

# **Glass Debris From Shock-Loaded Windows**

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## **ABSTRACT**

The majority of injuries in a terrorist bombing are due to glass shards. Currently, an adequate predictive model for the size, shape, and velocity distributions of the glass shards does not exist; this model is needed to provide input to human vulnerability and casualty assessments. To develop the required data, sixty nine tests of shock-loaded windows were performed. Annealed, TTG, IGU, and laminated windows were evaluated, with different thicknesses, layups, sizes, load levels, and support conditions. High speed digital cameras were used to record the initial break-up of the windows and the flight of the resulting shard cloud. A commercial image processing software package was used to measure the size and shape of the shards. The dependence of the shape and size of the shards on glass type, thickness, window size, and applied load is demonstrated.