May 1967

Brief 67-10126

NASA TECH BRIEF

High-Energy-Rate Magnetohydraulic Metal Forming System

Theoretical and experimental studies were carried out in an effort to implement new concepts in the development of a magnetohydraulic metal forming system. In this system, a sonic shock wave is generated and propagated in a liquid medium by a low-inductance, high-current, high-voltage coil which is energized by a high-voltage electrical discharge from a capacitor bank. High-pressure waves are created in the liquid, which is used as a medium for transfer of energy from a metal diaphragm to the metal workpiece. The diaphragm is actuated by the pulsed high-energy magnetic field.

In the course of this development, a qualitative and quantitative investigation of the pressure-pulse phenomenon in the liquid medium was carried out, using specially designed piezoelectric transducers and an acoustical pickup line. Experimental studies utilizing various modes of system operation were made with regard to both pressure and deformation measurements. Optimization of the pressure pulse parameters was based on studies of the forming capabilities of the system in the various operational modes. The system incorporates an inductive storage coil designed to store 50 kilojoules of energy with a power requirement of 15 kilowatts (5000 amperes at room temperature).

Note:

Inquiries concerning this development may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B67-10126

Patent status:

No patent action is contemplated by NASA.

Source: Advanced Kinetics, Inc.
under contract to
Marshall Space Flight Center
(M-FS-2142)

Category 02