

PREVENTIVE MAINTENANCE AND FACILITY MANAGEMENT

An Introduction to Facility Management Strategies for
Alaskan Schools



Presented By
Mike Gaede
Building Management Specialist

Discussion Topics

- **Overview of school maintenance programs**
- The critical role of preventive maintenance
- The work order process – 2 examples
- The importance of communication and community involvement
- PM and facility management requirements for CIP eligibility – 6 elements





Maintenance = Extended Facility Life



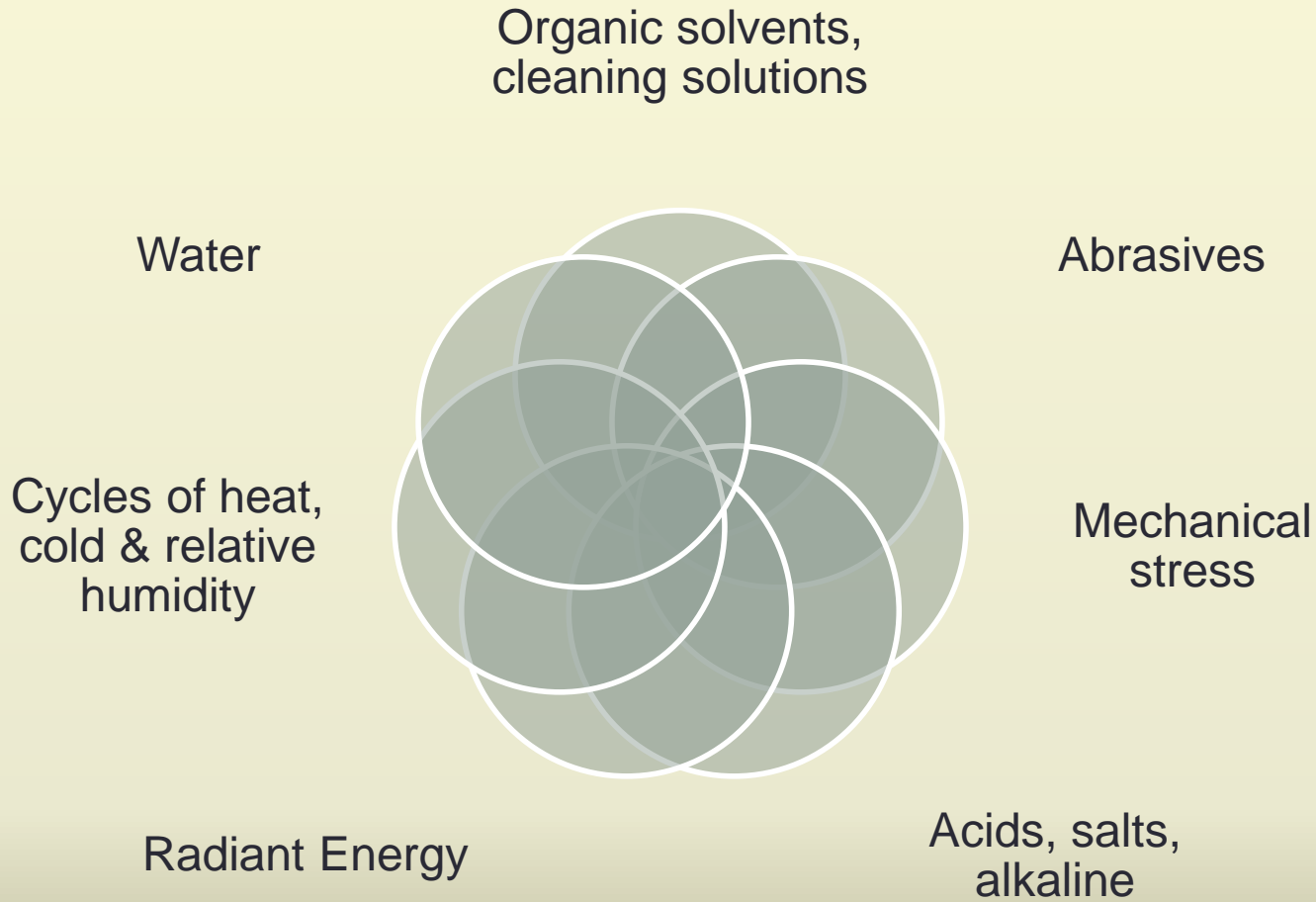
School building materials, wear factors, and maintenance requirements.



- *Average Age of School Facilities in Alaska = 20+ Years.*
- *Proper maintenance yields a long life span. Lack of care brings premature failure*



Deterioration of School Facilities – Contributing Elements



Maintenance vs. Learning Environment

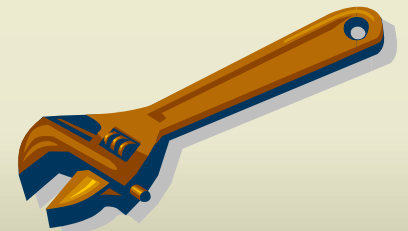


Appropriate scheduling of maintenance activities is critical



Maintenance Categories

- General Maintenance
- Grounds Maintenance
- Preventive Maintenance
- Emergency Repair
- Vandalism
- Vehicle Maintenance



Discussion Topics

- Overview of school maintenance programs
- **The critical role of preventive maintenance**
- The work order process – 2 examples
- The importance of communication and community involvement
- PM and facility management requirements for CIP eligibility – 6 elements



Preventive Maintenance

Preservation through a cyclical process of inspections



“to ensure the school operates at proper efficiency without interruption”

The Benefits of Preventive Maintenance

- Provides for extended life of the building and grounds.
- Provides a healthy learning environment for students.
- Increases the productivity of faculty, administrators, students, and maintenance personnel.
- Aesthetic qualities of the building and grounds are improved and maintained.
- Timely identification of building degradation that may otherwise be unnoticed.
- Maintains compliance with current codes and standards.
- Achieves reductions in energy consumption.

PM vs. Other Types of Maintenance

- **Predictive Maintenance**

Anticipate failure through vibration, ultrasonic, infrared detection

- **Corrective Maintenance**

Planned replacement of worn parts – based on PM inspections

- **Repair Maintenance**

Maintenance work that requires immediate action



Common PM Tasks

- Cleaning
- Painting
- Lubricating
- Replacing Worn Parts
- Lighting Replacement and Repair



Objective: to keep materials and components maintained at an optimal level of performance

Prioritizing PM Procedures

- Life Safety
- Overall Safety
- Regulatory Requirements
- Known Requirements
- Equipment Life Cycle
- Energy Efficiency



Contracting Outside Professionals

Licensed Professionals Required:

- Elevators
- Alarm Systems
- Fire Systems
- Pest Control Systems
- Fire Extinguisher Certification



Successful PM Protocol - Training

- Establish routine training sessions
- Collect and provide up-to-date training materials



- On the job training \implies Perfect skills under supervision
 - New equipment \implies Vendor service training

PM Protocol – Record Keeping

“Essential for understanding the potential of equipment failure and preventing future problems”

- Work logs
- Work orders
- Inspection checklists
- Equipment maintenance logs
- Equipment manuals and warranties
- Computerized maintenance management software (CMMS)

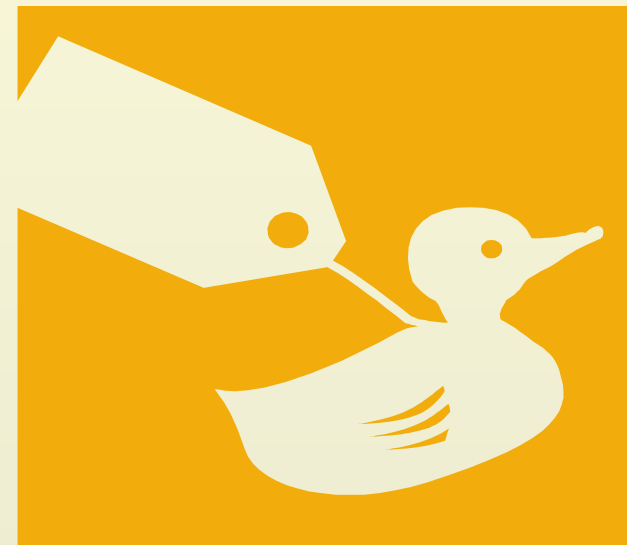


PM Protocol

Equipment Records & Tagging

Equipment Record Details:

- Location / Building
- Room number
- Equipment name / tag #
- Description of equipment defect
- Description of the PM or repair task to be performed
- Estimated work hours need to complete the PM task
- Task assignment
- Cost
- Date



Discussion Topics

- Overview of school maintenance programs
- The critical role of preventive maintenance
- **The work order process – 2 examples**
- The importance of communication and community involvement
- PM and facility management requirements for CIP eligibility – 6 elements

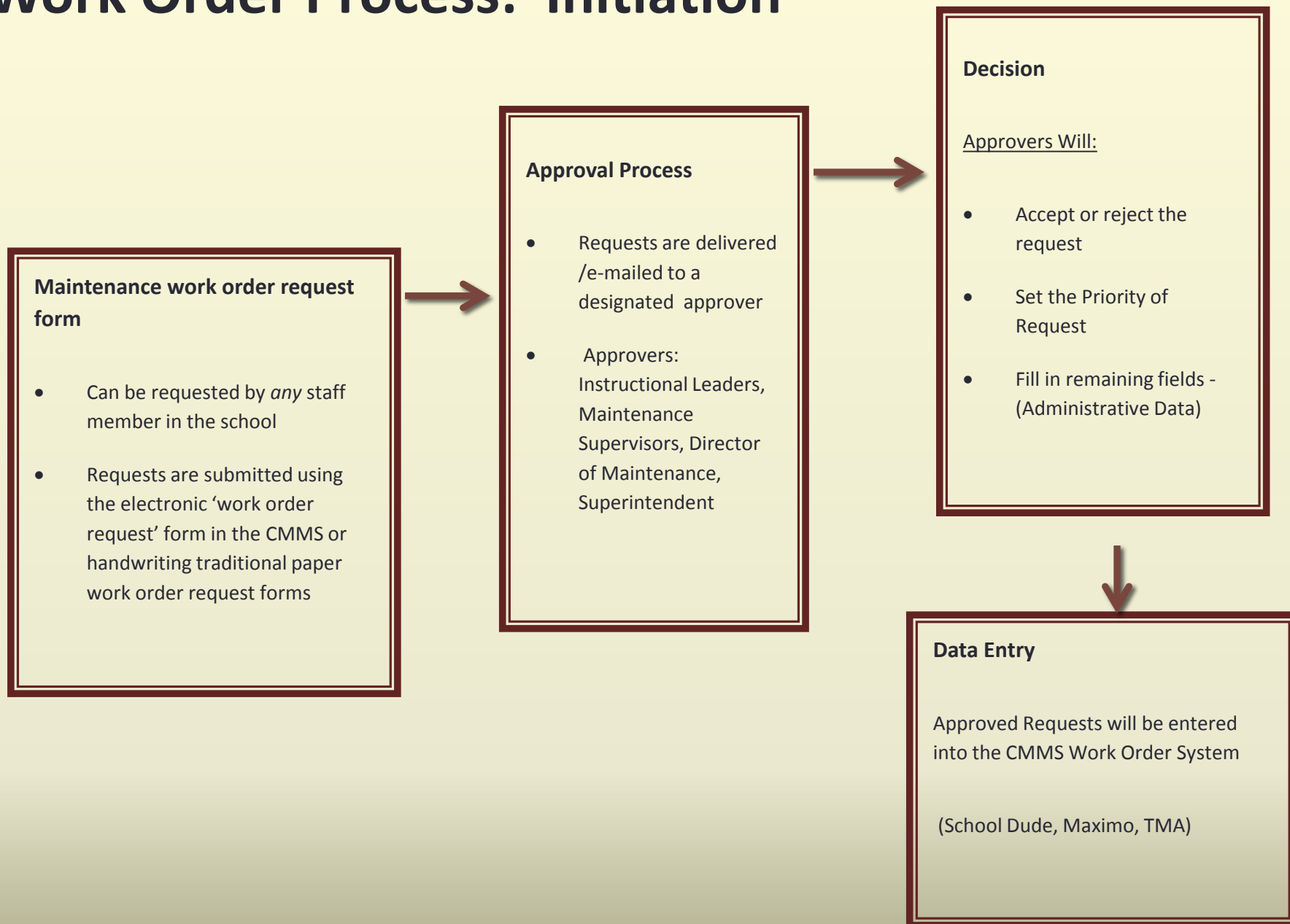




MAINTENANCE WORK ORDERS

The 'How To' guide for getting things fixed

Work Order Process: Initiation



Work Order Process: Action & Completion

Work Order

- Produced by the CMMS
- Delivered to the Maintenance Dept. (electronic or paper)
- Estimated start date
- Estimated completion date
- Prioritized
 1. Emergency
 2. Life/ Safety
 3. PM
 4. Corrective or seasonal maintenance

Deferred

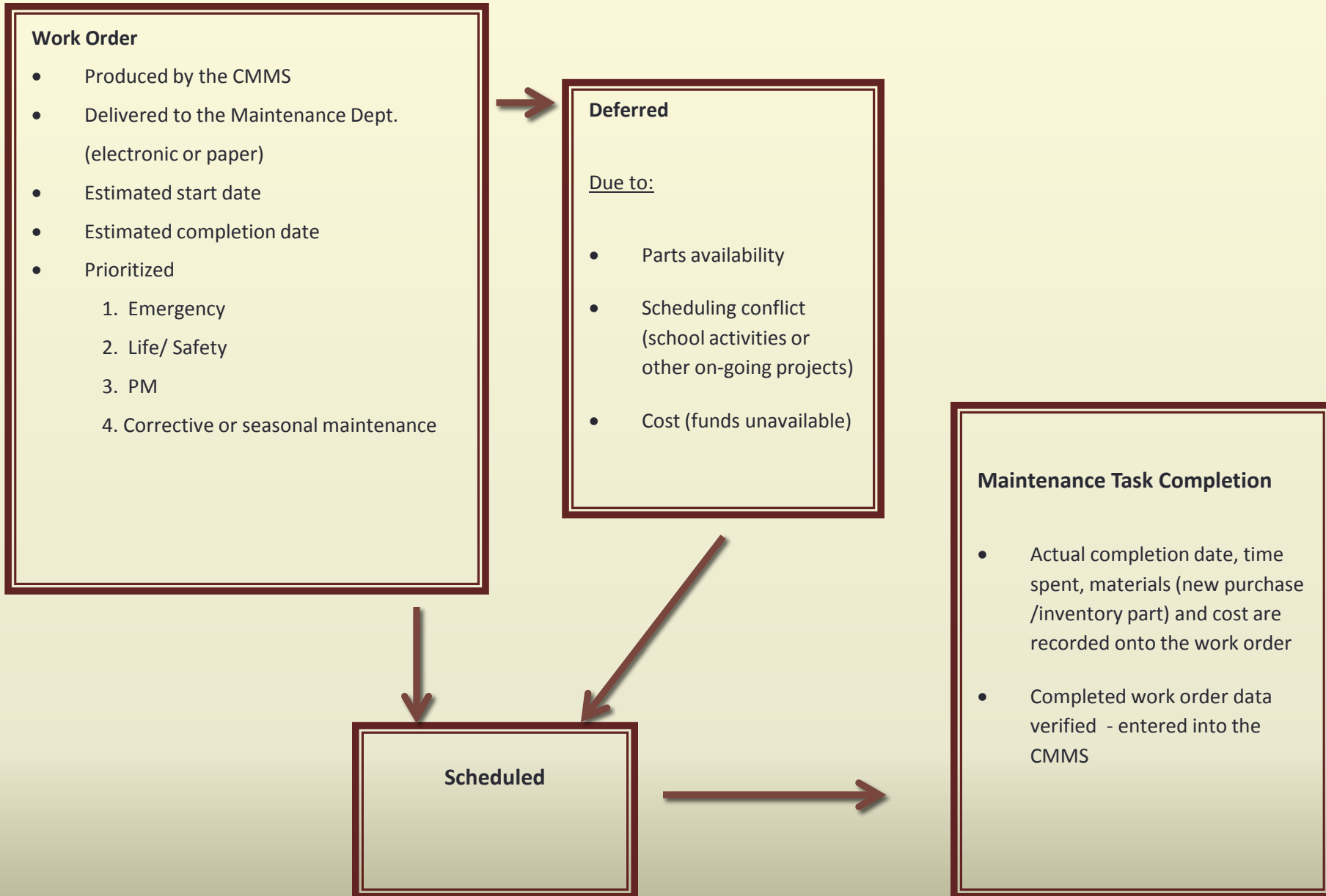
Due to:

- Parts availability
- Scheduling conflict (school activities or other on-going projects)
- Cost (funds unavailable)

Maintenance Task Completion

- Actual completion date, time spent, materials (new purchase /inventory part) and cost are recorded onto the work order
- Completed work order data verified - entered into the CMMS

Scheduled



Carl John / Work Request : LYSD

File Edit Format Message Collaborate View Help

Save and Close Find Check Spelling Print Delete History

**Lower Yukon School District
Maintenance Work Request Form**

Requestor Name: Carl John Submission Date: Fri, Jul 08, 2011

Subject: Work Request

School: District Office

Contact Information:

Location of Maintenance Work

School Building Teacher Housing

Room # or Area: Apartment 141/142 Duplex

Description of Work Requested

1. Please fix door to dumpster. Door is sitting at entry landing.

2. Repair and/or Replace skirting around building perimeter. several panels have blown-off due to wind. Children are accessing the crawl space and playing under the building.

Unlock

Administrative Use Only

Not Rated Approved Not Approved

Comments:

Signed by: Bob Reed

Target Start: July 8, 2011 Priority: Important (3)

Estimated Hours: 3

Work Type

AD=Administrative Labor CM=Corrective Maintenance CP=Capital Project

EM=Emergency Maintenance EV=Event Report GM=General Maintenance

PM=Preventive Maintenance SR=Snow Removal, Nature TH=Teacher Housing

TN=Training TR=Travel Time VM=Vehical Maintenance

VN=Vandalism/Crime

Entered into SERRC Signed by:

Save

100%

Sample WO Request

**KLAWOCK CITY SCHOOL DISTRICT
MAINTENANCE REQUEST**

Person Requesting _____ Date _____

Location _____

Emergency: _____ Routine: _____ Summer: _____ Vans: _____

Description of work to be done:

Work Authorized by: _____ / _____
Superintendent's Signature Date

Work completed by _____ Time Required _____ Date _____

Comments:

All maintenance requests should be placed in the Superintendent's Mail Box in the Principal's Office.

Various types of Work Order Requests

- Computer (email) or handwritten
- Depends on district size and protocol

Maintenance Request - Procedure



Large District Example:

Matanuska-Susitna Borough School District



Mat-Su Borough School District

Administrative organization

- Superintendent
- Director of operations and maintenance
- 3 maintenance divisions: east, central, and west
- Maintenance foreman and custodial supervisor for each division
- Maintenance technicians, custodial staff associated with each division

Work order process

- Work request – site level school admin. and teachers
- Request approval – school administrator
- Entered into CMMS
- Work request to appropriate maintenance foreman
- Prioritized and scheduled
- Work order issued
- Work order completion
- Completion notes written on issued work order
- Submitted to admin. secretary for entry into CMMS
- Weekly status reports / monthly summary reports

Maintenance Request Procedure



Small District Example

Hoonah City School District



Hoonah City School District

Administrative organization

- Superintendent
- Maintenance contractor
- Site administrator
- Custodial staff

Work order process

- Work requests – site level – all district staff involved
- Hand written work request sheets
- Work request approval – Superintendent
- Work request forwarded to Maintenance Contractor
- Prioritized and scheduled as W/O
- Time, cost, comments written in daily work log
- Completed W/O entered into CMMS at end of each day
- Weekly meetings with Superintendent to discuss on-going issues, future maintenance needs

Discussion Topics

- Overview of school maintenance programs
- The critical role of preventive maintenance
- The work order process – 2 examples
- **The importance of communication and community involvement**
- PM and facility management requirements for CIP eligibility – 6 elements



Communicate!



Observed problems should be communicated and addressed promptly

Paths of communication

- Teachers
- School Nurse
- Site Administrator
- Maintenance Department
- Custodial Services
- Superintendent



Courteous communication builds good working relationships

Positive Role Models

School Maintenance Technicians
School Custodians



- Encourage positive rapport with students
- Become a visible presence on campus

Community Involvement

Avenues for participation in creating a healthy, well maintained school environment.



- Citizen's Advisory Committee
- PTA
- School Board Planning Sessions

Discussion Topics

- Overview of school maintenance programs
- The critical role of preventive maintenance
- The work order process – 2 examples
- The importance of communication and community involvement
- **PM and facility management requirements for CIP eligibility – 6 elements**



Grant Applications – Statute Requirements

AS 14.11.011 / 4 AAC 31.013

Each district is required to have a preventive maintenance plan that includes:

maintenance management program, capable of tracking the timing and costs of planned and completed maintenance activities

energy management program for district buildings

custodial care program for district buildings

maintenance training program for facility managers and maintenance employees

renewal and replacement schedules for major facility components

fixed asset inventory system for equipment valued \$5000 or more

Maintenance Management Program Requirements:

- A formal work order system
- Ability to track timing and costs
- Ability to track labor and materials
- Ability to produce reports of planned and completed work



Energy Management Plan Requirements:

- Ability to record energy consumption for all utilities on a monthly basis
- Utilities are recorded for each building
- Utilities include electricity, heating oil, propane, and water
- If the facility was constructed before 12/15/2004, the district may record energy consumption for multiple buildings served by one utility plant (one meter)



Custodial Program Requirements:

- Provide a schedule and description of custodial activities for each building
- The custodial schedule is based on type of work and scope of effort required for each building



Training Program Requirements:

- Provide a training program that specifies training for custodial and maintenance staff
- Maintain training logs describing type and duration of training received by individuals
- Provide training logs recording both completed and scheduled training sessions



Capital Planning Requirements:

- Provide renewal and replacement schedules for each school facility over 1,000 gsf.
- Identify the construction cost of major building systems (electrical, mechanical, structural, etc...)
- Evaluate and establish the life-expectancy of major building systems
- Compare life-expectancy to the age and condition of major building systems
- Use the renewal and replacement data to forecast the replacement year and cost for each system

DEED Renewal and Replacement Schedule

Renewal Replacement Schedule - Chistochina School Original

CIP FY 2013	Building System Appraisal (List taken from Appendix A of EED Preventive Maintenance Handbook)			Current Dollar Value of Systems/Components that require Renewal or Replacement during Year (in thousands of dollars)						Deferred Project	Attach Survey if included in CIP	Total Costs by System (in dollars)	
	Facility or Building	System	Year Installed	Remaining Life Span	Year work req'd	Year 1	Year 2	Year 3	Year 4				Year 5
Name and/or Number	Site Improvements				2013	2014	2015	2016	2017	2018			
EED #	11002001	Site Utilities											
Dist. #	Copper River	Foundation/Substruct.	1978	15	2028								\$ 121,614
398.56 per sq. ft.		Superstructure	1978	15	2028								\$ 161,718
Gross Square Footage	2,840	Exterior Wall System	2002	14	2027								\$ 107,911
		Exterior Windows	1978	-5	2008	29					X		\$ 26,535
		Exterior Doors	1978	-15	1998	6					X		\$ 5,891
Number of Stories	1	Roof Systems	2006	13	2026								\$ 55,053
		Interior Partitions	1978	15	2028								\$ 62,468
		Interior Doors	1978	-5	2008	19					X		\$ 19,361
Building or Facility Use	Chistochina School Original	Interior Floor Finishes	2001	3	2016			65					\$ 64,663
		Interior Wall Finishes	2001	13	2026								\$ 24,605
		Interior Ceiling Finishes	1978	-10	2003	41					X		\$ 41,327
Replacement Value	\$1,131,905	Specialties	1978	5	2018							32	\$ 31,597
		Conveying Systems											
		Plumbing piping	1978	-5	2008	42					X		\$ 41,527
		Plumbing Fixtures	1978	-5	2008	20					X		\$ 20,348
NOTES	Orig/perm multipurpose gym	Fire Protect./Suppres.											
		HVAC Distribution	1978	5	2018					60			\$ 59,917
		HVAC Equipment	1978	-5	2008	136					X		\$ 135,615
		HVAC Controls	1978	-15	1998	26					X		\$ 25,509
		Electrical Serv./Gen.											
		Electrical Distribution	1978	15	2028								\$ 29,009
		Electrical Lighting	1995	7	2020								\$ 66,324
		Special Electrical	1978	-20	1993	29					X		\$ 29,128
Facility Cost Index	0.000306599	Equip and Furnishings											\$ 1,131,905
		Totals				347	-	-	65	-	92	\$ 503,216	Six Year Total

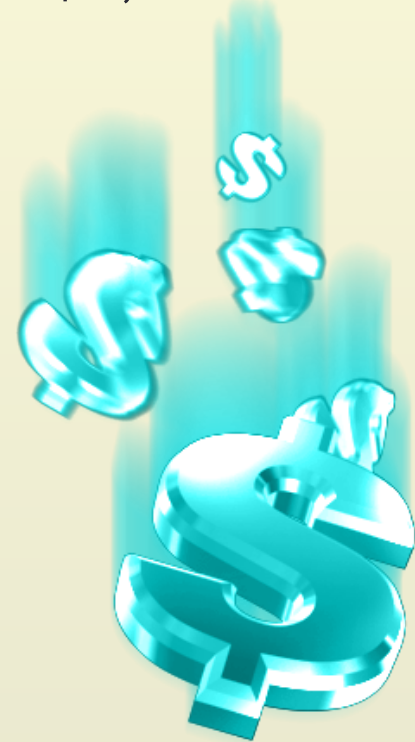
[Renew-Replace_Chistochina_FY13.xls]K-12_Org

Renew-Replace_Chistochina_FY13.xls as of 7/27/2011 11:29:17 AM

Page 2 of 5

Fixed Asset Requirement:

- Provide a report which records assets valued at \$5,000* or more
- Date acquired
- Location
- Estimated date of service



*(minimal level of asset valuation is usually associated with the district's tax audit requirements - \$500 valuation is commonly used by some)

In review

- Building components wear out eventually
- Various types of maintenance are employed. Preventive Maintenance (PM) extends component life cycles
- Successful PM requires training and record keeping
- Work order system required in Alaska
- Unique, yet similar, work order systems throughout Alaska
- 'Maintenance work requests' start the work order process
- Maintenance planning - the public is invited
- A comprehensive preventive maintenance and facility management program is required State CIP funding

Resources

- **Preventive Maintenance Guidelines For School Facilities**
John C. Maciha, RS Means Company, 2000
- **Indoor Air Quality – Tools for Schools**
US Environmental Protection Agency / Office of Air and Radiation (6609)/EPA 402-K-95-001(third edition)
January, 2005
- **Facilities Masters Online Webcast**
“Improving Indoor Air Quality and the Learning Environment” – July 2012
<http://www.facilitymastersonline.com/webcasts/>
Classroom Maintenance: Ed Cenedella (Hampden-Wilbraham Regional School District, NH)
Classroom Organization: Janet Brough (Laconia School District, MA) and Sandy Rhee (Organization Guru)
- **Alaska School Laws and Regulations Annotated 2011-2012 edition**
4 AAC 31.013. Preventive maintenance and facility management.
- **Alaska School Facilities Preventive Maintenance Handbook**
<http://education.alaska.gov/facilities/publications.html>

Questions?

