

Abstract Submitted
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Non ideal detonation of emulsion explosives mixed with metal particles R. MENDES, J. RIBEIRO, I. PLAKSIN, J. CAMPOS, Dept. Mechanical Eng., University of Coimbra — The detonation of ammonium nitrate based compositions like emulsion explosives (EX) mixed with metal particles has been investigated experimentally. Aluminium powder with a mean particle size of 10 μm was used, and the mass concentration of aluminum on the explosive charge was ranged from 0 to 30%. The values of the detonation velocity, the pressure attenuation – $P(x)$ – of detonation front amplitude in a standard PMMA monitor and manganin gauges pressure-time histories are shown as a function of the explosive charge porosity and specific mass. All these parameters except the pressure-times histories have been evaluated using the multi fiber optical probe (MFOP) method which is based on the use of an optical fiber strip, with 64 independent optical fibers. The MFOP allow a quasi continuous evaluation of the detonation wave run propagation and the assessment to spatial resolved measurements of the shock wave induced in the PMMA barrier which in turns allows a detailed characterization of the detonation reaction zone structure. Results of that characterization process are presented and discussed for aluminized and non aluminized EX. Moreover, the effect of the mass concentration of the sensitizing agent (hollow glass micro-balloons) on the non monotonic detonation velocity variation, for EX, will be discussed.

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