Abstract Submitted
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Improved Bar Impact Tests using a Photonic Doppler Velocimeter[1] STEPHAN BLESS, JOHN TOLMAN, SCOTT LEVINSON, The University of Texas at Austin, Institute for Advanced Technology, JEFF NGUYEN, Lawrence Livermore National Laboratories, IAN POLYZOIS, The University of Texas at Austin, Institute for Advanced Technology — Bar impacts were used to measure the dynamic strength of glasses. The conventional bar technique has been greatly improved through use of a photonic Doppler velocimeter (PDV) to measure free surface motion. The PDV records a compression pulse corresponding to compressive failure of the impact zone and a spall signal corresponding to tensile failure of the distal end. Best results were obtained using polished free surfaces, as opposed to retroreflective tape. Use of a graded density film had little effect on strain rate but reduced the peak transmitted stress. The experiments were interpreted with the aid of EMU (peridynamics) calculations. Indications are that the impact end of the bar fails in compression. The bar separates into two sections when the reflected tensile wave arrives at the zone of impact damage. The rear of the bar fails from an inward propagating failure wave that originates at surface flaws.

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