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Reliability Analysis for Explosive Initiator Based on Generalized Linear Models

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Abstract: In order to improve the reliability analysis of the explosive initiator with small sample size, a method based on generalized linear models of reliability analysis for explosive initiator was proposed according to sensitivity test and characteristics of reliability analysis. The likelihood function was transformed to a generalized linear expression of binomial variable. Using the generalized linear model for binomial distribution, the maximum likelihood estimations of the model coefficients were obtained, and corresponding arithmetic was put forward. With the asymptotic normality of maximum likelihood estimations, the approximated confidence interval for the reliability was obtained by logit transform of reliability function. The present method was validated by the test data of stab detonator and electronic detonator. Results show that using about 150 samples is available to analysis the explosive initiator with a reliability goal of 0.999 by the method in this research.

Key words: aircraft design; explosive initiator; reliability analysis; generalized linear models; sensitivity test

CLC number: TJ55, TB114.3

Document code: A

DOI: 10.11943/j.issn.1006-9941.2015.03.013



《含能材料》高效毁伤弹药专栏征稿

高效毁伤弹药以“利用最小化成本获得最大化效果”为目标,对含能材料的性能和能量提出了更高的要求。为进一步促进高效毁伤弹药及其技术的研究,本刊将于2015年增设高效毁伤弹药专栏,内容涉及(1)传统含能材料的优化和改进以及先进含能材料的开发和应用,包括:传统含能材料合成、制造、处理和应用的新技术与新技术,新的CHON含能材料的开发和应用,金属化炸药,非传统概念炸药(如燃料空气炸药、温压炸药),高能量密度材料;(2)含能材料能量的控制输出研究,包括:能量输出增强(如组合装药),能量输出聚焦/定向,能量输出模式可控(如多模装药),能量输出范围可控(如低附带毁伤炸药)。欢迎广大学者投稿,来稿时请选择对应的专栏。

《含能材料》编辑部