

## Doors

People usually constructed historic log cabin doors from several pieces of wood—a frame of vertical stiles and horizontal rails holding raised or flat panels in place; a style known as “rail and stile” or “frame and panel.” They typically cut grooves into the stiles and rails and matching tongues around the edges of the panels. The tongues fit into the grooves and held the panels solidly within the frame, but allowed the panels to move a little to accommodate changes in temperature or moisture without damaging any of the door parts.

Before 1900, most frame and panel doors had vertically oriented panels in two rows separated by a center mullion stile (figure 303). Center mullion stiles became less common after 1900. Instead, horizontal panels extended the full width between outside frame stiles. The doors of cabins built after 1850 sometimes included one or more lites (window panes) instead of panels in the upper part of the door.



Figure 303—This photo shows one of the doors of the Zeigler house in Dalmatia, Pennsylvania. The site-constructed frame and panel door was built in a style that people commonly used before 1900.

Some people constructed historic log cabin doors using several vertical boards tied together by horizontal boards at the top and bottom (called “ledges” or “battens”). Many of these doors also had a diagonal board (“brace”) that extended from the top ledge to the bottom ledge and fastened to each of the vertical boards to keep the door square (figure 304). This style is known as “ledge and brace” or “plank and batten.” People usually refer to doors with tongue-and-groove vertical boards as ledge and brace style and to doors with flat-edged vertical boards as plank and batten style.

Exterior doors usually are thicker than interior doors. Modern exterior doors normally are 1¾-inches thick and interior doors usually are 1⅜-inches thick. Historic doors may be thinner or thicker. Modern doors normally are 6 feet 8 inches or 7 feet tall. Historic doors may be nearly any height that the builder found convenient. Size is one reason to repair or rebuild historic doors rather than replacing them with modern doors.

As with wooden windows, historic doors are likely to have denser and more rot- and warp-resistant wood than newer doors. It’s worth saving as much of the original material of the doors in your log cabin as possible.

The requirements for removing deteriorated paint (especially lead-based paint), replicating original profiles and finishes, stripping paint, and acquiring historically appropriate hardware and modern replacement materials are much the same for doors as for windows. For information about these subjects, see the [Using Paint, Stain, and Oil](#) and [Windows](#) sections of this guide.

Don’t repair doors until after you remove deteriorated paint (see the [Windows](#) section of this guide). Replacement parts must match the profile (the shape, size, and joining types) of the original door. Useful tools for matching original details include a shaper, tenoning machine, and band saw. You can create many, but not all, profiles using multiple passes with a router, band saw, and table saw.

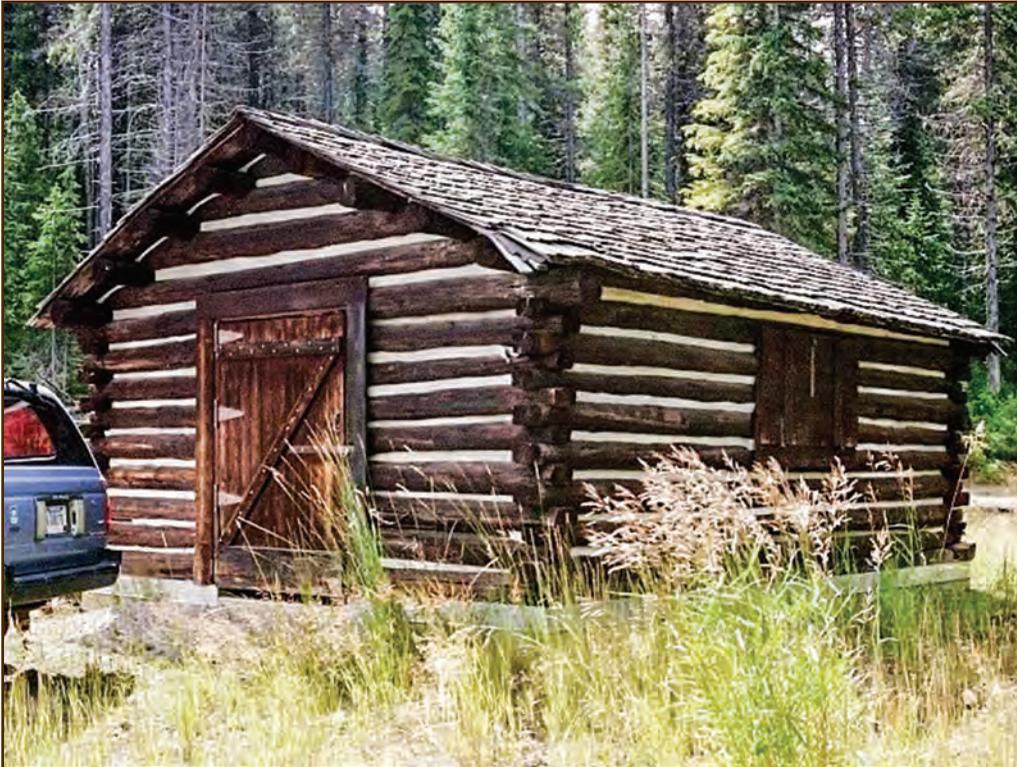


Figure 304—This log cabin at Lolo Pass (Clearwater National Forest, Northern Region) has a ledge-and-brace style door. The builders constructed the cabin in 1923.

### Tips for Effective Door Repair

You can successfully repair a wood door by carefully observing and replicating the original construction methods. However, the following tricks of the trade can make the process easier and more effective:

- Historically, builders usually pinned or doweled door components together, though some nailed or screwed them together. Look for evidence of wood or metal pins and dowels.
  - To disassemble the door for repairs, drill out the pins or gently tap the panels apart with a wooden mallet.
- You can use tempered glass in door windows to meet safety and building code requirements.
- You can install rubber bulb or brush weather stripping to help make the doors weather tight.
- Repaint carefully. Do not allow excess paint to build up or form drips.

Do not change the size of the doors, unless you must meet accessibility or fire safety requirements. See the [Decisions, Decisions: Deciding What To Do to the Cabin](#) section of this guide for more information on reconciling seemingly conflicting requirements. Widening a door affects the visual integrity of a building so, if possible, only modify doors that are not on the main façade of the cabin (figure 305). The SHPO will probably need to review or approve any door changes if a Federal or State government agency owns the cabin or if Federal or State sources provided some or all of the funding for the cabin preservation work. Check with your heritage resource specialist or archaeologist for the requirements.



Figure 305—As part of the renovation of the 1905 House at the Main Boulder Station (Gallatin National Forest, Northern Region), preservation crewmembers constructed a new door to meet accessibility requirements. The crew installed the door on the back of the cabin; it has the same number and configuration of panels as the historic doors, but is 36 inches wide. The crew later constructed a stoop to provide level access from the yard to the door.

## Fireplaces, Wood Stoves, Chimneys, and Flues

Your cabin probably has either a fireplace with a masonry chimney or a wood stove that connects to a masonry chimney or a metal flue. The wood stove or fireplace probably provided the only source of heat and may have been used for cooking when the builders originally constructed the cabin.

Wood stoves usually have a shorter life than a cabin. Replace the stove when it no longer functions properly or it poses a safety hazard. Because it's not a permanent part of the structure, you can replace an inadequate wood stove with a newer, safer, more efficient model. You don't have to match the appearance of the original stove, but, if possible, try to find a stove that's similar in size and appearance so it won't look out of place in the cabin.

### Tips on Selecting a Wood Stove

- Chose a high quality and efficient stove.
  - Ensure that the stove is Underwriters Laboratories-listed—the stove should have a tag attached.
  - Ensure that the stove is [Environmental Protection Agency certified](http://www2.epa.gov/compliance/list-epa-certified-wood-stoves) <http://www2.epa.gov/compliance/list-epa-certified-wood-stoves>
- If possible, choose a model with classic detailing that appears similar to something that might have been original to a historic cabin. While the Forest Service does not endorse or recommend specific products, some manufacturers produce stoves that have a historic look. Examples include:
  - [Vermont Castings](http://www.vermontcastings.com/products/Stoves/Wood-Burning/) <http://www.vermontcastings.com/products/Stoves/Wood-Burning/>
  - [Avalon](http://www.avalonfirestyles.com/product-guide.aspx) <http://www.avalonfirestyles.com/product-guide.aspx>

Information about wood stove installation and operation is available from the [National Agricultural Safety Database](http://www.nasdonline.org/document/1254/d001052/wood-stove-installation-and-operation.html) <http://www.nasdonline.org/document/1254/d001052/wood-stove-installation-and-operation.html> and the [University of Missouri extension office](http://www.extension.missouri.edu/publications/DisplayPub.aspx?P=g1730) <http://www.extension.missouri.edu/publications/DisplayPub.aspx?P=g1730>. Follow the manufacturer's instructions to install the new stove; do not install the stove closer to combustible surfaces than specified by the manufacturer. You may be able to reduce the clearance by using a heat shield.

A heat shield is a sheet of nonflammable material that you install on spacers to encourage a convection flow of air that prevents most of the heat from reaching the combustible material behind the shield. See the University of Delaware Cooperative Extension document "[Wood Stove Installation and Operation](http://nasdonline.org/1248/d001052/wood-stove-installation-and-operation.html)" <http://nasdonline.org/1248/d001052/wood-stove-installation-and-operation.html> for general information about wood stove installation and heat shields.

National Fire Protection Association (NFPA) publication [NFPA 211: Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances](http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=211) <http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=211>, contains the code requirements for proper spacing between wood stoves and combustibles, chimney or flue clearances and heights, and the use of heat shields. You must create a username and password before you can view this document.

The chimney or flue funnels exhaust from the wood stove or fireplace to the outdoors, taking advantage of the natural tendency of hot gasses to rise. If the flue or chimney cracks or breaks, or debris or creosote buildup blocks the flue or chimney, it becomes a safety hazard. Inspecting a flue or chimney annually and cleaning it regularly are very important. See the [Fireplace, Wood Stove, Chimney, and Flue Maintenance](#) section of this guide for more information.

If the cabin has a single-wall metal flue extending through the wall or roof of the cabin (figure 306), do not operate the wood stove until you can replace the flue with a properly constructed masonry chimney or a modern, Underwriters

Laboratories-listed metal flue that meets fire code requirements. This upgrade will affect the appearance of the cabin, but nearly all SHPOs would rather see a modern flue than a cabin that burns down because of an inadequate flue.

If you have to replace the flue, be sure to include an ash cleanout at the bottom of the vertical flue run so that you can easily remove the ash and creosote that you detach when you clean the flue with a brush. Install a spark arrester at the top of the flue unless your cabin is in a rain forest and the roof is likely to be wet when you use the stove.

Follow the manufacturer's clearance, flashing, and assembly instructions if you install a new metal flue. Do not install the flue closer to combustible materials than allowed in the manufacturer's instructions. You may be able to reduce the required clearance by installing a heat shield between the flue and the flammable materials. Check with the manufacturer and your city or county building department for specific requirements.

Remember that, to draw properly and to comply with Life Safety and International Building Codes, the top of any

flue or chimney must be at least 3 feet higher than the roof adjacent to the chimney or flue **and** at least 2 feet higher than any part of the building (including the roof) that is within 10 feet of the flue or chimney. The SHPO probably will need to review or approve any change to the flue or chimney (figure 307) if a Federal or State government agency owns the cabin, or if Federal or State sources provide some or all of the funding for the cabin preservation work. Check with your heritage resource specialist or archaeologist for the requirements.

If your cabin has a masonry chimney (figure 308), keep it in good repair so that your cabin doesn't burn down instead of heating up. Fix any problems identified during the annual inspection immediately so they don't become critical hazards.

If the chimney liner is cracked, rebuild it or resleeve it with a modern, poured-in-place cement liner or a metal chimney liner. Most people lined log cabin chimneys either with high temperature clay tile pipe sections or they parged the inside of the chimney with mortar to create a smooth surface. Some people built chimneys with no liner at all. Keeping unlined chimneys free of creosote is nearly impossible, so add a liner, if you can.



Figure 306—The Bull Prairie Ranger Station on the Heppner District (Umatilla National Forest, Pacific Northwest Region) had a single-wall metal flue. Smoke drifts from the flue, which is just barely visible beyond the peak of the roof, in this photo from 1931.



Figure 307—The original brick chimney at the Adams Ranger’s House (Salmon River Ranger District, Nez Perce National Forest, Northern Region) had deteriorated so badly that preservation crewmembers had to completely rebuild it. Although the crew replaced the portion of the chimney inside the building (hidden inside the interior walls) with a lined concrete block chimney, they rebuilt the portion visible above the roof to the original proportions using the original bricks.



Figure 308—The Wolf House in Norfolk, AR, built in 1829, has masonry fireplaces and chimneys on each end. The builders constructed the original chimneys of local stone. Someone apparently reconstructed the top of the chimney on the left side of the building with brick at some point after 1960; a photo from 1960 shows the chimney completely constructed of stone.

Resleeving reduces the interior diameter of the chimney. This may be good if the original chimney had a large interior diameter built for burning coal and you are now burning wood, which requires a smaller flue size. If you have a wood stove, size the chimney's interior cross-sectional area according to the wood stove manufacturer's recommendations. If you have a fireplace, make the chimney's interior cross-sectional area one-eighth the size of the total area of the fireplace opening. You won't be able to reline the chimney if you cannot reduce its interior area. You probably will have to rebuild the chimney.

Clay pipe chimney liners expand a little when they get hot. The liner must be able to move independently of the rest of the chimney, which doesn't heat up or expand as fast. If the liner is mortared directly to the chimney, it cannot expand; it will crack or shatter when you burn a hot fire in the stove during really cold weather or if a chimney fire occurs. More information on [chimney liners](#) is available from the Old House Journal <[http://www.oldhousejournal.com/chimney\\_liners/magazine/1465](http://www.oldhousejournal.com/chimney_liners/magazine/1465)>.

If you rebuild the chimney, use a layer of 30-pound asphalt felt roofing paper between the liner and chimney to create an air space. To accomplish this, roll out the felt on a relatively flat surface and cut it to the length of the liner. If the chimney is large, you may need two lengths of felt to completely cover the outside of the liner. Place one end of the felt between the lowest section of liner and the bottom of the chimney. Assemble the chimney around the felt-covered liner. Working around the floppy length of felt may be a little awkward, but it is far easier than cleaning excess mortar from the narrow, deep gap. After you complete the chimney and the mortar sets, pull out the felt. There will be a small air gap between the liner and the chimney where you removed the felt.

Over time, mortar often cracks and falls out from between the bricks in fireplaces and chimneys. Repair any mortar as soon as you discover that it's cracked. First, rake out all the cracked mortar. Raking out means removing the mortar to a  $\frac{3}{4}$  inch depth from the face of the bricks (see figure 242). Use a hammer and stone chisel, rock hammer, double jack, or similar tools (see figure 243). Do not break any of the

masonry or you will have to replace it and possibly rebuild the chimney. Repoint the joints that you raked out, matching the original joint profile. Match the color and type of mortar using a process similar to that used to match masonry daubing, as explained in the [Chinking and Daubing](#) section of this guide.

Crowns on chimneys may crack because of sudden heat from a flue fire, freezing and thawing moisture in the crown, or settling. Crowns built in place using mortar don't stand up to the weather as well as concrete or tile crowns; you need to rebuild them every few years. If you have a damaged mortar crown, do not patch it; remove it completely. Lay a new mortar crown with a sufficient slope to direct moisture away from the edges of the chimney.

A concrete or tile crown is relatively easy to replace, though it may be hard to find a replacement crown that matches the historic crown. You may have to cast a replacement concrete crown to replicate the profile of the historic crown. Finding a matching tile crown can be a challenge, and you may have to settle for something that isn't identical.

To replace a concrete or tile crown, first remove the damaged crown carefully to avoid damaging the flue liner or the chimney bricks. Removing a crown using pry bars usually is fairly easy because the mortar under the crown often is a little crumbly if the crown is damaged. If the crown is securely fastened, you may need to use a concrete saw to detach it. When you've removed the damaged crown, clean the top of the chimney and the side of the flue, then set the new crown in a bed of mortar.

If the fire box or the portion of the chimney directly surrounding the liner contains cracked or damaged bricks, use firebricks to replace the damaged bricks or to rebuild the damaged section. Unless surface materials hide the firebricks, use new or salvaged bricks that match the color and size of the original bricks. Use refractory mortar to set bricks in the firebox and to set sections of a clay tile flue liner. If decorative masonry covers the original chimney, reface the exterior as needed with river cobbles, split stone, or other nonflammable material that matches the original facing.

## Repairing Interiors

Cabin interiors normally are fairly plain and practical and often are well crafted. A restored cabin interior can be a pleasant place to work or live. Although it would be great to restore every cabin interior to its original configuration, historic preservation standards recognize that you may sometimes need to modify interiors to serve modern purposes. For example, people often add indoor plumbing to historic cabins, which means that they must divide a bathroom from the living or working space inside the cabin. The SHPO nearly always allows such changes. The SHPO probably will need to review or approve any change to the interior if a Federal or State government agency owns the cabin, or if Federal or State sources provide some or all of the funding for the cabin preservation work. Check with your heritage resource specialist or archaeologist for the requirements.

You can determine original paint colors by using the methods described in the [Using Paint, Stain, and Oil](#) section of this guide. The section contains information about lead-based paint, stripping paint, and latex versus oil-based paint. See the [Windows](#) section of this guide for information about historically appropriate hardware, removing deteriorated paint from woodwork before you make repairs, replicating original finishes, and using modern replacement materials. The issues and solutions for interiors are the same as for windows.

## Floors

Most log cabins originally had wood floors, although some builders originally constructed early 20th-century cabins with resilient flooring in service areas, such as bathrooms and kitchens. More information about resilient flooring is available to Forest Service and Bureau of Land Management employees in “[Early 20th-Century Building Materials: Resilient Flooring](http://fsweb.mtdc.wo.fs.fed.us/php/library_card.php?p_num=0773_2322)” at [http://fsweb.mtdc.wo.fs.fed.us/php/library\\_card.php?p\\_num=0773\\_2322](http://fsweb.mtdc.wo.fs.fed.us/php/library_card.php?p_num=0773_2322).

Some wood flooring was plain sawn or split planks, but builders sometimes laid carefully finished tongue-and-groove flooring boards on shiplap subfloors. Many builders used wide hardwood or clear softwood boards for cabin floors. Such materials that were common when builders constructed the cabins may be difficult to find these days.

Wood floors are extremely durable if you care for them properly. If the floor in your cabin is basically sound but needs a few repairs or refinishing, the first thing to do is to sand or strip the existing finish from the entire floor (figure 309). If any individual boards have deteriorated or been damaged beyond what you can sand out or patch, replace the damaged boards using boards that match the original species of wood and board size. Finally, refinish the floor using three or four coats of water-based polyurethane or durable paint to produce a finish similar to the original (figure 310).

If the entire floor is deteriorated or damaged beyond repair (figure 311), use replacement flooring material that matches the original flooring (figure 312) as closely as possible. You may be able to salvage flooring from another building or find modern flooring that is similar.



Figure 309—Preservation crewmembers patched, planed, and sanded the kitchen floor at the Adams Ranger's House (Salmon River Ranger District, Nez Perce National Forest, Northern Region) before refinishing it.

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Figure 310—The refinished kitchen floor of the Adams Ranger's House shows evidence of past heat damage from a wood stove that someone didn't properly shield. Because it shows no evidence of heat damage, it's easy to tell that someone previously replaced a short floorboard where the stove once sat.



Figure 311—The flooring inside the Square Mountain Lookout (Salmon River Ranger District, Nez Perce National Forest, Northern Region) was deteriorated beyond repair and preservation crewmembers had to completely remove it.



Figure 312—After the Northern Region Historic Preservation Team repaired or replaced deteriorated logs, floor joists, and subflooring at the Square Mountain Lookout, they installed new flooring of the same type as the original.

Before you install the new flooring, measure (at floor level) the length of the two walls that run perpendicular to the long dimension of the flooring. If the room is like most cabins, it probably is not square. If one wall is just a little longer than the other, adjust the spacing of the flooring (much like adjusting the shingles on a roof) so that the finished product looks square and fits neatly in the room. To adjust the space between the boards, place thin putty knives vertically between the boards and use them to move the boards slightly apart as necessary before fastening the boards in place. You may have to cut the last board at a slight angle to fit properly. Finish the new flooring to replicate the appearance of the original flooring.

You can install tongue-and-groove flooring most efficiently by using a flooring nailer and flooring nails, exactly like modern tongue-and-groove flooring. Install plank flooring using fastener spacing and types that match the original fastening method.

You can renovate stairs in much the same way that you renovate floors. If the stairs are well used, the treads probably have dips where they have worn down over the years. Unless the treads are broken or are worn to less than  $\frac{3}{4}$  inch thick, you don't need to replace them. Wear patterns add character to the stairway. Finish the repaired stairs to match the original finish (figure 313).

Because porch floors tend to receive a lot of abuse from boots and weather, the porch floor on your cabin may be severely buckled or deteriorated and you may need to repair or replace it. Porch flooring boards swell and shrink with the weather, so you should provide a little space between them to allow

them to expand without buckling and heaving. Providing space between the boards also prevents decay-causing moisture from being trapped between them. If the porch boards are plain planks, you easily can leave  $\frac{1}{8}$  to  $\frac{1}{4}$  inch of space between them.

If the porch has tongue-and-groove flooring, you may find that it's a little tricky balancing the need to have the tongues set firmly into the grooves with the need to leave expansion space between the boards. The most effective strategy is to use spacers. Lay the first row of flooring and nail it down. Place the second row of flooring, but don't nail it down immediately. Insert a series of thin metal spacers or several putty knife blades between the two rows of flooring to produce a uniform space between the rows. Do not push the spacers or blades all the way to the subfloor or joists; insert them only to the tongue to create a small  $\frac{1}{64}$ - to  $\frac{1}{32}$ -inch gap between the two rows, then nail the flooring down. Remove the spacers or blades and repeat the process for the rest of the flooring. Finally, finish the porch to match the original finish.

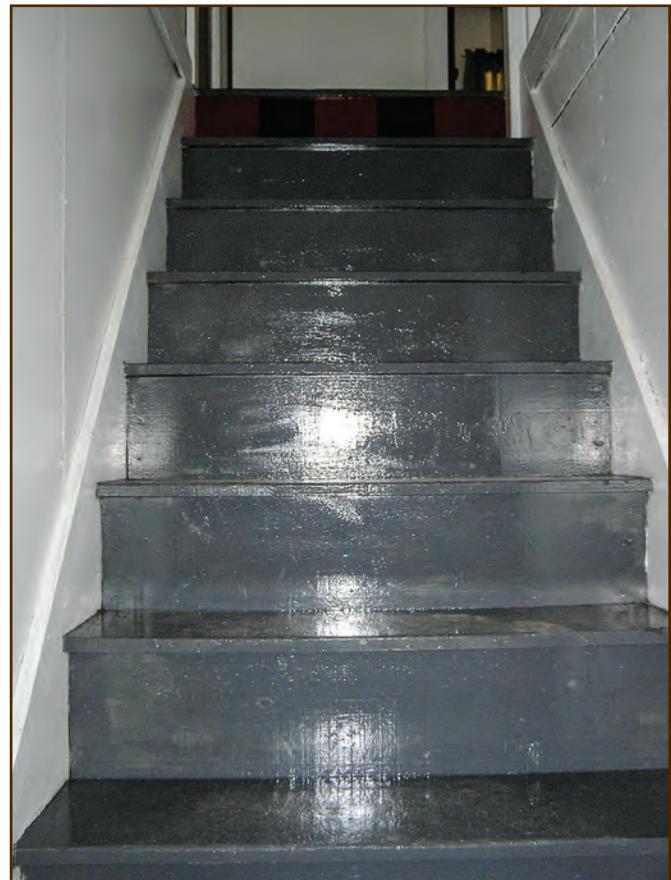


Figure 313—Preservation crewmembers painted the repaired stairs in the Adams Ranger's House glossy gray to match the original finish.

## Interior Walls

Occupants may have moved, added, or removed interior walls in historic cabins as their needs changed. The condition and historic assessment includes information about the original location of interior walls. Consider restoring the original wall configuration and finish if these don't conflict with the intended use of the cabin.

Interior cabin walls may originally have been round or hewn logs (figure 314). Sometimes, people framed interior walls with lumber and then plastered the walls. People also covered walls with early versions of gypsum wall board, paneled them with tongue-and-groove (figure 315) or plain boards, covered them with fiberboard (sometimes called Beaver Board) (figure 316) or plywood, or covered them with any combination of these finish materials.



Figure 314—The builders hewed and rough sanded the insides of the log perimeter walls at the kitchen and bathroom of the Adams Ranger's House to form a relatively flat surface. The builders originally covered the logs with fiberboard, but the fiberboard was severely deteriorated and the preservation crew did not replace it in the kitchen or bathroom when they repaired the cabin.

Figure 315—The builders originally paneled the parlor walls of the Adams Ranger's House with tongue-and-groove boards. Preservation crewmembers repaired and retained the paneling when they renovated the cabin.



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Figure 316—Preservation crewmembers repaired the original fiberboard panels and wood battens covering the upstairs walls of the Adams Ranger's House when they could save them and replaced the panels and battens when they couldn't.

You should repair cabin walls in kind to match the original wall surfacing (figures 317, 318, and 319). If you must build new walls to accommodate the current use of the cabin, the new walls should be similar in appearance to the original walls in that part of the cabin.

The builders originally covered the interior walls of some cabins with painted paneling or fiberboard. Fiberboard sometimes is called by the manufacturer's name, such as Upson Board, Beaver Board, Homasote board, and Celotex. Several manufacturers still produce this type of wallboard. Fiberboard crumbles when it gets wet. There's no way to patch the crumbled fiberboard, so you must replace it. More information about repairing and replacing fiberboard is available to Forest Service and Bureau of Land Management employees in "Early 20th-Century Building Materials: Fiberboard and Plywood" at [http://fsweb.mtdc.wo.fs.fed.us/php/library\\_card.php?p\\_num=0773\\_2308](http://fsweb.mtdc.wo.fs.fed.us/php/library_card.php?p_num=0773_2308).



Figure 317—The original fiberboard covering the walls in the upstairs west bedroom at the Adams Ranger's House was damaged by water leaking through the roof, rodents, and vandalism.

Figure 318—When the preservation crew removed the damaged fiberboard panels in the west bedroom, they found that all of the interior walls and the ceiling were covered with ¼-inch-thick boards to provide solid backing for the fiberboard panels.



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Figure 319—The preservation crew replaced damaged sections of fiberboard in the west bedroom with similar modern fiberboard panels, reinstalled the original wood battens to cover the panel joints, and replaced or reinstalled the trim boards. The crew painted the panels, battens, and trim boards to match the original colors.

Paint interior walls and trim to match the historic paint colors, even if the historic colors aren't considered attractive or appropriate by current standards. Determine the original paint colors using methods described in the [Using Paint, Stain, and Oil](#) section of this guide. A cheerful comment about "ugly" paint colors: at some point during the preservation project, someone usually will complain about the ugly historic paint colors. When you paint the trim, walls, and floor with the historic colors, put the appropriate furniture in place, and hang curtains in the windows, the historic colors (figure 320) will look pretty good.

### Propane, Plumbing, and Wiring

Most people who can repair cabin logs are able to follow manufacturer's instructions for making minor plumbing or electrical repairs, such as replacing a faucet or light fixture. If the condition assessment for your cabin identified serious plumbing or wiring problems, hire a licensed plumber or electrician to fix them. Licensed professionals operate safely and properly and perform work that meets code requirements. While the licensed professional is onsite, consider having him or her check all the wiring or plumbing for other problems that the condition assessment might have missed.

Some log cabins built in the 20th century used propane to power light fixtures, cook stoves, and even refrigerators. Historic propane piping is unlikely to meet current code requirements. For instance, most building codes no longer allow hard copper supply piping. Have hard copper piping replaced with soft copper, black iron, or stainless steel, as required by the local code. In addition, shutoff valves, which people seldom used on historic piping, now are required near each appliance. If the condition assessment identified any

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Figure 320—The 1890 Morgan-Case homestead cabin (Missoula Ranger District, Lolo National Forest, Northern Region) is listed on The National Register of Historic Places. "Passport in Time" volunteers refurbished the cabin, including repainting the interior using historic gray and cream colors. The cabin is available to rent for recreational use.

problems with the piping, hire a licensed propane gas professional to thoroughly assess the piping and connections and to perform any necessary repairs or replacements.

Regardless of who does the work, it is important to install historically appropriate fixtures, operating mechanisms, and hardware. If the original items still are in place (figure 321) or photos show the appearance of the original items, use replacements that look similar. If no evidence of the original items exists, use replacements that are appropriate for the time period and location (figure 322). For instance, Mission-style, craftsman-type light fixtures might be appropriate for a 1926 cabin in California, but would most likely not be appropriate for a 1908 cabin in Minnesota. [Appendix F—](#)

[Acquiring Tools and Materials](#), lists some sources for historically appropriate plumbing and lighting fixtures.

Appliances, on the other hand, don't necessarily require a historic appearance because they aren't permanently attached to the building. If you want to have a consistent historic look throughout the interior, purchase modern appliances that are manufactured with a retro or historic appearance, or old appliances that are retrofitted by appliance dealers to bring them up to current code. Preservation trade magazines, such as *Old House Journal*, carry advertisements from many of these manufacturers. [Appendix F—Acquiring Tools and Materials](#), lists some sources for these historic or historic-appearing appliances.



Figure 321—This toilet is original to the 1938 Cookhouse at Fenn Ranger Station (Nez Perce National Forest, Northern Region). The toilet still works just fine, although it is not water efficient.



Figure 322—This propane light fixture is not original to the kitchen of the 1933 Ranger's House at the Adams Camp Work Center (Nez Perce National Forest, Northern Region), but it is similar to fixtures available locally when the builders constructed the cabin.

## Log Cabin Maintenance

Every building has an optimum maintenance cycle. Proper maintenance keeps your building in excellent condition. Although you'll seldom have enough money, time, or labor for proper building maintenance, you can either find them or pay later for repairs that are much more expensive. It can be a vicious cycle.

Surprisingly, the easiest components to maintain on a log cabin are the logs. They are massive and sturdy. If they stay reasonably clean and dry, logs will provide decades (sometimes centuries) of service. Maintain the rest of the building much as you would your home, paying special attention to materials that don't last long, such as daubing. Unlike your home, most repairs and replacements must match the historic materials.

The Forest Service requires regular inspections (called condition surveys) and maintenance of all buildings under its care. Forest Service employees can refer to the report “[So That's Why It's Always Cold in Here: A Guide for Conducting Facilities Condition Assessment Surveys](http://fsweb.mtdc.wo.fs.fed.us/php/library_card.php?p_num=0473_2839)” <[http://fsweb.mtdc.wo.fs.fed.us/php/library\\_card.php?p\\_num=0473\\_2839](http://fsweb.mtdc.wo.fs.fed.us/php/library_card.php?p_num=0473_2839)> for guidance on performing a condition survey. Condition surveys are not the same as condition assessments, which the Forest Service requires every 5 years for reporting deferred maintenance needs on Forest Service buildings. Condition assessments aren't as detailed as condition surveys. Forest Service employees can find [information on performing condition assessments](http://fsweb.wo.fs.fed.us/eng/programs/facilities/assess.htm) at <<http://fsweb.wo.fs.fed.us/eng/programs/facilities/assess.htm>>.

You can keep your log cabin in good shape if you regularly perform the following maintenance items:

- Exterior and structure maintenance
- Log protection
- Fireplace, wood stove, chimney, and flue maintenance
- Roof maintenance
- Interior maintenance

## Exterior and Structure Maintenance

Quarterly or semiannually, remove accumulated pine needles, leaves, and other debris from roofs, gutters, and the base of the building. Remove debris from the log walls. Prune nearby trees, shrubbery, and grass away from the building logs.

Inspect the building's entire exterior and structure annually. Inspect the slope of the ground around the building to ensure proper drainage and ensure that water still drains away from the building. Examine the structure and surface of the logs, roof, and foundation; repair as needed, paying particular attention to:

- Daubing
- Crown ends
- Purlin ends
- Rafter tails
- Weather damage

## Log Protection

Every few years, reapply FPL log oil to logs that aren't painted or stained, and to cedar shingle or shake roofs. As wood dries out, it shrinks and cracks. FPL log oil restores the wood and repels water. Be especially thorough when recoating sill and spandrel logs and rafter tails; these logs tend to take more punishment from the weather and deteriorate more rapidly if not properly cared for. FPL log oil is the standard treatment for logs. The [Using Paint, Stain, and Oil](#) section of this guide contains a recipe and application information for this mixture.

You can purchase many commercial log protectants, but most aren't appropriate for historic buildings. They don't penetrate into the logs, so they only protect the surface. These products also build up on logs, preventing moisture from evaporating. Even though the FPL log oil mix has a strong smell and is sticky, it fully penetrates the logs and leaves them dry to the touch. The smell dissipates in a few days.

## Fireplace, Wood Stove, Chimney, and Flue Maintenance

If your fireplace or wood stove isn't operating properly, immediately put out the fire and inspect the fireplace or wood stove and the flue or chimney to find the source of the problem. Wood stoves and fireplaces that operate properly have the following characteristics:

- Fires light easily and burn bright and hot.
- Smoke immediately rises up the flue or chimney when you light fires.
- Draft builds quickly.
- Smoke continues to rise up the flue or chimney when you open the stove door or fireplace screen.
- When no fire is burning, but it's warmer inside the cabin than outside, air flows into the stove or fireplace rather than from the fireplace or stove into the room.

Clean the ashes out of wood stoves as needed to allow proper combustion, or at least once a week. Dispose of or store ashes outside in a noncombustible container with a tight lid.

Each spring and fall, or more often if you frequently bank fires, inspect the fireplace or wood stove and flue or chimney. Check the following, and correct or repair problems as needed:

- The area around the chimney or flue should be free of bird nests, tree branches, and other debris.
- The fire grate should be clean and intact—replace it if it is cracked or distorted.
- The firebricks and mortar should be intact—replace any that are damaged or cracked.
- The ash pan should be clean and in good shape—replace ash pans that develop holes.

- The fire rope seals around the doors and glass of the stove shouldn't be frayed or compressed and shouldn't have gaps. Close the door over a thin piece of paper; it should be difficult to pull the paper out again. Replace frayed or missing fire rope.
- The seals between the side and top plates of cast iron stoves should be intact. Reseal with fire cement if you find gaps.
- The finish on the stove should not be flaking or rusting. Remove a deteriorated finish using a wire brush or steel wool and touch it up with heat-resistant paint or black grate polish to match the original finish.
- The stove door or fireplace screen glass should be clean and have no cracks. Clean the glass using commercial glass cleaner and replace any cracked glass.
- Components, such as dampers, hinges, chimney caps, and spark screens, should not be loose, cracked, rusted, or damaged. Repair as necessary.

Use flue brushes to clean the flue or chimney whenever any significant amount of creosote builds up. Do not burn out the flue because the intense heat can damage the flue or chimney or even spread the fire to the rest of the cabin and damage or destroy it. Remember that most of the creosote buildup will likely be near the top of the flue or chimney and won't be visible from inside the building, even if you pull the flue pipe and look inside.

Hire only chimney sweeps certified by the Chimney Safety Institute of America or a State chimney sweep's guild. Hiring a certified chimney sweep to inspect all flues and chimneys once a year usually is sufficient, but don't ignore the flue for the rest of the year. You can rely on trained Forest Service personnel to clean the flues and chimneys at other times when the chimney needs it, and to perform the other semianual inspection.

## Roof Maintenance

Inspect your cabin's roof at least once a year, preferably right after you clean it, for signs of deteriorated roof materials.

Repair any roofing problems immediately.

See the [Safety First](#) and [Keeping the Rain Out](#) sections of this guide for tips on working safely on roofs. Be sure to follow OSHA requirements (including fall protection), the Forest Service Safety Code Handbook (6709.11, chapter 33), and the procedures in your JHA.

Clean the roof whenever you notice debris. Even if the roof is metal, debris or dirt can accumulate and provide a good environment for moss, lichens, and fungi to grow. Clean the roof at least once each year in damp climates and where trees overhang the roof. A roof in drier climates generally can go much longer between cleanings, unless a lot of dust regularly settles out of the air.

You have to get up on a roof to clean it. Use a broom or a hose, or maybe both. Starting at the ridgeline, sweep or hose the debris down and off the roof. **Never** stand on the ground with a pressure hose and try to blow dirt, debris, or moss off the roof. The water and debris will blow under the roofing. It may cause the roof to leak immediately and probably will cause future leaks and decay in the structure.

Most roofs don't benefit from foot traffic. In fact, you shouldn't walk on some roof materials at all, including slate tiles and clay tiles. If your roof won't hold up under foot traffic, hang a self-supporting ladder over the ridge of the roof or use planks to span the roof surface when you need to access it. Walk carefully on all other roofs. Do not step on standing seams or other attachment areas. Walk on the roof only when you absolutely have to. Be careful to not drop tools and equipment that could damage the roofing.

Clean gutters in the fall and again in the spring if any trees are in the immediate area. Keep gutters and downspouts clear of debris so water flows away from the building rather than seeping beneath the roofing at the eaves. Clean rainwater systems help prevent leaks, material deterioration, and wet basements. If your gutters or downspouts clog frequently,

consider installing hidden gutter screening at downspouts or across the full length of the gutter to help keep debris out.

Do not allow moss to grow on your roof. Moss grows on any roof material if the roof retains enough dust and moisture for extended periods, especially if trees shade the roof. Moss is a persistent problem on roofs in some climates. It looks picturesque, but it damages both wood and composition shingles, creates gaps that lead to leaks on slate and clay tile roofs, and reduces water drainage from metal roofing, causing leaks at the seams. See the Oregon State University web page "[Mosses on Rooftops](http://bryophytes.science.oregonstate.edu/page9.htm)" <<http://bryophytes.science.oregonstate.edu/page9.htm>> for general information on this subject.

Red cedar has a natural fungicide that resists the growth of moss, lichens, and fungi, unless you use the shingles in unusually warm, moist environments, or where certain strains of spores are found. See the Oregon State University publication "[Care and Maintenance of Wood Shingle and Shake Roofs](http://owic.oregonstate.edu/sites/default/files/pubs/shake_roof_maintenance.pdf)" <[http://owic.oregonstate.edu/sites/default/files/pubs/shake\\_roof\\_maintenance.pdf](http://owic.oregonstate.edu/sites/default/files/pubs/shake_roof_maintenance.pdf)> for more information about the effect of moss on wood roofs.

Sometimes, you can simply remove moss by cleaning the roof. Sometimes you need to kill the moss first. Although you can purchase a variety of chemical treatments, try the least toxic product you can find first. Only resort to more toxic products if your moss doesn't respond to the less toxic products. Oregon State University's website <<http://bryophytes.science.oregonstate.edu/page24.htm>> contains information about various types of [chemical moss control](#) that can help you decide on an appropriate treatment.

To reduce moss growth, keep the roof clean and remove overhanging tree branches or entire trees to allow sun and breezes to reach the roof. Remember that your cabin's original landscape did not include overhanging trees. Those trees grew after your cabin was constructed and are not good for your roof.

A zinc or copper ridge cap or a zinc or copper strip installed under and extending out about 1 inch from the bottom edge of ridge shingles will help to inhibit the growth of moss. You

may sometimes need a second strip midway down the roof if it has a long slope, especially on hip ends. Copper seems to be more effective than zinc but also is more expensive.

Builders in the 19th and 20th centuries commonly installed copper or zinc strips and ridge caps (figure 323) on roofs. If the builders didn't originally install them on your cabin's roof, you may need approval from the SHPO if a Federal or State government agency owns the cabin, or if Federal or State sources provide some or all of the funding for the cabin preservation work. Check with your heritage resource specialist or archaeologist for the requirements. You can apply a zinc sulphate treatment to the roof every few years rather than installing metal strips.

The FPL has found that fungicides extend the life of shingles. You can read the FPL publication “[Performance of Preservative-treated Wood Shingles and Shakes](http://www.fpl.fs.fed.us/products/publications/specific_pub.php?posting_id=15527)” at <[http://www.fpl.fs.fed.us/products/publications/specific\\_pub.php?posting\\_id=15527](http://www.fpl.fs.fed.us/products/publications/specific_pub.php?posting_id=15527)>. The publication explains how these products work and which work most effectively.

Carefully follow the manufacturer's application instructions and local code requirements to properly handle and apply herbicides, fungicides, or pesticides. Check the material safety data sheet and be sure to comply with the requirements of your job hazard analysis, which includes wearing personal protective equipment such as goggles and gloves.

Once a year, remove debris, weeds, and plants with deep roots from vegetated or sod roofs. Mosses and fungi normally aren't a problem on vegetated or sod roofs. Insects will likely not be a problem either; they will attract birds that eat them. Most vegetated roofs have light soils, so you usually can remove weeds simply by pulling them out. If soil clings to the roots and leaves a hole, brush or knock the soil off the root wad and pat it back into place on the roof.

Unless absolutely necessary, do not apply any fungicides, herbicides, or pesticides to vegetated roofs. These products will disrupt the mini-ecosystem that exists on the roof. If you have to use them, use the least toxic product you can find that will do the job.



Figure 323—The zinc ridge cap on the Brush Creek Work Center Office/Visitor Center (Medicine Bow-Routt National Forest, Rocky Mountain Region) provides some protection against moss on the shingle roof.

Check your vegetated roof once or twice a year to see if you need to add dirt or sod back to the peak. Just as on a sloped hillside, sod tends to migrate from the peak downhill to the eave because of gravity. In many cases, you can simply cut the sod off the eave and move it back to the peak.

Ensure that you properly vent attic spaces to prevent condensation that can rot the roof structure. For more information on venting attics properly, see the [Insulation and Ventilation](#) section of this guide.

Historic cabins that people occupied year round weren't built to hold heavy snow loads. The cabins weren't insulated, so the heat from inside the building melted any snow on the roof. Many of these cabins no longer are used during the winter, so snow can accumulate on the roofs and damage or even collapse the roof structure. Have a structural engineer determine the maximum allowable snow load in these cases. When the roof approaches that load, remove the snow (figure 324) to keep the building intact. In some cases, you may need to strengthen the roof structure to hold more snow.

Figure 324—Forest Service employees originally used the Moose Creek Wilderness Station (Nez Perce National Forest, Northern Region), built in the early 1900s, as a year-round Ranger Station. Employees now only staff it from late spring through the autumn hunting season. When an unusually deep, heavy snowpack accumulates, employees must travel to the site on skis to remove the snow so that the roofs won't collapse. This photo shows an employee on the roof of the Office/Cookhouse building, constructed in 1921. Employees used crosscut saws to slice the snow into chunks, which they then slid off the roof. When performing this type of work, use proper fall protection.



Of course, the opposite also can happen. Some people built uninsulated or poorly insulated cabins to use only during the summer. When people use these cabins during the winter, heat escaping through the roof melts the snow, and the water runs down the roof where it refreezes at the eave overhangs and creates ice dams. Ice dams lead to leaks, water staining, and structural damage.

If ice damming is a problem at your cabin but you can't add insulation, you may need to remove the old roofing and

install solid sheathing and ice and water shield, and then replace the roofing. You may need to add extra flashing or snow guards or take other measures to mitigate ice damming (figure 325). The SHPO probably will have to review or approve any changes to the building if a Federal or State government agency owns the cabin, or if Federal or State sources provide some or all of the funding for the preservation work. The SHPO usually approves beneficial changes that retain the character of the building. Check with your heritage resource specialist or archaeologist for the requirements.



Figure 325—The King's Hill Cabin (Lewis and Clark National Forest, Northern Region) had an ongoing ice problem at the back stoop because of refreezing melt water running off the uninsulated roof. The cabin now has a new back porch to shield the back stoop from ice and to also provide an accessible entrance to the building. The addition of the stylistically compatible porch ensures the cabin's continued use in the winter. The porch is clearly differentiated from the original construction by the wooden walkway and the concrete (rather than stone) column supports.

## Interior Maintenance

Maintain the interior of a log cabin to keep it in good operating condition, as you would any building, paying particular attention to:

- Leaks, drips, or wet spots at or near plumbing fixtures or pipes
- Electric or gas appliances or fixtures that don't operate properly
- Doors or windows that don't close properly or don't seal weather out
- Kinks in gas lines or odors that might indicate gas leaks
- Any evidence of rodent occupation—hantavirus can be fatal. See “[Controlling Rodents in Forest Service Facilities: Reports from the Field](http://www.fs.fed.us/eng/php/library_card.php?p_num=1471%202309P)” <[http://www.fs.fed.us/eng/php/library\\_card.php?p\\_num=1471%202309P](http://www.fs.fed.us/eng/php/library_card.php?p_num=1471%202309P)> for information about controlling rodent occupation.

Keep floors clean to minimize surface damage from sharp-edged, tracked-in debris. Sweep up dirt regularly so that it doesn't get tracked around. Do not use a rag mop to clean the floor because it will drag dirt around and leave water residue. Instead, use a good sponge mop or a disposable wet mop or mop pad and don't let water stand on the floor. Dust all horizontal surfaces, including interior wall logs, at least once a year. Interior wall logs accumulate dirt and dust, which holds moisture in the log and leads to mold and rot.

## Use Your Log Cabin

After you repair your log cabin, the best thing you can do is to use it. That may sound strange, but it really is common sense if you think about it. A building that you use will be cared for so that it can continue to serve its purpose. A building that is solely for display may not last much longer than the person who advocated restoring it in the first place. The Forest Service often uses log cabins as seasonal crew quarters or recreation rentals or for administrative purposes, such as offices, storage, visitor contact points, and so on. A building with no purpose will only sit and decay until (hopefully) somebody else takes up the preservation cause and again brings it up to serviceable standards—or until fire or weather destroys it or it simply melts into the ground.

So, use your log cabin, take good care of it, and it will be around to tell its story to the next generation.

