OPTIMIZING DECISION MAKING – FACILITY LIFE CYCLE CONSIDERATIONS

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2019 Project Management Symposium
“... an organized effort directed at analyzing the functions of systems, equipment, facilities, services, and supplies for the purpose of achieving the essential functions at the lowest life cycle cost consistent with the required performance, reliability, quality, and safety.”

Source: Office of Management and Budget

*Facility Management Bias
Framing the Issue – Portfolio Asset Management

- Real estate and facilities are among the top four expense categories.
- Initial cost is only 10% to 13% of the life cycle cost of the facility.
- Initial design input has dramatic and incalculably large cost savings over the life of a facility and portfolio.
Asset Management (Creation)

- Planning and budgeting pipeline
- Immediate need
- Separate funding streams
- Restrictions on bond funds
Facility Optimization

• Maintainers and Operators participate in design reviews and equipment selection (Stockham™ syndrome).

• Operations and Maintenance software considered during design

• VE workshops or interactive sessions held during design phases
Operations and Maintenance

• Operations and engineering design standards
• Service contractor considerations
• Training
  — IFMA
  — APPA
Operations and Maintenance Software

- BIM value beyond commissioning
- Asset management including inventory and GIS
- Reliability Centered Maintenance
Value Engineering  Facility Optimization

• Typically done after schematic design or 35% (late)
• Assist designer earlier in the process (ROI)
• Support the balance of requirements, future needs, sustainability, O&M and design excellence
Optimization Beyond Creation

Example 1. A three-phase circuit feeding a 125 H.P. 460 V motor, operating at 75% load, 250 ft. from the load center, running 8,000 hours per year. Draw is assumed to be 75% of 156 full-load amps (FLA).

<table>
<thead>
<tr>
<th></th>
<th>3/0 wire</th>
<th>4/0 wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduit Size</td>
<td>2 in.</td>
<td>2 in.</td>
</tr>
<tr>
<td>Estimated Loss (at 75% load and 44°C and 40°C, respective conductor temps.)</td>
<td>708 W</td>
<td>554 W</td>
</tr>
<tr>
<td>Wire Cost</td>
<td>$991</td>
<td>$1232</td>
</tr>
<tr>
<td>Conduit Cost</td>
<td>$365</td>
<td>$365</td>
</tr>
<tr>
<td>Incremental Cost</td>
<td>$241</td>
<td></td>
</tr>
<tr>
<td>Energy Savings: at 75% load</td>
<td>1,237 kWh/year</td>
<td></td>
</tr>
<tr>
<td>Dollar Savings: at $0.07 per kWh Payback</td>
<td>$86.59/year 2 years, 9 months</td>
<td></td>
</tr>
<tr>
<td>Dollar Savings: at $0.10 per kWh Payback</td>
<td>$123.70/year 1 year, 11 months</td>
<td></td>
</tr>
</tbody>
</table>

In this example, the payback is under 3 years, and the savings continue indefinitely into the future.
Balancing Value and Desirability

**ORIGINAL DESIGN:** The current design includes linoleum flooring in the science laboratory and prep room spaces.

**PROPOSED CHANGE:** It is proposed to utilize stained/polished concrete floors in the science labs and science prep rooms in lieu of the linoleum flooring.

**JUSTIFICATION:** The polished/stained concrete floors are a more durable finish and would appear to be a more appropriate flooring for the laboratory spaces.

**ADVANTAGES:**
- Reduces construction costs
- Reduces life cycle costs of future replacement
- Concrete is easier to clean

**DISADVANTAGES:**
- Concrete will have differences in appearance
- Some hairline cracks may be visible

<table>
<thead>
<tr>
<th></th>
<th>INITIAL COST</th>
<th>OPERATING COST</th>
<th>TOTAL LIFE-CYCLE COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORIGINAL DESIGN</td>
<td>$171,648</td>
<td>$</td>
<td>$171,648</td>
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<tr>
<td>PROPOSED CHANGE</td>
<td>$72,000</td>
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<tr>
<td>SAVINGS</td>
<td>$99,648</td>
<td>$</td>
<td>$99,648</td>
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</tbody>
</table>

MBP
Optimizing Decisions for Portfolios

- Develop Clear and updated design guides and standards
- Involve O&M staff and IT in the design process
- Create portfolio level value engineering initiatives for educational clients
- Address contractual reality (LPTA or DBB...)
- Allow for creativity where possible
Questions?