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Anisotropic Effects on Constitutive Model Parameters of Aluminum Alloys NACHHATTER BRAR, University of Dayton Research Institute, University of Dayton, Dayton, OH 45469-0116, VASANT JOSHI, Naval Surface Warfare Center, Indian Head, MD 20640 — Simulation of low velocity impact on structures or high velocity penetration in armor materials heavily rely on constitutive material models. The model constants are required input to computer codes (LS-DYNA, DYNA3D or SPH) to accurately simulate fragment impact on structural components made of high strength 7075-T651 aluminum alloys. Johnson-Cook model constants determined for Al7075-T651 alloy bar material failed to simulate correctly the penetration into 1" thick Al-7075-T651plates. When simulations go well beyond minor parameter tweaking and experimental results are drastically different it is important to determine constitutive parameters from the actual material used in impact/penetration experiments. To investigate anisotropic effects on the yield/flow stress of this alloy we performed quasi-static and high strain rate tensile tests on specimens fabricated in the longitudinal, transverse, and thickness directions of 1" thick Al7075-T651 plate. Flow stresses at a strain rate of $\sim$1100/s in the longitudinal and transverse direction are similar around 670MPa and decreases to 620 MPa in the thickness direction. These data are lower than the flow stress of 760 MPa measured in Al7075-T651 bar stock.

Nachhatter Brar
University of Dayton Research Institute,
University of Dayton, Dayton, OH 45469-0116

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