PROMISING PERSPECTIVES FOR THE USE OF ENHANCED BLAST EXPLOSIVES CASED WITH COMPOSITE MATERIALS

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In recent years, great efforts were devoted to the development of new kinds of weapons able to generate high blast and temperature effects. Such effects are commonly obtained by the incorporation of a large amount of aluminium particles in the explosive formulation, leading to a strong decrease in detonation performances: Velocity of Detonation and consequently, Detonation Pressure. As a matter of fact, fragments generated by a standard metallic casing containing this type of composition should exhibit a lower velocity, but they are potentially far bigger and heavier than fragments generated by a standard association metallic casing / standard High Explosive. This is why this new family of explosives should be used in a light casing, such as a composite casing.
In this frame, MBDA France has developed and manufactured a composite casing with the objective of maintaining a good compromise between blast effects and low collateral damages, while reducing as much as possible fragments impacts due to the structure.
On the other side, SME (SAFRAN Group) Le Bouchet Research Centre has been developing a novel Enhanced Blast Plastic Bonded eXplosive (EB-PBX) able to generate enhanced blast effects. This new composition has been called B2514A. Some earlier publications deal with the gains obtained in blast effects with bare charges in comparison with PBX references already known for their blast effects, at a scale representative of potentially future ammunition.
Different types of structures have been designed, which could meet the specifications of future ammunition with a composite casing. In particular, a preliminary study led to the dimensioning of a composite casing in comparison to a reference steel casing.
The first part of the paper deals with MBDA studies leading to the manufacturing of structures. The second part addresses evaluations of such structures filled with B2514A. A comparison has been made with a bare charge (same volume of B2514A), as well as a comparison in a metallic structure. The results have also been compared to results obtained in similar configurations of structures filled with a standard PBX. A dedicated instrumentation leads to the characterization of blast and particles effects, and fragments impacts. Results are discussed regarding the potential interest of using a composite structure for specific applications in future ammunition.