Abstract Submitted
for the SHOCK05 Meeting of
The American Physical Society

A study of the failure wave phenomenon in glasses at peak stresses exceeding the HEL G.I. KANEL, Institute for High Energy Densities, Moscow, Russia, S.V. RAZORENOV, A.S. SAVINYKH, Institute of Problems of Chemical Physics, Chernogolovka, Russia, A. RAJENDRAN , U.S. Army Research Office, ZHEN CHEN, University of Missouri-Columbia — Shock-wave experiments with two glasses of different hardnesses have been carried out at shock stress levels above the Hugoniot elastic limit. A comparison between the measured wave profiles (VISAR signals) from two plate impact experiments performed at approximately the same shock stress level (one with a single thick target plate, and the other with several adjacent target plates of total thickness equal to that of the thick target plate) revealed: 1) at shock loading the failure wave is not formed at stress levels above the HEL, indicating suppression of the fracture process by plasticity, 2) at gradual compression the failure wave process occurs as the stress increases above the failure threshold up to the stress at which plastic deformation begins. These experiments unambiguously demonstrate the role of surfaces in the overall response of glass to shock compression loading and provide an effective tool to reveal and diagnose the failure wave process.

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Date submitted: 21 Jan 2005 Electronic form version 1.4