# Equipment Tracking and Maintenance

Crew Leader

Learning Objectives

By attending this session, participants will be able to:

* Recognize the importance of keeping track of tools and equipment.
* Explain the importance of equipment maintenance and its effect on production.
* List specific equipment maintenance needs.
* Demonstrate how to involve crew members in tool maintenance and accountability.

Key Terminology

Calibration

Carbon monoxide (CO)

Magnehelic differential pressure gauge

Manometer

Positive displacement blower

Pounds per square inch (psi)

Supplemental Materials

Handouts & Resources

Bacharach, Inc. “Instrument Maintenance.”   
www.bacharach-training.com/InstrumentMaint/instrumentmaintenance.htm.

“Gearing Up: Outfitting a Wx Crew Trailer.” *WxTV*. Montana Weatherization Training Center. <www.wxtvonline.org>.

Krendl Machine Company. “Blower Owner’s Manual, 1000/2000 Model.”

The Energy Conservatory. “Procedure for Field Calibration Check of Digital Pressure Gauges.” (January 2007).

The Energy Conservatory. “Operation and Maintenance Tips for Energy Conservatory Test Instruments.” (Oct. 2004).

Thomson, Jeff, Bob Pfeiffer, Suzanne Harmelink, and Martha Benewicz. “Pressure Testing Insulation Blower and Hoses.” WI Weatherization Program (Dec. 1999).

Whole House Weatherization Equipment List – *Adapted from an original file by Anthony Cox, Building Science Manager for the New River Center for Energy Research and Training, Christiansburg, VA.*

Maintenance Logs and Equipment Checklists:

* Blowing Machine Checklist and Inspection Log
* Equipment Calibration Schedule
* Generator Checklist and Inspection Log
* Tool Box Checklist Form
* Truck Tool Inventory Blank Form
* Truck Tool Inventory Sample
* Vehicle Maintenance Log

Classroom Props & Activities

Pressure Testing Blowing Machines and Hoses (30 minutes)

Materials needed:

* Standard positive displacement blowing machine (cleaned)
* Standard insulation hose
* Blowing machine pressure test gauge kit
* Hose clamps, screwdriver, pliers, duct tape, flashlight, extension cords, and utility knife
* Handouts: “Pressure Testing Insulation Blower and Hoses” and “Blowing Machine Checklist and Inspection Log”

Using the handouts as a guide, show the students the major components of the blowing machine, paying special attention to the paddles and air lock at the bottom of the hopper. Turn the machine on so students can observe the paddles spinning inside the air lock chamber. Remove the material feed gate for easy viewing.

Test the operating pressure of the machine with a magnehelic pressure gauge as outlined in the handout. Test the machine. Explain that the paddles have a tendency to wear out over time.

* Install the pressure test gauge to read pressure at the outlet.
* Turn on the agitator and blower.
* Record the pressure and explain that it should read 3–4 psi for the equipment to pass the test.
* Indicate that the paddles should be replaced if fluctuations occur at or below 3 psi.
* Explain that if, after replacing paddles, the pressure is still below 3 psi, the blower may need to be replaced.
* Turn off the machine and take questions.

Test the hose. Explain that well-used hoses have a tendency to develop pinholes. Enough of these tiny leaks will lower the machine’s capacity.

* Repeat the process of pressure testing but with the pressure gauge attached to the end of the insulation hose.
* Record the pressure.
* Explain that the pressure should read 3–4 psi.
* If it doesn’t reach that reading, explain that the hose may need to be replaced. Duct tape can be used to perform quick repairs but hoses degrade over time, developing dozens of tiny holes that are difficult to detect.
* Simulate a bad hose by punching a few holes near the end of the insulation hose. Read a pressure of less than 3 psi.

Involve students by asking for volunteers to operate the machine and record the pressures. Stress that the agency and/or subcontracting insulation company should have at least one pressure testing kit to test its fleet of insulation blowers and hoses.

Safety Upgrades (30 minutes)

Materials needed:

* Aluminum ladder and fiberglass ladder
* Light-duty extension cord (100 ft., 18 gauge)
* Frayed extension cord
* Old drill with missing ground plug
* Circular saw with an extremely dull blade, saw horses, extension cord, and a 4 ft. section of 2x10 framing lumber
* Utility knife with dull blade and a piece of sheet rock
* Dull chisel
* Hammer with a chipped or mushroomed head
* Miscellaneous hand tools with cracked or splintered handles
* Respirator with clogged filters and missing strap
* Others at the instructor’s discretion

This is a show-and-tell demonstration of the kinds of tools that should not be on the job site. Ask students what’s wrong with this assortment of tools.

Some problems may not be so obvious. For instance, there may be nothing wrong with the aluminum ladder, but does it belong on a job site where electrical hazards may be present? Explain why a non-conductive fiberglass ladder is a better choice and drive the point home with a scary scenario of someone on an aluminum ladder coming into contact with overhead electrical wires while installing sidewall insulation.

Make the same point about the 100 ft. light-duty extension cord. It may look fine, but long, light-duty cords should not be used with high-current-draw equipment such as insulation machines. Why? The length of cord and thin gauge conductor will not allow sufficient current to the equipment, thereby shortening its useful life. It may also result in a tripped circuit breaker.

Other problems are more obvious. Demonstrate cutting through a 2 x 10 with a dull saw blade. It will not only burn and smoke but may kick back. Then replace the old blade with a new one and ask a volunteer to cut the lumber with the new blade. Point out to students how easy and safe it is to do the cutting with a new blade. Use personal safety equipment for this exercise, including safety glasses and hearing protection.

Show or ask a volunteer to demonstrate how many attempts it takes to score a piece of sheet rock with a dull utility blade compared to a new sharp blade. Stress that dull tools are dangerous tools.

Show other examples such as the power tools with missing ground plugs. In all instances encourage students to draw their own conclusions. Ask what other bad equipment doesn’t belong on the job site.

Wrap up the exercise with the slide titled “Safety Upgrades Summary.”

**Missing Tools Exercise (20 minutes)**

This is an open discussion with the whole class. Attempt to draw out the quiet students. Present the following scenario and ask for feedback from the class.

A weatherization crew is preparing to insulate the sidewalls of a house by first removing the vinyl siding. The crew leader notices a siding zip tool missing just when they need it most. The crew leader asks the crew members if they have seen it but no one has. The crew leader dismisses it and has another one allocated to the truck. A week later, a crew member reports that a hammer and tape measure are missing from his tool pouch. The crew leader goes through the same process of asking around and simply replaces the tools. A week later a cordless drill is missing.

The crew leader now begins to suspect a pattern of theft and speaks to the crew. The crew leader proclaims that because of this and the previous week’s incidents he suspects “a thief is among us.” The crew leader is visibly angry and threatens to fire whoever it is and call in the law, but he says that if the missing tools turn up, he’ll forget the whole thing. The crew appears visibly shaken.

A week goes by when one of the crew members approaches the crew leader and says that he suspects another crew member of stealing the cordless drill. When asked on what grounds, the crew member states that he thought he noticed one just like it in his personal vehicle. The leader then angrily confronts the suspect crew member about the missing drill and said that he heard from another crew member that the drill was in his car. The crew member denies it, and claims that it belongs to him. He later shows it to the crew leader and although it is a similar model, there’s no way to prove that it belongs to the agency. The serial number of the agency’s drill was not recorded and the tool did not have an agency property label.

One week later a client calls the agency to report that he found a hammer and tape measure at his home after the weatherization crew was done. The missing drill turns up two weeks later on another truck. The zip tool is never found.

Ask the class what went wrong here and how this should have been handled. Write the responses on the white board.

Some of the correct answers:

1. The crew leader should have been more proactive early on when it was discovered that the small tools were missing.
2. Every effort should have been made to locate the missing tools, including searching the truck and previous job sites.
3. The crew leader should have acted more discretely and not identified a possible witness. This caused dissension among the crew.
4. The crew leader should not have made an accusation until he had proof.
5. All agency tools should be clearly marked and serial numbers recorded where applicable.
6. The crew leader could appeal to the crew’s sense of morality and stress that tool theft impacts everyone and the whole operation.
7. Crew members need to be held responsible for their tools and are expected to look out for common tools.
8. A crew leader should never “turn the other cheek” if there’s any evidence of theft.

Follow up with this multiple-choice question:

There’s clear and undisputed proof that a crew member has stolen agency property. The crew leader should:

1. Call the police.
2. Demand that the property be returned.
3. Report the incident to his or her immediate supervisor.
4. Fire the crew member on the spot.

The correct answer is (c). A crew leader needs to understand the limits of his or her authority and act within the guidelines of an agency’s policies and procedures.

**Class Overview**

* Use the presentation, discussion, and handouts to introduce students to the key elements of tool maintenance and tracking. Using the cues within the presentation, introduce the class exercises described in detail above to ensure students gain some hands-on experience with tracking and maintenance.
* Using the maintenance logs and equipment checklists provided, lead a discussion with the class about what they use to track things at their workplaces. If they don’t have processes in place, ask them what they think might be beneficial about using similar forms. Provide each student with a packet of resources for future use.