



Principles Of Reliability Engineering



Introduction:

Reliability is an engineering discipline with specific principles. Reliability applies scientific know-how to a component, assembly, plant, or process so it will perform its intended function, without failure, for the required time duration when installed correctly, and operated correctly in a specified environment. The course will use statistical analysis examples and software to measure and predict equipment reliability. Actual process equipment examples and exercises will be used to demonstrate the techniques. The candidates will be asked to bring specific examples from their work environment to use as case studies. This is a basic training course in the fundamentals of reliability. Enhancing reliability satisfies customers for on-time deliveries through increased equipment availability and by reducing costs and problems from products that fail early. The course shows how improving reliability boosts business performance.

Who Should Attend?

Reliability engineering and operations personnel involved in improving reliability, availability, safety, maintainability, and profit performance in existing or proposed process equipment and systems. Participants should have foundation skills in statistical analysis and reliability techniques for equipment.

Course Objectives:

By the end of this course delegates will be able to:

- Define, measure, and predict reliability
- How to use the reliability equation to aid in improving equipment maintenance strategies
- How to analyze system design to determine if projected capacity will meet capital requirement
- How to analyze and improve system safety

Predict life cycle costs to make buy/replace decisions and to determine which equipment or system will create the most value for the business

Course Outline:

- Overview of reliability engineering methods
- Mean time between failures
- Bathtub curves for modes of failure
- Availability concepts from reliability analysis
- Preparing reliability data for analysis
- Normal probability plots
- Log-normal probability plots
- Weibull probability plots & analysis
- Corrective action for Weibull modes of failure
- Reliability block diagram models
- Monte Carlo simulations
- Critical items list
- Pareto distributions
- Failure mode effect analysis
- Effects of good installation/use practices on system life

- Fault tree analysis
- Quality function deployment
- Design reviews
- Mechanical components testing for interactions
- Load/strength interactions
- Electronic device screening and derating
- Software reliability tools for error detection/elimination
- Reliability testing strategies
- Simultaneous testing
- Sudden death testing
- Accelerated testing
- Reliability growth models and displays
- Failure recording, analysis, and corrective action systems
- Reliability policies and specification of system reliability
- Contracting for reliability
- Reliability audits
- Management's role in achieving reliability improvements
- Root cause failure analysis
- Availability and capacity modelling
- System reliability prediction and safety analysis
- Maintenance optimization
- Life cycle cost analysis