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Instability evolution in shock-accelerated inclined heavy gas cylinder[1] DELL OLMSTEAD, PATRICK WAYNE, PETER VOROBIEFF, DANIEL DAVIS, C. RANDALL TRUMAN, The University of New Mexico — A heavy gas cylinder interacts with a normal or oblique shockwave at Mach numbers M ranging from 1.13 to 2.0. The angle between the shock front and cylinder axis is varied between 0 and 30°, while the Atwood numbers A range from 0.25 (SF_6-N_2 mix) to 0.67 (pure SF_6). The evolution of the column is imaged in two perpendicular planes with Planar Laser Induced Fluorescence (PLIF). For oblique shock interactions, the nature of the flow is fully three-dimensional, with several instabilities developing in separate directions. In the plane that captures a cross-section of the column, Richtmyer-Meshkov instability (RMI) leads to formation of a pair of counter-rotating vortex columns. A uniform scaling appears to govern the primary instability growth in this plane across the M and A ranges, when the length scale is normalized by a product of the minimum streamwise scale after shock compression and $M^{0.5}$. In the vertical plane through the column, Kelvin-Helmholtz vortices form with regular spacing along the column. The dominant wavelength of the structures in the vertical plane also appears to scale with the minimum compressed streamwise length.

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