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Statistical Evaluation of Small-scale Explosives Testing

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Small-scale explosives sensitivity testing is used to qualitatively and quantitatively evaluate risk. Both relative comparison and characterization of the transition from no reaction to reaction is used to estimate that risk. Statistical comparisons and use of statistically efficient methods are critical to accurately and efficiently make risk related decisions. Many public and private entities are not making accurate decisions based on the test data because of the lack of properly applying basic statistical principles. We present methods and examples showing how to use statistics to accurately and efficiently evaluate the risk for relative comparison and in-process risk evaluation. Some of the methods presented include the Significance Chart Method and adaptive step-size techniques like the Neyer D-Optimal method. These methods are compared to the more traditional approaches like Bruce-ton and Probit. Use of statistical methods can significantly improve the efficiency, accuracy, and applicability of small-scale explosives sensitivity testing.