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Design and Development of Die Cutter Mounting Bracket

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Abstract*: It is required that any machine component must be work properly during its service life time. But due to the loading conditions, there may be a chance of breakdown. It is required to design the proper Cutter mounting bracket. Sudden failure or break down may cause production idle time which further leads to loss of production rate and loss of money. In this work design and development of bracket is carried out.
Keywords: Modal Analysis, Mounting Bracket, Structural Analysis

I. INTRODUCTION

The important function of Cutter mounting bracket is to balance and hold the module at proper position with minimum deflection and maximum load carrying capacity. In this work design and weight optimization is done. The manufacturers have strong importance on the cost has the demand for the component, improve the material performance and to deliver these materials at low cost is the requirement. In this work 1020 Hot Rolled Steel is used for plate, and square tubing for stiffness which is easily available at customers end.

Analysis of the strength of bracket was made easier with the introduction of Computer Aided Engineering (CAE) software. The finite element method (FEM) is a very good tool available in CAE software.

II. ANALYSIS OF MOUNTING BRACKET

Modeling is done in inventor and analysis is carried out in Ansys. Cutter weight is 900 kg. And bracket should have deflection less than 0.5mm.

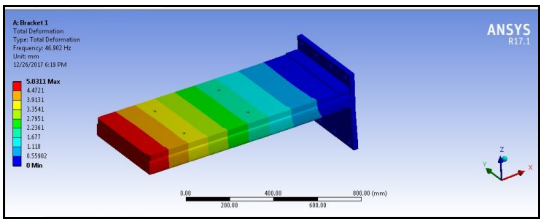

Fig. 1 First Natural Frequency

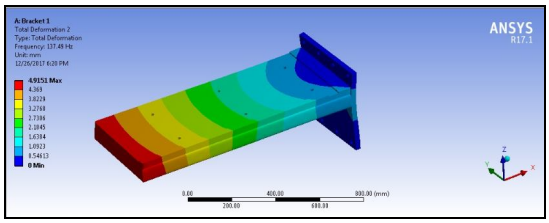

Fig. 2 Second Natural Frequency

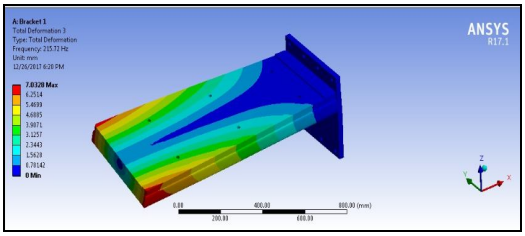

Fig. 3 Third Natural Frequency

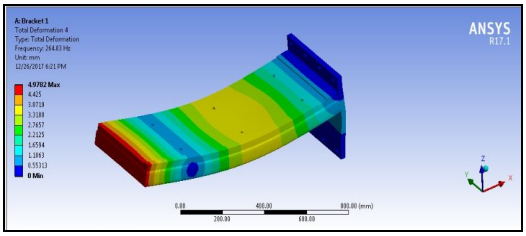

Fig. 3 Fourth Natural Frequency

Abobe figures shows modal analysis done in Ansys and output natural frequencies tabulated in below table 1.

Mode	Frequency Hz
1	46.902
2	137.49
3	215.72
4	264.83

TABLE INATURAL FREQUENCIES

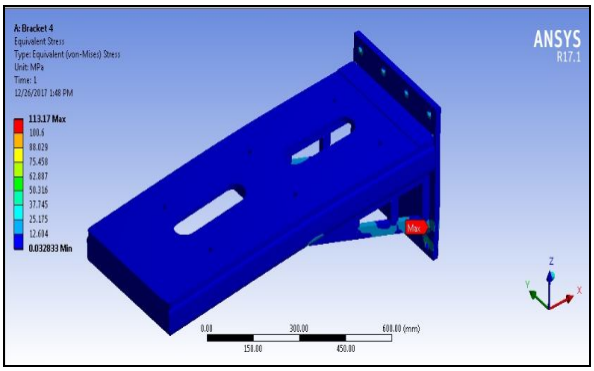

Fig. 4 Stress Analysis

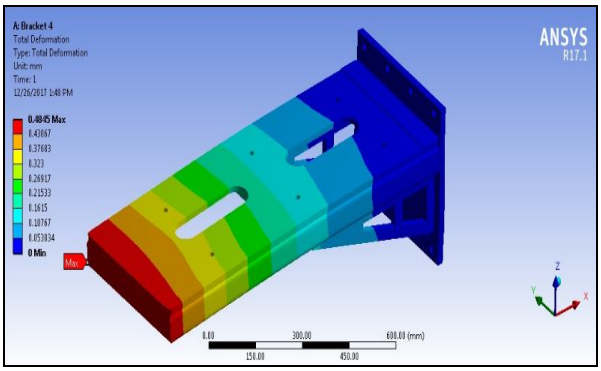

Fig. 5 Deflection Analysis

Above figure 4 and figure 5 shows stress and total deflection developed. For the loading of 900 kg stress developed is 113.17 Mpa and total deformation is 0.48 mm respectively.

III.CONCLUSIONS

An efficient design process, requires two parameters, the structure should fail at the design load and at the same time have minimum weight. Results it is concluded that designed bracket is safe which is having maximum stress of 113.17 Mpa and total deformation is 0.48 mm respectively.

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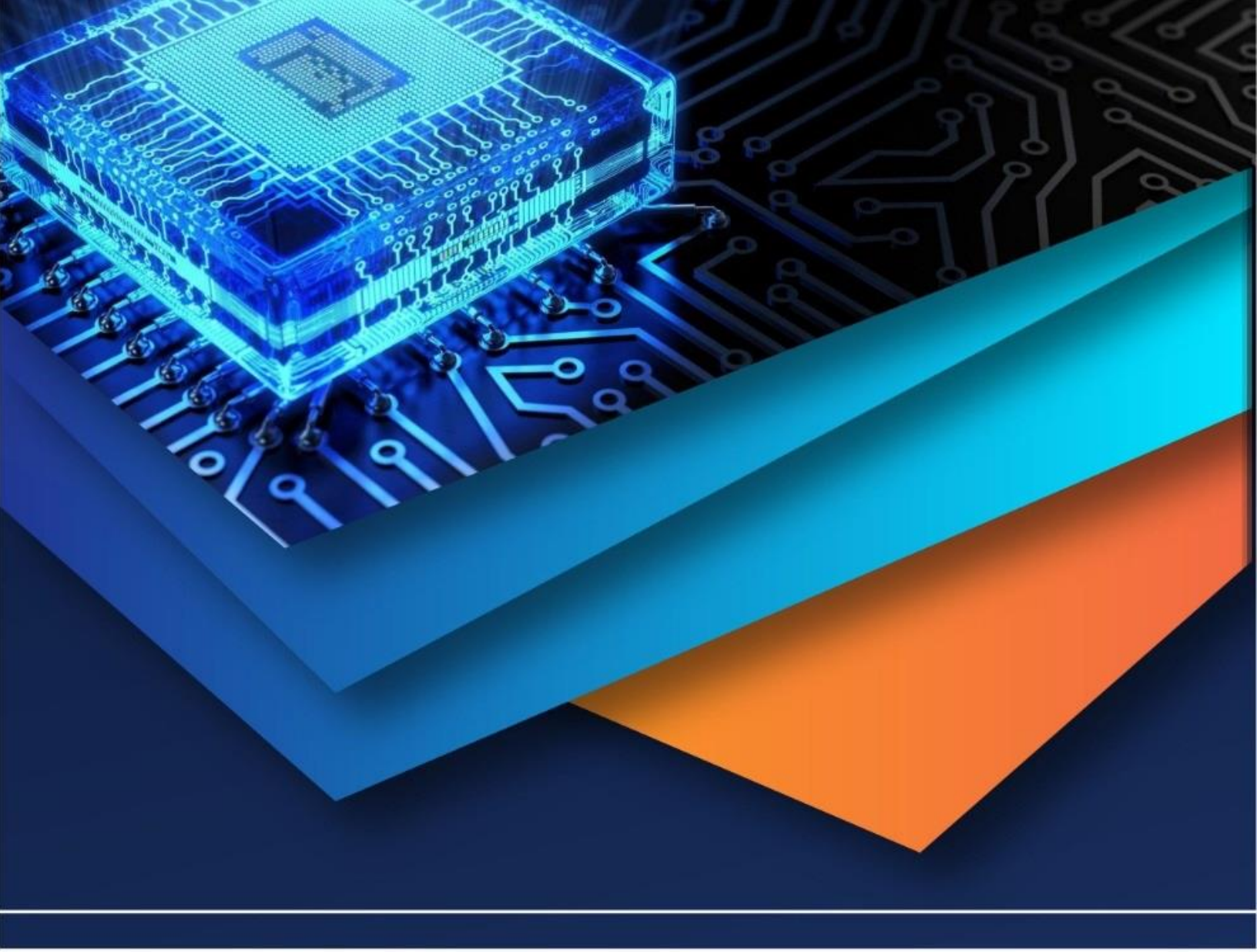

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