

Electronic Design Reliability Training Course

This intensive course is structured for all key participants in the reliability engineering process. Included are systems and circuit design engineers, quality engineers and members of related disciplines having little or no previous reliability training. The course deals with both theoretical and practical applications of reliability; all considerations related to the design process including parts selection and control, circuit analysis, reliability analysis, reliability test and evaluation, equipment production and usage, reliability-oriented trade-offs, and reliability improvement techniques. Course hand-outs include a course manual and RAC's publication "Reliability Toolkit: Commercial Practices Edition."

Course Contents

General Concepts and Mathematics

1. Definitions
2. Mathematical Foundations
3. Military & International Standards/Handbooks

System Reliability Analysis, Assessment, and Apportionment

1. Allocation/Apportionment
2. Modeling
3. Prediction

Parts Management

1. Part and Vendor Selection
2. Design Criteria and Tools
3. Manufacturing/Assembly Processes

Part Derating and Reliability Prediction

1. Derating Theory
2. Specific Derating Factors for Various
3. Part Types
4. Microcircuit Prediction Example
5. Compare & Contrast: MIL-HDBK-217, Telcordia, PRISM

Reliability Demonstration

1. Statistical Concepts
2. Confidence Intervals
3. QC Concept
4. MIL-STD-781 Methodology

Failure Mode Effects and Criticality Analysis

1. FMECA Characteristics
2. FMEA Methodology
3. CA and RPN Methodologies

Reliability References and Data Sources

1. RAC, GIDEP, NTIS & DTIC
2. Professional Organizations
3. Failure Reporting Analysis and

4. Corrective Action System

Reliability Growth Management

1. The Growth Process
2. Growth Test Planning
3. Duane & AMSAA Plots

Circuit Analysis

1. Circuit Simplification
2. Degradation Analysis Techniques
3. Overstress and Transient Analysis

Fault Tree Analysis

1. Construction Methodology
2. Qualitative Analysis
3. Quantitative Analysis

Design for the Environment

1. Thermal Considerations
2. Shock and Vibration
3. Salt and Humidity
4. EMI & Nuclear Radiation

Reliability Program Management

1. Program Elements
2. Program Implementation
3. Organizational Considerations

Production and Use Reliability and ESS

1. Production Degradation Factors
2. Field Degradation Factors
3. Environmental Stress Screening
4. HALT and HASS

Final Group Problem