

Material Selection and Computational Analysis on DOHC V16 Engine's Mounting Bracket Using COMSOL Multiphysics Software

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Introduction: This paper deals with the material selection and finite element analysis for the engine accessory components. This main objective of the analysis is to minimize the weight of the mount bracket. This paper also deals with overall weight reduction of vehicle's engine mounting bracket using different types of materials.



Figure 1. Location of engine mounting bracket

Research Methodology:

The FEA simulation on engine mounting bracket is done in the isotropic state. The model is kept under the force of 150N and fixed on the other end. The testing is done on a varying frequencies (0-1000 Hz) and constant time (10 seconds). This project gives the detailed analysis about the applicability of AISiC Composite Material in comparison with that of the Conventional Grey Cast Iron.

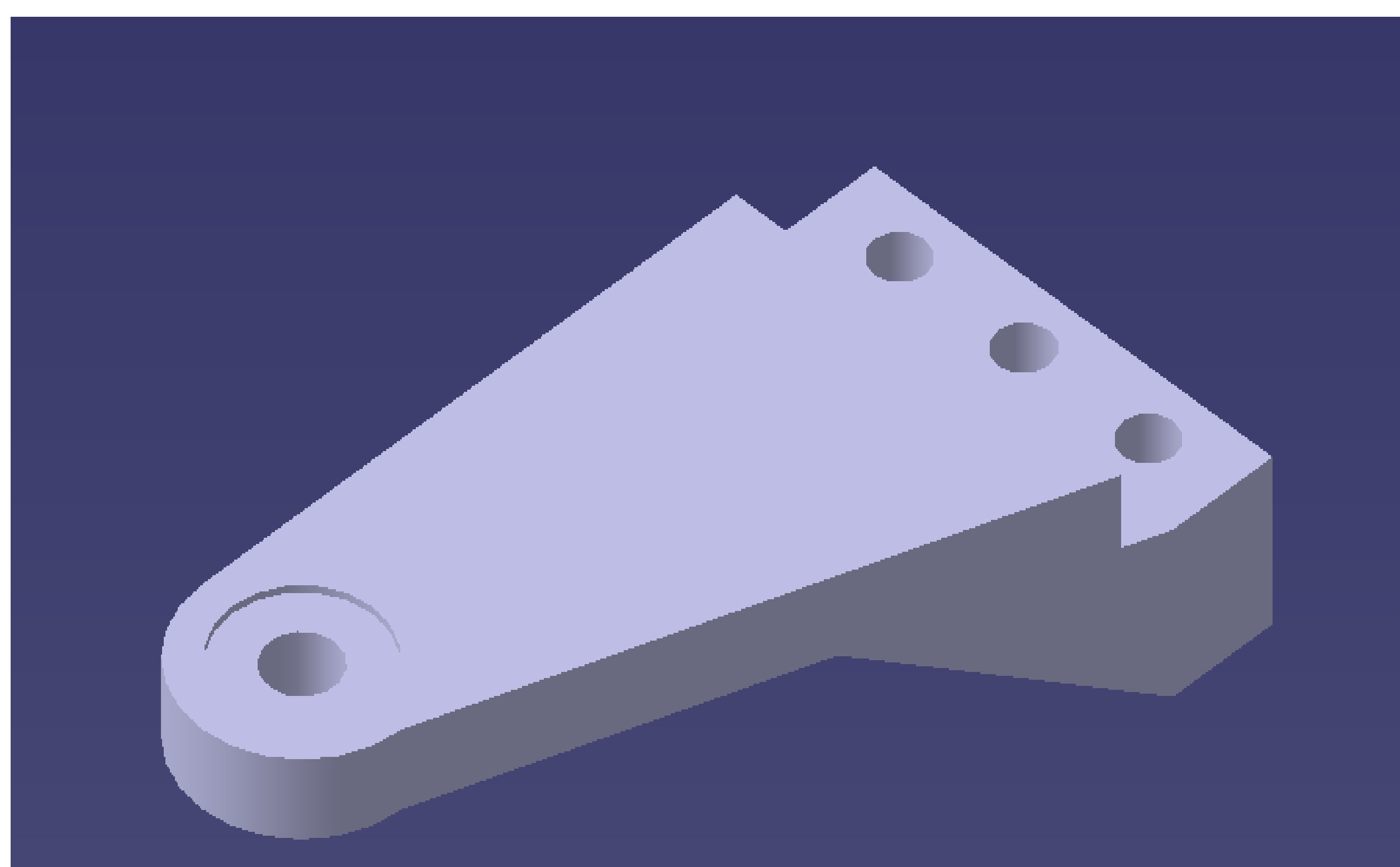


Figure 2. Model of Engine Mounting Bracket

Results: Hence, from the figures 3, 4, we can say that the applicability of the AISiC material on the Engine Mounting Bracket not only gives the better performance in comparison with Grey Cast Iron but also helps in the weight reduction of the component by 60%.

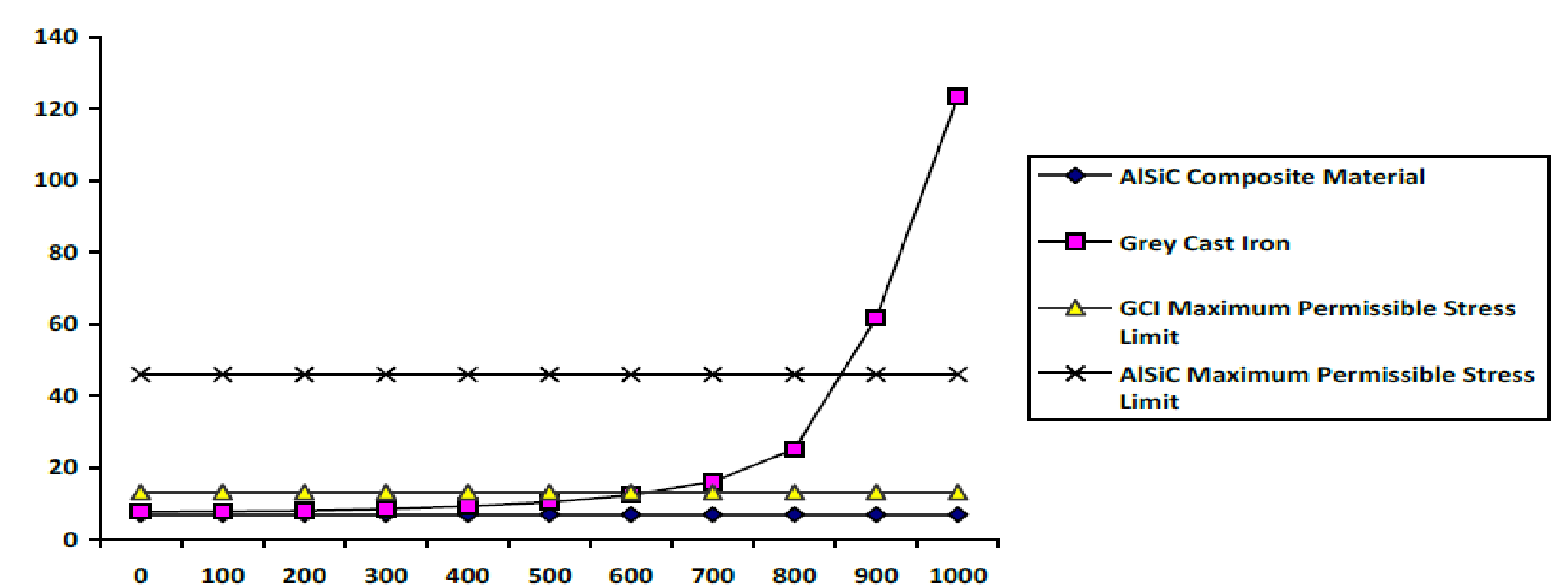


Figure 3. Relationship between the Stress and the frequency obtained to during analysis

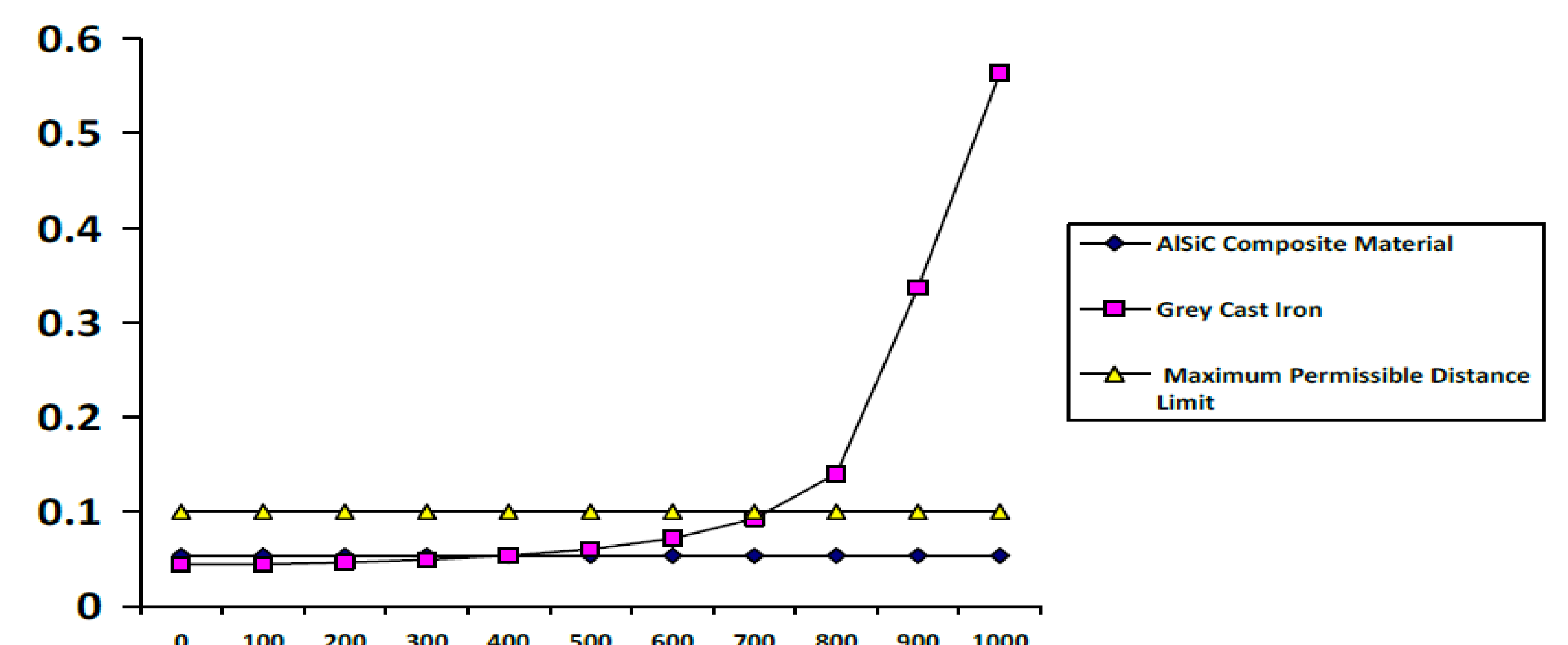


Figure 4. Relationship between the displacement and the frequency obtained to analysis

Conclusions: In this paper the weight reduction engine mounting bracket is taken under the consideration without varying the performance of the component. The bracket has further undergone weight reduction using the material selection through the usage of Comsol Multiphysics software. The results obtained states that 60% of the weight reduction is done to the component through material variation. The future work focuses on the cost reduction of the material without varying the weight and performance of the component..