

ABSTRAK

PERBANDINGAN HARGA IMPACT DAN KEKERASAN PADA PERLAKUAN PANAS BAJA KARBON

Nama : Asrul Miftakhul Reza
NIM : 2204211352
Dosen Pembimbing : Suhardirman, MT

Baja karbon banyak digunakan dalam industri karena sifat mekaniknya dapat ditingkatkan melalui perlakuan panas. Salah satu tahapan penting dalam proses ini adalah pendinginan, yang sangat memengaruhi kekerasan dan ketangguhan material. Penelitian ini bertujuan untuk menganalisis pengaruh variasi media pendingin terhadap nilai kekerasan dan ketangguhan (impact) pada baja karbon ST 50 setelah perlakuan panas. Spesimen dipanaskan pada suhu 900°C selama 15 menit, lalu didinginkan menggunakan air, oli, udara, dan tungku. Pengujian dilakukan dengan uji kekerasan *Rockwell* dan uji impak metode *Charpy*. Hasil menunjukkan bahwa air menghasilkan kekerasan tertinggi (51,8 HRB) dengan ketangguhan terendah ($0,31 \text{ J/mm}^2$), sedangkan tungku menghasilkan kekerasan terendah (22,5 HRB) dengan ketangguhan tertinggi ($1,21 \text{ J/mm}^2$). Temuan ini menunjukkan hubungan terbalik antara kekerasan dan ketangguhan, serta dapat menjadi acuan dalam memilih media pendingin sesuai kebutuhan aplikasi.

Kata kunci: baja karbon, perlakuan panas, kekerasan, uji impak, pendinginan.

ABSTRACT

COMPARISON OF IMPACT PRICE AND HARDNESS IN HEAT TREATMENT OF CARBON STEEL

Name : Asrul Miftakhul Reza
NIM : 2204211352
Supervisor : Suhardirman,MT

Carbon steel is widely used in industry due to its mechanical properties, which can be improved through heat treatment. One critical stage in the heat treatment process is cooling, which significantly affects the hardness and toughness of the material. This study aims to analyze the effect of different cooling media on the hardness and impact toughness of ST 50 carbon steel after heat treatment. The specimens were heated to 900°C for 15 minutes and then cooled using water, oil, air, and furnace. The tests conducted were the Rockwell hardness test and Charpy impact test. The results showed that water quenching produced the highest hardness value (51.8 HRB) with the lowest toughness (0.31 J/mm²), while furnace cooling resulted in the lowest hardness (22.5 HRB) but the highest toughness (1.21 J/mm²). These findings indicate an inverse relationship between hardness and toughness, and can serve as a reference in selecting appropriate cooling media based on specific application requirements.

Keywords: carbon steel, heat treatment, hardness, impact test, cooling.