

ABSTRAK

Penelitian ini dilakukan untuk mengetahui pengaruh heat treatment dengan variasi media quenching air, radiator coolant, dan oli serta pengaruh tempering setelah quenching terhadap kekuatan uji tarik dan struktur mikro pada baja karbon sedang. Proses perlakuan panas diawali dengan austenisasi pada temperatur 900°C selama 45 menit kemudian di quenching dengan variasi air, radiator coolant, dan oli setelah itu dilanjutkan tempering 450°C selama 90 menit.

Dari hasil penelitian menunjukkan variasi media quenching berpengaruh terhadap nilai kekuatan tarik dan struktur mikro. Pada struktur mikro spesimen yang diquenching air cenderung membentuk martensit yang tajam dan tegas sehingga memiliki nilai rata-rata kekuatan tarik tegangan maksimal 1.594,19 dan regangan 1,85%, media quenching radiator coolant dan quenching oli memiliki struktur mikro yang hampir mirip namun memiliki nilai kekuatan tarik rata-rata yang berbeda tegangan maksimal 1.209,99 dan 1.123,58 serta regangan 0,47% dan 1,61%.

Proses tempering mengakibatkan terurainya martensit sehingga struktur mikronya berubah dan lebih didominasi perlit dan ferit menjadikan nilai kekuatan tarik menurun. Nilai kekuatan tarik rata-rata media quenching air tegangan maksimal 1.117,46 dan regangan 12,71%, quenching media Radiator coolant tegangan maksimal 1.083,47 dan regangan 13,46%, dan quenching oli tegangan maksimal 774,87 dan regangan 12,35% setelah menerima proses tempering.

Kata kunci : Baja karbon sedang, quenching, tempering, kekuatan tarik, struktur mikro

ABSTRACT

This research was conducted to determine the effect of heat treatment with variations media quenching of water, radiator coolant, and oil and also the effect of tempering after quenching on tensile strength and microstructure of carbon steel currently. The heat treatment process begins with customization at a temperature of 900°C for 45 minutes then quenched with variations of water, radiator coolant. After that, the oil was tempered at 450°C for 90 minutes.

The results of the study show that the variation of quenching media affects the value of tensile strength and microstructure. On the microstructure of the specimen water quenched tends to form sharp and firm martensite so that it has an average maximum tensile strength of 1,594.19 and strain of 1.85%. Radiator coolant and oil quenching media have almost similar microstructure but have an average tensile strength value which differs in maximum stress of 1,209.99 and 1,123.58 and strain of 0.47% and 1.61%.

The tempering process results in the decomposition of martensite so that the microstructure changes and is more dominated by pearlite and ferrite making the value tensile strength decreases. The average tensile strength value of water quenching media maximum stress was 1117.46 and strain 12.71%, quenching Radiator media coolant maximum stress 1,083.47 and strain 13.46%, and oil quenching maximum stress 774.87 and strain 12.35% after receiving the process tempering.

Keywords: Medium carbon steel, quenching, tempering, tensile strength, structure micro