

1.3.20. DEVELOPMENT OF PIPELINE GIRTH WELD INSPECTION USING ULTRASONIC PHASED ARRAYS

Amirkhosro M., Rashed G., Petroleum University of Technology, Abadan, Iran;
Sodagar S., Khaje Nasir Toosi University, Tehran, Iran

Ultrasonic Phased Array testing is based on the use of ultrasonic transducers made up of individual elements that can each be independently driven. These transducers allow for electronic scanning, beam focusing, and steering to be carried out by giving suitable time delays to the active elements of the transducer.

In this paper, a novel method for effective evaluation of pipeline girth welds using ultrasonic phased array is presented. For this purpose, the ultrasonic wave field resulting from the phased array transducers in pipeline girth welds is modeled and the parameters affecting on the inspection are studied. Then, the modeling results are employed to select the inspection parameters and to conduct an effective phased array inspection on a girth weld. To investigate reliability and efficacy of the proposed approach, phased array results and radiographic test results are compared for a 12-inch girth weld for a variety of planar and volumetric defects including crack, lack of fusion, porosity, inclusions, and slag.