

**Reliability Analysis in the Office of Safety, Environmental, and  
Mission Assurance (OSEMA)**

by

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The technical personnel in the SEMA office are working to provide the highest degree of value - added activities to their support of the NASA Langley Research Center mission. Management perceives that reliability analysis tools and an understanding of a comprehensive systems approach to reliability will be a foundation of this change process. Since the office is involved in a broad range of activities supporting space mission projects and operating activities (such as wind tunnels and facilities), it was not clear what reliability tools the office should be familiar with and how these tools could serve as a flexible knowledge base for organizational growth.

Interviews and discussions with the office personnel (both technicians and engineers) revealed that job responsibilities ranged from incoming inspection to component or system analysis to safety and risk. It was apparent that a broad base in applied probability and reliability along with tools for practical application was required by the office.

A series of ten class sessions with a duration of two hours each was organized and scheduled. Hand out materials were developed and practical examples based on the type of work performed by the office personnel were included. Topics covered were:

- Reliability Systems: A broad system oriented approach to reliability
- Probability Distributions: Discrete and continuous distributions
- Sampling and Confidence Intervals: Random sampling and sampling plans
- Data Analysis and Estimation: Model selection and parameter estimates
- Reliability Tools: Block diagrams, fault trees, event trees, FMEA

In the future, this information will be used to review and assess existing equipment and processes from a reliability system perspective.

An analysis of incoming materials sampling plans was also completed. This study looked at the issues associated with Mil Std 105 and changes for a zero defect acceptance sampling plan.