DESIGN OF MEASUREMENT TOOL TO DETERMINE THE ABSORPTION COEFFICIENT OF ACOUSTIC ABSORBER MATERIAL USING THE IMPULSE RESPONSE METHOD

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Abstract

To measure the absorption coefficient of the material damping then designed gauges that are practical and easy to use, and can take measurements directly in place (in situ). Data were collected by two variations of the test material, three variations of the distance measure (15 cm, 20 cm, and 25 cm), and three variations of frequency (500 Hz, 1000 Hz, and 2000 Hz), and two sensors are microphones and Sound Level Meter (SLM). The ideal frequency for absorption coefficient measurement is the frequency of the middle range. In this case, the value of α egg foam test materials that have the highest value, ie α = 0.683 at a frequency of 1000 Hz with a microphone sensor and α = 0.84 at a frequency of 1000 Hz with SLM sensor. Meanwhile, when compared with the test material rockwool α values tend to be unstable at the sensor microphones, but increased the value of α on measurements using SLM in line with the higher frequency is raised. Comparison between measured and literature values show the difference. In the egg foam material that approaches the value of literature is the measurement with a microphone sensor with 0.11 difference (500 Hz), 0.08 difference with SLM (1000 Hz), and 0.33 difference with SLM (2000 Hz). While the rockwool material value is close to the literature value measurements using microphone with 0.02 difference (500 Hz), 0.30 difference with SLM (1000 Hz), and 0.05 difference with microphone (2000 Hz). Measurements using SLM sensor should be closer than the literature value due to the omni directional response pattern, whereas the response pattern is cardioid microphone. Lack of calibration of the SLM and the microphone to be the cause of lack of accuracy of the data produced.

Keyword: Frequency, in situ, absorption coefficient, microphone, sound level meter.