

## SPECTRAL CHARACTERIZATION OF W4541 STAINLESS STEEL, FOR STRUCTURAL COMPONENTS IDENTIFICATION

Zăgan R.<sup>1</sup>, Petculescu P.<sup>1</sup>, Bormambet M.<sup>1</sup>, Petculescu A.<sup>2</sup>

1 Ovidius University of Constanta, Romania

2 Louisiana University of Lafayette, U.S.A

Corresponding author: Zăgan Remus, zagan.remus@gmail.com

**Abstract:** Spectral characterization of materials using ultrasonic and time-of-flight-diffraction technique (TOFD) is considered as one of the fastest methods of Non-destructive testing (NDT) since a weld can be characterized regarding the structural components and also in base material. A spectrum image of the complete weld is created showing frequencies components and, more importantly, for any peak frequency we have information regarding his structure.

In this paper a comprehensive review of the TOFD technique covering many aspects, where the real value of TOFD lies-despite its few inherent limitations is presented. This paper presents the results of experimental investigations carried out using NDT techniques including TOFD on specimens for duplex stainless steel like as welds with various types of quenching treatment after. The results of these investigations are compared and the feasibility of using TOFD as an alternative NDT procedure to replace the traditional metallographic methods of inspecting, the material structure.

**Key words:** frequency, time-of-flight diffraction (TOFD), Non-Destructive Testing (NDT), ultrasonic testing, spectral characterization

