

ABSTRAK

ANALISIS PENGARUH VARIASI KOMPOSISI ALUMINIUM MURNI DAN ALUMINIUM *SCRAP* TERHADAP KEKERASAN DAN KEKUATAN IMPAK BALING-BALING KAPAL

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(2026: xvi + 86 Halaman, 21 Gambar, 6 Tabel, 11 Lampiran)

Penelitian ini bertujuan untuk menganalisis pengaruh variasi komposisi aluminium *scrap* tromol motor dan aluminium murni terhadap kekerasan dan kekuatan impak hasil pengecoran untuk aplikasi baling-baling kapal. Variasi komposisi yang digunakan adalah 100% aluminium *scrap*, 85% aluminium *scrap* + 15% aluminium murni, dan 70% aluminium *scrap* + 30% aluminium murni. Proses pengecoran dilakukan menggunakan metode *metal mold casting*, kemudian dilakukan pengujian kekerasan *Brinell* dan impak *Charpy*. Hasil penelitian menunjukkan bahwa nilai kekerasan tertinggi diperoleh pada variasi 100% aluminium *scrap* sebesar 80,30 kg/mm², sedangkan nilai impak tertinggi diperoleh pada variasi 70% aluminium *scrap* + 30% aluminium murni sebesar 1,45 Joule/cm². Peningkatan kandungan aluminium *scrap* meningkatkan kekerasan material, sedangkan peningkatan aluminium murni meningkatkan kekuatan impak. Berdasarkan keseimbangan antara kekerasan dan ketangguhan, komposisi 85% aluminium *scrap* + 15% aluminium murni merupakan komposisi yang paling optimal untuk aplikasi baling-baling kapal.

Kata Kunci: aluminium *scrap*, aluminium murni, impak *charpy*, kekerasan *brinell*, pengecoran cetakan logam.

ABSTRACT

ANALYSIS OF THE EFFECT OF VARIATIONS IN PURE ALUMINUM AND ALUMINUM SCRAP COMPOSITION ON THE HARDNESS AND IMPACT STRENGTH OF SHIP PROPELLERS

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This study aims to analyze the effect of varying compositions of motorcycle brake drum aluminum scrap and pure aluminum on the hardness and impact strength of cast materials for ship propeller applications. The compositions used were 100% aluminum scrap, 85% aluminum scrap + 15% pure aluminum, and 70% aluminum scrap + 30% pure aluminum. The casting process was carried out using the metal mold casting method, followed by *Brinell* hardness and *Charpy* impact tests. The results showed that the highest hardness value was obtained from the 100% aluminum scrap composition at 80.30 kg/mm², while the highest impact strength was achieved by the 70% aluminum scrap + 30% pure aluminum composition at 1.45 Joule/cm². Increasing the aluminum scrap content improved material hardness, whereas increasing the pure aluminum content enhanced impact strength. Based on the balance between hardness and toughness, the composition of 85% aluminum scrap + 15% pure aluminum was found to be the most optimal for ship propeller applications.

Keywords: aluminum scrap, pure aluminum, impact strength, mechanical properties hardness, metal mold casting.