

This Quarter's Work:

The theory of axially symmetric Schlieren pictures has recently been developed to the point that quantitative interpretation of the pictures in terms of pressure on a bullet seems a definite possibility.

Proposed Next Quarter's Work:

We have been asked to submit a quotation for additional work with much more precise objectives. The present contract will be closed out and a report submitted together with a quotation for the additional work.

Miscellaneous

Because of the specialized equipment and techniques available in the Physics and Ballistics Group, a considerable portion of the time of this group is taken in work on particular problems in other groups.

High Speed pictures were taken of .22 lead bullets for the purpose of detecting and measuring yaw and breakup in flight (OSRD).

In cooperation with the Chemical and Metallurgical Group X-ray pictures were taken to show the compressibility and sealing by wadding during the firing of shot shells. Pictures taken demonstrated the superiority of Piston Plus over "Seal Tite" (Western) and Punched Felt Wads.

Extrusion punch forces were measured by means of an ESS gauge placed directly on the punch. This was to supply information on caliber .50 aluminum extrusion operations and curves were taken showing many interesting details. Maximum force for this particular operation was 64,000 pounds.

High pressures obtained in caliber .50 aluminum shells were traced to a 4% decrease in volume and a change in design recommended.

An estimate was made of the primer pressure in the caliber .50 primer cup at the moment of explosion. This information was used in designing devices to make the primer cup self sealing.

The ignition times of various primer mixtures fired electrically were measured in a constant volume bomb made from a caliber .50 case. The pressure time curves gave a comparative measure of the ignition times and forces of the various mixtures submitted for tests (Eastman Kodak).

Interior ballistic calculations on three proposed new cartridges were made and the muzzle velocities predicted were supplied to the Engineering Unit. Case volume increases to obtain the muzzle velocities required were also recommended.