DEVELOPMENT OF A PREDICTIVE FRAMEWORK FOR ASSESSING THE VIABILITY AND POWER OF IDEAL AND NON-IDEAL EXPLOSIVES WITH RESPECT TO MITIGATING AND PROTECTING AGAINST ENERGETIC EFFECTS

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Abstract: Within the UK Defence and Security domain numerical modelling is being increasingly used to rapidly assess the viability and power of a broad range of both ideal and non-ideal explosive materials. This work allows analysts and engineers to develop mitigating and protective solutions in the case of potential conventional or terrorist attack. Considering the broad scope of available explosives, a combination of highly efficient analytical and experimental techniques have been developed by Dstl, and its research partners, to accurately parameterise explosive materials for simulating initiation, energetic expansion and secondary combustion events. This paper describes how cylinder expansion testing (and other diagnostic techniques), combined with thermochemical analysis, serve as a foundation within this process. With reference to very near-field experimental validation data it also provides Dstl's experience concerning the predictive accuracy of various prominent hydrocode-based modelling approaches, with particular emphasis on appropriately handling the differences between ideal and non-ideal explosive behaviour.