

ABSTRAK

PENGARUH PENDINGINAN CAIRAN *RADIATOR COOLANT* (RC) AHM TERHADAP KEKUATAN TARIK HASIL PENGELASAN SMAW PADA PLAT BAJA ST 37

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Penelitian ini bertujuan untuk mengetahui pengaruh pendinginan cairan *radiator coolant* (RC) AHM dan oli SAE 10W- 40 sebagai pembanding terhadap kekuatan tarik hasil pengelasan SMAW. Material yang digunakan adalah plat baja ST 37 merupakan baja karbon rendah dengan kadar karbon $\pm 0,12\%$. Penggunaan baja karbon rendah ST 37 dalam kehidupan sehari-hari adalah sebagai bahan pembuatan mur, baut, perkakas dan yang lainnya. Penggunaan baja karbon rendah, diperlukan peningkatan sifat mekaniknya terutama dari segi sifat mekanik (*tegangan tarik dan kekerasan*) tetapi harganya masih relatif murah dibandingkan dengan jenis baja karbon lainnya. Material dibentuk sesuai standar spesimen uji tarik JIS Z 2201 1981 panjang 200 mm dan tebal 10 mm. Material ini menggunakan sudut kampuh V ganda yaitu dengan sudut 60° .

Material dilas menggunakan elektroda las listrik E4313 berdiameter 3,2mm. Arus yang digunakan dalam proses pengelasan yaitu AC 125 Amper. Proses pendinginan dilakukan dengan tahap, yaitu : pendingin *radiator coolant* (RC) dan oli SAE 10W-40 dicelup masing-masing selama 5 detik, dan pendinginan *radiator coolant* (RC) dan oli SAE 10W-40 dicelup masing-masing sampai dingin. Setiap perlakuan pendinginan dibuat tiga spesimen uji jadi ada 12 spesimen uji.

Dari data hasil pengujian bahwa pendinginan Oli SAE 10W-40 dicelup sampai dingin memiliki nilai rata-rata tegangan, regangan yang tinggi, yaitu rata-rata memiliki tegangan $144,27 \text{ kgf/mm}^2$ dan regangannya $5,19 \%$ kemudian disusul oleh *radiator coolant* (RC) dicelup sampai dingin memiliki tegangan $142,03 \text{ kgf/mm}^2$ dan regangan paling terendah diantara perlakuan pendinginan yang lain yaitu $3,65 \%$. Sedangkan pada perlakuan pendinginan Oli dicelup selama 5 detik memiliki nilai rata-rata tegangan $138,63 \text{ kgf/mm}^2$ dan regangan $5,13 \%$ kemudian disusul oleh *radiator coolant* (RC) dicelup selama 5 detik memiliki tegangan $134,17 \text{ kgf/mm}^2$ dan regangan $4,03 \%$. Pada hasil pengelasan dengan perlakuan pendinginan RC dicelup sampai dingin memiliki nilai rata-rata modulus elastisitas tertinggi yaitu $38,93 \text{ kgf/mm}^2$ dibandingkan dengan pendinginan RC 5 detik $33,33 \text{ kgf/mm}^2$, Oli 5 detik $26,99 \text{ kgf/mm}^2$ dan Oli dicelup sampai dingin $27,83 \text{ kgf/mm}^2$.

Kata kunci: SMAW, ST 37, Media pendingin, Kekuatan tarik

ABSTRACT

THE EFFECT OF THE REFRIGERATION OF THE RADIATOR COOLANT (RC) LIQUID AHM TO THE TENSILE STRENGTH OF THE SMAW WELDING RESULT ON STEEL PLATE ST 37

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This research had an objective to know the effect on the refrigeration of AHM radiator coolant (RC) liquid and SAE 10W – 40 lubricating oil as the standard comparison to the tensile strength of SMAW welding result. The material used was ST 37 steel plate which was mild steel with $\pm 0.12\%$ carbon level. The uses of ST 37 mild steel in daily life are as the material to make moor, bolt, equipment, etc. The use of mild steel needs to improve its mechanic characteristic (stress and hardness) but its price is still relatively cheap compared to the other kind of carbon steel. The material was formed appropriately with the standard of specimen of tensile test JIS Z 2201 1981 with lenght 200 mm and width 10 mm. The material used double V groove hem with angle 60°.

The Material was welded using electrode of electric welding E4313 with diameter 3,2 mm. The influx used in the welding process was AC 125 Ampere. The refrigeration process was done in some steps. The steps were the refrigeration of radiator coolant (RC) and lubricating oil SAE 10W – 40 which were dipped during 5 seconds. Then, the refrigeration of the radiator coolant (RC) and lubricating oil SAE 10W – 40 which were dipped until cold. Every treatment of refrigeration was made in three specimens test, so there were 12 specimens test.

Based on the data of test result, the refrigeration that the refrigeration of lubricating oil SAE 10W - 40 dipped until cold had high mean score of stress and strain. The stress mean score was 144,27 kgf/mm² and the strain was 5,19% Then, the stress mean score of radiator coolant dipped until cold 142,03 kgf/mm² and the lowest strain among the other treatment of refrigeration was 3,65%. While, in the treatment of refrigeration of lubricating oil during 5 seconds had stress mean score 138,63 kgf/mm² and the strain 5,13%. Then radiator coolant dipped during 5 seconds had stress 134,17 kgf/mm² and the strain 4,03% The result of welding by treatment of refrigeration RC dipped until cold had the highest modulation elasticity mean score, that was 38,93 kgf/mm² compared to refrigeration of RC during 5 seconds 33,33 kgf/mm², lubricating oil 5 seconds 26,99 kgf/mm², and lubricating dipped until cold 27,83 kgf/mm².

Keywords: SMAW, ST 37, Cooling equipment, Tensile Strength