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Nickel based superalloy containment case design: constitutive modeling and computational analysis ANDREW RUGGIERO, NICOLA BONORA, GIOVANNI TORRICE, University of Cassino, MARCO DI SCIUVA, MARCO DEGIOVANNI, MASSIMILIANO MATTONE, MARCO GHERLONE, Polytechnics of Turin, CARLO FROLA, Aviogroup S.p.A. — Quasi-static and dynamic characterization of nickel based superalloy Waspaloy<sup>(R)</sup> has been performed at the University of Cassino. Quasy-static tensile tests have been carried out on both round bar specimens, to obtain the flow stress curve at low strain rates, and hourglass specimens, to investigate damage evolution with plastic strain. The mechanical behavior at high strain rates has been obtained by means of a direct tension split Hopkinson Bar, which allows the characterization of the material up to failure. Experimental results show that when strain rates increases, the failure strain increases while the yield strength decreases, in some intervals of the range considered. This singular behavior has been modeled and implement in a Finite Element Method commercial code in order to perform numerical simulations of experimental ballistic tests carried out at the Polytechnics of Turin, using an airgun facility. Good agreement has been found between FEM simulations and experimental results...

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