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Axial VISAR Velocity Measurements of the Non-planar Acceleration of a Plate from a Penetrating Shaped Charge Jet ERIC FERM, MATHEW E. BRIGGS, Los Alamos National Laboratory — A Viper explosive shaped charge jet creates a stretching rod of metal, with its tip traveling 9.2mm/μs and slower portions traveling slower than 3 mm/μs. As this rod impacts and penetrates an obstructing steel plate, a highly non-planar flow evolves. We have recorded the free-surface velocity at the point of exit of the jet, which will ultimately be accelerated to the residual velocity of the jet. The thick target we have chosen allows the penetration to reach a quasi-steady subsonic penetration rate, before the wave structure begins to exit the plate. The resulting acceleration at the free surface is a continuous VISAR record with no required discontinuous fringe jumps. The free surface is first accelerated with an elastic wave, followed by a decaying shock wave, and plastic wave. Ultimately the release waves reach the penetrating jet and the surface begins to accelerate to velocities near the speed of the jet exiting the plate. We compare these results with previous experiments and calculations.

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