

Abstract Submitted
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Measurements of Shaped Charge Jet Velocity HONGFA HUANG,
Schlumberger Perforating Research — Penetration depth is an important requirement in oil/gas well perforating jobs. The depth determines how far the wellbore can directly communicate with reservoir fluids. Deep perforation charges are widely used in oilfield industry and most of those are powder metal liner charge for no carrot-like slug left as solid liner does. Comprehensive measurements for the powder metal liner shaped charge jet characteristics, namely, the jet density and velocity, are needed to predict the shaped charge performance and to plan the perforating job. This paper focuses on an experimental work of jet velocity measurements. A medium size of powder metal liner charges (27 grams HMX) is used in the tests. The powder jet shoots through a stack of limestone blocks with shorting switch set in between. Half inch air-gap between two blocks is design to provide space for jet traveling in air to record free fly velocity, meanwhile the jet penetration velocity in the limestone is measured. Aluminum foil switches are used to record the jet Time of Arrival (TOA). The charged switch shorted by the metal jet when it arrives. The shorting signal is recorded. The two velocities can be used to estimate the jet penetration effectiveness. A series of TOA tests show that jet velocity along its length linearly decreases from jet tip to tail until the stagnation points referring to which jet material moves in opposite direction.

Hongfa Huang
Schlumberger Perforating Research

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