

#350 Structural integrity of welded joints with different defect combinations – previous studies

Mihajlo Arandelović¹, Simon Sedmak¹, Radomir Jovičić¹, Aleksandar Sedmak², Ana Petrović²

¹*Innovation Centre of Faculty of Mechanical Engineering, Kraljice Marije 16, 11120 Belgrade, Serbia*

²*Faculty of Mechanical Engineering, University of Belgrade, Kraljice Marije 16, 11120 Belgrade, Serbia*

Welded joint defects

Structural Integrity

Low-alloyed low-carbon steels

Abstract This paper presents the overview of extensive research about the effects of multiple different welded joint defects on the structural integrity of welds typically used in pipelines, made of steels S235 and S275. This research involved the preparation and welding of plates (with several different combinations of defects), cutting of specimens with “defective” geometries, experimental tests (such as tensile tests and hardness), measuring of strain using digital image correlation and numerical simulations. Initial tests and analyses were performed on plates made of S235 steels, and will be used as the base for investigating a higher quality steel, in this case S275. During the research, numerous adjustments and improvements to the welding technologies and numerical methods were made, in accordance with the obtained results, in order to develop a methodology for accurately describing and predicting the behaviour of welded joints in the presence of multiple defects, which is a topic that still remains largely unexplored, even by state-of-the-art relevant standards.



Figure 1. Numerical models used throughout the various stages of research