Simulation Analysis of Spray Pattem for KE－rod Warhead

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ABSTRACT

The conventional blast fragmentation warheads of tactical ballistic missile (TBM) have low lethality occurs with non-optimum hit the payload sweet spot. A novel warhead can achieve very high lethality against missile payload was kinetic energy (KE) rod warheads. The KE-rod warheads deploy a very dense spray pattern in the target ’ s direction when it engaged. This dense cloud of rods can achieve very high lethality against submunition payloads with high relative velocities. The KE-rod warheads cab be separated into two major categories: isotropic schemes and aimable ejection schemes. In order to enhance the penetration capability and increase the probability of kill of KE-Rod warhead, the spray pattern, density as well as the velocity of rod deployment should be analyzed. The purpose of this study is to establish the numerical analysis model of KE-Rod warhead. Numerical simulations are performed by LS-DYNA to investigate the velocity and the spray pattern of rod deployment. The influence of the velocity and the spray density of rods on rod shape, and arrangement are also included. The simulation results indicated that the rod deploy get more dense, and the velocities of rods were increased when warhead arrange more rods. A hexagonal shape rod has higher velocity than circular KE-Rod; the spray pattern change was not distinct. The research results herein can be used in developing the KE-Rod warhead analysis model and related design. It ’ s also useful for the KE-Rod warhead optimal design and interception performance evaluation.

Keywords : Anti-Tactical Ballistic Missile ; Isotropic KE-Rod Warhead ; Aimable KE-Rod Warhead, Spray Pattern, LS-DYNA

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