

Pengaruh Jenis Kayu dan Variasi Amonium Sulfat Dalam Pelapisan Arang kayu asam Terhadap Sifat Ketahanan Api

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INTISARI

Penggunaan material kayu pada bangunan perumahan yang tidak diberikan perlakuan tahan api dapat menyebabkan kebakaran. Salah satu alternatif dalam peningkatan ketahanan api pada bahan kayu adalah dengan memberi lapisan penghambat api seperti arang dan amonium sulfat. Penelitian ini bertujuan untuk mengetahui pengaruh tiga jenis kayu dan variasi amonium sulfat terhadap sifat ketahanan api dengan memanfaatkan arang kayu asam sebagai bahan baku pembuatan lembaran Lapisan Penghambat Api (LPA).

Penelitian ini menggunakan rancangan acak lengkap dengan 2 faktor perlakuan yaitu jenis kayu (mahoni, pinus dan meranti) dan variasi amonium sulfat (0%, 3%, dan 5%) dengan masing-masing perlakuan tiga kali ulangan. Lembaran LPA arang dibuat dari campuran 185 g serbuk arang dan perekat 30% kemudian dicetak dan dikempa panas pada suhu 140°C selama 5 menit. Lembaran LPA arang selanjutnya dilapiskan pada permukaan kayu dan diuji bakar sesuai dengan ASTM E 69-02. Stik kayu yang telah dilapisi lembaran LPA arang diuji sifat ketahanan api kayu yang meliputi persentase kehilangan berat dan waktu mencapai suhu 260°C.

Hasil penelitian menunjukkan kayu mahoni dilapisi LPA arang kayu asam dengan amonium sulfat 0%, 3% dan 5% memiliki persentase kehilangan berat berturut-turut sebesar 16,06%; 15,23%; 10,60% serta waktu mencapai suhu 260°C secara berurutan selama 47 detik, 93 detik dan 139 detik. Kayu meranti dilapisi LPA arang kayu asam dengan amonium sulfat 0%, 3% dan 5% memiliki persentase kehilangan berat berturut-turut sebesar 14,42%; 12,89%; 10,13% dan waktu untuk mencapai suhu 260°C secara berurutan selama 45 detik, 34 detik dan 51 detik. Kayu pinus dilapisi LPA arang kayu asam dengan amonium sulfat 0%, 3% dan 5% memiliki persentase kehilangan berat berturut-turut sebesar 16,78%; 15,43%; 9,82%, waktu mencapai suhu 260°C secara berurutan yakni 49 detik, 78 detik dan 79 detik. Kombinasi jenis kayu mahoni dengan variasi konsentrasi amonium sulfat 5% menghasilkan nilai ketahanan api yang paling baik.

Kata kunci: Mahoni, meranti, pinus, lapisan penghambat api, arang kayu asam.

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The Effect of Wood Type and Ammonium Sulfate Variation in Tamarind Charcoal Coating on Fire Resistance Properties

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ABSTRACT

The use of wood materials in residential buildings that are not treated to resist fire can cause fires. One of the applications of fire resistance improvement is with fire-retardant materials such as charcoal and ammonium sulfate. This research is aimed to find out the effect of three types of wood with the addition of ammonium sulfate on the fire resistance properties by utilizing tamarind charcoal as raw material for the Fire-Retardant Sheet (FRS).

This research was employed a Completely Randomized Design, using 2 factors, including type of wood (mahogany, pine and meranti) and ammonium sulfate addition variations (0%, 3%, and 5%) with each treatment had three repetitions. A tamarind charcoal FRS was made by mixing 185 g charcoal powder and 30% adhesive then was hot-pressed at 140°C for 5 minutes. The tamarind charcoal FRS was overlaid on the surface of the timber and were tested for combustion according to ASTM E 69-02. The percentage of weight loss and the time it reached a temperature of 260°C were measured.

The results show that mahogany timber with tamarind charcoal FRS with the addition of ammonium sulfate 0%, 3% and 5% had a weight loss percentage of 16,06%; 15,23%; 10,60% and the time to reach a temperature of 260°C for 47 seconds, 93 seconds and 139 seconds, respectively. Meranti timber with tamarind charcoal FRS with the addition of 0%, 3% and 5% ammonium sulfate had weight loss percentages of 14,42%; 12,89%; 10,13% and the time to reach a temperature of 260°C for 45 seconds, 34 seconds. and 51 seconds, respectively. Pine timber with tamarind charcoal FRS with the addition of 0%, 3% and 5% ammonium sulfate had weight loss percentages of 16,78%; 15,43%; 9,82%, the time reaching a temperature of 260°C was 49 seconds, 78 seconds and 79 seconds, respectively. The combination of mahogany timber species with a variation of ammonium sulfate 5% produces the best fire resistance value.

Keywords: Mahogany, meranti, pine, fire retardant sheet, tamarind charcoal

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