1.3.52. ULTRASONIC TESTING AND FLAW CHARACTERIZATION

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Results of the ultrasonic inspection of tubes sometimes are not satisfactory due to inability to characterize a flaw (i.e. determine its shape and orientation). It is therefore worthwhile to develop some special approach for tubes examination, which could significantly improve inspection capabilities by using only a few simple methods. Pitch-catch technique performed at large incident angles and containing three skips within the tube wall allows “seeing” flaw simultaneously at different angles. The large normal beam probe due to various angles and directions of flaw insonification allows characterizing the flaw and even “depicting’ its shape. An addition, one can employ a few transducers (pitch-catch, angle pulse-echo and normal beam), working simultaneously in parallel and positioned differently in order to insonify a flaw from a variety of angles and directions. The obtained image will contain a number of responses, related to various transducers. Combining these data, one can “reproduce” flaw shape and orientation, as well as assess its dimensions. Using various techniques it is possible to measure durations and lengths of different responses, and then applying the respective empirical formulae to calculate flaw parameters: depth, width, inclination angles, and tip radius.