SIZING ACCURACY OF LACK OF SIDE WALL FUSION ON SINGLE V-BUTT JOINT WELDS USING ULTRASONIC BACK TIP DIFFRACTION TECHNIQUE

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Final Year Project Report Submitted in
Partial Fulfilment of the Requirements for the
Degree of Bachelor of Science (Hons.) Physics
in the Faculty of Applied Sciences
Universiti Teknologi MARA

JULY 2017

ABSTRACT

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This purpose of study is to compare the performance of conventional Ultrasonic Testing (UT) with Back Tip Diffraction technique on Phased Array Ultrasonic Testing (PAUT) in determining the size of Lack of Sidewall Fusion (LOSWF) defect on single V-butt joint welds. The instrument used for both methods is OmniScan MX2, equipped with 5L64 probe and rexolite angle wedge. The frequency and beam angle is set at 5MHz and 45°, 60° and 70°. Three welded carbon steel for this study are PL 14971, PL 14962 and PL 14960, each has designated LOSWF defect varied in height and length. The sizing technique applied is 6dB drop technique. The dimension obtained then compared with a reference data and the relative difference between the two acquired. For PL 14971, the relative error for conventional UT and PAUT with Back Tip Diffraction inspection in obtaining LOSWF length is 0% and 6.67% while 373% and 20.4% for its height. For PL 14962 and PL 14960, the length relative difference for is 7.14% and 10.7% using conventional UT and 10.7% and 32.1% using PAUT. Their height relative difference using conventional method is 21.4% and 80.6%. The diffracted signal from PL 14962 and PL 14960 were too faint to acquire their height. Therefore, this study proved that conventional UT method is suitable to obtain LOSWF length and height for specimen that has any thickness. PAUT with Back Tip Diffraction technique, however, is not suitable to determine defect height for specimen that is 8mm or thinner than that.

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