ABSTRAK

PENGARUH *HOLDING TIME* PADA PROSES *ANNEALING* TERHADAP NILAI KEKERASAN DAN KETANGGUHAN BESI COR KELABU FC25

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Besi Cor Kelabu FC25 adalah salah satu material baja karbon tinggi yang sedang banyak digunakan sebagai bahan utama pada pembuatan elemen mesin seperti sambungan perpipaan, poros, engkol, roda gigi, landasan mesin. Penelitian ini bertujuan untuk mengetahui pengaruh lama waktu *holding time* pada proses *annealing* terhadap sifat mekanik dan struktur mikro Besi Cor Kelabu FC25. Penelitian ini menggunakan spesimen berupa Besi Cor Kelabu FC25 yang diberikan perlakuan panas *annealing* dengan temperatur 850°C dengan variasi *holding time* 30 menit, 60 menit dan 120 menit, kemudian didinginkan secara lambat didalam *furnace* selama 30 jam. Selanjutnya dilakukan pengujian kekerasan metode *Vickers* dan pengujian impak metode *charpy*. Hasil uji kekerasan didapatkan nilai kekerasan sebelum dilakukan perlakuan panas sebesar 154,739849 kg/mm². Hasil uji kekerasan setelah dilakukan perlakuan panas *annealing* dengan *holding time* 30 menit, 60 menit dan 120 menit sebesar 152,662722 kg/mm², 148,797411 kg/mm², 143,470735 kg/mm². Hasil pengujian impak didapatkan energi impak sebelum dilakukan perlakuan panas adalah sebesar 3 Joule. Hasil energi impak setelah dilakukan perlakuan panas *annealing* dengan *holding time* 30 menit, 60 menit dan 120 menit sebesar 3,8 Joule, 4,06 Joule, 4,3 Joule. Pada pengamatan struktur mikro menggunakan Optical Microscopy (OM) menunjukkan perubahan fasa grafit flake menjadi grafit nodular dengan butir yang lebih besar.

Kata kunci : Beci Cor Kelabu FC25, *Annealing, Holding Time*, kekerasan, ketangguhan dan OM.

ABSTRACT

THE EFFECT OF HOLDING TIME IN THE ANNEALING PROCESS ON THE HARDNESS AND IMPACT STRENGTH OF FC25 GRAY CAST IRON

By

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FC25 Gray Cast Iron is a high carbon steel material that is widely used as the main material in the manufacture of machine elements such as pipe fittings, shafts, cranks, gears, and machine beds. This study aimed to determine the effect of holding time during the annealing process on the mechanical properties and microstructure of FC25 Gray Cast Iron. This research used FC25 Gray Cast Iron specimens that were heat treated with annealing at a temperature of 850°C with holding time variations of 30 minutes, 60 minutes, and 120 minutes, then slowly cooled in the furnace for 30 hours. Subsequently, Vickers hardness testing and Charpy impact testing were carried out. The hardness test results showed a hardness value of 154.739849 kg/mm² before heat treatment. The hardness test results after annealing heat treatment with holding times of 30 minutes, 60 minutes, and 120 minutes were 152.662722 kg/mm², 148.797411 kg/mm², and 143.470735 kg/mm², respectively. The impact test results showed an impact energy of 3 Joules before heat treatment. The impact energy results after annealing heat treatment with holding times of 30 minutes, 60 minutes, and 120 minutes were 3.8 Joules, 4.06 Joules, and 4.3 Joules, respectively. Optical Microscopy (OM) observation of the microstructure showed a transformation of the graphite flake phase to a nodular graphite phase with larger grains.

***Keywords**:* FC25 Gray Cast Iron, Annealing, Holding Time, hardness, toughness, and OM.