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Modelling of Mechanical Behavior at High Strain Rate of Ti-6al-4v Manufactured By Means of Direct Metal Laser Sintering Technique GIANLUCA IANNITTI, NICOLA BONORA, DOMENICO GENTILE, ANDREW RUGGIERO, GABRIEL TESTA, University of Cassino and Souther Lazio, SIMONE GUBBIONI, MBDA — In this work, the mechanical behavior of Ti-6Al-4V obtained by additive manufacturing technique was investigated, also considering the build direction. Dog-bone shaped specimens and Taylor cylinders were machined from rods manufactured by means of the EOSSINT M2 80 machine, based on Direct Metal Laser Sintering technique. Tensile tests were performed at strain rate ranging from 5E-4 s-1 to 1000 s-1 using an Instron electromechanical machine for quasistatic tests and a Direct-Tension Split Hopkinson Bar for dynamic tests. The mechanical strength of the material was described by a Johnson-Cook model modified to account for stress saturation occurring at high strain. Taylor cylinder tests and their corresponding numerical simulations were carried out in order to validate the constitutive model under a complex deformation path, high strain rates, and high temperatures.

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