

King County Wastewater Treatment Division
Available Metrics for Maintenance

ANNUAL METRICS

Maintenance

Metric	World Class	Comments
Maintenance Cost (CEB)/Replacement Asset Value (RAV)	1.5 – 2.0%	DITP at 1.4%, RAV = 1 billion, CEB Maintenance Budget 14.2 million
RAV/Mechanic	\$ 8-9 MM	This metric is to drive the appropriate number of maintenance staff based upon plant asset value
Craftspeople/first line supervisor	15-25	This metric is to drive the appropriate number of craftspeople per supervisor
Craft Personnel/Planner	18-25	This metric is for reporting yearly to trend over time
Percentage of Overtime	5-8%	This metric is to control overtime use
Minor Maintenance by Operations	20-30%	This metric is used to increase minor maintenance by Operations staff
Training Dollars as % of Maintenance Budget	5 %	This metric is to ensure adequate training is provided for maintenance staff
# Maintenance FTEs		This metric is to track reduction of FTE's to meet competitiveness study goals
Total Maintenance Cost		This metric is to track efficiency gains in maintenance spending

Stores

Metric	World Class	Comments
MRO Inventory Turns	> 2-3 turns/year (> 1.5 turn)	This metric is to ensure overstocking does not occur.
Stores Value/RAV	0.25-0.5 %	This is a target for the value of spares that should be retained. DITP is at 0.8%.
Store Value/Store Employee	\$ 1-1.5 M	This is a guideline for appropriate staffing levels.
Inventory Accuracy	99 %	This is to ensure that all spares are identified appropriately.

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Maintenance

Metric	World Class	Comments
Preventive Maintenance Work Orders	> 20 %	Metrics are to make a shift to proactive maintenance
Proactive Maintenance	> 20 %	
Predictive Maintenance	> 50 % (80% of equipment)	
Reactive Work Orders	< 10 %	
Emergency Work Orders	< 5%	

Preventive Maintenance (PM) – Maintenance performed to prevent failures of equipment
 Proactive Maintenance (PR) – Maintenance that is completed to prevent failures. This could be projects or as a result of a predictive maintenance work order
 Predictive Maintenance (Pdm) – Maintenance performed to determine/trend the health of assets and predict when maintenance should be performed
 Reactive Work Orders (RE) – Work that is performed that is not scheduled and requires an immediate repair by maintenance
 Emergency Work Orders (E) – A subset of reactive maintenance that includes work that jeopardizes health, safety, or the process meeting regulatory requirements.

Wrench Time	> 65 %	Wrench time is defined as time a technician actually works on equipment and does not include travel time or waiting for parts
Rework	< 2 – 5%	Rework is defined as completing a work order, then testing and finding work needs to be redone.
Equipment Availability	> 97 %	Plant equipment availability as determined by minimum number of equipment to meet design requirements.
Preventable Work	< 10%	Work that could have been prevented and was caused either by an operational, maintenance, management, or design error.
% PM Completed	100 %	Goal is that all PMs are completed.
Estimated Backlog in Crew Weeks	5-7 weeks	Backlog is determined by the outstanding work orders and estimated hours divided by the number of craft.
Work Order Cost/Area or Asset Group		This trend could help in defining area/asset groups with the most expenditures

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Maintenance (continued)

Work Order parts cost/work order type (PM, Pdm, Reactive, Emergency, Proactive)		This indicator should show a decline in PM costs over the time the RCM program is implemented.
Labor Cost by Area or Asset Group		This trend helps in defining where the most labor is used
Average Hours/work order		This is to trend if the average time to complete work orders changes over time to track craft productivity.
Labor Hours by Asset Group and Performing Department		This trend shows where each department hours are expended
Work Order Age 0-30 days 31-60 days 61-90 days 91+ days		These metrics are useful in eliminating old work orders.

Work Coordination/Planning

Metric	World Class	Comments
Schedule Attainment/week	> 75 %	This metric is to check how many work orders out of the total population were not completed as part of the work plan.
Planned hours worked/total hours worked	> 90 – 95 %	This metric is to track the percentage of hours that were expended that were not part of the week work plan.
Job Estimating Accuracy	90 %	This is to validate the hours estimated by the planners for each work order.

MONTHLY (continued)

Stores

Metric	World Class	Comments
MRO Inventory Turns	> 2-3 turns/year (> 1.5 turn)	This is to ensure that inventory is not overstocked
Material "Stock outs"	< 1-2 %	Stock out is when an item is not available in the warehouse due to stock not being reordered.
Line Items Processed per Employee/Hour	10-12	This is an efficiency measure for employees.
Stores Disbursements/Store Employee	\$ 1.5-2.0 M	This is an efficiency measure for employees.
RFM prepared date to PO issued time		This metric will track procurement efficiency.

RCM Metrics

Metric	World Class	Comments
OEM PMs vs RCM PMs cost	N/A	This is to show the change from the original PM hours to the RCM PM hours (labor and materials)
OEM CM vs. RCM CMs cost	N/A	It is expected that the effect of an RCM analysis will be a decrease in the amount of corrective and emergency maintenance (labor and materials)