Weapon Effects on Urban Terrain

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ABSTRACT:

The overall goal of the project that I worked on was to create a system capable of protecting a lightly armored platform from an incoming enemy round. In order to do this the system would identify a threat, calculate the incoming trajectory, and fire an explosive warhead to intercept, damage, or deflect the incoming round. The focus of the testing that the division I was working with was the effects of the intercept on the enemy round as well as how much this system increases the survivability of our current and projected light armored platforms.

The main focus of the research I was involved with was the effects of a fragment setting off a shaped charge warhead at normal stand off but from the front or the side. In order to test this we set up shaped charges with a smaller detonator mounted on the side of the warhead, which simulated a piece of fragmentation impacting the warhead at very high speed, and then we set off first the small detonator and very shortly after that the main detonator. X-ray machines were used to track the jet formation and steel witness plates were used to determine the spread of the damage and the depth of penetration. Using this information and we were able to compare the tested warhead to the baselines given by testing the warhead under normal circumstances. We found that there was a very remarkable decrease in effectiveness the closer to the front we set it off until we eventually went so far forward that the warhead ceased to form a shaped charge jet.

With the data that we gathered we were able to prove that if the system is able to hit the incoming round with fragmentation and possibly set it off it is very likely even relatively thin skinned vehicles would survive the attack. This is key for the continuing research into smaller and lighter, but no less effective, armor platforms for the future combat system. It is projected that the 20 ton tank the Army wants to build will need one of these systems or something like it in order to be well enough protected on the battlefield.

KEYWORDS: warhead, normal stand off, X-ray machines, shaped charge jet, witness plates

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