

Abstract Submitted
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High-speed Photographic Study of Wave Propagation and Impact Damage in Fused Silica and AlON Using the Edge-on Impact (EOI) Method PARIMAL PATEL, JAMES MCCAULEY, US Army Research Laboratory, Aberdeen Proving Ground, Maryland 21005, ELMAR STRASSBURGER, Ernst-Mach-Institut (EMI), Efringen-Kirchen, Germany, DOUGLAS TEMPLETON, US Army TARDEC, Warren. MI 48397 — An Edge-on Impact (EOI) test method coupled with a high speed Cranz-Schardin camera has been developed at the Fraunhofer-Institute for High-Speed Dynamics, Ernst-Mach-Institut (EMI), Efringen-Kirchen, Germany to visualize damage propagation and dynamic fracture in structural ceramics. Most work in the past has been carried out in a reflection mode from the surface of impacted ceramics. In the current study, the test was reconfigured to photograph the propagation of damage in the transmission mode using shadowgraphs. In addition to plain light observations, the stress wave was also visualized in crossed polarizers using the photoelastic effect. Plates of fused silica measuring 100X100X13mm were impacted at velocities from 151 to 350 m/s. Plates of AlON measuring 100X100X10mm were impacted using solid cylinder steel projectiles with velocities ranging from 270 to 925 m/s. Detailed analysis of the macroscopic fracture patterns, stress wave characteristics and velocity, various damage zones structures, single crack and crack front velocities will be presented.

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