**UW Facilities Engineering Services: System Development and Process Improvement**

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### Background

Engineering Services (ES) is a team of engineers, architects, and records staff that is responsible for all UW community operations, maintenance, and other engineering supports.

**Maintenance | Engineering | Construction**

### Problem Overview

* Engineering Services Initial Internal Flowchart

- Current State
  - Lack of integration and definition
  - No departmental work performance measures
- Opportunities
  - Implement accurate work performance feedback system
  - Implement Six Sigma concepts
  - Lack of standardized processes
  - Work orders (WOs) are done intuitively based on experience
  - Inconsistent use of status change on AIM

**GOAL STATEMENT**

To maximize ES value to the UW community by providing more effective services through data-driven decision-making, process standardization, and work performance review.

**Deliverables**

- Prioritized List Generator
- Engineering Services Process Standard Operating Procedures & Manuals
- Work Order Process

**Constraints**

- Work dependency on other UW departments
- Limited access to work order database (AIM)
- Variability in ES work orders due to different timelines: maintenance, engineering, and construction

**ES Staff Survey Response**

“It’s unclear how to prioritize internal projects against client work orders, especially when some of these work orders have been in process for longer than 60 days.” - ES Staff (2020)

“It feels somewhat disjointed at times, I would like to see it become more cohesive.” - ES Staff (2020)

### System Creation

**Requirements**

Our system shall provide...

**Work Order Categorization & Prioritization**

- **ES Work Order Risk Level**
  - High (Environmental, Health & Safety risks OR Project with ≤ 1 week deadline): 0.670
  - Moderate (Regulatory risks OR Project with 2-4 weeks deadline): 0.330
  - Low (Risk OR Projects with no specified deadline OR > 4 weeks deadline): 0.294

**Prioritized List Generator (PLG):**

- Produces prioritized list of WOs that promotes timely completion of work orders and better task overview
- A work order priority score is weighted based on risk level (67%) and time opened (33%)
- WOs will be sorted from highest to lowest priority score
- Open and Active WOs that have reached assessment time (Table 1) would be highlighted on the prioritized list (Table 2) to gain stakeholders attention and prompt the progress of the WOs

**Standard Procedures & Definitions**

- **ES AIM Operational Definition**
  - Open - Work order received may/may not be assigned; work execution has not begun.
  - Active - Work order is assigned to staff and work execution has begun for completion or rework.
  - Work Complete - All tasks required for a work order are completed. No status transitions are permitted once the work order is completed EXCEPT rework.

**Performance Review**

- Produces quarterly and annual reports on PPT based on:
  - Order category (maintenance/engineering/construction)
  - ES departments (e.g., electrical/mechanical)
  - Helps managers identify areas of improvement
  - Allows for assessment of ES departmental performance

**Continuous Improvement Plan**

- Define the problem and improvement opportunities (e.g., Work order facilitation, long work order completion time)
- Implement improvement measures (e.g., Prioritize WOs, report generation)

**Impact Analysis**

**Engineering Services Improved Internal Flowchart**

**Table 1: Example of prioritized list (Yellow indicates WOs that have reached assessment time; Blue indicates WOs that have not reached assessment time)**

<table>
<thead>
<tr>
<th>Work Order Category</th>
<th>Assessment Time</th>
<th>Expected Completion Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>30 Days</td>
<td>90 Days</td>
</tr>
<tr>
<td>Construction</td>
<td>60 Days</td>
<td>270 Days</td>
</tr>
<tr>
<td>Engineering</td>
<td>60 Days</td>
<td>270 Days</td>
</tr>
</tbody>
</table>

**Figure 3: Example of generated chart on annual performance report**

- Annual completion time for Maintenance WOs

**Table 3: Expected impacts by WO category**

<table>
<thead>
<tr>
<th>Work Order Category</th>
<th>Est. Reduction in Completion Time vs. 2019 Avg. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>57</td>
</tr>
<tr>
<td>Construction</td>
<td>46</td>
</tr>
<tr>
<td>Engineering</td>
<td>133</td>
</tr>
</tbody>
</table>

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