

Asset Management for Wastewater Utilities



Module 5

Maintenance Management Development

At the conclusion of this module, the participant will be able to:

- List steps to develop a Maintenance Management System
- Discuss methods and procedures of an effective Maintenance Management System
- Explain the following terms:
 - Reactive maintenance
 - Planned maintenance
 - Predictive maintenance

Asset Management Steps

1. Identify dedicated AM team and Mission Statement, Goals, and Objectives
2. Asset Inventory
3. Criticality
4. Condition and Valuation
- 5. Maintenance Management**
6. Renewal / Replacement
7. Financial Plan



MAINTENANCE MANAGEMENT

What is Maintenance Management?

- Maintenance management is a method where the assets are maintained at a level that minimizes operating cost while delivering the desired service of the asset throughout its life cycle

Benefits

- Asset performance is optimized
- Minimize costs from unplanned maintenance
- Reduced service disruptions from asset failure
- Better budgeting for asset maintenance activities

Develop and Implement Maintenance Management System

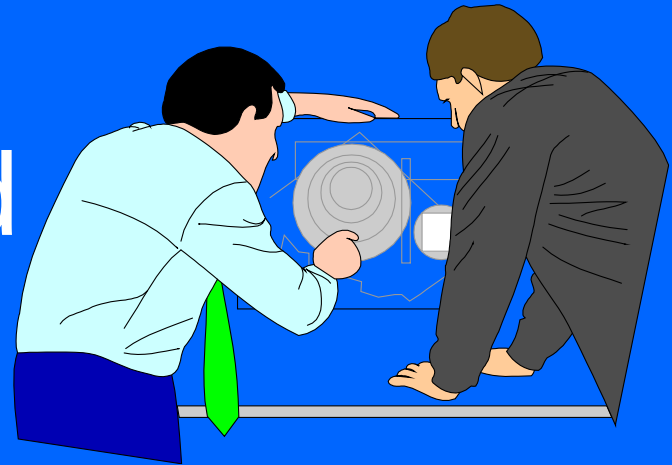
- Develop a priority asset list and costs
- Obtain financing and resources
- Implement the maintenance program

Two General Types of Maintenance

- Reactive



- Planned



Reactive Maintenance

- Work performed *after* a breakdown. Two types:
 - Emergency
 - Non-emergency
- Unplanned
- Expensive



Planned Maintenance

Maintenance work that is scheduled by calendar time, run time, or demand.

There are two types

- Preventive Maintenance
- Predictive Maintenance



Preventive Maintenance

- Performed on a regular basis to prolong asset life:
 - Includes:
 - Inspection
 - Adjustment
 - Lubrication
 - Cleaning
 - Minor parts replacement

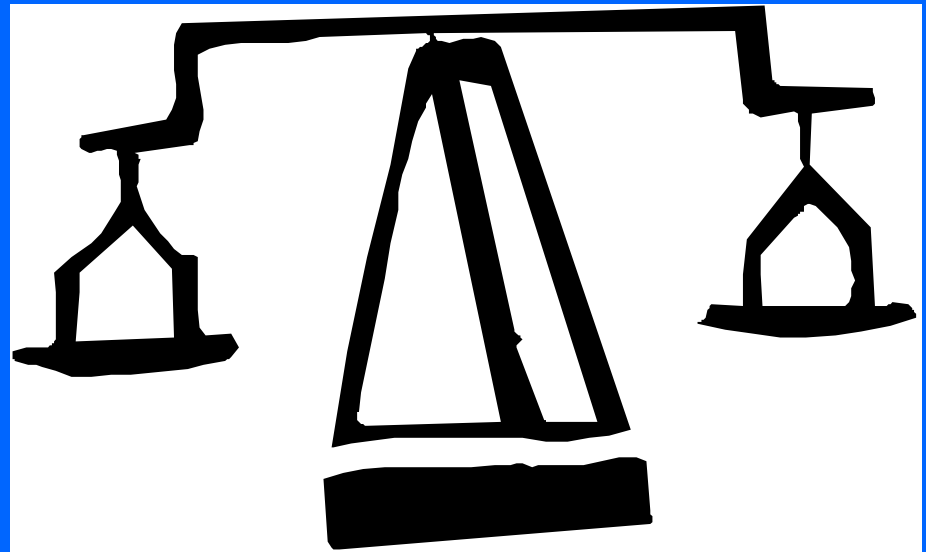


Predictive Maintenance

- Monitoring and analyzing asset condition to anticipate failures
- Delay or prevent failure
- Reduces operating costs
- Emergency repairs
- Provides data on effectiveness of preventive maintenance program

Ideal Maintenance Balance

- Generally accepted to be about
- 75% Planned
- 25% Reactive or Unplanned



Maintenance Management System Characteristics

- Planned
- Labor and parts needs are determined in advance
- Activities are generated through routine work orders
- Parts and materials are stocked or scheduled for just-in-time delivery

Maintenance Management System Goals

- Maximize asset life and reliability
- Minimize asset failure
- Increase asset efficiency
- Increase labor efficiency

Building a Maintenance Management System

- Identify and label all assets
- Determine what to include in program – Criticality analysis
- Define activities & schedules
- Build a master schedule of activities
- Establish performance indicators

Maintenance Management System Activities Preventive Maintenance

- Activities and Frequencies
 - Manufacturer Recommendations
 - Historical data
 - Breakdown analysis
 - Staff experience
- Determine material and labor requirements

Maintenance Management System Activities Predictive Maintenance

- Determine testing methods
- Determine whether internal or external forces are needed
- Determine labor and funding requirements

Work Scheduling

- Determine workload requirements
- All activities are generated by work orders
 - Labor hours are documented and compared to estimates
- Establish backlog management
 - Fine tune frequencies and need

Performance Indicators

- Proper indicators...
 - Measure what's important
 - Easily understood
 - Measured over time
 - Have established goals
 - Are limited in number
 - Based on easily obtained data



Maintenance Management Systems

- Optimize resources
- Provide data on the state of the system
- Establish labor requirements
- Assist determining rehabilitation and replacement decisions

Summary

Questions