

Development of SINGLE PROBE TOFD UT method for T-shaped bevel groove welding part applied to construction machinery

Jaekwang Kim¹, Yeajun Choi², Hocheol Kim³

¹Material Technology Team, Doosan Infracore, Republic of Korea, ¹ Institute of Technology, Doosan Infracore, Republic of Korea, ¹Measurement & Analysis part, Doosan Infracore, Republic of Korea

In our company, Conventional UT (Pulse Echo method) is applied as a inspection method for T-joint bevel groove welding applied to welding parts such as excavator boom and arm. However, this method has a problem of low accuracy in measuring the size of defects such as crack, and there is a problem that it is not easy to continuously hire an experienced inspector who can perform the inspection.. To solve these problems, we needed to introduce a TOFD technique that is relatively accurate and can automatically perform defect size measurements. However, the general TOFD technique using two probes was not applicable due to the geometric limitation of T-joint welding. Therefore, it was necessary to develop a TOFD method that can be applied to T-joint welding of our products, and we devised a single probe TOFD technique that uses one probe to replace the existing method. First, we verified whether the tip echo signal can be obtained from the defect in T-joint welding of our product and confirmed that the tip echo from the defect can be obtained. Then, we developed a method to measure the defect size by using the relation between the acquired signal information and joint geometric information of T-joint bevel groove welding. For the developed method, the accuracy and suitability of the developed method were verified by performing verification test using mock-up and actual welding specimen. In addition, an automated defect measurement software was developed to allow unskilled inspectors to quantitatively measure defect size. Keywords : Single Probe TOFD, Weld, T-joint, Bevel groove, Weld defect, Construction machinery