

Abstract Submitted  
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**Dynamic Fracture Behavior of Plastic-Bonded Explosives** HUA FU, JUN-LING LI, DUO-WANG TAN, IFP, CAEP TEAM — Plastic-Bonded Explosives (PBX) are used as important energetic materials in nuclear or conventional weapons. Arms Warhead in the service process and the ballistic phase, may experience complex process such as long pulse and higher loading, compression, tension and reciprocating compression - tension, friction with the projectile shell, which would lead to explosive deformation and fracture. And the dynamic deformation and fracture behavior of PBX subsequently affect reaction characteristics and initiation mechanism in explosives, then having influence on explosives safety. The dynamic fracture behavior of PBX are generally complex and not well studied or understood. In this paper, the dynamic fracture of explosives are conducted using a Kolsky bar. The Brazilian test, also known as an indirect tensile test or splitting test, is chosen as the test method. Tensile strength under different strain rates are obtained using quartz crystal embedded in rod end. The dynamic deformation and fracture process are captured in real-time by high-speed digital camera, and the displacement and strain fields distribution before specimen fracture are obtained by digital correlation method. Considering the non-uniform microstructure of explosives, the dynamic fracture behavior of explosive are simulated by discrete element method, the simulation results can reproduce the deformation and fracture process in Brazilian test using a maximum tensile strain criterion.

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