

## Impact Damage Characteristics of TATB-based Polymer Bonded Explosive Under Confining Pressure Based on the CT Image Sequences

LIU Ben-de, CHEN Hua, ZHANG Wei-bin, ZHANG Cai-xin, LIU Chen

(Institute of Chemical Materials, CAEP, Mianyang 621999, China)

**Abstract:** To study the damage characteristics of polymer bonded explosive (PBX) under impact load action, the dynamic impact test of TATB-based PBX was carried out with split Hopkins on pressure bar (SHHB) and X-ray micro-computed tomography (X- $\mu$ CT) was used to observe and characterize the damage. Based on CT image sequences and combined with digital image processing algorithm, the extraction and 3D reconstruction of damaged cracks was performed and a damage variable evaluation method based on the proportion of defect volume in CT image sequences was proposed. The value of damage variables under different impact velocities of bullet was calculated. Results show that the damaged cracks extends from two ends to the middle along the direction of approximately 60° with the end face. The whole crack exhibits a “hourglass” distribution characteristic. With the increase of the bullet impact velocity, the crack extension direction is unchanged. Because of the existence of initial damage, the value of damage variables does not always increase, while first decreases and then increases, and then shows a sharp increase trend.

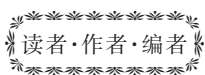
**Key words:** polymer bonded explosive(PBX); impact damage; X-ray micro-computed tomography(X- $\mu$ CT); damage variable

**CLC number:** TJ55; O389

**Document code:** A

**DOI:** 10.11943/CJEM2018166

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