



September 27 - October 01, 2004, Bad Reichenhall, Germany

BLAST INHIBITORS WITH TRANSFORMATION OF BLAST WAVES BY TWO-PHASE MEDIUM

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Criminal usage of explosives has been growing and range of blast protection equipment that protect against harmful blast wave effects and fragments is required. Upgrading protective devices and increasing their effectiveness present the main direction of scientific investigations based on understanding the key features of blast loads and ways of their attenuation.

It is found experimentally that blast waves produced by HE burst are weakened while passing through liquid screen. Energy of blast is consumed for protective device destruction and acceleration of liquid. Blast wave is sharp jump of pressure with delaying pressure decrease. Blast wave amplitude in space near the inhibition device diminished several times in comparison with blast at the same distance at bare HE charge.

It was shown the crucial role of the liquid compressibility in blast wave attenuation and transformation. The efficiency of blast inhibitors increases with replacing the liquid by relaxing media, for example by two-phase gas-liquid system. Partial increase of liquid screen compressibility may be achieved due to usage an elastic envelope confining liquid. Introduction gas bubbles into liquid changes liquid compressibility and decreases the sonic velocity depended now on pressure. Multiple reduction of linear and nonlinear pressure wave speed provoked pressure profile extending in time. There is the reason that protecting devices with two-phase filler instead pure liquid will not only attenuate the amplitude of blast but also change their temporal-frequency characteristics. Blast waves transformation by two-phase layer has been investigated. Based on testing data it was confirmed that two-phase screens are effective gain –frequency transformers of blast effects created by HE charge bursts.