

Abstract Submitted
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Experimental Determination of the Dynamic Behavior of a Low Alloy Structural Steel S355K2G3 AURELIEN LACHAUD, PIERRE HEREIL, JEROME MESPOULET, Thiot-Ingenierie — An experimental characterization of the dynamic response of a low strength structural steel (S355K2G3) has been investigated using various experimental techniques. Taylor impacts, hat shaped shear tests, dynamic tensile test and plate impact experiments have been used to quantify strain hardening, shearing behavior and fracture threshold under well controlled conditions. All these tests were performed at THIOT INGENIERIE impact shock physics test facility using the single stage gas gun TITAN. Dynamic Tensile tests have been performed in a new experimental configuration which is like a small Hopkinson bar. The strain rate achieved in the specimen (6 mm diameter, 40 mm long) varies between $2 \cdot 10^2 \text{s}^{-1}$ and 10^3s^{-1} . Velocity profiles obtained with an interferometer system lead to the determination of the stress-strain conditions in the metallic sample submitted to tensile pulse. Plate impact experiments allow the determination of fracture threshold and magnitude under uniaxial strain condition. Samples with 55 mm diameter, 10 mm thickness have been impacted by 55 mm diameter, 5 mm thickness at velocities between 178 and 463 m/s. All these results obtained under different experimental conditions and different strain rates are compared in order to determine useful parameters for plasticity and fracture models.

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