

## [知能生産システム工学]

### 31-17 Uniform Expansion of Cylinders at High Strain Rates Using an Explosive Loading

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An explosive loading technique is applied to study the uniform expansion of steel cylinders at high strain rates. A column of powder PETN is installed coaxially inside a cylinder specimen and initiated at the central axis simultaneously by exploding a fine copper wire. As a preliminary study, ranges of wire length and PETN column diameter are investigated to produce a uniform cylindrical diverging detonation wave. The expanding shadows of the cylinders are observed to the final burst failure with an image converter camera (IMACON), showing a nearly cylindrical uniform expansion. The details of the initial deformation behavior are recorded using a laser interferometry method (VISAR). It is known that the cylinders expand with the average strain rates of  $0.91-3.9 \times 10^4 \text{ s}^{-1}$  for three kinds of the PETN charge amount. The comparison with the numerical results demonstrates that the proposed loading technique is available to obtain the fundamental data on expansion behavior of cylinders at very high strain rates.

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