

NOTE: Any yellow text shading or red text annotations have been added by ORNL Subject Matter Experts (SMEs). The annotations have been made in order to document (1) certain Forest Service requirements that have been waived or (2) where some requirements for the ORNL participants have been clarified or established within the ORNL Research Safety Summary (RSS) instead. The RSS 7728 is the work control document that governs the ES&H the activities/actions of the ORNL participants doing work at the Marcell Experiment Station.

FS-6700-7 (3/98)

U.S. Department of Agriculture Forest Service	1. WORK PROJECT/ACTIVITY Ladder usage	2. LOCATION Grand Rapids MN	3. UNIT RWU 4101/4351
JOB HAZARD ANALYSIS (JHA) References-FSH 6709.11 and -12 (Instructions on Reverse)	4. NAME OF ANALYST	5. JOB TITLE	6. DATE PREPARED
7. TASKS/PROCEDURES	8. HAZARDS	9. ABATEMENT ACTIONS Engineering Controls * Substitution * Administrative Controls * PPE	
A. Portable ladders	a. Defective ladder b. Not using a ladder properly	1. Inspect ladder before and after each use. <ol style="list-style-type: none"> a. Check the condition of ladders that have been dropped or have fallen before using them again. b. Check for missing or loose steps or rungs (they are loose if you can move them by hand) c. Damaged or worn non-slip feet d. Loose nails, screws, bolts or nuts. e. Rot , decay or warped rails in wooden ladders. f. Cracks and exposed fiberglass in fiberglass ladders. g. Cracked, split,worn or broken rail, braces steps or rungs. h. Sharp edges on rails or rungs. i. Rough or splintered surfaces. j. Corrosion, rust, oxidation and excessive wear, especially on tread. k. Twisted or distorted rails. l. Check ladders for distortion by sighting along the rails. Using a twisted or bowed ladder is hazardous. 2. Reject and tag any ladder that have defects. 3. Have faulty ladders repaired or thrown out. 4. DO NOT MAKE TEMPORARY REPAIRS 5. DO NOT TRY TO STRAIGHTEN OR USE BOWED LADDERS. 1. Use ladder designed for the task. Consider strength, type, and length. 2. Get help when handling a heavy or long ladder. 3. Keep ladders away from electrical lines. 4. Tie off ladders at top and secure bottom to prevent them from slipping. (see Diagram) 5. Set up barricades and warning signs when using a ladder in a doorway or passageway. 6. Before mounting a ladder, clean the boot soles if they are muddy or	

- slippery.
7. Avoid climbing with wet soles.
 8. Ensure foot wear is in good condition.
 9. Face the ladder when going up or down and when working from it.
 10. Keep the centre of your body within the side rails.
 11. When placing a ladder against a building make sure ladder is at a 75 degree angle. or a 4 to 1 ratio (for every 4 ft. up 1 ft. out)
 12. Minimum distance from top of ladder to where ladder rests on top of building.

Size of ladder	Overlap
Up to 36 ft.	3 ft.
36 to 48 ft.	4 ft.
48 to 6	5 ft.0 ft.
 13. Do not use a ladder in a horizontal position as a scaffold plank or runway
 14. Do not carry objects in your hands while on the ladder.
 15. Hoist materials or attach tools to belt.
 16. Do not work from the top three rungs. The higher the person goes on the ladder, the greater the possibility that the ladder will slip out at the base.
 17. Clear areas around base and top of the ladder of debris, tools and other objects.
 18. Wear an approved safety harness when needed.
 19. Ensure only one person at a time is on a ladder.
 20. Maintain three-point contact by keeping two hands and one foot, or two feet and one hand on the ladder at all times. (see diagram)
 21. Grasp the rungs when climbing a ladder, not the side rails. If your foot slips on a ladder, holding onto rungs is easier than holding on to side rails.
 22. Rest frequently to avoid arm fatigue and disorientation when the work requires you to look up and reach above your head.
 23. Drape your arms over a rung and rest your head against another rung or side rail if you become dizzy or panicky. **CLIMB DOWN SLOWLY.**
 24. Do not let anyone stand under a ladder.
 25. Do not place a ladder against flexible or moveable surfaces.
 26. Do not over reach from a ladder; Move as required.

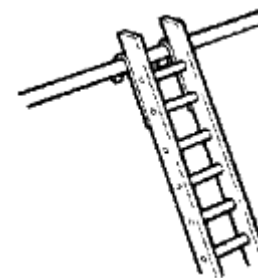
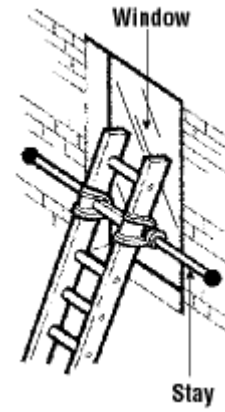
1. Portable ladder
 - a. Locking hinge style

- a. Can cause a fall from a ladder



3 Point Contact

TIE OFFS



1. Locking hinges must be locked before any attempt is made to use folding ladders.
2. Check instructions on ladder before using for proper set up.
3. Utilize upper and lower stabilizer bar.

2. Portable ladder
a. Step ladder

a. Defective step ladder

b. Not using a step ladder properly can cause a fall.

1. Do not use step ladders that wobble, are loose or have bent hinges and hinge spreaders, or a broken stop or hinge spreader.
1. Use a stepladder that is about (3 ft.) shorter than the highest point you have to reach. This gives a wider, more stable base and places shelf at a convenient working height.
2. Open the step ladder spreaders and shelf fully.
3. Check stability. Ensure that all ladder feet are on a firm level and non-slippery surface.
4. Keep stepladder close to work.
5. Avoid pushing and pulling stepladders from the side.
6. Do not shift or walk a step ladder when standing on it.
7. Do not stand, climb, or sit on the stepladders top or pail shelf.
8. Do not overload. Stepladders are meant for one person.
9. Do not climb a stepladder leaning against a wall.
10. Do not use a stepladder on soft ground where one leg may sink farther into the ground than others.
ORNL SME: Ladder use in bogs must be supported by a solid surface and include a spotting individual to ensure that the ladder does not shift from its position on the solid board or walkway.
11. Do not use a stepladder as a scaffold.
12. Do not climb the back of a stepladder.

ORNL SME: Also do not use the top or top step for standing or stepping

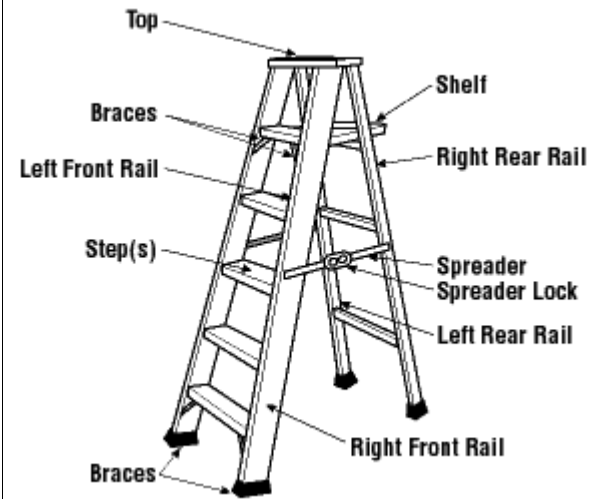
ORNL SME: Never use a stepladder that is not fully opened. Be sure the metal spreaders are locked.



Lock Spreader

- 3. Portable ladder
 - a. straight ladder
 - b. extension ladders

- a. Defective ladders
- b. Improper use of ladder can cause a fall.

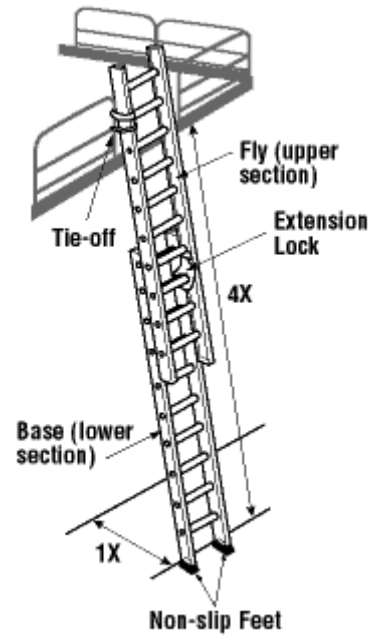
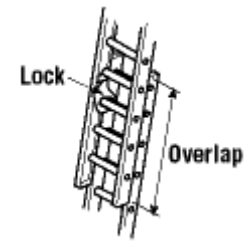


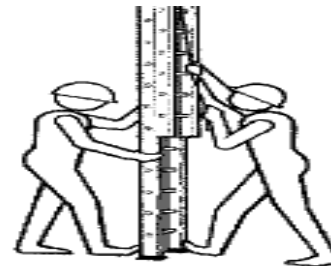
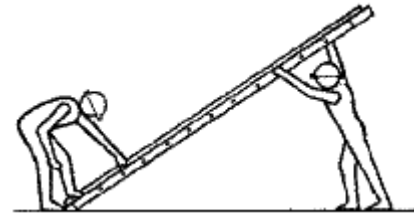
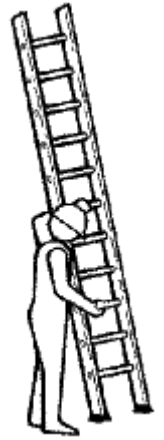
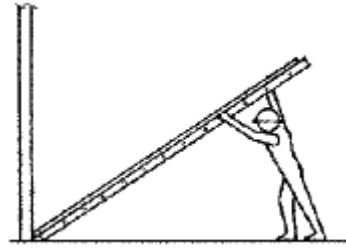
1. Check for loose, broken or missing extension locks.
2. Defective locks that do not seat properly when ladder is extended.
3. Defective cords, chains and ropes.
4. Missing or defective pads or sleeves.

1. Place ladder on a firm, level surface and ensure the footing is secure.

ORNL SME: Ladder use in bogs must be supported by a solid surface and include a spotting individual to ensure that the ladder does not shift from its position on the soild board or walkway.

2. Erect extension ladder so that the upper section rests (e.g., in front of) the bottom section.
3. Raise and lower ladders from the ground.
4. Ensure the locking hooks are secure before climbing.
5. Where a ladder cannot be tied off at the top, station a person at the foot to prevent it from slipping. (THIS METHOD IS ONLY EFFECTIVE FOR LADDERS UP TO 16 FT. LONG.)
6. The person at the foot of the ladder should face the ladder with a hand on each side rail and with one foot resting on the bottom rung.
7. Leave all tie-off devices in place until they must be removed before taking the ladder down.
8. Maintain the minimum over lap of sections as shown on ladder label.
9. Do not set up or take down when a ladder is extended.
10. Do not over extend. Maintain minimum overlap.
11. Do not climb higher than the fourth rung from top of ladder.





c. Straining muscles or losing control of ladder

1. With ladders weighing more than 55 lbs, or where conditions complicate the task, have two person set up a ladder step by step.
 - a. Lay ladder on the ground close to intended location.
 - b. Brace ladder base using helpers feet.
 - c. Grasp the top rung with both hands, raise the top end over your head and walk towards the base of the ladder. Grasp

4. Ladder storage and handling

a. Climate

- d. the center of the rungs to maintain stability.
- d. Move the erect ladder to its desired location.
- e. Lean it forward against its resting point.
- f. The method for lowering any ladder is the reverse procedure of erecting it.

2. One person erecting of a short ladder.

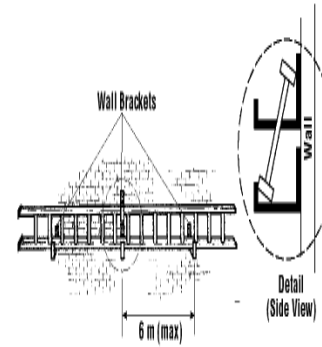
- a. Place bottom of ladder firmly against the base of a building or stationary object.
- b. Lift the top of ladder, and pull upwards to raise a ladder to a vertical position.
- c. Transfer a ladder to its required position when it is erect.
- d. Keep a ladder upright and close to the body with a firm grip.
- e. The method for lowering ladder is the reverse procedure of erecting it.

- 1. Store ladders where they are protected from the weather.
- 2. Keep wooden ladders in a well –ventilated location, away from dampness and excessive heat.
- 3. Do not expose fiberglass ladders to excessive temperatures (above 200 degrees F)
- 4. Do not expose plastic-reinforced ladders to excessive sunlight. Ultraviolet light may cause the plastic resins to degrade.

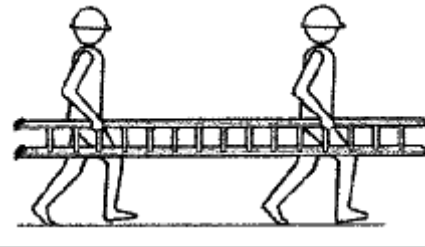
b. Improper storage

- 1. Support ladder on horizontal racks . To prevent sagging, support ladder every 6 ft.
- 2. Ensure storage area is easy to reach and free of clutter.
- 3. Vehicles:
 - a. Avoid long overhangs beyond support points when transporting ladder on vehicles.
 - b. Pad racks on vehicles with soft materials to reduce wear and road shock.
 - c. Mark ladders which overhang vehicles with a red or orange flag.
 - d. Tie ladder to each support point to reduce damage.
 - e. Do not store materials on ladder.

c. Improper carrying and handling



1. Grasp ladders near the centre when carrying them.
2. Do not hold the front of the ladder at head level when carrying them.
3. Use a partner to help carry long or heavy ladders.
4. Ensure that you and your partner are on the same side when carrying a ladder.
5. Stay in step.
6. Work out in advance any hand or voice signals to coordinate stopping or changing direction.
7. Use caution when carrying ladders through passageways, doorways or any place your view is obstructed.



10. LINE OFFICER SIGNATURE

12. TITLE

13. DATE

JHA Instructions (References-FSH 6709.11 and .12)

The JHA shall identify the location of the work project or activity, the name of employee(s) involved in the process, the date(s) of acknowledgment, and the name of the appropriate line officer approving the JHA. The line officer acknowledges that employees have read and understand the contents, have received the required training, and are qualified to perform the work project or activity.

Blocks 1, 2, 3, 4, 5, and 6: Self-explanatory.

Block 7: Identify all tasks and procedures associated with the work project or activity that have potential to cause injury or illness to personnel and damage to property or material. Include emergency evacuation procedures (EEP).

Block 8: Identify all known or suspect hazards associated with each respective task/procedure listed in block 7. For example:

- a. Research past accidents/incidents.
- b. Research the Health and Safety Code, FSH 6709.11 or other appropriate literature.
- c. Discuss the work project/activity with participants.
- d. Observe the work project/activity.
- e. A combination of the above.

Block 9: Identify appropriate actions to reduce or eliminate the hazards identified in block 8. Abatement measures listed below are in the order of the preferred abatement method:

- a. Engineering Controls (the most desirable method of abatement).
For example, ergonomically designed tools, equipment, and furniture.
- b. Substitution. For example, switching to high flash point, non-toxic solvents.
- c. Administrative Controls. For example, limiting exposure by reducing the work schedule; establishing appropriate procedures and practices.
- d. PPE (least desirable method of abatement). For example, using hearing protection when working with or close to portable machines (chain saws, rock drills, and portable water pumps).
- e. A combination of the above.

Block 10: The JHA must be reviewed and approved by a line officer. Attach a copy of the JHA as justification for purchase orders when procuring PPE.

Blocks 11 and 12: Self-explanatory.

Emergency Evacuation Instructions (Reference FSH 6709.11)

Work supervisors and crew members are responsible for developing and discussing field emergency evacuation procedures (EEP) and alternatives in the event a person(s) becomes seriously ill or injured at the worksite.

Be prepared to provide the following information:

- a. Nature of the accident or injury (avoid using victim's name).
- b. Type of assistance needed, if any (ground, air, or water evacuation).
- c. Location of accident or injury, best access route into the worksite (road name/number), identifiable ground/air landmarks.
- d. Radio frequencies.
- e. Contact person.
- f. Local hazards to ground vehicles or aviation.
- g. Weather conditions (wind speed & direction, visibility, temperature).
- h. Topography.
- i. Number of individuals to be transported.
- j. Estimated weight of individuals for air/water evacuation.

The items listed above serve only as guidelines for the development of emergency evacuation procedures.

JHA and Emergency Evacuation Procedures Acknowledgment

We, the undersigned work leader and crew members, acknowledge participation in the development of this JHA (as applicable) and accompanying emergency evacuation procedures. We have thoroughly discussed and understand the provisions of each of these documents:

SIGNATURE DATE

SIGNATURE DATE
