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Recent Advances in Energetic Materials

Application of Modern Techniques for Blast Hazard Mitigation

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ABSTRACT

As a result of the devastating effect of accidental explosions during transportation of explosive devices, blast load effects and mitigation of the resulting hazard have received considerable attention in recent years. International peacekeeping efforts require long -distance transportation of explosive devices and sensitive ammunition to highly unstable regions of the world, Blast- resistant transport containers and storage facilities must be designed to withstand specific levels of accidental explosions. Such facilities are constructed using thick reinforced concrete or heavy steel sections, and typically weigh t 20 - 30 ton, with capacities to resist explosions equivalent to those resulting from 10 - 150 kg TNT. In addition to the demand on light-weight explosive transportation system, the development of cost –effective blast protection system to limit the use of traditional heavily reinforced concrete shelter system is also becoming necessary. To mitigate the blast load effects on critical structures or within explosive transport containers, engineering solutions may aim at providing sufficient stand-off distance from expected explosion epicenter. However, this option is not viable because of practical space limitations. Anther option would be to use sacrificial materials that are capable of dissipating and /or absorbing blast wave energy and, thus, mitigati ng blast load hazards, available data from recent experiments has shown that Rigid Polyurethane Foam(RPF) have a remarkable capability to absorb and dissipate blast wave energy. In addition, a series of investigations on the application of RPF focused on e valuating the effect of the foam density on the capability to absorb the impact of explosive blast waves, fragments and projectiles have been conducted during the past two decades.

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