

Phongphan Wachoom 2014: Interior Particle Board from Sawdust. Master of Architecture (Building Innovation), Major Field: Building Innovation, Department of Building Technology. Thesis Advisor: Mr. Parames Kamhangrittirong, D.Eng. 123 pages.

This research aims to process waste sawdust obtained from wood processing factories that was up to 8 million tons per year causing some problems on storage and disposal. The objectives of this research were to utilize waste sawdust by manufacturing as interior wall panel. The mix proportion of sample wall panel were consisted of sawdust and natural welding materials including rubber oil mixed with dammar powder that are natural materials and local wisdom of ancient people on repairing the leak of the boat as well as to study and compare properties on thermal resistance and sound absorption between interior wall panel made of sawdust and plywood against gypsum boards available in the market. For manufacturing sample wall panel for testing, the mix proportions of sawdust: rubber oil: dammar powder at 1: 1: 1, 2: 1: 1, and 2.0: 1.5: 1.5, were used. The panel was compressed and molded by using thermal compression at 100 degrees Celsius with pressure of 80-100 pounds per square inch for 10 and 5 minutes. The results showed that, generally, thermal conductivity coefficient of (k) of interior wall panel made of sawdust with the mix proportion of 2: 1: 1 and duration of compression of 10 minutes provided the highest value of thermal conductivity at 0.28 watts/m.K. The thermal conductivity coefficient of (k) of interior wall panel made of sawdust with the mix proportion of 2: 1.5: 1.5 and duration of compression of 5 minutes provided the lowest value of thermal conductivity at 0.24 watts/m.K. Interior wall panel made of sawdust had the property on thermal resistance similar to that of gypsum board, i.e., 0.19 watt per m.K., while the property on thermal resistance of plywood was 0.138 watt per m.K. After testing, when the proportion of sawdust was higher than welding materials, the value of thermal conductivity (k) would be higher than that with the proportion of sawdust equal to welding materials. For the value of sound absorption for all proportions, the graph of sound absorption would be higher from frequency of 200-2,000 Hz. Subsequently, the graph would be lower in the high frequency except for the mix proportion of 2.0: 1.5: 1.5 with duration of compression of 5 minutes, the value of sound absorption would be higher by 40%. As a result, it was able to absorb the sound as much as acoustic board available in the market with the capacity of sound absorption of 40%. Moreover, it was physically be able to be developed for exterior utilization because the value of its inflation was low.

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Thesis Advisor's signature