

1.11.13. HIGH SPEED AUTOMATIC ULTRASONIC INSPECTION OF GIRTH WELDS FOR OFF-SHORE AND ON-SHORE PIPELINES COMBINING PHASED ARRAY, TOFD, AND CONVENTIONAL PULSE ECHO TECHNOLOGIES

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In the newly constructed gas and oil off-shore and on-shore pipelines pipes are girth-welded automatically then rapidly inspected, coated, and buried. Detection, evaluation, and repair of defects in the welds must be very quick in order not to affect the construction cycle therefore high-speed automatic ultrasonic testing (AUT) of girth welds is incredibly demanded as sole codes accepted alternative to radiography. Practical use of traditional PA AUT stuff over several years highlighted a number of inconveniencies such as big expensive, heavy, bulky, and vulnerable umbilical causing relatively high operational cost as well as low signal to noise ratio and high power consumption due to transfer of analogue signals through tens meters length wires; insufficient quantity of A/D converters leading to use of multiplexing and elevating pulse repetition rate further increasing power consumption; overheat of electronics caused by high power consumption and requiring water-cooling or frequent shutdown breaks during the work shift, etc. Innovative solution avoiding the noted problems is proposed and described in the lecture.