

### 33-15 A Study on High Speed Expansion and Fracture of Metal Cylinders Driven by Cylindrical Exploding Detonation

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An explosive loading technique is applied to study the uniform expansion of cylinder specimen (carbon steel and 304 stainless steel) at high strain rate. A column of powder PETN is installed coaxially inside a cylinder specimen and initiated at the central axis by exploding a fine copper wire using an impulsive discharge current from a capacitor bank. The streak and framing camera photos indicate almost uniform expansion of cylinders with the strain rate of over  $10^4 \text{ s}^{-1}$ , representing rather early fracture for 304SS cylinders. The laser interferometry system VISAR is also adopted to monitor the precise behavior of surface velocity at the early stage. Hydro codes have been applied to simulate experimental behavior of the cylinders, examining the constitutive equations and the fracture criteria. The recovered fragments are also investigated.

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