ABSTRAK

Letak Indonesia yang dikelilingi laut merupakan faktor yang dapat mempercepat terjadinya proses korosi. Tujuan dari penelitian ini adalah untuk mengetahui kekuatan tarik, harga keuletan impak dan laju korosi baja karbon yang diberi perlakuan panas *quenching tempering* 400°C dan tanpa diberi perlakuan *tempering*.

Dalam penelitian ini, bahan yang digunakan adalah baja karbon medium. Berdasarkan uji komposisi kadar karbonnya 0,45%. Baja diberi perlakuan *quenching* untuk menaikkan tegangan sisa dan di*tempering* 400°C untuk menurunkan tegangan sisa agar dapat tahan terhadap korosi. Proses korosi dilakukan dengan cara benda uji diletakkan pada lingkungan sekitar pantai dan akan dilakukan pengujian secara berkala, sebelum terkorosi, korosi 1,5 bulan, dan 3 bulan. Jenis pengujian dan pengamatan yang dilakukan adalah kekuatan tarik, harga keuletan impak, dan laju korosi.

Hasil penelitian ini menunjukkan bahwa kekuatan tarik benda uji dengan perlakuan panas lebih tinggi dibanding benda uji tanpa perlakuan *tempering*. Kekuatan tarik tertinggi benda uji dengan perlakuan panas sebesar 137,94 kg/mm^2 dan terendah 124,87 kg/mm^2. Pada benda tanpa perlakuan *tempering* kekuatan tarik tertinggi sebesar 77,15 kg/mm^2 dan terendah 70,30 kg/mm^2. Harga keuletan benda uji impak tanpa perlakuan *tempering* lebih tinggi dibanding benda uji dengan perlakuan panas. Harga keuletan tertinggi benda tanpa perlakuan *tempering* sebesar 0,594 J/mm^2 dan terendah 0,538 J/mm^2. Pada benda uji dengan perlakuan panas harga keuletan tertinggi sebesar 0,516 J/mm^2 dan terendah 0,406 J/mm^2. Laju korosi mengalami peningkatan seiring dengan waktu penahan dengan media korosif. Pada benda uji tarik dengan perlakuan panas laju korosi sebesar 93,27 mdd dan 102,45 mdd, sedangkan benda uji tanpa perlakuan panas, laju korosi sebesar 158,65 mdd dan 190,30 mdd. Pada benda uji impak dengan perlakuan panas laju korosi sebesar 76,56 mdd dan 87,77 mdd, sedangkan benda tanpa perlakuan *tempering* sebesar 110,18 mdd dan 145,66 mdd.

Kata kunci : korosi, baja karbon sedang, *quenching tempering*, pantai, tanpa perlakuan *tempering*

ABSTRACT

The location of Indonesia which is surrounded by the sea is a trigger factor to accelerate the corrosion process. The aims of this research were to determine the tensile strength, impact durability value and the corrosion rate of carbon steel which was given a heat quenching tempering treatment of 400°C and without being given a heat tempering treatment.

The material used in this research was medium carbon steel. Based on the composition test, the carbon content 0,45%. Steel given quenching to raise voltage the rest and voltage tempered 400°C to lower remaining to be resistant to corrosion. The process of corrosion was carried out by placing the object specimen in the environment around the coast and would be tested regularly, before corroding, corrosion 1,5 months, and corrosion 3 months. The type of testing and observation performed were tensile strength, impact durability value, and corrosion rate.

The results of this study indicate that the tensile strength of specimens with heat treatment is higher than specimens without tempering treatment. The highest tensile strength of the specimen with heat treatment was 137,94 kg/mm^2 and the lowest was 124,87 kg/mm^2. In objects without tempering the highest tensile strength was 77,15 kg/mm^2 and the lowest was 70,30 kg/mm^2. The tenacity of impact test specimens without tempering treatment is higher than that of heat treated specimens. The highest tenacity object without tempering treatment is 0,594 J/mm^2 and the lowest is 0,538 J/mm^2. In the specimens with heat treatment the highest tenacity value was 0,516 J/mm^2 and the lowest was 0,406 J/mm^2. Corrosion rate increases with the holding time with corrosive media. In the tensile test specimens with heat treatment the corrosion rate was 93,27 mdd and 102,45 mdd, whereas the specimens without heat treatment, the corrosion rates were 158,65 mdd and 190,30 mdd. In the impact test object with heat treatment the corrosion rate was 76,56 mdd and 87,77 mdd, while the object without tempering treatment was 110,18 mdd and 145,66 mdd.

Keywords: *Corrosion, medium carbon steel, quenching tempering, coastal, no tempering treatment*