

Abstract Submitted  
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**Numerical Simulation of Pre-heated Confined PBX Charge Under Low Velocity.**<sup>1</sup> CAI HU, YANQING WU, FENGLI HUANG, YAN LIU, State Key Laboratory of Explosion Science and Technology, Beijing Institute of Technology, EXPLOSION AND DAMAGE TEAM — Impact sensitivity and thermal safety are very important for explosive safety usage. To investigate the effect of thermal softening on impact sensitivity of HMX-based PBX, a finite element model aiming at pre-heated confined PBX charge subjected to bullets impact has been established. The predicted ignition starting area of the explosive charge was evaluated based on volume strain and equivalent strain contours. It showed that the ignition starting area moves towards the center of the explosives from the surface with increase of heating temperature. The threshold velocity does not increase monotonically with the pre-heating temperature increases. Instead, the threshold velocity rises till 360 m/s when the cook-off temperature is lower than 75°, then decreases the increased temperature. The results imply that our PBX has the lowest impact sensitivity at about 75°. These numerical results agree very well with the corresponding experiment results conducted by Dai et al.. The influence of thermal softening on the impact sensitivity has been analyzed. As the strength decreases, more impact energy will be absorbed. At the same time, shear resistance ability will be weakened and volume compression work may play a more important role to ignition.

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