

Development of Low-Cost Vibro-Acoustic, and Fire-Resistant, Insulation Material from Natural and Sustainable Sources

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Abstract : The topic of the research is to develop sustainable fire-resistant materials for vibration and acoustic damping of structure and airborne noises from sustainable recycled materials and biodegradable binders. The paper reports, methods and techniques of enhancing fire resistive, vibration and acoustic properties of building insulation materials made from natural resources like wood and recycled materials like rubber and textile waste. The structures are designed to optimize the number, size and stratification of closed (heat insulating) and open (noise insulating) pores. The samples produced are tested for their heat and noise insulating properties, including vibration damping and their structural properties (airflow resistivity, porosity, tortuosity and elastic modulus). The structural properties are then used in theoretical models to check the acoustic insulation measurements. Initial data indicate that one layer of such material can yield as much as 18 times more damping, increasing the loss factor by 18%.

Keywords : fire resistant, vibration damping, acoustic material, vibro-acoustic, thermal insulation, sustainable material, low cost materials, recycled materials, construction material

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