

THE CHANNEL EFFECT FOR AN/FO SLURRIES AND EMULSIONS

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ABSTRACT

The channel effect is a phenomenon that takes place with decoupling explosive charges; an air shock wave propagating ahead of the detonation wave in the annular space around the explosive charge compresses the charge so that the process of detonation is modified and even stopped. For commercial explosives, such as AN/FO slurries and emulsions, the channel effect causes partial detonation under certain conditions. To simulate and evaluate the phenomenon, a hydrodynamic model was developed based on the assumption that the pre-shock wave is produced by Mach reflection at the tube walls. Based on instrumented experimental studies with the above explosives in diameters ranging from 25 to 90 mm in pipe sizes ranging from 35 to 127 mm, it has been possible to demonstrate that a criterion for failure based on a critical impulse concept fits the experimental data well. Critical impulse values for the various explosives tested are presented along with the necessary correlations between charge and borehole diameter required to produce this.