MAINTENANCE

APRIL 23-25, 2024 9:00AM-2:00PM MOUNTAIN TIME





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Trainers



Bill Nibbelink – Has provided training and technical assistance for more than 30 years for tribal communities.



Ryan Siegel – Has over 20 years in the energy and facilities field including as a maintenance supervisor and site technician.



. . . .

- What is your role in housing?
- How long have you been working in housing?
- What do you want to learn from this training?

Introductions

• Where are you from?



Training Overview

- Agenda
- Breaks
- Attachments
- PowerPoint

Key Maintenance Program Components

- Annual Facilities Maintenance Plan
- Staffing and Staff Supervision
- Budgeting System
- Materials Management
- Work Order System
- Tenant Relations Program
- Inspections and Standards
- Vacancy Turnarounds

nce Plan sion

Programs with Maintenance Requirements



- Rental Housing
 - Tribe/TDHE is responsible for maintenance and repairs.
 - Tenant damage may be repaired by the
 - tenant or by the tribe/TDHE, and
 - charged to tenant.
- Homeownership Housing
- Rental Assistance Housing

Programs with Maintenance Requirements



- Homeownership Housing
 - Homebuyer is responsible for
 - maintenance and repairs.
 - If Homebuyer does not maintain or repair the house, the tribe/TDHE must see that repairs are made and charge the homebuyer.

Programs with Maintenance Requirements



- Rental Assistance Housing
 - Such as Section 8 or similar.
 - Private landlord is responsible.
 - Tenant damages are the responsibility of
 - the tenant.

Sources of Funding for Maintenance, Modernization & Rehabilitation

Indian Housing Block Grants (IHBG)

- Formula Grants
- CARES Act Grant
- American Rescue Plan (ARP) Grant
- Competitive Grant

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Sources of Funding for Maintenance, Modernization & Rehabilitation

Indian Community Development Block Grants (ICDBG)

- Competitive Grants (rehabilitation)
- Imminent Threat Grants (rehabilitation)

Maintenance Policy Requirements

Documents that Guide Maintenance Policy Development:

- Native American Housing & Self-Determination Act (NAHASDA)
- Code of Federal Regulations at 24 CFR 1000
- Uniform Administrative regulatory requirements at 2 CFR 200
- Dwelling Lease
- Homeownership Agreement
- HUD Notice CPD 16-02, guidance on National Environmental Policy Act (NEPA) and Maintenance/Rehab

NAHASDA Maintenance Requirements

SEC. 201. NATIONAL OBJECTIVES AND ELIGIBLE FAMILIES.

(a) PRIMARY OBJECTIVE – The national objectives of this Act are--(1) to assist and promote affordable housing activities to develop, maintain, and operate affordable housing in safe and healthy environments on Indian reservations and in other Indian areas for occupancy by lowincome Indian families;

NAHASDA Maintenance Requirements

SEC. 203. PROGRAM REQUIREMENTS.

(b) MAINTENANCE AND EFFICIENT OPERATION- Each recipient who owns or operates (or is responsible for funding any entity that owns or operates) housing developed or operated pursuant to a contract between the Secretary and an Indian housing authority pursuant to the United States Housing Act of 1937 shall, using amounts of any grants received under this Act, reserve and use for operating assistance under section 202(1) such amounts as may be necessary to provide for the continued maintenance and efficient operation of such housing. This subsection may not be construed to prevent any recipient (or entity funded by a recipient) from demolishing or disposing of Indian housing referred to in this subsection, pursuant to regulations established by the Secretary.

NAHASDA Maintenance Requirements

SEC. 203. PROGRAM REQUIREMENTS

(e) MANAGEMENT AND MAINTENANCE- Each recipient shall develop policies governing the management and maintenance of housing assisted with grant amounts under this Act.

Regulatory Maintenance Requirements

Uniform Administrative Regulations (2 CFR 200) 200.313 Equipment (d) (4) Adequate maintenance procedures must be developed to keep the property in good condition.

The Lease

- Includes dwelling, lease-purchase, and homeownership leases.
- Spells out specific roles and responsibilities of tenant and maintenance staff for maintaining quality, for inspections, and for making repairs.

Best Practices:

- Includes excerpts of the maintenance policy in the standard lease agreement.
- Tenants and homeowners are expected to keep the property in a safe and sanitary condition.

Procurement Regulatory Requirements

200.318 General procurement standards

(a) The non-Federal entity must have and use documented procurement procedures, consistent with State, local, and tribal laws and regulations and the standards of this section, for the acquisition of property or services required under a Federal award or subaward. The non-Federal entity's documented procurement procedures must conform to the procurement standards identified in §§ 200.317 through 200.327.

Program Compliance **Procurement General Standards**



Effective Procurement Systems

- Have a written procurement policy.
- Have a contract-administration system.
- Have a written code of standards of conduct.
- Award contracts only to responsive and responsible contractors.
- Maintain sufficient written records to support all procurement.

Procurement Policy Should Address

- Procedures for purchasing in cases where competitive bidding is required.
- Identification (by position title) of the officials authorized to make purchases when competitive bidding is not required and procedures for making such purchases.
- Procedures for inventory control.
- Establishment of capitalization levels.
- Procedures for storage and protection of goods and supplies.

Procurement Policy Should Address

- Procedures for issuance or other disposition of supplies and equipment.
- Procedures for implementing Indian Preference requirements.
- Procedures for handling complaints and protests regarding procurement.
- Standards of conduct governing directors, officers, and employees.
- Conflict of interest provisions governing directors, officers, employees, contractors/developers and other firms doing business with tribe/TDHE.

Methods of Procurement

2 CFR 200

- Informal Methods
 - Micro-purchases
 - Small purchases
- Formal Methods
 - Sealed bids
 - Proposals
- Noncompetitive procurement

Informal Methods 2 CFR 320 (a)

Micro Purchases (less than \$10,000)

- Recipient is required to adopt Micro Purchase policy clause.
- Applies to all purchases less than \$10,000 when a reliable quote is available.
- Documented with an authorized purchase order or other formal method.
- Purchases can not be broken into smaller transactions to meet the Micro Purchase threshold.

Informal Methods

Small Purchases

- NAHASDA permits when purchase is under \$250,000.
- Establish your threshold in your procurement policy.
- No public advertising.
- Must be competitive (2 or more quotes).
- Can be used to procure:
 - Office supplies
 - Vehicles
 - Rehabilitation contractors
 - Professional services
 - Equipment 0

Formal Methods of Procurement

Sealed Bids

- Bids are publicly solicited and a firm fixed-price contract is awarded to the responsible and responsive bidder whose bid is lowest in price.
- Preferred method of procuring construction.
- Must be used if and when the estimated contract cost exceeds the recipient's established simplified acquisition threshold (up to \$250,000).
- Invitation for bids shall include specifications and must define the items or services in order for the bidder to properly respond.
- Bids must be solicited from an adequate number of qualified sources (to be determined by the recipient, usually 2 or more).

Formal Methods of Procurement 2 CFR 200 (b)

Competitive Proposals

- A common and versatile procurement method.
- Used to procure goods and services when price is not the only factor.
- Proposals include a list of evaluation factors and their relative importance (e.g. a points scale).
- Solicitation is requested for proposals.

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More Competitive Proposal Info.

Can be used to procure:

- Architects
- Accountants
- Attorneys
- Acquisition of pre-built housing
- Developers
- Computer systems
- Consultants
- Auditors

Non-Competitive Method

Can be used if one or more of the following circumstances apply:

- The acquisition of property or services, the aggregate dollar amount of which does not exceed the micro-purchase threshold;
- The item is available only from a single source;
- The public exigency or emergency for the requirement will not permit a delay resulting from publicizing a competitive solicitation;
- The Federal awarding agency or pass-through entity expressly authorizes a noncompetitive procurement in response to a written request from the non-Federal entity; or
- After solicitation of a number of sources, competition is determined inadequate.

NAHASDA Requirements to Perform Inspections

SEC. 403 MONITORING OF COMPLIANCE (b) PERIODIC MONITORING- Not less frequently than annually, each recipient shall review the activities conducted and housing assisted under this Act to assess compliance with the requirements of this Act. Such review shall include an appropriate level of onsite inspection of housing to determine compliance with applicable requirements. The results of each review shall be included in the performance report of the recipient submitted to the Secretary under section 404 and made available to the public.

Annual Performance Report Inspections Table

SECTION 11: INSPECTIONS

NAHASDA § 403(b)

(1) Inspection of Units (Use the table below to record the results of recurring inspections of assisted housing.)

		Results of Inspections			
	Total Number	Units in	Units needing	Units needing	Total number
Activity	of Units	standard	rehabilitation	to be replaced	of units
	(Inventory)	condition			inspected
(a)	(b)	(C)	(d)	(e)	(f)
1 1937 Housing Act Units:					
a. Rental					
b. Homeownership					
c. Other					(
1937 Act Subtotal	0	0	0	0	(
2 NAHASDA assisted units:					
a. Rental					
b. Homeownership					
c. Rental Assistance					(
d. Other					
NAHASDA Subtotal	0	0	0	0	
Total	0	0	0	0	(

The Inspection of Units table is used to record the results of the inspections of the recipient's HUD-assisted housing. The requirement to periodically inspect units applies to all units under the recipient's control. The recipient is not required to inspect every assisted unit every year; however, over time, all units should be inspected. The recipient may take a representative sample of its units and rotate which units are inspected each year. This would include any 1937 Act units, as well as IHBG-assisted units owned by the tribe or TDHE. Because the tribe or TDHE holds the title to Mutual Help units until they are conveyed to the homebuyer, these units need to be inspected as long as the units are within the recipient's control. This does not include units that were assisted under the 1937 Act or NAHASDA, but which are now privately owned, such as private homeownership units. For more information on the inspection requirements, see Notice PIH 2012-45 (Recipient Inspection of Housing Units Assisted under the Native American Housing Assistance and Self Determination Act of 1996 (NAHASDA) and those Assisted Under the United States Housing Act of 1937) at http://portal.hud.gov/hudportal/documents/huddoc?id=pih2012-45.pdf

If the recipient conducted more than one inspection of the same unit during the 12-month program year, the recipient should only report the condition of the unit based upon the last inspection of that unit. For example, a rental unit is inspected in July as part of an annual inspection program and the unit is in standard condition, but then the family moves out in September and the move-out inspection reveals considerable damage to the unit, then the unit should be reported based on the September inspection.

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Recurring Inspections Responsibilities Notice PIH 2012-45

The recurring recipient inspection requirement will eventually terminate. For rental housing, the requirement expires when the unit is no longer required to remain as affordable housing upon the end of its "useful life" as defined under 24 CFR § 1000.142. For Mutual Help homes developed under Sec. 202 of the United States Housing Act of 1937 and lease-purchase housing developed with NAHASDA funds, the recurring inspection requirement expires when unit ownership is conveyed to the homebuyer/purchaser.



Developing a Work Order System



What is in a work order system?

Database Contents

- Employees
- Buildings
- Equipment
- Work Order Numbers



Features


Features

- Scheduling recurring maintenance
- Maintenance hierarchy
- Canned vs. Custom reports
- Data Displays/Dashboards
- Tracking of building value
- Integration with building scheduling or utility meters
- Work order invoicing
- Work order inputting

Features

- Automatic timing of work orders for labor charges
- Inputting material costs



Equipment Tracking



What is the method of tracking Equipment

- How easy is it to call up past work on a piece of equipment?
- Is there a method to schedule routine maintenance? i.e. filter and belt changes
- Does the system track the frequency or total costs of repairs over time?



Maintainability, Longevity, Record Retention/Access



Maintainability, Longevity, Record Retention/Access

- This is likely the most difficult to ascertain.
- Maintainability may include software updates and service agreement costs.
- How long can the records be maintained?
- What is the longevity of the workorder system provider?
- What is the accessibility following termination of the software?



Material Selection

Material Quality impacts maintenance Program



IDENTIFY CRITICAL ATTRIBUTES

- Ingredients
- Durability Grades
- Material types
- Thicknesses

INGREDIENTS

Paint Additives (Acrylic, sheen, cleanability)

Solids



DURABILITY GRADES

- Residential Grade, Commercial Grade, Institutional/Industrial Grade
- Heavy Duty, Specification Grade, Hospital Grade, Federal Spec Grade

I/Industrial Grade ederal Spec Grade

MATERIAL TYPES

- ABS vs. PVC
- Pex A vs Pex B



THICKNESSES

- Mils
- Guage
- Schedule





Before You Upgrade A holistic approach





BIG PICTURE DIAGNOSIS

- Check for related issues
- May help avoid boxing yourself in for a future improvement or having to replace something again due to another upgrade
- Less chance of nickel and diming oneself

Big Picture Diagnosis

- For equipment, what is the condition of the other components? Contactors, motors, fan blades, lights, controls, etc. • Have previous repairs been made with aftermarket parts that are
- different from OEM?
- Is the present situation being compounded by something else? Poor design, inappropriate installation, lack of maintenance, improperly sized
- What is the repairability or maintainability of the system? Harder to get parts, degrading efficiency
- Are there opportunities to extend other systems?





Identify coordinating/compounding effects/ impacts, consider load reduction abilities

- Buildings are systems of systems.
- Improving one area may impact another.
- Reducing load can save capital cost.

Systems

- Envelope (windows, doors, walls, ceiling, floor) • Water control layer, air control layer, vapor control layer, thermal control layer
- Lighting (fixtures, lamps, controls)
- Plug Loads (appliances, electronics)
- Water Heating (heater, piping system, circulation system)
- HVAC (heating, ventilation, A/C, ductwork)

HVAC Load Calculation

Right sizing HVAC leads to lower cost, better comfort and better IAQ

HVAC load calculation from thermostat/BAS data

- Identify design conditions <u>(http://ashrae-meteo.info/v2.0/)</u>.
- Collect run time data and correlate with average outside temperatures (this may be available using smart thermostats, submeters, or utility data).
- Trend run time vs average OAT
- Estimate run time using trend at design conditions.
- Ratio between estimated run time and 24 hours is ratio of present capacity to required capacity.



2017 ASHRAE Handbook - Foundamentals (IP)

SIOUX FALLS REGIONAL, SD, USA (WMO: 726510)															
Lat:43.578N		Long:96.754W		Elev:1428			StdP: 13.95	i	Time zone:-6.			00 Period:90-1		WBAN:14944	
Annual Heating and Humidification Design Conditions															
Coldest Month	Heating DB		Humidification DP/MCDB and HR						Coldest month WS/MCDB				MCWS/PCWD to		
			99.6%			99%			0.4%		1	1%		99.6% <u>DB</u>	
	99.6%	99%	DP	HR	MCDB	DP	HR	MCDB	WS	MCDB	WS	MCDB	MCWS	PCWD	
1	-11.3	-6.5	-18.0	2.2	-10.8	-13.5	2.8	-6.2	33.2	14.8	29.5	18.9	8.4	310	
Annual Cooling, Dehumidification, and Enthalpy Design Conditions															
Hottest Month	Hottest	Cooling DB/MCWB								Evaporation	WB/MCDB			MCWS/PCWD to	
	Month	0.4%		1%		2%		0.4	% 10		% 2		.% 0.4%		6 DB
	DB Range	DB	MCWB	DB	MCWB	DB	MCWB	WB	MCDB	WB	MCDB	WB	MCDB	MCWS	PCWD
7	20.2	91.5	73.7	88.4	72.9	85.6	71.3	77.4	86.7	75.5	84.9	73.8	82.9	14.5	180
Dehumidification DP/MCDB and HR									Enthalpy/MCDB						E
0.4%				1%		2%			0.4%		1%		2%		Max WR
DP	HR	MCDB	DP	HR	MCDB	DP	HR	MCDB	Enth	MCDB	Enth	MCDB	Enth	MCDB	mux mD
74.7	137.1	83.7	72.7	127.7	81.7	70.8	119.6	79.7	42.0	86.6	40.1	84.8	38.3	82.9	83.8

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Heating & Cooling Example

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Heating Design: -8.3 °F

Cooling Design: 87.6 °F



Cooling Load Calc



Heating & Cooling Example

Heating Calculation **Cooling Calculation** • Design: 87.6 °F • Design: -8.3 °F • OAT=1.2601*hrs/day + 70.5 °F • OAT=-5.1193*hrs/day + 63.1 °F • $87.6 \,^{\circ}F=1.2601 \,^{*}hrs/day + 70.5$ • -8.3 °F=-5.1193*hrs/day + 63.1 °F °F • -71.4 °F=-5.1193*hrs/day • 17.1 °F=1.2601*hrs/day • -71.4 °F / -5.1193=hrs/day • 17.1 °F / 1.2601=hrs/day • 13.9 hrs/day • 13.6 hrs/day • 13.9/24=57.9% • 13.6/24=56.7%

Heating & Cooling Example

Heating Calculation

- Existing Equipment Capacity: 120,000 Btu/hr
- Capacity Ratio=57.9%
- Required Capacity: 69,480 Btu/hr
- Nearest sizes: 60,000 & 80,000



- Existing Equipment Capacity: 54,000 Btu/hr
- Capacity Ratio=56.7%
- Required Capacity: 30,618 Btu/hr

Cooling Calculation

• Nearest sizes: 30,000 & 36,000

Example with utility date



Heating Design: 0 °F

Heating Calculation Example

Heating Calculation

- Design: 0 °F
- OAT=-0.0341*therms/mo + 65.8 °F
- 0 °F=-0.0341*therms/mo + 63.1 °F
- -65.8 °F=-0.0341*therms/mo
- $-65.8 \,^{\circ}F / -0.034I = therms/mo$
- 1930 therms/mo
- 1930 /30.5 days/mo/24 hrs/day=2.64 therms/hr

Heating Calculation Example

Heating Calculation

- Design Input: 264,000 Btu/hr
- Boiler Efficiency=80%
- Design Output: 211,200 Btu/hr



Developing Inspection Plans

LEVELS OF DETAIL

Safety Focused

Identify maintenance needs

Planning for capital improvement



SAFETY FOCUSED

- Alarm systems
- Backup systems
- Mold
- Asbestos
- Lead
- Carbon Monoxide
- Electrical hazards

IDENTIFY MAINTENANCE NEEDS

- Condition of roof
- Condition of exterior paint/masonry
- Condition of sealants
- Listening for odd equipment sounds
- Feeling for odd heat patterns
- Ask occupants about comfort issues

PLANNING FOR CAPITAL IMPROVEMENTS

- Characterize equipment status & remaining life
- Identify features needed and deficiencies
- Can help minimize environmental reviews

CATEGORIES OF INSPECTIONS

Building level Equipment level

BUILDING LEVEL DETAILS

- General Details
- Notes tied to the building/unit number
- More common for landlord/housing authority


EQUIPMENT LEVEL DETAIL

- Commonly used for maintenance staff ie. HVAC mechanics
- Details tied to specific equipment
- Typically use numbered equipment or equipment's serial number



Root Cause Analysis

What appears on the surface isn't necessarily what the problem is.







EXAMPLE #1























EXAMPLE #2













EXAMPLE #3











Inspection Tracking

Tracking over time



INSPECTIONS ARE NOT ONE-TIME EVENTS, BUT SNAPSHOTS IN TIME

- Develop systematized inspection forms
- Determine how progress is tracked
- Look for method to compare present inspection to past inspections
- What potential is present to integrate with maintenance program

























Developing a Scope of Work



Identifying needed components



Necessary Components

- Objectives/Outcomes/Deliverables
- List of applicable building standards
- Benchmarks/Deadlines
- Schedule of payments
- Procedure and criteria for selection
- Amendment procedure

Identify Available Data or Information

- When relying on contractor to do sizing, need to identify and/or provide available data.
- Data could be meter data, building information, assessment information, etc.

Identify Available Data or Information

- What needs to be specified.
- What flexibility can contractors handle.

Detail vs. Outcomes

 Providing appropriate details while allowing flexibility for better ideas.
First Cost & Diminishing Returns Traps

- Too many projects focus on cost rather than value.
- Taught the Law of Diminishing Returns.





Maintenance vs. Rehab



When to Consider Replacement vs. Repair



When does repair become impractical

- Cost of repairs vs. replacement.
- Considering savings from upgrading.

Avoiding Deferred Maintenance

• Identifying features no longer needed.

Review how facility needs change

- Buildings may be built with functions or features never used or no longer needed.
- Understand how things can be consolidated.



Considerations for moving toward rehab

Minimizing Environmental Reviews

- A 5-year plan can be done as a single environmental review
- Having a capital plan can help avoid needing a supplemental review

Environmental Review Types

- Maintenance Categorically Excluded (repair of existing equipment).
- Rehabilitation may be Generally Categorically Excluded (new equipment).
- New construction may require an Environmental Assessment, goal to have Finding Of No Significant Impact (FONSI).

Review of Examples of Maintenance and Rehab Activities

6 CPD Notice 16-02 PDF

Deep Energy Retrofits



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What is it?

- Whole-building analysis and construction achieving much larger energy cost savings than simpler energy retrofits.
- Commonly includes envelope enhancements along with lighting and HVAC improvements
- May be phased in, but planned ahead.

Why is it different?

- Improving windows and air sealing can reduce HVAC loads to where bigdollar equipment can be reduced in size and cost.
- Considers upcoming capital needs to take advantage of these opportunities vs. just business as usual replacing like-for-like.

When would I do it?

- When buildings are changing tenants.
- When envelope components are nearing end of life (roof, windows, siding).
- When HVAC, lighting, or other major equipment is nearing end of life.
- When making life safety code upgrades.
- Desire to fix an "energy hog".

What might it entail?

- New windows Replacing or decommissioning existing plug-in equipment • Exterior shading devices Shading adjacent parking areas • Light shelves or other items to drive daylight into building • Reduce hot water loads Caulking or other sealing Locate water heater as close to loads as feasible Adding insulation Install dedicated ventilation • New lighting fixtures or bulbs system
- New lighting controls

• Optimize HVAC distribution

What might it entail?

- Recover energy from exhaust/ makeup systems
- Right-size HVAC equipment
- Improve control strategies

Thank You!

Questions and/or Comments?