

Abstract Submitted
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Study of Compressive Failure of Alumina in Impact Experiments with Divergent Flow VITALY PARIS, EUGENE ZARETSKY, Ben Gurion University, Israel — Axisymmetric divergent flow characterized by increasing (with propagation distance) difference between longitudinal and radial stress was produced in the plane-parallel alumina samples by impact of spherical ($R=200-600$ mm) copper impactors having velocities 210 to 260 m/s. The velocity of the interface between the impacted 5-mm alumina samples and 6-mm sapphire windows was continuously monitored by VISAR. Preliminary AUTODYN simulations show that such impact is capable of producing in the sample the stress states which cannot be produced by planar impact loading and which may result in the brittle failure of alumina. Actually, the waveforms recorded in these experiments contain distinct signatures of the alumina failure. AUTODYN numerical simulations of the experiments allow finding the alumina failure threshold, the path of the increasingly damaged alumina, the kinetics of this damaging and the locus of the states of comminuted material in the principal stress space. Possible applications of the developed experimental/numerical technique and its limitations are discussed.

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