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A STUDY OF SOUND ABSORPTION COEFFICIENT OF NATURAL FIBER SAMPLES, COIR FIBER AND RICE DUST AT DRY AND WET CONDITIONS

W.A.A.W.P. Weerasuriya*, U.L. Zainudeen and P.A.N.S. Priyadharshana

Department of Physical Sciences, South Eastern University of Sri Lanka
* priyadarshani.weerasuriya@gmail.com

Noise control and its principles play an important role in creating an acoustically pleasing environment. This can be achieved when the intensity of sound is brought down to a level which is not harmful to human ears. Absorption, isolation, vibration isolation and vibration damping are four basic principles employed to reduce noise. The most recognized technique is sound absorption on the materials itself. The main aim of this work is to investigate the sound absorption coefficient in impedance tube standing wave ratio method using two natural fiber samples coir fiber and rice dust. The experimental setup was constructed newly to measure the sound absorption coefficient. Accuracy of the constructed experimental setup was examined by using a standard material called as glass wool sample. The experimental values of sound absorption coefficient of standard material agreed well with the values provided in the datasheets under ASTM C-423 standards, demonstrating the capability of the experimental setup to use for the measurements. The samples used for this study, coir fiber and rice dust are heavily wasted, and freely available as a natural materials in Sri Lanka. Absorption coefficients were measured in dry form and wet form separately. Both materials got wet till their maximum level. Results obtained show a significant variation in the absorption coefficient with sample condition. The sound absorption coefficient decreases when the relevant material got wet. Number, size and pore type are found to be important factors in determining the sound absorption mechanism in porous materials. Sound must enter the porous material, meaning that at the surface of the material there should be enough open pores to allow this to happen. As the materials used have porous surfaces, they exhibit a natural condition to retain water inside its cavities. In case of moisture conditions, the empty spaces will be filled with water. It alters the sound absorption characteristics, as the water entraps the air voids or, at least, reduces their volume.

Keywords: *Noise, Porous material, Sound absorption coefficient.*

* Corresponding Author