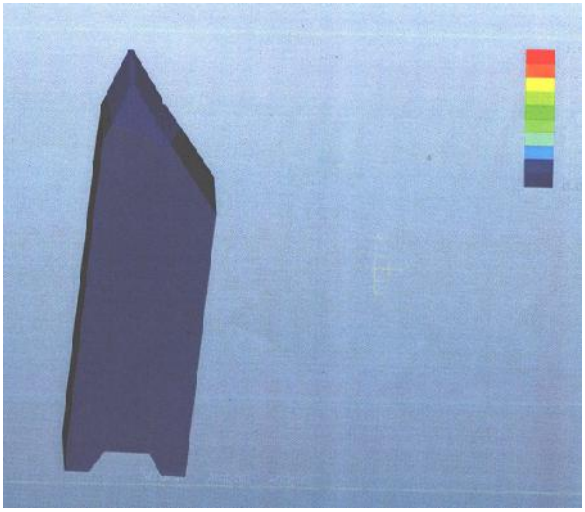
Savings = Existing method - Suggested method

= 6,33,700-1,58,700

= Rs. 4,75,000

VII. CONCLUSION

After finishing this project, that the labour burden and the Work piece location, Support and tool referencing. Its time consumption is less, to reduces man power and man labour wastage, and Cost of saving **Rs**. 4,75,000 per year, so reduce the fixture cost.



Fast operational characteristics, Ease of part loading and unloading, fool proof part locating during the production run. Thus the project can be handled easily and can be used for better results.

VIII. REFERENCE

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