PORTABLE ACOUSTIC PANEL USING FABRIC AND FOAM AS SOUND ABSORBER

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ABSTRACT

Unpleasant noise problems can be a sound pollution. Absorption of sound is required to provide environmental comfort to the user. This study was conducted to determine materials such as acoustic foam and fabric thickness to absorb noise as well as solve the problem of fabrics waste that contributes to the problem of waste disposal. Sound waves are transferred to the acoustic foam, where the energy is lost due to the reflection on the characteristics of acoustic foam, so there is no echo. Acoustic foam helps absorb some of the sound energy and some can still pass through the second layer(fabric layer). The soft properties of the fabric can absorb excess sound that passes through the acoustic foam.Sound waves are deflected when passing through a thick fabric, and causing the production of echoes thus reducing noise. The performance of "Portable Acoustic Panel Using Fabric and Foam as Sound Absorber" is tested using decibel meter method and experimental method. The experiment was conducted in an enclosed space to obtain accurate data. The thickness tested on “Portable Acoustic Panel Using Fabric and Foam as Sound Absorber” is 30mm which has 48.63% average efficiency compared to 10mm which has only 25.29% average efficiency. Moreover, the fabric is more effective(37.33%) than acoustic foam(17.83%) as a material of the panel. For the recommendation to the future researcher, we recommend them to increase the dimension of the box and thickness according to the standard of wall panel.

Keywords: Fabric, Acoustic Foam, Sound Absorber

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ABSTRAK

Masalah bunyi yang tidak menyenangkan boleh menyebabkan pencemaran bunyi. Penyerapan bunyi diperlukan untuk memberi keselesaan persekitaran kepada pengguna. Kajian ini dilakukan untuk menentukan bahan seperti busa akustik dan ketebalan fabrik untuk menyerap bunyi bising serta menyelesaikan masalah sisa fabrik yang menyumbang dalam masalah pelupusan sampah. Gelombang bunyi dipindahkan ke busa akustik, di mana tenaganya hilang akibat pantulan pada ciri-ciri busa akustik, sehingga tiada gema. Busa akustik membantu menyerap sebahagian tenaga bunyi dan sebahagian lainnya masih boleh melepasi ke lapisan kedua (lapisan fabrik). Sifat lembut fabrik dapat menyerap lebihan bunyi yang melepasi busa akustik. Gelombang bunyi dipesongkan apabila melalui kain tebal, menyebabkan penghasilan gema dan mengurangkan kebisingan. Prestasi “Portable Acoustic Panel Using Fabric and Foam as Sound Absorber” ini diuji dengan menggunakan kaedah meter desibel dan kaedah eksperimen. Eksperimen dijalankan di dalam ruangan tertutup untuk mendapatkan data yang tepat. Ketebalan yang diuji pada “Portable Acoustic Panel Using Fabric and Foam as Sound Absorber” adalah 30mm yang mempunyai 48.63% purata kecekapan dibandingkan dengan 10mm yang hanya memiliki 25.29% purata kecekapan . Selain itu, fabrik lebih berkesan (37.33%) daripada busa akustik (17.83%) sebagai bahan penyerap bunyi. Untuk cadangan kepada pengkaji seterusnya, kami mengesyorkan agar meningkatkan dimensi kotak dan ketebalan fabrik mengikut standard ketebalan panel dinding.

Katakunci: Fabrik, Busa akustik ,Penyerapan bunyi