ABSTRAK

PENGARUH VARIASI TEMPERATUR 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 variasi temperatur 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 variasi temperatur 750^{o}C, 850^{o}C dan 1000^{o}C dan *holding time* 30 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 sebesa4 154,739849 kg/mm^2. Hasil uji kekerasan setelah dilakukan perlakuan panas *annealing* dengan temperatur 750^{o}C, 850^{o}C dan 1000^{o}C sebesar 152,662722 kg/mm^2, 150,3386871 kg/mm^2, 146,1269614 kg/mm^2. Hasil pengujian impak didapatkan energi impak sebelum dilakukan perlakuan panas sebesar 3 joule. Hasil energi impak setelah dilakukan perlakuan panas *annealing* dengan temperatur 750^{o}C, 850^{o}C dan 1000^{o}C sebesar 3,26 joule, 3,8 joule, 4,23 joule. Pada pengamatan struktur mikro menggunakan Optical Microscopy (OM) menunjukan perubahan fasa grafit flake menjadi grafit nodular dengan butir yang lebih besar.

Kata Kunci : Besi Cor Kelabu FC25, *Annealing,* Temperatur, kekerasan, ketangguhan dan OM.

ABSTRACT

THE EFFECT OF TEMPERATURE VARIATIONS IN THE ANNEALING PROCESS ON THE HARDNESS AND IMPACT STRENGTH FC25 GRAY CAST IRON

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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, machine bads. This study aimed to determine the effect of temperature variations in the annealing process on the mechanical properties and microstructure of FC25 Gray Cast Iron. This research used specimens in the form of FC25 Gray Cast Iron which were given heat annealing treatment with temperature variations of 750^{o}C, 850^{o}C and 1000^{o}C and a holding time of 30 minutes, then cooled slowly in a furnace for 30 hours. Subsequently, Vickers hardness testing and Charpy method impact testing were carried out. The hardness test results showed that the hardness value before heat treatment was carried out was 154,739849 kg/mm2. The hardness test results after annealing heat treatment at temperatures of 750^{o}C, 850^{o}C and 1000^{o}C were 152,662722 kg/mm^{2}, 150,3386871 kg/mm^{2}, 146,1269614 kg/mm^{2}. The impact test results showed that the impact energy before heat treatment was carried out was 3 joules. The impact energy results after annealing heat treatment with temperatures of 750^{o}C, 850^{o}C and 1000^{o}C were 3,26 joules, 3,8 joules, 4,23 joules. Observation of the microstructure using Optical Microscopy (OM) shows a change in the flake graphite phase to become nodular graphite with larger grains.

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