

Management Overview Of Reliability Engineering Principles

Reliability Engineering Principles (REP) is a 3-day engineering short course. REP provides basic training for engineers in the fundamentals of reliability. REP provides the practical engineering details not usually covered in most engineering curriculum. REP is long on practical problem solving and short on statistical calculations as we encourage the students to use commercial software for the statistics. The purpose of the REP course is to boost business performance by reducing the costs of unreliability through preventing/avoiding failures of equipment and processes. REP connects engineering details with financial details for the business to motivate cost reductions using non-traditional tools.

The Management Overview of Reliability Engineering Principles is a 1.5 hour summary of tools discussed during the longer training session. The Overview purpose is to educate (to persuade or condition to feel, believe, or act in a desired way) the managers about REP training (to undergo instruction, discipline, or drill) received by their engineers. When all members of the team have the same information they can pull together for the common good of the business enterprise. The overview helps avoid team members using the same words but having different meaning. The Management Overview aids in building a reliability culture for reducing costs.

A few of the subjects discussed in the overview include:

- What reliability is (preventing/avoiding failures) and what it's not (faster repairs).
- How to prioritize work activities based on a Pareto list of cost problems to concentrate on reducing the high cost of unreliability.
- Why reliability and its new tools will help boost business performance by solving old nagging problems.
- Why failure data is important and how to use data to solve problems on a fact driven basis rather than based on opinions.
- Why use of failure data and repair data in reliability models can provide alternatives for selecting the lowest long term cost of ownership.
- How modeling failure costs can aid in selecting the most attractive corrective action plan for reducing the cost of unreliability.
- How conversion of unreliability values into time and money can spring to life to guide actions for making cost effective plans.
- Knowing reliability values and business costs exposures guides you to know when to reject risk and when to accept risks.
- Reliability required is dependent upon cost of outages, and reliability demands can change depending upon business conditions.
- Depending upon the needs of the organization, a few of the following reliability tools that may be discussed are:
 - **Mean time between failures**—how to use chance failure data.
 - **Decision trees**—how to use reliability values and find net financial results

- **Bathtub curves**—how to recognize different failure modes for improvements.
- **Availability concepts**—how to separate portions of the effectiveness equation.
- **Preparing data for analysis**—how to segregate data for suspensions.
- **Probability plots**—how to make straight line plots from the chaos of data.
- **Corrective action for Weibull modes of failure**—how to direct corrective action.
- **Reliability block diagrams**—how to reduce complexity to simplified models
- **Monte Carlo simulations**—how to use simulation tools on complex problems.
- **Critical items list**—how to simplify reliability problems for management reports.
- **Pareto distributions**—how to separate a few vital issues from trivial many problems.
- **Failure mode effect analysis**—how to use qualitative bottom-up reliability analysis.
- **Fault tree analysis**—how to use experience in a top-down reliability analysis.
- **Quality function deployment**—how to use the voice of the customer for reliability.
- **Design reviews**—how to introduce reliability issues into new designs.
- **Configuration control**—how to identify and trace future problems.
- **Mechanical component interactions**—how numerous interactions lower reliability.
- **Load/strength interactions**—how variations reduce the expected reliability.
- **Electronic device screening and derating**—how to improve electronic reliability.
- **Software reliability**—how reliability problems are started and corrected.
- **Reliability testing strategies**—how test/use conditions/environments alter reliability.
- **Simultaneous testing**—how to test/use inexpensive parts for quick reliability values.
- **Sudden death testing**—how to test/use few expensive parts for quick reliability values.
- **Accelerated testing**—how to speed-up reliability tests for quick indications.
- **Reliability growth models**—how to show reliability improvements.
- **FRACAS**—how to use failure reporting and corrective action systems.
- **Reliability policies**—how to sell the organization a vision for reliability programs.
- **Contracting for reliability**—how to tell vendors the requirements for reliability.
- **Reliability audits**—how to find out what's really being implemented for reliability.
- **Demonstration project**—how to put reliability tools to work for improvements.

During the REP training session, each student is encouraged to take a problem in his area and use the new tools to solve it by way of a demonstration project for reducing costs. The managers will be encouraged during the Overview to do follow-up with each student to insure that a cost reduction is achieved so the training class can be a profit contributor rather than a cost drag on the enterprise.

The Management Overview can be a growth event for both managers and engineers with new tools discussed for solving old nagging problems. The REP program uses engineering tools to get to money solutions that the business can afford.

Barringer & Associates, Inc. are reliability consultants solving reliability problems for industry using engineering, manufacturing, and business expertise as we train you in how to solve and implement improvement programs. We specialize in solving reliability problems for profit oriented, capital intensive, and continuous process operations. Through our network of reliability experts, we get cost effective engineers assigned to solve your reliability problems efficiently and cost effectively. We want to quickly help you solve problems—we do not plan to move-in and live with you as a semi-permanent part of your staff.

Our training course in [Reliability Engineering Principles](#) teaches engineers how to use equipment failure data to reduce the high cost of unreliability. Failure data drive reliability-centered maintenance (RCM) programs and support total productive maintenance (TPM) efforts. Over 6000 engineers have received training in the [Reliability Engineering Principles training](#) course in the USA, Canada, South America, Europe, Africa, and Asia.

Our training course in [Life-Cycle-Cost](#) brings together reliability models, cost details, installation practices, operating practices, and failure data for making good business decisions. The training course uses Monte Carlo simulations in an Excel spreadsheet to simulate failures expected each year and shows how to cost the results over the life of the equipment or project. The [Life-Cycle-Cost training](#) program integrates business decisions into engineering failure details to show how equipment and projects are managed for the lowest long-term cost of ownership. These practical courses use software to solve statistical problems while we concentrate our training efforts on how to use data, and reliability engineering tools cost effectively.

Our training course in [Process Reliability](#) teaches engineers how to study their processes, determine reliability of the process, and categorize the losses for a top-down view for identifying problems using new reliability tools. The tools prioritize the categories of special causes and common causes for attacking problems for quickest paybacks by eliminating the hidden factory.

Our software uses Weibull statistics in [Monte Carlo](#) models for cost effective business solutions for reliability and availability problems.

We sell Fulton Findings [SuperSMITH[®] Weibull](#) software for Weibull analysis of failure data; and we use this software to build Weibull-databases from failure data. We sell [SuperSMITH[®] Visual](#) software for reliability growth plots to predict future failures and the statistics will show if you are reducing failures, tolerating increasing failures, or muddling along with no significant improvements.

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