THE STUDY OF EFFECTIVENESS OF HALF BEAD TECHNIQUE AS AN ALTERNATIVE TO PWHT IN WELDED JOINT

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The study of effectiveness of half bead technique as an alternative to post weld heat treatment in welded joint / Muhammad Adib Safwan Ab Halim.

THE STUDY OF EFFECTIVENESS OF HALF BEAD TECHNIQUE AS AN ALTERNATIVE TO POST WELD HEAT TREATMENT IN WELDED JOINT

By

MUHAMMAD ADIB SAFWAN BIN AB HALIM

A thesis submitted in partial fulfilment of
the requirement for the award of the degree of
Bachelor of Applied Science (Maritime Technology)

DEPARTMENT OF MARITIME TECHNOLOGY
FACULTY OF MARITIME STUDIES AND SCIENCE MARINE
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DEPARTMENT OF MARITIME TECHNOLOGY
FACULTY OF MARITIME STUDIES AND MARINE SCIENCE

DECLARATION AND VERIFICATION REPORT

FINAL YEAR RESEARCH PROJECT

It is hereby declared and verified that this research report entitled:

THE STUDY OF EFFECTIVENESS OF HALF BEAD TECHNIQUE AS AN ALTERNATIVE TO POST WELD HEAT TREATMENT IN WELDED JOINT By **MUHAMMAD ADIB SAFWAN BIN AB HALIM** Matric No. **UK 21727** have been examined and all errors identified have been corrected. This report is submitted to the Department of Maritime Technology as partial fulfillment towards obtaining the **Bachelor Degree of Applied Science (Maritime Technology)**, Faculty of Maritime Studies and Marine Science, Universiti Malaysia Terengganu.

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DECLARATION

I hereby declare that this thesis entitled **THE STUDY OF EFFECTIVENESS OF HALF BEAD TECHNIQUE AS AN ALTERNATIVE TO POST WELD HEAT TREATMENT IN WELDED JOINT** is the result of my own research except as cites in the references.

Signature : 

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Date : 13 JAN 2013

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THE STUDY OF EFFECTIVENESS OF HALF BEAD TECHNIQUE AS AN ALTERNATIVE TO POST WELD HEAT TREATMENT IN WELDED JOINT

ABSTRACT

Post Weld Heat Treatment (PWHT) had been used after welding to reduce the residual stress hence improved the properties of weld metal. The purpose of this project is to investigate the mechanical properties of weld metal using Half Bead Technique welding compare with Post Weld Heat Treatment (PWHT). This technique was developed using the Manual Metal Arc Welding (MMAW) process and was essentially aimed at providing an alternative to the used of Post Weld Heat Treatment (PWHT). Low carbon steel (Marine Grade) had been used as a parent metal. Each specimen performed with three type of welding technique. The welding techniques that had been performed throughout this research are full bead without post weld heat treatment, full bead with post weld heat treatment and half bead technique. So, there are six specimen produced in this research. Each specimen had been performed hardness test and bending test to evaluate the mechanical properties and the length of heat affected zone had been measured also the angular distortion produced had been recorded by each sample. The result stated that half bead technique give better performance than full bead welding with post weld heat treatment.

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ABSTRAK

Post Weld Heat Treatment (PWHT) telah digunakan selepas proses kimpalan untuk mengurangkan kesan tekanan untuk menambah baik sifat logam kimpalan. Tujuan projek ini adalah untuk mengkaji sifat mekanikal logam kimpalan dengan menggunakan teknik kimpalan Half Bead Technique dibandingkan dengan teknik Post Weld Heat Treatment (PWHT). Teknik ini dijalankan dengan menggunakan proses kimpalan Manual Metal Arc Welding (MMAW) dengan tujuan mencari alternatif lain kepada Post Weld Heat Treatment (PWHT). Logam berklasifikasi marin yang berkarbon rendah telah dikimpal sebagai radas kajian. Setiap bahan telah disediakan dengan tiga jenis teknik kimpalan. Teknik kimpalan yang diaplikasikan dalam kajian ini ialah full bead without post weld heat treatment, full bead with post weld heat treatment and half bead technique. Oleh itu kesemua bilangan contoh radas yang telah dihasilkan dalam kajian ini ialah enam. Setiap radas telah dijalankan ujian hardness test dan ujian bending test untuk menilai sifat mekanikal dan panjang heat affected zone telah diukur dan juga kesan angular distortion yang dihasilkan telah dicatat. Keputusan menunjukkan half bead technique adalah lebih baik berbanding dengan full bead welding with post weld heat treatment.