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Experimental and Computed Results Investigating Time-Dependent Failure in a Borosilicate Glass SIDNEY CHOCRON, DARREL BARNETTE, TIMOTHY HOLMQUIST, CHARLES ANDERSON, RORY BIGGER, THOMAS MOORE, Southwest Research Institute — This article presents new work investigating time-dependent failure of a borosilicate glass. Plate-impact spall experiments were used to generate tensile stresses of various magnitudes and time durations to determine if internal tensile failure (spall) is time dependent. Plate-impact experiments were designed using borosilicate impactors of various thicknesses. The magnitude of the tensile stress is controlled by impact velocity and the tensile stress duration is controlled by the thickness of the impactor. A PDV (Photon Doppler Velocimeter) was used to monitor the back surface velocity of the target, allowing the determination of spall. High-speed photography was also used to provide visual inspection of the spall plane during failure. Time durations of 0.5 – 2.0 μs were investigated. Computations are also presented that provide insight into the experiments and support the interpretation of the results.

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