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The Influence of Hydrogen on the Microstructure and Dynamic Strength of Lean Duplex Stainless Steel RAVIT SILVERSTEIN, Ben Gurion University, BENNY GLAM, SNRC, DAN ELIEZER, Ben Gurion University, DANIEL MORENO, SHALOM ELIEZER, SNRC — In this research the dynamic strength of lean duplex stainless steel (LDS) with and without hydrogen was investigated. The LDS was chosen since it has a mixed structure of ferrite (BCC) and austenite (FCC) which allows an attractive combination of high strength and plasticity. Data collection was performed by VISAR and metallurgical analysis by post mortem observation. In addition, a thermal desorption process (TDS) was carried out in order to observe the influence of hydrogen charging on LDS crystal structure and to determine the hydrogen trapping mechanism before and after the plate impact experiments. Several assessments can be made based on the results of this study. TDS analysis revealed that even after hydrogen desorption, some hydrogen remained trapped in the austenitic phase causing a small lattice expansion. After impact, a brittle spall mechanism was seen, which occurred through crack progression along both phases grain boundaries. It was found that even small hydrogen content affects the dynamic strength of LDS. The relation between the microstructure and the dynamic strength of the LDS in the presence of hydrogen will be discussed. This work was supported by the Pazi foundation.

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