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Investigation of Acoustic Material Properties of Neem Wood Powder and Glass Wool Materials

Gurushanth B. Vaggar[1], Vishalagoud S. Patil[2], S. L. Nadaf[2], Kiran C. H.[3], Deepak Kothari[3], S. C. Kamate[4].

Associate Professor, Department of Mechanical Engineering, Alvas's Institute of Engineering and Technology, Mijar, Moodbidri, Karnataka, India.

Assistant Professor, Department of Mechanical Engineering, Government Engineering College, Talkal, Koppal, Karnataka, India.

Assistant Professor, Department of Mechanical Engineering, Alvas's Institute of Engineering and Technology, Mijar, Moodbidri, Karnataka, India.

Professor and Principal, Hirasugar Institute of Technology, Nidasoshi, Belagavi district, Karnataka, India.

Abstract: -The specimens of neem wood and waste wood powder were prepared in a constant 35 mm diameter but with various thickness values ranging from 25 to 35 mm for testing. The material was initially mixed to produce coarse fibres and then processed in a grinding machine to produce fine fibres. Two samples sample specimen's diameters of 35 mm and thickness (45 mm and 80 mm) were prepared by glass wool. The sample specimens test was conducted by using two microphones-transfer function method. By using Alfa-X software we obtain parameters by providing real part and imaginary part readings of respective samples. the randomly distributed glass fibers create a porous structure that effectively traps and dissipates sound energy. This results in a high Sound Absorption Coefficient (SAC), indicating significant sound absorption capability. The porous nature of the Neem wood powder structure allows sound waves to penetrate and get trapped within the material, reducing sound reflections. The specific Sound Absorption Coefficient (SAC) values will depend on the characteristics of the wood powder used.

Keywords: *Neem wood, Wood powder, Sound Absorption Coefficient, Porosity, Acoustic.*

1. Introduction

In recent years, due to the rapid development of transport, industrialisation and urbanisation noise pollution has increased, leading to the introduction of heart diseases, annoyances and loss of concentration, which hurt human health. Therefore, by using b natural and waste materials, the priority is to regulate and control sound. Effective solutions to these problems can be provided by the use of active noise-absorbent materials. Porosity materials and resonant materials are available for trade. In many applications that fall within the category of resonant materials, perforated panels and membrane absorbers are applied to absorb sounds.

The fundamental principle of sound absorption referred to above is based on an internal resonant effect, which endears these materials with effective absorbability in particular at low frequency range. These materials are particularly notable for their ability to perform at lower frequencies, despite their efficiency in a large frequency band. Porous materials, which contribute to their overall sound absorption characteristics, are characterised by several channels and holes facilitating the absorption of sound waves into the material.

Sound energy is lost through thermal and fluid losses due to internal friction in the materials. For porous materials, this fundamental principle allows them to function effectively in a wide range of frequencies. Due to their low weight and ease of handling, porous materials have proven to be an excellent sound absorption option for construction and transport applications. Porous materials can be classified into synthetic and natural