

Relating pressure measurements to phenomena observed in high speed video recordings during tests of explosive charges in a semi-confined blast chamber

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Tests with explosive charges of 0.5 kg and 2 kg were conducted in the semi-confined blast chamber at the CSIR DBEL test range. Pressure measurements were obtained with side-on and face-on sensors mounted in the walls of the chamber and high speed video recordings were obtained from the open end of the chamber of the fireball and post detonative behaviour of explosive products. The framing rate of the video camera was 10 000 fps and the pressure measurements were obtained for at least 10 ms after initiation of the charge. It was observed in the video recordings that the detonation product cloud exhibited pulsating behaviour due to the reflected shocks in the chamber analogous to the behaviour of the gas bubble in underwater explosions. This behaviour is analysed and compared with the pressure measurements obtained during the same tests. It is noted that with each compression phase of the detonation product gas cloud, renewed reaction activity is initiated in the gas cloud.

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