

- [14] Garon K D, Faminu O. Aeroballistic Range tests of missile configurations with non-circular cross-sections and aeroprediction comparison results, AIAA03-1243[R]. 2003.
- [15] 时党勇, 李裕春, 张胜民. 基于 ANSYS/LS-DYNA 8.1 进行显式动力分析[M]. 北京: 清华大学出版社, 2005: 184-249.
- [16] 白金泽. LS-DYNA3D 基础理论与实例分析[M]. 北京: 科学出版社, 2005: 74-103.
- [17] 苗长青, 张奇, 白春华, 等. FAE 装置炸高对爆炸压力场影响的实验研究[J]. 火炸药学报, 2002, 25(3): 9-10.
- MIAO Chang-qing, ZHANG Qi, BAI Chun-hua, et al. Investigation of bursting height of FAE influences blast pressure measuring [J]. *Chinese Journal of Explosives & Propellant*, 2002, 25(3): 9-10.
- [18] 黄菊, 王伯良, 仲倩, 等. 炸高对爆炸超压的影响规律[J]. 火炸药学报, 2012, 35(1): 35-38.
- HUANG Ju, WANG Bo-liang, ZHONG Qian, et al. Influence rule of bursting height on blast over pressure[J]. *Chinese Journal of Explosives & Propellant*, 2012, 35(1): 35-38.

Simulation of Explosion Overpressure Distribution for Non-circular Cross-section Cloud

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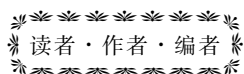
Abstract: To study the distribution characteristics of explosion overpressure field for non-circular cross-section cloud, the numerical simulation of overpressure process of cloud explosion was performed by LS-DYNA program. Comparison between the simulated overpressure values with experimental was carried out. The changing rule of overpressure with distance, as well as of different ignition height on overpressure field distribution was studied at four directions, including 0° , 90° , 135° and 180° . Results show that: ignited cloud shows up as an ellipsoidal detonation fireball in experiment. The peak overpressure value measured at the position of 5 m from explosion center at four directions is from 2.9 MPa to 5.2 MPa. In the range of 5 m to 50 m from explosion center, a shock wave oval trajectory on ground was revealed. Shock wave propagated at 90° direction has lower velocity than others. In the range of 5 m to 15 m, the ground peak overpressure enhances by 8% averagely when ignited height increases from 0.5 m to 2.5 m.

Key words: non-circular cross-section; overpressure; ignition height; cloud explosion numerical simulation

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《含能材料》固体推进剂专栏征稿

高能量、低特征信号、低易损、低成本、低污染、灵活能量管理和高可靠性成为当前固体推进剂面临的紧迫课题,为促进其研究,本刊将于 2015 年开设推进剂研究专栏,以专题报道固体推进剂研究的最新研究进展。欢迎广大学者投稿,来稿时请选择对应的专栏。

《含能材料》高品质炸药晶体研究专栏征稿

高品质炸药晶体的出现为钝感弹药的研究与应用开辟了一条重要途径,高品质炸药晶体因而也成为目前国内外含能材料研究领域的热点之一。为促进高品质炸药晶体的研究和应用,《含能材料》将于 2015 年开设高品质炸药晶体研究专栏,专题报道高品质炸药晶体的制备、表征、性能、应用等领域的最新研究成果,促进学者间的交流。欢迎相关研究学者投稿。来稿建议为英文。来稿时请选择对应的专栏。

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