

An Introduction to Asset Management and Asset Management Resources

I. Introduction

Asset management is defined as maintaining a desired level of service at the lowest life cycle cost. In simple terms, it provides a means of determining the best way to spend your limited dollars to achieve the maximum impact. In these times of “doing more with less,” it’s about “doing less better.” There is no way to achieve everything you want to with a severely reduced budget, but it is possible with Asset Management techniques to achieve the maximum result within the available funding. Asset management provides a framework to make data driven decisions about how to operate, maintain, repair, rehabilitate, and replace assets.

II. Five core components of Asset Management

The five core components of asset management are: current state of the assets, level of service, criticality, life cycle costing, and long term funding. Each of these concepts will be described in more detail below.

- ❖ The current state of the assets inventories all of the physical components of your facility. It is the most straightforward aspect of asset management.
- ❖ The level of service enables you to set goals for the facility regarding what services you want to provide. This component is the most underappreciated part of asset management. Many people feel that goal setting is not important. However, goal setting changes one’s thinking about the facility operation and how the assets are managed.
- ❖ Criticality enables a manager to determine which assets are the most vital to the sustained operation of the facility. The criticality component is the heart and soul of asset management. Understanding criticality allows a manager to make informed decisions about the best way to use the limited financial and personnel resources.
- ❖ Life cycle costing uses the information regarding the first three components – what assets the facility owns, what you want them to do and which ones are critical to the sustained operation to make informed decisions about operation and maintenance and asset replacement. This portion of the process is the most complex, but allows the best use of limited dollars.
- ❖ The final component is the long term funding. In this component, the facility managers must determine how much money they need to operate and maintain the assets and how much they need to replace or rehabilitate the assets over time. They must then determine how to obtain the necessary funding. This component requires communication of information to governing bodies and funding agencies to ensure that decision makers have the best information possible when making funding decisions.

III. Current State of the Assets

The current state of the assets covers the basic questions of:

1. what assets do I own
2. where are they located
3. what condition are they in
4. what are their remaining useful lives, and
5. what are the replacement values.

This step of the process includes completing an inventory of all of the assets in the system. It also involves gathering data about the assets. The data should be of the best quality possible and include information that is important to the facility managers. The information should be kept up to date and any inaccurate information should be revised as soon as the errors are discovered. Each asset should be given a unique ID number. A method of storing the data should be determined. It can include anything from a pen and paper inventory to a generic database or spreadsheet to a commercial product. There are many, many products on the market at all different price ranges that will address whatever the needs of the system are.

One tip when conducting an asset inventory is to take digital pictures of the assets that are visible. It helps in the data collection process and it creates a permanent record of the assets. If you take pictures over time, you can also look at trends in the asset conditions.

IV. Level of Service

The level of service establishes what you want your assets to provide. It outlines the major goals of the utility in order to provide the customers what they want. Goals can be in several different areas, such as water quality, water loss, water conservation, or customer service and should be “SMART” (specific, measurable, attainable, realistic or relevant, and time bound.) For example, “The water utility will provide water at a minimum pressure of 50 psi 95% of the time.” This goal is specific, you know exactly what the utility is trying to do. It is measurable because we could check pressures at various points around the system and see if it met that minimum standard. It is attainable if the facility has the pumping facilities or storage tank elevation to meet that pressure. It is realistic or relevant if this is the level that customers want you to maintain. It is time bound in that we are saying we will meet the level 95% of the time. We are allowing for periods when the system may be undergoing repairs and the pressure may drop below the minimum of 50 psi. The level of service goals can include both external goals (goals you would share with the public or decision-makers) and internal goals (goals that would be shared only within the utility.) Internal goals are items that are specific to operations, such as the ratio of corrective to preventative work orders, and generally not well-understood by the customers. It is important to measure how well you meet the goals periodically (monthly, quarterly, semi-annually, or annually) and to report the results to the public or decision-makers at least annually.

V. Criticality

Not all assets are equally important to the sustained operation of the facility. Some assets are much more critical than others. In order to determine which assets are more critical than others, the following questions are key:

- A. What is the probability of failure of any given asset and
- B. What are the consequences if the asset does fail?

Based on the answers to these two questions it is possible to determine which assets are more important to the operation than others. It is these assets that should be the focus of the utility's resources – money and personnel. The more resources are focused on the highest risk or highest criticality assets, the greater the benefit for the money spent.

VI. Life Cycle Costing

The facility managers must make decisions regarding how they will operate and maintain their assets as well as deciding when to continue to repair an asset versus replacing or rehabilitating it. In general, spending more on O&M (operation and maintenance) means spending less on replacement and vice versa. Since O&M is generally cheaper than asset replacement, it is usually better to perform more O&M and do less replacement. However, managers must balance how much O&M to do and specifically which activities to perform based on the resources available. These choices involve thinking about criticality. More O&M should be practiced on highly critical assets than less critical assets. Similarly, decisions about asset replacement also involve criticality. A highly critical asset may be replaced sooner because of its importance to the operation, while a lower criticality asset may remain in operation longer and continue to be repaired as needed.

VII. Funding

The facility managers must determine how much money is needed for short term operation and long term capital replacement projects. This amount of funding must be communicated to decision-makers and this communication needs to include a communication and understanding of the risk level that exists at different funding levels. The decision-makers can then make an informed decision regarding how much of this funding is going to be made available and the source of the funding.

VIII. Example

An example of how asset management could work in practice is presented below. A utility believes that their pipe infrastructure is getting old and deteriorating and thinks that they will need to replace all of the pipe. The cost of pipe replacement is estimated to be \$8 million dollars which is much more money than the system can afford. Furthermore, there are other priorities in the system that are demanding money. The system knows they need another approach.

1. The first step would be to evaluate the pipe assets. This would include determining the pipe types, sizes, location, and condition. The best way to complete the asset inventory of pipes would be to generate a map of the pipes.
2. The second step would be to determine the level of service for pipe reliability. For example, there might be a level of service goal such as “Pipes will be replaced when the break rate reaches 4 times the average break rate of the system.” With this level of service goal you could determine which pipes are over the break rate, which are close to it, and which are well below.
3. The third step would be to evaluate each pipe segment (pipe segment can be defined by the system) to see which are likely to fail and which will cause a serious consequence if they do fail. When pipes are evaluated on the basis of probability of failure and consequence of failure it is possible to rank the pipes in terms of risk to the system.
4. With this information, it is possible to develop a phased approach to pipe replacement. This phased approach would include which pipe would be replaced each year given the funding available.

So, in this example, the budget may include \$500,000 to spend on pipe replacement. This would allow them to select roughly one mile of the riskiest pipe in the system. By taking this pipe out first, they would leave in the relatively better pieces of pipe. This type of decision-making could allow the system to achieve a benefit that is greater than the money expended.



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Asset Management Resources

AM IQ Evaluation: <http://southwestefc.unm.edu/asset-management/>
AM Manual: <http://southwestefc.unm.edu/amkan/main.php>

For Assistance: Heather Himmelberger
Director, Southwest EFC at UNM
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Asset Inventory Spreadsheet

<http://southwestefc.unm.edu/Tools/AssetInventoryWithRiskCalculations.xlsx>

Level of Service

Level of Service: Guidelines, Categories, and Example Goals - <http://southwestefc.unm.edu/Guides/LOS-GuidelinesCategoriesAndExampleGoals.pdf>

Level of Service: Goal Measurement Table -
<http://southwestefc.unm.edu/Guides/LOSGoalMeaserumentTable.pdf>

Criticality

Risk Analysis Tables and Chart: <http://southwestefc.unm.edu/Guides/CriticalityOfAssets.pdf>

Reference Guide for Asset Management Inventory and Risk Analysis:
<http://southwestefc.unm.edu/Guides/InventoryAndRiskReferenceGuide.pdf>

Asset Management Webinar Series Links

The EFCN conducted a 5 part webinar series on Asset Management during the fall of 2013. Each of these webinars was one hour in length and covered one of the five core components. Recordings of the webinars can be found at the following link: <https://www.youtube.com/channel/UCFHISF8Bx9fxkO3jBUA0vWQ>

Other Resources

O&M Plan (PM Program): <http://www.doh.wa.gov/portals/1/documents/pubs/331-351.pdf>

Inventory Tool:
http://files.dep.state.pa.us/Water/BNPNSM/InfrastructureFinance/FiscalSustainabilityPlans/Asset_Mgmt_Spreadsheet_WW_071415.xls