Life Cycle Cost Training Course

A two-day training course to justify projects or equipment for the lowest long term cost of ownership.

The training course is offered by:

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Manufacturing, Engineering, and Reliability Consultants

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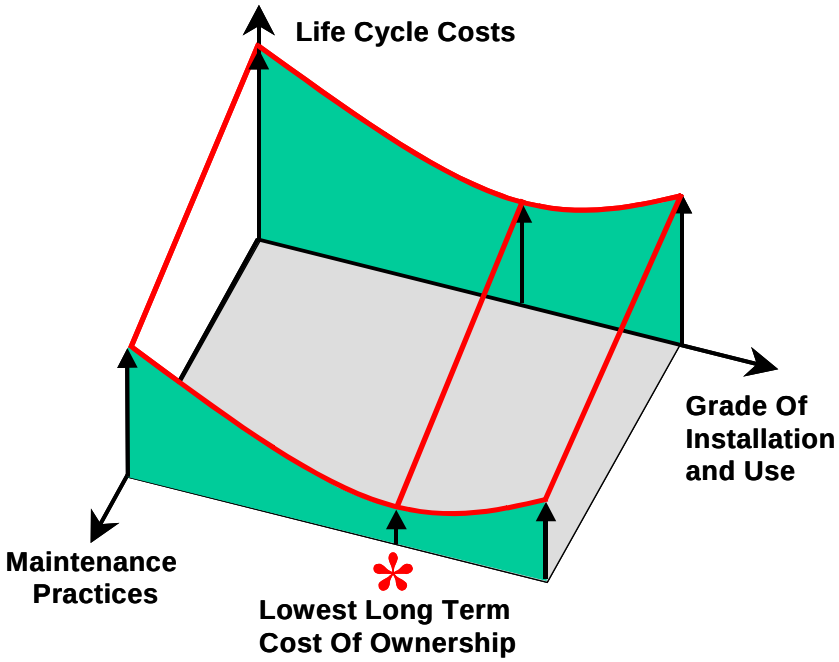
Life cycle costs are the summation of project/equipment costs from inception to disposal with consideration for the time cost of money. Finding costs requires knowledge of the life and death of equipment. The training course uses life models developed with reliability engineering principles.

The objective of life cycle cost analysis is to choose the most cost-effective alternative from a series of approaches so the least long-term cost of ownership is obtained. Decisions are made between alternatives using net present value concepts. The course shows how to merge engineering and financial details for cost-effective, long-term, decisions.

The course-Life cycle cost training is an engineering training session that converts engineering details into a financial value. The course teaches engineers how to justify equipment using alternatives and financial decisions. Excel™ spreadsheet templates are provided so the student can easily make net present value calculations for discrete or probabilistic decisions. *The course emphasizes making selections from a series of alternatives and basing the final decision on net present values.*

The $ issue-Life cycle cost is about making correct financial decisions on projects and equipment while providing an evidence trail to justify the final decision. This requires engineers to think like MBAs but act like engineers using the art and science of engineering. *The course emphasizes buying right rather than buying cheap as first costs are not the last costs.*

Failures–Most equipment has component failures during its life. Failures incur money losses for repairs along with costs for lost production during equipment outages. Many failures are motivated by grade of procured equipment, grade of installation, grade of maintenance, grade of operation, and decisions about spare/non-spare equipment. These are all alternatives for



life cycle cost decisions. Failure expenditures and failure time must be established for the cost spreadsheet to take into account the time value of money. Reliability engineering concepts give clues about when things will fail so costs can be accumulated in the correct time segment. *The course shows how to use reliability tools for estimating when failure may occur and finding the price paid for failures in terms of net present value..*

Costs-Failures drive costs. The issue is to decide the alternative that displays the least total cost of capital and expense during the life of the equipment as judged by net present value. The complications of the time value of money for procurement and operation must be balanced with the discount factors and depreciation factors to arrive at business decisions regarding costs. *The course is about life cycle costs, which is the language of money, and how engineering decisions can be money driven to improve stockholder wealth.*

Financial tools and engineering-Engineers can learn enough accounting and business principles to communicate with accountants. However, few accountants are willing to learn engineering

details for reliability calculations. Thus engineers must learn enough cost details to improve their teamwork with accounts. *Engineers must think like MBAs and act like engineers for accomplishing the desired financial results by justifying the numbers.*

Two approaches: discrete or probabilistic–The simplest response to life cycle cost problems are obtained by considering cost/life numbers as discrete. Discrete answers are easier to get, the results have moderate accuracy, and answers are found quickly. For complex problems, the Monte Carlo technique of using random numbers to solve complex problems improves the accuracy of the calculation and lets the computer find when things will fail by using reliability models. *Simple problems call for discrete models while complex problems require probabilistic approaches for economic selection of equipment.*

Excel™ templates–Spreadsheet templates are provided for student use on practical problems. Classroom drill emphasizes how to use the spreadsheet so the student is confident in the use of the techniques when they return to the job site. During the class, engineers need access to a notebook or desktop computer to complete the assignments.

More complex Monte Carlo problems require considerable personal computer time for solving many problems/alternatives to reach the least cost recommendation. The Monte Carlo problem requires 36 individual solutions for a pump problem and time to run simulations is lengthy unless fast (200+MHz) computers are used. The Monte Carlo simulation template can be changed from pumps to other equipment by changing the names and other details within the spreadsheet.

All Excel analysis complications are reduced to a single NPV number for deciding the financial results. *Excel templates are building blocks for many engineering tasks and the templates have been automated to avoid re-inventing the wheel for every task.*

Tradeoff conditions-Often, life cycle cost problems may result in a decision for which all elements cannot be included. This

requires the use of judgment in the decision making process. Tradeoff diagrams are calculated using system effectiveness calculations from reliability engineering along with net present values to reflect the life cycle cost considerations. Tradeoff plots are helpful for engineers to include both art and science into the decision process. *Engineers need their tradeoff tools for sales presentations to account for items which cannot be covered in detail.*

Tools studied- The life cycle costs (LCC) course is a broad introduction. Topics studied are:

- Language of money—business facts of life for engineers
- Important financial concepts—net present values
- Alternatives—The accounting view and engineering view
- Checklists for acquisition and sustaining costs
- Effectiveness issues—A*R*M*C
- Defining the LCC problem—the recipe and steps
- Choosing analytical cost models—memory joggers
- Preparing cost profiles by year—why this is important
- How equipment lives and dies—and why it matters
- Pareto charts—separating the vital few cost contributors
- Sensitivity analysis— "what if" scenarios
- Tradeoff conditions—how to show and how to sell
- Adding uncertainty to LCC—Monte Carlo models
- The value of LCC—buyer and seller viewpoints
- How much can I afford to pay—quick estimates
- Databases for failure information
- LCC decisions for maintenance projects

Classroom schedule-Lectures on LCC fundamentals consumes 1/2 to 3/4 of the first eight hour day with computer problems solved during the last half. The second day consists of computer simulations and converting LCC concepts into presentation facts. The class will conclude by 3 PM on day two for travel convenience.

Completion of the Reliability Engineering Principles training class before the LCC class is recommended but not mandatory.

Course instructor- Paul Barringer is the instructor for the Life Cycle Cost course. He provides a student's notebook with examples worked out in detail. The course details are enhanced by use of color slides.

His course theme is making life cycle cost a practical decision making tool for engineers by effectively communicating the results using established reliability models. He uses Excel spreadsheet templates for solving problems for practical and cost effective effort. Over 300 engineers have completed the Life Cycle Cost course and over 2000 engineers have completed the Reliability Engineering Principles course, which is recommended prior to the LCC course.

Barringer brings a unique and multifaceted set of skills to the course because of his 35+ years experience in industry. The breadth of his experiences avoids the usual narrowness of expertise in only a single area of reliability. He has:

- Experience as *Design Engineer* for ultra-high rotating speed centrifuges used in separation of isotopes and viruses.
- Experience as a *Plant Engineer* installing equipment and correcting equipment outages.
- Experience as a *Manufacturing Manager* and *Plant Manager* with financial responsibilities for equipment not performing to meet production schedules.
- Experience as *Director of Manufacturing* for building-in functional reliability levels for customers purchasing high quality and high reliability products while simultaneously experiencing effects of vendor supplied reliability problems in a worldwide manufacturing network of plants and equipment.
- Experience as *Director of Engineering* for guiding development of products used in the oil-patch for the world's deepest and highest pressure oil and gas wells where reliability is a critical performance characteristic.

Barringer's most recent industrial experience included Director of Manufacturing and Director of Engineering at an ISO 9001 approved manufacturing facility.

He is a registered professional engineer (Texas). He is named inventor in five USA patents. His education includes an MS and BS with honors in Mechanical Engineering from North Carolina State University where he also worked as a graduate teaching assistant. He has also participated in Harvard University's Manufacturing Strategy conference.

Barringer is a contributor to **The New Weibull Handbook**, an advanced reliability text published by Dr. Robert B. Abernethy. He is a short course presenter on the subject of reliability and life cycle costs for the American Society Of Mechanical Engineers and for the Society of Maintenance and Reliability Professionals. His technical associations include: American Society For Quality, American Society Of Mechanical Engineers, Society Of Manufacturing Engineers, Society of Maintenance and Reliability Professionals, and Society of Reliability Engineers.

Who should attend?-

Production supervisors will find new tools for understanding how operations can improve cost performance of their processes. They will learn how to influence improvements in availability, how they can assist in reducing costly failures, and how they can justify equipment using life cycle cost business decisions to attack costly problems.

Engineering personnel will find helpful techniques for justifying equipment grades along with how equipment is installed, operated, and maintained for making life cycle cost decisions in justifying new equipment, new processes, and spare equipment.

Maintenance engineers will find life cycle cost tools helpful for proposing and justifying equipment replacements. They will understand why capital expenditures are controlled in a tight manner and why capital is spent with great care. They will also see how the grade of maintenance is important.

Managers will find business aspects of life cycle cost helpful for measuring and motivating improvements in processes, procedures, people, and equipment to reduce costs as they ferret-out hidden factories wasting time and money. They will learn how to justify spare equipment as a selling point for improvement projects.

For more information–

Training course details:

http://www.barringer1.com/lcctrng.htm

Schedules and availability for in-house seminars:

http://www.barringer1.com/schedule.htm

Prices for seminars:

http://www.barringer1.com/pricelst.htm

Problems solved using reliability engineering principles:

http://www.barringer1.com/problem.htm

For other details contact:

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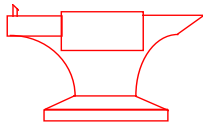
Wise use of life cycle cost concepts in your operation
really will save you money!



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