

Appendix C: Defining Basic Value – Benefit Terminology

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What is Value?

When determining the value of your car, your answer is most likely either what you paid for it or what you can sell it for. Ask the same question for a valve that leaked gas into a building that caused several people to require medical attention, the answer is no longer confined to the cost of the valve. The answer now includes the additional costs of medical attention, the costs of lost productivity, and also the costs of legal risks. It stops being a \$75 valve.

Value is a combination of actual out-of-pocket costs and all the possible costs associated with the function of the equipment.

What are Normal Costs?

The costs of any equipment are what it costs to have it installed in operating condition and then to keep it running. The absolute minimum cost is to buy it, install it, run it until it wears out, and then replace it. Any additional costs such as lubrication, balancing or overhauls is done either to improve its operation, extend its life, or because it is more cost effective than replacement. Total replacement is seldom the most cost effective maintenance practice and should be avoided. In the normal lifetime of any equipment, the total lifetime costs would include the following:

- Initial cost, includes original purchase price, cost of installation, and cost of acceptance and operational verification
- Costs of routine servicing (lubrication, adjustments, etc.)
- Costs of overhauls

Risks – The Reasons for Performing Maintenance

Because we recognize that failure of an equipment item is not translated merely to be the cost of the item, we must understand how to generate value for the item. This perceived value is usually determined by the risks associated with that item. Some of those risks can be classified as follows:

- Risk to production (lost revenue)
- Risk to mission schedule (lost opportunity)
- Risk to mission schedule (prolonged costs)
- Risk to personnel safety and/or environment
- Risk to additional damage to collateral equipment

Risks or the avoidance of risk is the primary reason for performing maintenance other than correcting failures that have already occurred. Knowing how to measure risk in terms of dollars is an important activity that will allow relative scaling and comparison of equipment items so that the maintenance team can effectively determine which risks are not acceptable, and then rank those risks in order of priority so that they can be effectively managed.

By measuring risks in terms of dollars we can judge the effectiveness of maintenance activities, and we can judge the effectiveness of monitoring activities. Dollars at risk should never be confused with actual costs. It is real dollars that are spent purchasing plant equipment, real dollars to operate and maintain equipment, and real dollars to monitor their health. Risk dollars are potential costs that would occur based on predefined scenarios that usually represent “worst- case” situations. The likelihood of these events occurring are an important consideration when calculating risk.

Cost Savings

When reviewing an equipment’s maintenance strategy, any maintenance costs that can be eliminated without impacting the equipment’s performance or reliability can be called a cost savings. Basically, it means that a specific action in the existing program is either unnecessary or can be performed in a more cost effective way. Consider the following examples:

Example #1: Vibration analysis on a total of 50 motors performed monthly over the last year has not revealed any irregularities or degradation. Consider relaxing the frequency to every other month and cut the cost of performing the vibration analysis by 50%.

Example #2: A heat exchanger is opened and inspected every year for internal condition. For the last three years, no irregularities or fouling was discovered. Consider installing thermocouples at the inlet and outlet of the heat exchanger, and perform internal inspections only when the delta temperature exceeds a predefined limit

There are many opportunities for cost savings. Some typical examples would be:

- Decrease the frequency of an existing task
- Eliminate a task than is not effective
- Substitute technologies that are more cost effective
- Substitute condition monitoring tasks for preventive maintenance actions

Cost Avoidance

Cost avoidance is determined by estimating the total costs that would have been incurred as a result of a failure, but did not occur because of actions taken in advance of the failure. These costs would include such things as repair or replacement costs to the equipment with the failure, repair costs to collateral equipment, and other costs associated with restoring function. Calculations for cost avoidance will usually complete the following statement:

“We could have avoided having to spend _____ dollars had we done _____.”