

31-20 High Speed Expansion of Metal Cylinders Driven by Cylindrical Exploding Detonation

知能生産システム工学科	教授	廣江哲幸
	教授	松尾日出男
	助教授	藤原和人
熊本大学	大学院生	加藤拓弥
	大学院生	中山大輔

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 simultaneously 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 10^4s^{-1} and no axial elongation, representing rather early fracture of 304SS cylinders. The laser interferometer system VISAR is also adopted to monitor the precise behavior of surface velocity, showing the initial successive reflections of shocks and rarefaction waves. 1-D lagrangian wave propagation code and 2-D hydro code AUTODYN-2D have been applied to simulate experimental dynamic behavior of the cylinders, examining the constitutive equations at very high strain rates. (Proceedings of the 1998 Annual Meeting of JSME/MMD, pp.281-282)