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# Experimental Evaluation on Palm Oil and Sesame Oil-based Resin Properties as Core Sandwich Material for Lightweight Ship Structure

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**Abstract**

Research on lightweight material on ship structure has taken giant steps during the last decade. One reason is that shipping activities have increased and, therefore, the possibility of increasing the carrying cargo capacity in a realistic way using advanced lightweight material. This article summarizes a research investigation regarding the experimental tests of vinyl ester bio resin material using palm oil and sesame oil based on Lloyd's Register (LR) standard. Several tests were conducted, including density, water absorption test, Fourier transformed infrared test (FTIR), scanning electron microscope (SEM), and mechanical tests to evaluate the effect of 2-10% addition of vegetable oils on mechanical properties. The influence of the addition of vegetable oils is successfully characterized using physical measurements, which indicate the possible formation of a polymer blend to increase in elongation value. Mechanical testing shows that adding vegetable oils causes a decrease in average density, hardness, bending strength, and tensile strength. The bending strength decreases about 9.20 - 47.06% for 2-10% palm oil addition and 5.33 - 42.40% for sesame oil addition. Moreover, vegetable oil causes a tensile strength decrease of about 5-18.75% on palm oil and 3.75-13.75% on sesame oil. As summarized, bio resin based on sesame oil has better mechanical behavior with the oil addition of 4-8% fulfills all Lloyd's Register criteria. © 2022 Materials and Energy Research Center. All rights reserved.

Author keywords

Bio Resin; Core Sandwich; Palm Oil; Sesame Oil; Ship Structure

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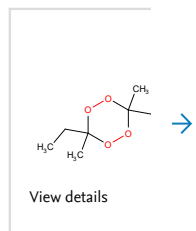
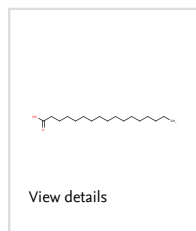
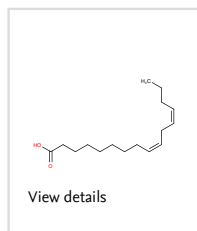
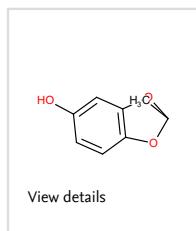
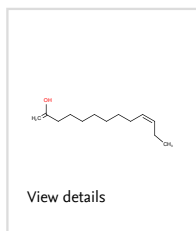
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