DEFENCE TRIAL 840 (27TE NEQ EXPLOSIVES STORE HOUSE TRIAL) ANALYSIS

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Since the 1980's, the UK MoD have conducted joint trials with other nations at Woomera, South Australia. These trials have been designed to assess the effects from the accidental mass explosion of ammunition in an Explosives Store House (ESH). The earliest trials used Net Explosive Quantities (NEQ) of between 500 kg to 5.6 tonne TNT. Results from these early trials led to the development of Quantity-Distance rules and consequence models for use in risk assessment calculations. However, it then became necessary to extrapolate the models developed to regimes well beyond their validated range, sometimes for NEQs in excess of 50 tonnes. In 1999, a 40 tonne NEQ trial was conducted in order to alleviate the growing concern over this degree of extrapolation.

Defence Trial 840, conducted on 20 September 2002, employed a stack of 8inch HE M106 projectiles giving a NEQ of 27 tonnes in an ESH of typical reinforced concrete beam-column-slab construction with brickwork infill cavity walls. This trial was conducted to bridge the data gap between the 5.6 tonne and the 40 tonne events, to investigate the effects of higher donor loading density, and to investigate the effects of blast on modern construction style target structures. These target structures included UK 3 bedroom semi-detached housing and a variety of industrial style constructions. The results of Defence Trial 840 will be used to improve the debris modelling capability for quantitative risk assessment (QRA) calculations.

This paper details the analysis of the trials data with particular reference to the potential implications of the findings on the UK MoD Explosives Regulations, and the underlying Quantity-Distances. The paper also highlights numerical studies conducted to model the initial ESH break up. Once fully validated, this numerical modelling technique could form the basis for numerical experiments which can be used to further investigate the debris sensitivity to individual parameters such as loading density, stack geometry and initiation path.