

## **Experimental discrimination of planar/volumetric defects in the examination of welds : a new frontier in TOFD**

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Defect characterization through ultrasound technics (UT) was the main topic of study during this paper. The scope of UT examination of welds is to detect, characterize and size a defect according to norms. Our purpose was to help technicians working on the field by giving them tools to provide the most accurate evaluation. Our attention was mainly focused on ultrasound technic, as it is one of the most widely used in non-destructive testing. First, characterization is a crucial aspect of testing, and in the norm EN ISO 23279 are given instructions to distinguish the defect type using ultrasound. Thus, the first step in our work was to check the efficiency of this norm. Multiple tests were realized on volumetric and planar defects. Results had shown that a significant number of defects was misjudge by the norm. Thereby, the inefficiency of current norms in characterization of defects led to second research focused on the optimization of diffraction on planar defects with ultrasound waves. In fact, as diffraction is already used for Time Of Flight Diffraction (TOFD) or Pulse Echo, ultrasound technic could also benefits from this phenomenon [1,3]. It was discovered that planar and volumetric defects gave very distinct diffraction figures. By analyzing them using a diffraction factor, it was possible to distinguish planar defects from volumetric ones. REFERENCES 1. Serge Dos Santos et al, Experimental analysis of planar/volumetric defects in ultrasonics NDT: Standardization of evaluation metrics using symbiosis of TOFD and TR-NEWS methods, in Proc of the 2023 ECNDT, Lisbon, [https://www.ndt.net/article/ecndt2023/presentation/ECNDT2023\\_PRESENTATION\\_185.pdf](https://www.ndt.net/article/ecndt2023/presentation/ECNDT2023_PRESENTATION_185.pdf) 2. G. NARDONI, D. NARDONI, P. NARDONI, A. DORISE, J. DANELUTTI, "Diffraction, the underestimated phenomena for the Characterization in the Manual Ultrasonic Technique useful for TOFD and Phased array, 56th Annual conference NDT 2017, Telford, UK, 2017 3. Nardoni Giuseppe et al, A NEW FRONTIER IN TOFD, USING 23° ANGLE BEAM FOR SCANNING AND CHARACTERIZATION OF INDICATIONS IN WELD EXAMINATIONS WITH ULTRASONIC, submitted to Materials Evaluation. <https://www.ndt.net/article/ndtnet/papers/A-new-frontier-in-TOFD-using-23-angle-beam-for-scanning-and-characterization-of-indications-in-weld-examinatio.pdf>