Asset Management - A Simple Approach

Douglas Stewart, PE

Who am I?

Doug Stewart, PE
- Principal Consultant, Director of Asset Management Services – K/J;
- former Asset Management Program Director, Orange County Sanitation District;
- 32 years engineering experience, 10 years utility management;
- BSCE, MSCE.

Agenda

- AM Intro/Background
- What is Asset Management?
- Investment Decision and Implementation Framework
- Creating an Asset Management Plan
- So where do I start?
- Questions?
What is Advanced Asset Management?

A Paradigm Shift

- Engineering (building and operating assets) meets management science (managing assets):
  - Extending asset life while achieving acceptable reliability
  - Optimizing renewal/replacement decisions
  - Developing accurate long term funding forecasts

It’s a business model for managing infrastructure DECISIONS
The Definition of Advanced AM

Advanced Asset Management ("AAM") is
- a management paradigm and a body of management practices
- that is applied to the entire portfolio of infrastructure assets at all levels of the organization
- that seeks to minimize the total cost of acquiring, operating, maintaining and renewing the assets
- within an environment of limited resources
- while continuously delivering the service levels customers desire and regulators require
- at an acceptable level of business risk to the organization

What do we really manage?

Assets Exist only to Provide a Service to Customers

Customer Expectations  Sustainable Cost of Service  Level of Service  Business Risk Exposure

Future Funding Needs Analysis
Investment Decision & Implementation Framework

Investment Decision Making Process

Life Cycle Asset Management
Organizational Asset Management

Creating an Asset Management Plan

Investment Decision Making Process
What do we own?

![Diagram showing a hierarchy of assets: Portfolio, Grand Parent Asset, Parent Asset, Child Asset, and another Child Asset.]

Investment Decision Making Process

- Current State of our Assets?
- Required Sustained Level of Service?
- Which Assets are Critical to Sustained Performance?

- Development of Asset Register
- Failure Modes: Capacity, Level of Service, Mortality
- Determination of Remaining Useful Lives
- Collection of Historic and Current Replacement Costs
- Setting Current & Future Levels of Service

- Establish Risk Ratings
- Develop Maintenance & Operations Plans
- Develop CIP Program
- Future Funding Strategy
- Build the AMP

The Four Strategic Failure Modes

<table>
<thead>
<tr>
<th>Mode</th>
<th>Definition</th>
<th>Tactical Aspects</th>
<th>Management Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Capacity</td>
<td>Required capacity exceeds design capacity</td>
<td>Growth, system expansion</td>
<td>Redesign</td>
</tr>
<tr>
<td>2. LOS</td>
<td>Functional requirements exceed design capability</td>
<td>Permit compliance</td>
<td>Redesign</td>
</tr>
<tr>
<td>3. Mortality</td>
<td>Physical consumption of asset reduces performance below an acceptable minimum level</td>
<td>Physical deterioration from age, usage, acts of nature</td>
<td>O&amp;M, Renewal</td>
</tr>
<tr>
<td>4. Efficiency</td>
<td>Performs ok, but cost of operation exceeds that of feasible alternatives</td>
<td>“Pay-back” period</td>
<td>Replace</td>
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Investment Decision Making Process

Current State of our Assets?  
Required Sustained Level of Service?  
Which Assets are Critical to Sustained Performance?

Management Strategies for the Assets
Best Long-Term Funding Strategy

- Develop Asset Register
- Failure Modes: Capacity, Physical Integrity, Level of Service, Economic
- Determine Remaining Useful Lives
- Collect Historic and Current Replacement Cost
- Set Current & Future Levels of Service
- Establish Risk Ratings
- Develop Maintenance & Operations Plans
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Condition of the assets

<table>
<thead>
<tr>
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<th>Age</th>
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<tbody>
<tr>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>75</td>
<td>X</td>
</tr>
<tr>
<td>50</td>
<td>X</td>
</tr>
<tr>
<td>25</td>
<td>X</td>
</tr>
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<td>0</td>
<td></td>
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Determining Remaining Useful Life

- Current Condition
- Serviceable
- Unsatisfactory
- Remaining Service Life
- Threshold Value
- Time (years)

Courtesy: USEPA

Kennedy/Jenks Consultants  
Engineers and Scientists
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Establish Risk Ratings  
Develop Maintenance & Operations Plans  
Develop CIP Program  
Future Funding Strategy  
Build the AMP

Life-Cycle Costs

Cumulative Costs Over Asset Life

Costs

Create
Operate & Maintain
Renew

% Effective Life

Creating
Disposal and Replacement

Curney/Jenks Consultants  
Engineers and Scientists

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Courtesy: USEPA
Levels of Service

Investment Decision Making Process

Risk Mapping
### Then What?

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<tr>
<td>Med High</td>
<td>&gt; Assess Condition at Regular Intervals</td>
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<td>&gt; Rehab/Repair if Required</td>
</tr>
<tr>
<td>Med Low</td>
<td>&gt; Assess Condition at Extended Intervals</td>
</tr>
<tr>
<td>Low</td>
<td>&gt; Monitor &amp; Assess</td>
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**BRE Management Strategy**

- **High**
  - Develop Risk Mitigation Strategy
  - Assess Condition at Short Intervals
  - Rehab/Repair
- **Med High**
  - Assess Condition at Regular Intervals
  - Rehab/Repair if Required
- **Med Low**
  - Assess Condition at Extended Intervals
- **Low**
  - Monitor & Assess

### Investment Decision Making Process

**Current State of our Assets?**
- Required Sustained Level Of Service?
- Which Assets are Critical to Sustained Performance?

**Management Strategies for the Assets**
- Best Long-Term funding strategy

1. **Develop Asset Register**
2. **Failure Modes:** Capacity, Level of Service, Economic
3. **Determine Remaining Useful Lives**
4. **Collect Historic and Current Replacement Cost**
5. **Set Current & Future Levels of Service**
6. **Establish Risk Ratings**
7. **Develop Maintenance & Operations Plans**
8. **Develop CIP Program**
9. **Future Funding Strategy**
10. **Build the AMP**

### Choosing the Optimal Management Strategy

**Condition vs. Economic Life**

- **Do Nothing**
- **Maintenance/Repair**
- **Rehabilitation**
- **Replace**

**Optimization Curve**

- Optimize 1 Replacement
- Optimize 2 Replacement
CIP Development Process Steps

Determining optimized maintenance tactics

Investment Decision Making Process
Future Funding Needs Analysis

Asset Management Plan Structure

The Enterprise Asset Management Plan
Sample AMP Contents

So where Do I Start?

Organizational Asset Management
Our Approach to Asset Management

We have a staff of ex-Utility managers that have knowledge on both the process and cultural side of implementation
- Teaching and Guidance of Staff
- Understandable Implementation Practices
- Change Management Practices
- Partner your staff asset knowledge with our process expertise
- Pilot Projects – prove it works.

Asset Management is a journey; getting there is half the fun!

Questions?