

EFFECT OF CHARGE SHAPE: PRESSURE AROUND A CYLINDRICAL CHARGE

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When an explosive charge is fired, generally only the mass is considered as important parameter. The shape however, also plays an important role in the effect of an explosive charge. Knowledge of this shape effect can be important before the use of the explosive (in order to create a maximum effect with a certain mass of explosive), or in post-explosion damage assessment. The shape effect however is only significant within a certain range from the charge. At longer distance, the charge behaves as a spherical charge.

A series of experiments has been performed in order to determine the range of influence of the charge shape. Cylindrical charges with different length-to-diameter ratios have been fired and pressure around the charges has been measured in the short range. The cardboard cylinders were filled with an explosive emulsion. Experiments have demonstrated that the distance up to which the charge shape plays a role, varies with the length-to-diameter ratio.

Numerical simulations have given good qualitative agreement with the experimental data. Numerically, other cylindrical charges can be simulated as well. This allows to determine the distance of significant shape effect in function of length-to-diameter ratio. The same operation can be repeated numerically for other explosives, where the influence of the explosive on the previous conclusions can be studied.

Knowledge of these effects is of importance for anyone working with non-spherical charges and can allow use of an adequate shape of explosive charges to obtain a certain effect.