

7<sup>th</sup> World Convention on

# WASTE RECYCLING AND REUSE

May 16-17, 2018 Tokyo, Japan

## Sound absorption properties of wood plastic composites made of recycled materials

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Recycling plastic and its reuse are essential for metropolis waste reduction. Producing Wood Plastic Composites (WPCs) with recycled plastics has been a practical method, which could further eliminate the impact of construction industry and promote environment sustainability. However, the application of WPCs has been focused on deck boards for its mechanical properties, durability and hydrophobicity. Therefore, studying features of WPCs with various perspectives that would be effective to broaden its application and further alleviate environment impact of larger scale. Noise reduction has been a crucial issue for building environment, but traditional sound absorbing asbestos based materials were harmful to human health. Therefore, porous absorbents of similar structure have grown popular for replacement. WPCs with fibrous and granular porous microstructures were expected to provide certain sound attenuation properties. In this study, the sound absorption coefficient of commercial WPCs consisting of recycled Polypropylene (PP) and Polyethylene (PE) mixture were measured. Specimens with various structures and surface patterns combining panel absorbent structures were compared to determine the main factors affecting the sound attenuation performance of WPCs. The results proved that WPCs are potential sound absorption materials. WPCs with chamber structures had superior sound absorption properties at low and middle frequency range comparing to present commercial products. Higher surface roughness and density both benefit sound attenuation. However, the effect of density towards sound energy dissipation would require further study on its microstructure. Comparing to common noise abatement materials, WPCs are affective to mid-low frequency range sound absorption and require less space. The results showed that recycled plastic based WPCs are building materials with wider application potential, which allow larger amount of waste plastic reused.

### Biography

Lan-Ting Chang has expertise in wood and biomaterial science, and has been devoted to studying the acoustic properties of wood and biomaterials through her master's. The object of her work was intended to realize the possibility of practically applying wood and biomaterials for acoustic means according to their physical and chemical performances, and provide solid data for actual modeling. The concerns of her study would also include understanding environmental impact of the material with perspectives including the manufacture process of the material, and its afterward utilization analyzed with BIM.

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