



FR0107392

Simulation tools for industrial applications of phased array inspection techniques

Steve MAHAUT, Olivier ROY, Sylvain CHATILLON and Pierre CALMON

CEA / DRT/LIST/STA,

CEA-Saclay, 91191 Gif-sur-Yvette *cedex*, France.

e-mail : steve.mahaut@cea.fr

Ultrasonic phased arrays techniques have been developed at the French Atomic Energy Commission in order to improve defects characterization and adaptability to various inspection configuration (complex geometry specimen). Such transducers allow « standard » techniques - adjustable beam-steering and focusing - , or more « advanced » techniques - self-focusing on defects for instance - .

To estimate the performances of those techniques, models have been developed, which allows to compute the ultrasonic field radiated by an arbitrary phased array transducer through any complex specimen, and to predict the ultrasonic response of various defects inspected with a known beam. Both modeling applications are gathered in the CIVA software, dedicated to NDT expertise.

The use of those complementary models allows to evaluate the ability of a phased array to steer and focus the ultrasonic beam, and therefore its relevancy to detect and characterize defects. These models are specifically developed to give accurate solutions to realistic inspection applications.

This paper briefly describes the *CIVA* models, and presents some applications dedicated to the inspection of complex specimen containing various defects with a phased array used to steer and focus the beam. Defect detection and characterization performances are discussed for the various configurations. Some experimental validation of both models are also presented.

Keyword : ultrasonic modeling, phased array techniques, performances demonstration.