The velocity of compression waves in copper is investigated by detonation of explosives inside cylinders. The angle of failure of the end of the cylinder is taken as proportional to the wave velocity. Theory is explained and results are compared to article 1127.

1144 Mallory H D
ON THE EXISTENCE OF A BINARY REACTION ZONE AT A METAL-EXPLOSIVE BOUNDARY DURING DETONATION
U. S. Naval Ordnance Laboratory 1954
Library of Congress P. B. 122054.

This report is a summary of recent progress made in the interpretation of pin-point data. The pin technique has been used to measure the free surface velocity of aluminum targets struck by a plane detonation wave from crystalline TNT at a loading density of 0.624 g/cc. (Author's abstract)

1145 Rinehart J S
DEFORMATION OF AN EXPLOSIVELY LOADED ALUMINUM SINGLE CRYSTAL
Journal of Applied Physics
1955, Vol. 26, pp. 1315-1318.

A hollow cylindrical single crystal of pure aluminum was deformed by detonating an explosive charge that had been placed axially within the crystal. The approximate strain rate achieved was 10^5 sec^{-1}. The object of the test was to relate the pattern of deformation to the stresses set up by the explosive and the crystallographic axes of the crystal. The reaction of the cylinder was markedly different from the reaction which would be exhibited by a similarly shaped cylinder of polycrystalline material. The deformation was nonuniform with both the fracturing and the plastic flow exhibiting a twofold symmetry that could be unambiguously related to the orientation of stress with respect to the crystallographic axes and their associated slip systems. (Author's abstract)

1146 Goranson R W, Bancroft D, Burton B L, Blechar T, Houston E E, Gittings E F, and Landeen S A
DYNAMIC DETERMINATION OF THE COMPRESSIBILITY OF METALS
Journal of Applied Physics
1955, Vol. 26, pp. 1472-1479.

Equation of state data for Duralumin in the pressure range from 0.1 to 0.3 megabar have been determined dynamically by measuring shock and free surface velocity electrically in a plate of 24 ST Duralumin that has been stressed by a high explosive detonation. A theory is presented which allows comparison with data obtained by other experimenters, and which yields the relationship between pressure and compression either at constant entropy or constant temperature. The empirical form chosen for the equation of state ($p = a\mu + \beta\mu^2$) expresses the pressure as a quadratic function of the compression. Experimental techniques are described in detail. Five points are given for the equation of state of Duralumin in the pressure range from approximately 0.15 megabar to 0.33 megabars. Some data are also presented for cadmium and steel. (Authors' abstract)

1147 Pearson J and Rinehart J S
APPLICATION OF THE ENGRAVEMENT METHOD TO THE STUDY OF PARTICLE VELOCITY DISTRIBUTION IN EXPLOSIVELY LOADED CYLINDERS
Journal of Applied Physics
1955, Vol 26, pp. 1431-1435.

Application of the engravement method to the study of particle velocity distribution in the wall of a thick-walled metal cylinder internally loaded with an explosive charge is described. Tests were conducted with this method on modified cylinders of annealed low-carbon steel and of brass. Even though each of the modified cylinders broke into a number of fragments, the engravements were well enough preserved to furnish considerable data. Many measurements were obtained from each cylinder by using a large number of pellets of several thicknesses. Particle velocity data were obtained to within 7/16 inch from the metal explosive interface. Temporal particle velocity distribution curves are presented for each of the cylinders. (Author's abstract)

1148 Minshall S
PROPERTIES OF ELASTIC AND PLASTIC WAVES DETERMINED BY PIN CONTACTORS AND CRYSTALS
Journal of Applied Physics
1955, Vol. 26, pp. 463-469.

Experimental techniques are described by which one can observe the separation of a shock wave in a metal into an elastic wave and a slower plastic wave. The plastic-wave velocity was about 15 percent less in steel and 10 percent less in tungsten than the elastic-wave velocity, at pressures imparted by Composition B explosive. Elastic-wave velocities were the same, within experimental error, as the measured sound velocities. The pressure in the elastic wave in SAE 1020 steel, deduced from the material and wave velocities, is independent of the plastic-wave pressure within experimental accuracy, and is about 12 kilobars. SAE 1040 steel, however, does not exhibit a single characteristic elastic-wave pressure. The pressure initially is about 6 kilobars and increases to about 12 kilobars before the arrival of the plastic wave. (Author's abstract)