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33－34 Ultra-high pressure generated from cylindrical implosion of explosive

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Numerical simulation predicts that when an explosive in cylindrical shape explodes from the most outside, much higher detonation pressure may be achieved as the detonation wave reaches the central part. Based on this knowledge, we devised a device so as to acquire the cylindrically convengent detonation wave in a cylinder explosive charge. The principle of the device is very similar to that employed widely in the fabrication of the plane-wave generator for the acquirement of the planar detonation wave. The detonation from this device was studied by means of high-speed photographic observation on the progress of the detonation wave and the configuration during the propagation. From the experimental records on the trajectories of detonation front in motion, the propagating velocities were deduced using the least squares fitting technique. The results show that as the detonation moves toward the center of the cylinder charge, the detonation velocity increases slowly at the beginning, and when approaching the portion of the center, the velocity rises readity. Numerical calculation also reproduced those experimental phenomena. The detonation pressure and velocity along the radial direction were given. The results help us understand how much extent of the pressure could be achievable in the cylindrically convergent detonation process.

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