

PENGARUH VARIASI SUHU *TEMPERING* TERHADAP KEKERASAN, KEKUATAN IMPAK, DAN STRUKTUR MIKRO BESI COR KELABU DENGAN KANDUNGAN UNSUR SILIKON 2,3%

ABSTRAK

Penggunaan besi cor kelabu masih sangat digemari hingga kini. Kemampuan mekanis besi cor kelabu mengutamakan kegetasannya sehingga, besi cor kelabu diharuskan mempunyai kekerasan dan kekuatan impak yang baik. Pembentukan grafit pada besi cor yang kurang seragam dan merata membuat sifat mekanis besi cor kelabu kurang maksimal. Pada penelitian ini diberikan perlakuan *tempering* untuk menaikkan sifat mekanis pada besi cor kelabu dengan kandungan unsur Si 2,3%.

Suhu tempering dapat mempengaruhi pergerakan atom sehingga, perbedaan suhu *tempering* dapat memberikan pengaruh pada hasil struktur mikro yang terbentuk. Perlakuan panas yang diberikan pada spesimen adalah *quenching-tempering*. Perlakuan *quenching* diberikan pada suhu 800°C, lalu variasi suhu perlakuan *tempering* 300°C dan 600°C. Pada spesimen dengan tiap variasi suhu *tempering* dilakukan pengujian kekerasan Brinell, uji impak *charpy*, dan uji struktur mikro.

Perlakuan tempering 300°C menaikkan nilai kekerasan sebanyak 44,57% dari spesimen awal, menaikkan kekuatan impak sebanyak 43,23%; dan memiliki struktur grafit tipe A. Perlakuan tempering 600°C menurunkan nilai kekerasan sebanyak 7,76% dari spesimen awal, menaikkan kekuatan impak sebanyak 345,69%; dan memiliki struktur grafit tipe C.

Kata Kunci: Besi Cor Kelabu, Silikon, *Tempering*, Uji Kekerasan, Uji Impak, dan Struktur Mikro

EFFECT OF TEMPERING TEMPERATURE VARIATIONS ON HARDNESS, IMPACT STRENGTH, AND MICROSTRUCTURE OF GRAY CAST IRON WITH 2.3% SILICONE CONTENT

ABSTRACT

The use of gray cast iron is still very popular today. The mechanical ability of gray cast iron prioritizes its brittleness so that gray cast iron is required to have good hardness and impact strength. The formation of graphite in cast iron is less uniform and distribute less evenly, which makes the mechanical properties of gray cast iron less optimal. In this study, tempering treatment was given to improve the mechanical properties of gray cast iron with an elemental Si content of 2.3%.

The tempering temperature can affect the movement of atoms so that the difference in tempering temperature can affect the results of the microstructure formed. The heat treatment given to specimens is quenching-tempering. Quenching treatment was given at a temperature of 800°C, and then variations of 300°C and 600°C tempering treatment. The specimens with each variation of tempering temperature were tested with Brinell hardness, Charpy impact test, and microstructure test.

The tempering treatment of 300°C increased the hardness value by 44.57% from the initial specimen, increasing the impact strength by 43.23%; and has a type A graphite structure. The tempering treatment of 600°C reduces the hardness value by 7.76% from the initial specimen, increases the impact strength by 345.69%; and has a C-type graphite structure.

Keywords: Gray Cast Iron, Silicon, Tempering, Hardness Test, Impact Test, and Microstructure

