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Research on the Dynamic Characteristics of Multi-Condition Penetration of Concrete by Warhead-Fuze Systems

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Abstract : This study focuses on the overload environment and dynamic response of the core components (i.e., sensors) within the fuze of a warhead-fuze system during penetration of typical targets. Considering the connection structure between the warhead and the fuze, as well as the internal structure of the fuze, a finite element model of the warhead-fuze system penetrating a semi-infinite thick concrete target was constructed using the finite element analysis software LS-DYNA for numerical simulation. The results reveal that the response signal of the sensors inside the warhead-fuze system is larger in magnitude and exhibits greater vibration disturbances compared to the acceleration signal of the warhead. Moreover, the study uncovers the dynamic response characteristics of the sensors within the warhead-fuze system under multi-condition scenarios involving different target strengths and penetration angles. The research findings provide a sound basis for the rapid and effective prediction of the dynamic response and overload characteristics of critical modules within the fuze under different working conditions, offering technical references for the integrated design of warhead-fuze systems.

Keywords : penetration, warhead-fuze system, multi-condition, acceleration overload signal, numerical simulation
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