Life Cycle Costs & Profits

MAINTENANCE MANAGEMENT – ME 514
MUDITHA ABYESEKERA – E/04/005

Definition for LCC
- Life cycle cost is the total cost of ownership of machinery and equipment, including its cost of acquisition, operation, maintenance, conversion, and/or decommission
- LCC is an economic model over the project life span
- LCC is a planning technique
- LCC can be used as a management decision making technique, a decision making tool and a philosophy

Presentation Flow
- Definition of LCC
- Why use LCC
- LCC system program definition
- Life Cycle Cost Analysis
- Life cycle costing procedure
- Design formats
- Present Value Technique
- Life Cycle Profits
- Analysis Procedure

LCC are summations of cost estimates from inception to disposal for both equipment and projects as determined by an analytical study and estimate of total costs experienced in annual time increments during the project life with consideration for the time value of money

Why use LCC?
- LCC helps change provincial perspectives for business issues with emphasis on enhancing economic competitiveness by working for the lowest long term cost of ownership which is not an easy answer to obtain

“Womb to Tomb”
Procurement Costs
Other costs associated with life cycle costing (Service, Maintenance, Repair etc.)

Why use LCC? (Contd.)
- Accounting of inflationary effects of money, energy, cost, labor and materials.
- Increased liability costs required for safer product planning and support.
- Consumers increasing interest on operation and maintenance cost
- To ensure greater Life-cycle profit
- To reduce risk and uncertainties

Conflicting Ideas in a company
- Project Engineering wants to minimize capital costs as the only criteria.
- Maintenance Engineering wants to minimize repair hours as the only criteria.
- Production wants to maximize uptime hours as the only criteria.
- Reliability Engineering wants to avoid failures as the only criteria.
- Accounting wants to maximize project net present value as the only criteria.
- Shareholders want to increase stockholder wealth as the only criteria.

Management is responsible for harmonizing these potential conflicts under the banner of operating for the lowest long term cost of ownership.

"It's unwise to pay too much, but it's foolish to spend too little"
- LCC must be applied early in design stage to bring beneficial change
- Reliability and Maintainability are two of important considerations
- While the front end cost maybe initially more expensive, total LCC savings from reduced failures and maintenance should result

Life Cycle Costs
- Research and Development
- Production and Construction Investment
- Operations
  - Personnel, Training, Facilities etc.
- Maintenance
  - Preventive maintenance
  - Corrective repairs
  - Repair parts
- Support
  - Transportation, Tools, Modifications etc.
- Termination

System Life Cycle
- Concept formulation and System Definition phases
- Development phase
- Production/Purchase and Installation
- Operations and Support
- Modifications and retirement
- Planning Period
- Acquisition period
- Use period
Pareto Principal - The Critical Few

- 10 to 20% of the elements of a cost analysis will identify 60% to 80% of the total cost
- These high cost items are the vital few items of concern and need to be carefully considered

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**Alternatives 2:** Add/Replace/Expand AMI Pump

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Life Cycle Costing Process

1. Determine the problem requiring LCC
2. Alternatives and acquisition/maintenance costs
3. Pareto analysis
4. Choose analytic tool model
5. Gather cost estimates and cost models
6. Make cost profiles for each year of study
7. Make box-and-whisker charts for alternatives
8. Pareto chart of vital few cost contributors
9. Sensitivity analysis of high cost items and measures
10. Study risks of high cost items and measures
11. Select preferred course of action using LCC
Comparison Tools

Factors related to LCC
- Agree on common units
  - Mileage, Build rates, average life, reliability
  - Product Life

Design Formats
- Design to Cost – DTC
  - Only production/purchase costs are considered
- Design to Life Cycle Cost – DTLCC
  - Includes all other factors of operation and maintenance
- Design to Unit Cost – DTUC
  - A decision made after considering alternatives and calculating life cycle costs

Present Value Technique
“The dollar in hand is worth than the dollar anticipated tomorrow”
- Present value is the value on a given date of a future payment or series of future payments, discounted to reflect the time value of money and other factors such as investment risk.
- The LCC value is compared in the present value format

Life Cycle Profits - LCP
Profits = Revenue – Expenses
- Increase in revenue value should also be given attention
- Maximize LCP
- To gain the most beneficial balance between revenues against cost

Change Impact Analysis
- A variation of trade off analysis
- To ensure selection of the most profitable alternative
- Best of both acquisition and support costs obtainable
- Determine What, Why, How, When and Where
- Changes will effect the whole life cycle cost
Important aspects in the Analysis Procedure

- Identify the point of need
- Brainstorming
- A cooperative atmosphere
- Formal training
- Follow up and on the job training
- Continual communication between groups

The End