

CASE STUDY

RCM Study Optimizes Preventative Maintenance Strategy and Leads to 27% Reduction in Planned Labor Hours

The San Francisco Public Utilities Commission (SFPUC) is a public agency of the City and County of San Francisco that provides water, wastewater, and electric power services to the city and an additional 1.9 million customers within three San Francisco Bay Area counties.

SFPUC Wastewater Enterprise (WWE) is undergoing major renovations in the coming years. In preparation for the renovations, one of two existing headworks facilities (SEP 011) will be substantially demolished, requiring a higher level of reliability and availability of the remaining headworks facility (SEP 012). WWE requested a reliability study of the facility that will remain, to identify required mitigations (maintenance, replacements, redesigns, etc.) to ensure the required reliability.

CHALLENGES

Built in 1952 and subsequently upgraded in 1982 and again in 1996, the Southeast Water Pollution Control Plant (SEP) treats 80% of the City's wastewater, but many of the SEP's aging facilities are beyond their useful lives and need to be upgraded and modernized.

The first step in the wastewater treatment process occurs at a headworks facility. A headworks facility is used to provide pretreatment, removing debris (such as paper towels and wipes) and grit (like sand) from the wastewater stream. This process is critical to protect downstream equipment, help control odors, and ensure that the SEP can operate efficiently. The >35-year-old headworks facility (SEP 011) is beyond its useful life and is unable to adequately perform these functions.

The SSIP Headworks Project (Project) will construct a modern headworks facility (SEP 020 – Headworks), with associated odor control structure (SEP 017), as well as modify the city's existing Bruce Flynn Pump Station.

SUMMARY

Challenge: Ensure the reliability for remaining headworks facility (SEP 012) and identify required mitigations.

Approach

Preparation: Identified stakeholders and collected and reviewed data.

RCM Workshops: Conducted multiple RCM workshops to identify failure modes and consequences.

Gap Analysis: Identified gaps between asset care strategy and current PMs; updated PMs accordingly.

Results

- \$54,000 in labor cost savings
- 27% reduction in labor hours
- 34% reduction in PMs

The Project will provide the following benefits:

- Continue to protect public health and the environment.
- Minimize odors using advanced odor control equipment.
- Meet current seismic standards to better protect the facilities against damage due to earthquakes.
- Improve operational reliability and flexibility.
- Increase efficiency of treatment processes and protect downstream equipment.
- Achieve the adopted Level of Service goals for wastewater treatment under the Sewer System Improvement Program (SSIP).

APPROACH: RCM FACILITATION AND IMPLEMENTATION

MaxGrip was contracted to conduct a reliability centered maintenance (RCM) study to identify the required mitigations to ensure reliability of the remaining headworks facility (SEP 012 – New Headworks). Since completion of the SSIP Headworks Project is estimated to be 2024, SEP 012 will have to operate as the only headworks facility for SEP between 2019 and 2024.

The goals of the RCM study were to identify the required mitigations to ensure reliability of SEP 012, while SEP 020 is being constructed. The scope of the RCM study not only included RCM facilitation and mitigation reports but also implementation.

Preparation

To ensure an effective RCM study and minimize the impact to the SFPUC WWE organization, thorough preparation was required. As part of the preparation, all stakeholders and participants were identified, expectations were communicated, and workshops were planned. Drawings, manuals, and Maximo data pertaining to the scope of the RCM study were also collected and reviewed.

RCM Workshops

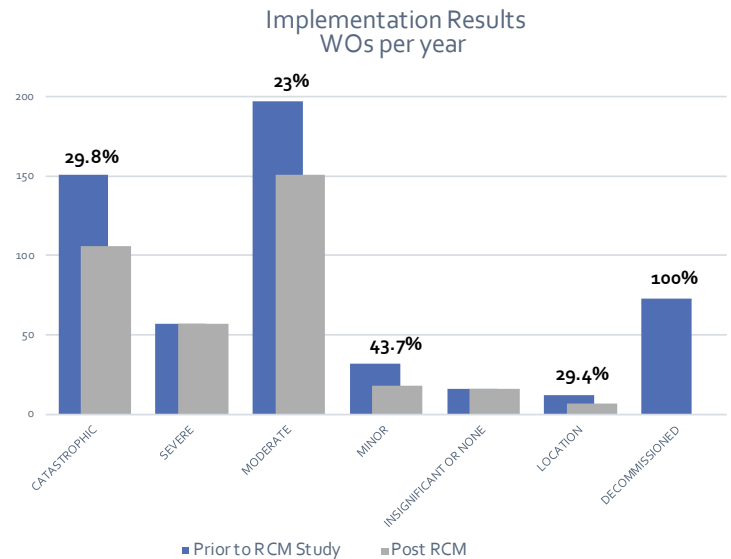
MaxGrip performed five weeks of RCM workshops with various stakeholders. During these workshops, asset functional failures were determined, as well as their subsequent consequences. Additionally, failure modes were reviewed, and risk analyses were conducted to finalize mitigation action plans.

Processing and Gap Analysis

During and after the workshops, RCM data were processed (copied, quality checked, reviewed, etc.). To ensure the strategy will be executed in the field, the gaps between the asset care strategy and current PMs in Maximo were identified and changes made accordingly.

Scope of RCM implementation included:

- Optimized preventive maintenance (PM) strategy based on RCM structured results
- Improved Job Plans
 - Job Plan Duration provides valuable insight into Labor demand and equipment downtime
 - Expanded Job Plan tasks to support the PM work order as well as reflect the captured work execution knowledge
- Identified single action and mitigation recommendations to increase asset reliability



RESULTS: OPTIMIZED PMS AND REDUCED PLANNED LABOR HOURS

As a result of the RCM study, MaxGrip identified gaps and opportunities to increase reliability. 349 assets were reviewed under the risk analyses – reviewing their failure modes, ranking their failure criticality, and finalizing mitigating actions. Thirty-five single action and mitigation recommendations resulted from the RCM study, and analysis of Job Plan durations provided valuable insight into labor demand and equipment downtime.

Additionally, an optimized preventative maintenance (PM) strategy led to a reduction in PMs by 34 percent. Implementing this maintenance strategy resulted in a 27 percent reduction in labor hours and a yearly savings of \$54,000.

	Prior to Implementation	After Implementation	Percent Improvement
Labor Hours	4081	2956	27.5%
Labor Cost	\$209k	\$155k	26%

\$54,000

in labor cost savings

27%

reduction in labor hours

34%

reduction in PMs

ABOUT MAXGRIP

MaxGrip consultants enable organizations in asset-intensive industries to achieve continuous improvements on their asset performance, also using the power of Digital Transformation. MaxGrip embraces APM 4.0 with a maintenance track record of over twenty years in industries like Oil & Gas, Food & Beverages and Utilities & Infrastructure. We operate on all continents and have a global presence with our main offices in the Netherlands (HQ), USA, Malaysia, and, Australia.

WOULD YOU LIKE TO KNOW MORE?



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