# Appendix A.5
# Aboveground, Ridgepole Shelter

## PROTECTION PROVIDED

**Against fallout radiation:** Protection Factor 300 (PF 300) if covered with 24 in. of earth. (A person in the open outside this shelter would receive about 300 times more fallout radiation than if he were inside.) See the accompanying drawing at the end of Appendix A.5.

**Against blast:** Better protection than most homes. Blast tests have indicated that this shelter would be undamaged at least up to the 5-psi overpressure range from large explosions. Without blast doors, the shelter's occupants could be injured at this overpressure range, although probably not fatally.

**Against fire:** Good, if the shelter is sufficiently distant from fires producing carbon monoxide and toxic smoke.

## WHERE PRACTICAL

In many wooded areas and wherever enough poles are available.

In locations where belowground expedient shelters are impractical because the water table or rock is too close to the surface for a covered-trench shelter.

## FOR WHOM PRACTICAL

For a family or group with 5 or more members able to work hard for most of 48 hours, at least one of whom is able to saw and fit poles and use the hand tools listed on the following page.

## CAPACITY

The shelter illustrated in Fig. A.5 is the minimum length for 5 persons. For each additional person, add 1 ft to the length of the ridgepole and shelter room. (If more than about 15 persons are to be sheltered, build 2 or more separate shelters.)

## BUILDING INSTRUCTIONS

1. Before beginning work, study Fig. A.5 and read ALL of the following instructions.
2. Divide the work. CHECK OFF EACH STEP WHEN COMPLETED.
3. By the time the shelter is finished, plan to have completed a ventilating pump (a KAP 20 in. wide and 26 in high, essential for this shelter except in cool weather) and the storage of at least 15 gallons of water per occupant. (See Appendix B and Chapter 8.)
4. Start to assemble the materials. **For the illustrated 5-person shelter,** these are:

### A. Essential Materials and Tools

- Poles. (Fresh-cut, green poles are best; sound, untreated poles are satisfactory.) See the following list for the number of poles required for a 5-person shelter.

| Use | Pole Length | Minimum Diameter of Small End | Number of Poles Required | Width When All Are Laid on the Ground |
|---|---|---|---|---|
| **For main room:** | | | | |
| Ridgepole | 4 ft 9 in. | 6 in. | 1 | |
| Column-posts | 4 ft 3 in. | 5 in. | 2 | |
| Footing log | 8 ft 0 in. | 6 in. | 1 | |
| Cross braces | 6 ft 2 in. | 3 in. | 2 | |
| Roof poles | 9 ft 0 in. | 4 in. | – | 5 ft[a] |
| Vertical end-wall poles | 5 ft 0 in.[c] | 3½ in. | – | 14 ft[b] |
| Slanting end-wall poles and extras | 6 ft 6 in.[c] | 3½ in. | – | 18 ft[b] |
| **For outer sections of entryways:** | | | | |
| Horizontal poles | 8 ft 0 in. | 3½ in. | 4 | |
| Cross braces (material for 16) | 5 ft 0 in.[c] | 3½ in. | 6 | |
| Wall poles | 3 ft 4 in. | 3 in. | – | 32 ft[b] |
| Roof poles | 2 ft 8 in. | 2½ in. | – | 12 ft[b] |
| **For inner sections of entryways:** | | | | |
| Long, sloping poles | 14 ft 0 in. | 4 in. | 4 | |
| Cross braces | 1 ft 8 in.[c] | 4 in. | 8 | |
| Vertical support poles | 4 ft 0 in.[c] | 4 in. | 8 | |
| Roof poles | 3 ft 0 in. | 2½ in. | – | 13 ft[b] |

[a]This width equals the distance measured across the tops of a single layer of poles when a sufficient number of poles are laid on the ground side by side *with all the same ends in a straight line and touching.* (These poles will be placed butt-ends down to form the walls of the shelter room.)

[b]This width equals the distance measured across a single layer of poles when a sufficient number of poles are laid on the ground side by side and *touching, with large ends and small ends alternating so as to cover a rectangular area.*

[c]To be cut into the various lengths needed to close the ends of the main room and also to close a part of each entryway.

- A saw and an ax or hatchet, to cut green poles. (A bow saw or crosscut saw serves well and often is more dependable than a chain saw. Having an extra blade for a bow saw may be essential.)
- Two shovels (one shovel for each two workers is desirable). A pick will also be needed, if the earth is hard.
- Large buckets, cans, or pots with bail handles—in which to carry earth, and later to store water or wastes.
- A knife.
- A hammer and at least 80 nails (3 in. or longer). If these are not at hand, rope, wire, or strips of cloth can be used to lash poles together. At least 200 ft. of rope or strong wire will be needed, or two additional bedsheets for each person to be sheltered. (Other fabric of equal strength can be used.) The cloth can be cut or torn into foot-wide strips and twisted slightly to make "rope."
- Three double-bed sheets for the illustrated 5-person shelter or a piece of strong fabric or plastic of about the same size. One additional sheet for each additional 2 occupants. (If sufficient sheets or other material are not available, use many sticks and small poles, placed across the 9-ft side poles.)
- At least 2 square yards per person of rainproofing material (shower curtains, plastic tablecloths, plastic mattress covers, or the like)—essential in rainy, cold weather.
- Materials for building a ventilating pump, a KAP 20 in. wide and 26 in. high. (See Appendix B.)
- Containers for storing 15 gallons of water per occupant. (See Chapter 8.)

### B. Useful Tools and Materials

- Additional saws, axes, hatchets, shovels, and large buckets or cans.

- A chain saw—if there is a person in the group who is skilled at operating one.
- Kerosene, turpentine, or oil—to keep a handsaw from sticking in green, gummy wood.
- A measuring tape, yardstick, or ruler.
- One bedsheet for each person to be sheltered, or a piece of strong fabric or plastic of about the same size.
- A total of 40 square yards of rainproofing materials for the illustrated 5-person shelter and $3\frac{1}{2}$ square yards for each additional person. (Even thin plastic will serve for the "buried roof.")

5. To save time and work, SHARPEN ALL TOOLS AND KEEP THEM SHARP.
6. Wear gloves from the start—even tough hands can blister after hours of digging and chopping and can become painful and infected.
7. Select a shelter location where there is little chance of the ground being covered with water if it rains hard. (If you are sure the water table will not rise to cover the floor of a shallow excavation, you can save work by first lowering the area of the planned main room by a foot or two. After the shelter is roofed, the excavated earth can be shoveled back to help cover the completed pole roof.) To avoid the extra work of cutting roots when excavating earth, select a site at least as far away from a tree as the tree is tall.
8. For a shelter that is completely aboveground, clear grass, weeds, etc. from the area where the shelter is to be built. (This reduces the possible problem of chiggers, ticks, etc.) Do not remove any earth at this stage.
9. Stake out the entire shelter. Check the squareness of the shelter room by making its diagonals equal. Then drive two lines of stakes to mark the outside edges of the completed earth covering. Place these stakes 4 ft outside the future positions of the lower ends of the roof poles.
10. Check the squareness of the future floor area inside the two lines marking where the two V-shaped, 4-in.-deep trenches will be dug, to secure the lower ends of the sloping side-poles of the room. These two parallel lines are 14 ft 6 in. apart. When the two diagonals joining the ends of these two parallel lines are equal in length, the area between them has square corners.
11. While some persons are staking out the shelters, others should be cutting green poles and hauling them to the site. Cut poles that have tops with diameters (excluding bark) no smaller than the diameters specified on the illustration for each type of pole.
12. To make the hauling and handling of the longer poles easier, select poles with top diameters no more than 50% larger than the specified minimum diameters.
13. Sort the poles by length and diameter and lay all poles of each size together, near the excavation.
14. AS SOON AS POLES ARE BROUGHT TO THE SITE, SOME WORKERS SHOULD START BUILDING THE FOUR LADDER-LIKE HORIZONTAL BRACES FOR THE ENTRYWAYS—TO AVOID DELAYS LATER. Study the drawing. Then construct these braces on smooth ground near the excavation. Place two straight poles, each 8 ft long (with small-end diameters of $3\frac{1}{2}$ in.), on smooth ground, parallel and so that their outer sides are 3 ft apart. Hold these poles securely so that their outer sides are exactly 3 ft apart, by driving two pairs of stakes into the ground so that they just touch the outsides of the two long poles. Each of the four stakes should be located about one foot from the end of a pole. To keep the 8-ft poles from being rotated during the next step, nail two boards or small poles across them perpendicularly, as temporary braces, about 4 ft apart.

    Then with an ax or hatchet, slightly flatten the inner sides of the two poles at the spots where the ends of the 4 cross-brace poles will be nailed. Next, saw each cross-brace pole to the length required to fit snugly into its place. Finally, toenail each cross-brace pole in place, preferably with two large nails in each end.
15. If more than 5 persons are to be sheltered, use 3 column-posts for 6 to 9 persons, and 4 column-posts for 10 to 14 persons.
16. For each additional person beyond 5, make the ridgepole and the footing log each 1 foot longer than shown in Fig. A.5.

17. After notching the footing log (see drawing), place it in a trench dug deep enough so that the bottoms of its notches are about 4 inches below the surface of the ground.

18. Carefully dig the 4-in.-deep, V-shaped, straight trenches in which the lower ends of the 9-ft wall poles will rest. Dig each of these two parallel trenches 7 ft. 3 in. from the center line of the footing log.

19. Carefully notch a "V" only about $^1/_2$-in. deep in the top of each of the two outer column-posts. Then saw off the other ends so that each is 4 ft 3 in. long. (When they are placed on the notched footing log and the ridgepole is placed on them, the upper side of the ridgepole will be about 4 ft 4 in. above the ground.)

20. Place the two **outer** column-posts in their notches in the footing log, and secure the base of each column-post against sideways movement by placing two small-diameter, 4-ft horizontal poles just below the ground level on both sides, as illustrated. Then temporarily place and brace the ridgepole in position.

21. For shelters sized for more than 5 occupants, make and place the inner column-post, or posts. To avoid cutting a "V"-notched column-post too short, first carefully "V"-notch each remaining column-post, cut it about 1 in. too long, and trim it off to fit in its final position under the ridgepole.

22. If nails at least 4 in. long are available, nail sloping cross-braces to the inner sides of the column-posts. If nails are not available, notch slightly bowed cross-braces and the column-post as illustrated; then lash or wire them in position. (Strips of ordinary bedsheets, torn about a foot wide and twisted together slightly, can be made to serve as lashing "rope.") To hold the tops of the column-posts securely against the upper ends of the cross-braces, a tightened "rope" loop that encircles the tops of the column-posts can be used.

23. Next put four of the larger-diameter, 9-ft roof-poles in position, with the outsides of the outermost two roof poles each only about 1 in. from an end of the ridge pole.

24. Place the rest of the 9-ft roof-poles in position, making sure that all their small ends are uppermost, and that they are pressed together and overlap on the ridgepole at least as far as illustrated. Pack earth between their lower ends. If the earth is clay, put small spacers of wood between the ends.

25. At each end of the shelter room, build extra shelter space and an entryway. First position two 14-ft poles with their upper ends resting on the outermost wall poles. Study Fig. A.5. Place the two 14-ft poles 20 in. apart, parallel, and equally distant from the centerline of the ridgepole. Nail four 20-in.-long spacer-poles between each pair of 14-ft poles, as illustrated. To make sure that the upper ends do not move before earth pressure holds them in place, tie the upper ends of the 14-ft poles together. Drive a stake against the lower end of each 14-ft pole, to keep it from slipping outward. Under the center of each 14-ft pole, place two supporting, vertical posts.

26. Dig. 4-in.-deep trenches for the lower ends of the sloping end-wall poles of the main room. These poles must be cut to length so that their upper ends will be about 4 in. above the outermost 9-ft roof pole against which they lean. Dig narrow, vertical trenches, about 8 in. deep, for all vertical wall poles that do not press against horizontal brace poles near the ground.

27. Start placing the sloping end-wall poles. First place the longest pole, then the shorter poles—all touching.

28. Across the open spaces between the 9-ft roof poles, place limbs and/or sticks roughly horizontally, as shown in the lower left-hand drawing. Be sure to use limbs or sticks that have diameters of at least $^1/_2$ in. and put them no farther apart than 6 in. Leave needles and leaves on the limbs. Do not leave sharp ends sticking upward. Do not place more than a 6-in.-thick mass of limbs and leaves over the side-poles. The thickness of the earth cover necessary for excellent fallout protection might be unintentionally reduced by making the limb cover too thick.

29. Place bedsheets (or 4-mil-thick polyethylene film or equally sturdy material) over the limbs and sticks to keep earth from falling through the roof.

30. To prevent sand or dry earth from falling between the cracks where the poles are side by side, cover these parts of the roof with cloth, plastic, or paper. If these materials are not

available, use sticks, leaves, and grass. (In tick or chigger season, avoid using grass or leaves from on or near the ground.)

31. After the entryways are completed, begin to cover the shelter with earth. **Starting from the ground up,** put on a full 1-ft thickness of earth cover. First raise its height about a foot on one side or end of the shelter, and then on the other—repeatedly. This is to prevent unequal loading from tipping the shelter or pushing it over. (Do not excavate any earth closer than 3 ft to the line of stakes marking the final outer edge of the completed, 2-ft-thick earth cover.)

32. Fill the spaces between the entryways and the main room only with earth. (An equal thickness of wood or other light material provides much less protection against radiation.)

33. Before placing the rainproofing material for the "buried roof," smooth the surface of the 1-ft-thick earth cover. This will prevent sharp rocks or sticks from puncturing the plastic or other rainproofing material. If you do not have sufficient waterproofing materials to cover the whole roof, use what is available to rainproof the central part, on both sides of the ridgepole.

34. To prevent rainwater on the ground outside from running into the entryways, make mounds of packed earth about 4 inches high across the entryway floors, about 2 ft from their outer ends. Dig a shallow drainage ditch completely around the earth mounded over the shelter.

35. Unless the weather is cold, install your shelter-ventilating KAP in the entry into which you can feel air moving naturally.

36. Complete the storage of water and other essentials.

37. To prevent fallout or rain from falling onto the floor of the outer entryways, place a small awning (not illustrated) over each opening.

38. Fill all available water containers, including pits which have been dug and lined with plastic, then roofed with available materials. If possible, disinfect all water stored in expedient containers, using one scant teaspoon of a chlorine bleach, such as Clorox, for each 10 gallons of water. Even if only muddy water is available, store it. If you do not have a disinfectant, it may be possible to boil water when needed.

39. As time and materials permit, continue to improve your chances of surviving by doing as many of the following things as possible;

    (1) Make a homemade fallout meter, as described in Appendix C.

    (2) Make expedient lights.

    (3) Make and hang expedient bedsheet-hammocks and bedsheet-chairs.

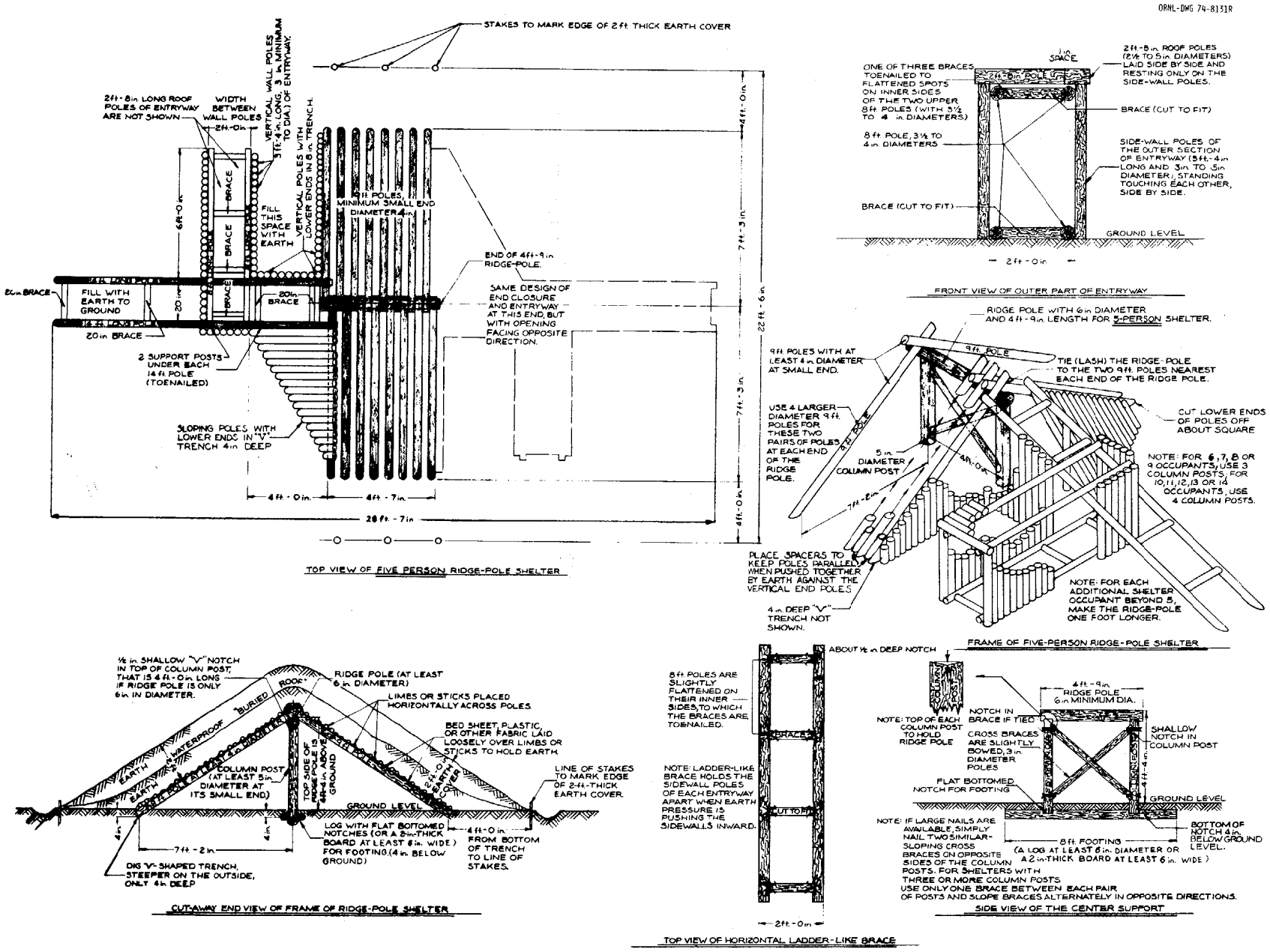


Fig. A.5. Aboveground, Ridgepole Shelter.