P30 Combined Blast and Fire Modelling

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Abstract:

Fires can form a major hazard in scenarios involving various munitions. Accidental detonation of a munition within a closed structure can lead to the initiation and spread of a fire within that structure with the associated hazard to personnel (both workers and firefighters), equipment and stored energetic material. Currently such incidents are assessed by the use of simplified engineering models coupled with knowledge of previous incidents. Related accident scenarios include:

> More slowly burning or deflagrating munitions where heat release is over a longer timescale and so may form an even greater fire hazard.
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> Fires in close proximity to munitions either through dynamic events (catastrophic ejection and burning of fuel from platforms) or accidental fire initiation near or on platforms or storage facilities where cook-off can be a major concern.

Such scenarios become of more importance as munitions become more insensitive, with the accident consequences potentially trending away from detonation and blast effects to deflagration and burning outputs.

This paper describes work funded by the UK MoD Defence Ordnance Safety Group Risk Assessment Team. We demonstrates the feasibility of linking a high fidelity hydrocode, EDEN, (for detonation, blast wave, fireball and afterburning) to a fire modelling code, FDS, (for material ignition, flame and smoke propagation) to give a more accurate insight into such hazards and so potentially help guide assessment of safety and actions of first responders.

We discuss the codes we have used, the methodology we have applied to link them and show results from a set of generic scenarios following the detonation of a charge in a closed multiroom roomed structure. Work is currently underway to demonstrate potential use in idealised scenarios relevant to munition safety.

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