

Abstract Submitted
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Expanding cylinder experiments in Cu-2wt%Be STEWART STIRK, RON WINTER, AWE — Expanding cylinder techniques are useful methods of investigating dynamic fracture properties since uniform radial strains are achieved at high strain-rates. A gas-gun technique to achieve uniform radial expansion of a cylinder is explored in which the motion of the cylinder is driven by impact of a plastic projectile upon silastomer rubber that partially fills the specimen cylinder. Cylinders of age-hardened copper-beryllium alloy Cu-2wt%Be (TF00 treatment) have been expanded to failure at radial strain-rates in the range $1.2 - 5.7 \times 10^3 \text{ s}^{-1}$. The temporal history of fracture activation is captured using high speed photography and modelled using a combined statistics and energy based fragmentation theory [1]. The model is shown to reproduce the crack dynamics and strain-rate dependence reasonably well.

[1] D. E. Grady, and M. L. Olsen, Int. J. Impact Engng. **29**, 293 (2003).

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