Abstract Submitted
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Role of Target Strength in Momentum Enhancement JAMES WALKER, SIDNEY CHOCRON, Southwest Research Institute — Experiments with small aluminum spheres striking 2024-T4 and 1100-O aluminum targets at velocities of 4 to 7 km/s have shown an interesting effect in terms of momentum enhancement. Momentum enhancement is the amount of extra momentum delivered to the target due to the ejecta thrown back along the projectile's path. Momentum enhancement is less for the softer 1100-O material, even though the craters are larger [1]. Thus, there is not a correlation between crater volume and ejecta momentum. When straightforward computations with hydrocodes are performed, this result is not replicated; rather, the opposite occurs in that reduced flow stress for the aluminum target leads to increased momentum enhancement [2]. This paper examines the effect of linking the tensile failure behavior to the damage model by assuming a strain energy to failure for the material. Thus, larger strains produced in larger craters need not directly result more failed material and more ejecta. Computations are performed using CTH to compute the momentum enhancement for different flow stress models and damage models, providing a possible explanation of the experimental observations. [1] Denardo, BP, Nysmith CR. Proc. AGARD-NATO Specialists, Vol. 1, Gordon and Breach, New York, 1964, 389-402. [2] Walker, JD, Chocron, S. Int. J. Impact Engng, 2011, in press.

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