

Hewn and Sawn Logs

Sawn logs are round logs that people cut into square or rectangular timbers using large circular saws that leave distinctive curved saw blade marks on the log (figure 115). You can purchase sawn logs at sawmills or from loggers, or you can cut them onsite using a portable sawmill.

Hewn logs are round logs that people shape into square or rectangular timbers or partially squared timbers using axes (see figure 88). Partially squared timbers are called cants. Cants retain part of the natural log roundness, but they are flattened on one or two faces. The cutting and hewing process leaves distinctive marks on hewn logs (figures 116 and 117). The hewing marks on replacement logs should closely resemble the marks on the original logs. Hewing logs takes time and talent, but with some practice, nearly anyone willing to put in enough time to perfect the technique can hew good replacement logs.

An excellent explanation of how to hew logs is available in the Forest Service publication “An Ax to Grind” <http://www.fs.fed.us/eng/php/library_card.php?p_num=9923_28_23P>, so it’s not repeated here. Refer to the Hewing section of the Using Axes chapter of “An Ax to Grind.” The drawings in figures 118 through 121 supplement the information in “An Ax to Grind” and illustrate the steps for hewing a log. Figures 122 through 125 show the appearance of logs during the process and how people use felling axes and broadaxes for these purposes.

To make the hewing process quicker and easier, use a chain saw (figure 126) or large circular saw (figure 127) to trim the log to a size slightly thicker than the desired dimension. Then, hew the log down to the desired dimension using a felling axe or double-bitted axe and broadaxe to obtain a finish similar to that of the log you are replacing. For a smoother surface, give the logs a final finish with an adz (figure 128) or drawknife.



Figure 115—A ranch crew constructed the Sage Creek Cabin of the Custer National Forest, Northern Region, using sawn logs. Weathering on the second log from the bottom shows the saw pattern more distinctly than the other old logs or the replacement log.



Figure 116—Hewn logs show distinct patterns that vary depending on the hewing method used and the skill of the hewer. The hewing marks disappeared from these wall logs because of exposure to many years of weather, but the vertical scoring marks from juggling are still visible. The publication “[An Ax to Grind](#)” (see website link on page 77) explains hewing and juggling.



Figure 117—The early 20th century builders hewed these logs expertly. Except for a few rough patches on the middle log, they left only very shallow, slightly scalloped marks when they smoothed the log faces with a broadaxe.

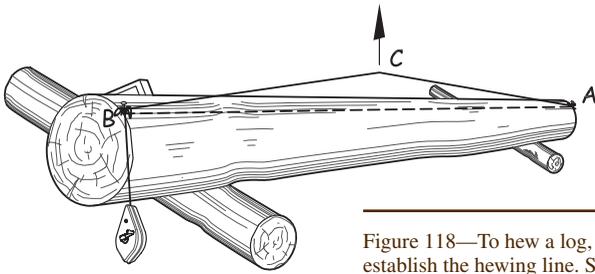


Figure 118—To hew a log, first establish the heaving line. Stretch a chalkline very tightly between nails A and B. Lift the chalkline up plumb and straight at C. Release the line quickly so that it snaps down onto the log, creating a chalkline to mark the line to which you will hew.

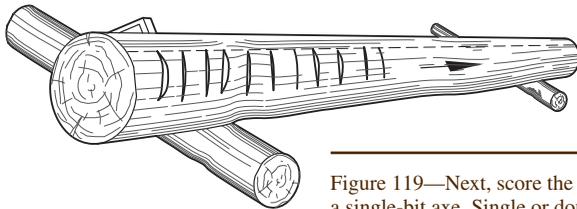


Figure 119—Next, score the log using a single-bit axe. Single or double scoring cuts should be 4 to 6 inches apart and almost to the depth shown by the chalkline. The upper drawing shows single slash scoring cuts. This method is suitable for use on logs from 8 to 12 inches in diameter. The lower drawing shows double slash scoring cuts. Double cuts, and sometimes even triple cuts, are suitable for use on logs larger than 12 inches in diameter. Make the scoring cuts 4 to 6 inches apart and almost to the depth of the chalkline.

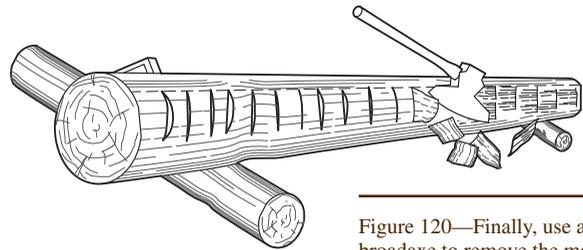
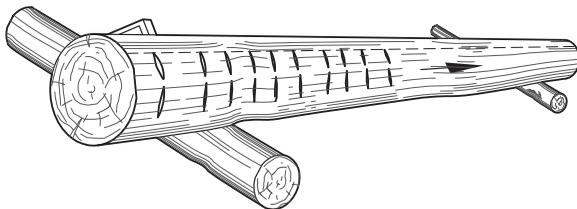


Figure 120—Finally, use a broadaxe to remove the material between the scoring marks and smooth the wood. Use the broadaxe with the blade parallel to or just slightly off parallel with the grain of the log.

Figure 121—On really big logs, it's often easier to score and rough-hew by juggling. To juggle, use a felling ax to chop a series of narrow, V-shaped notches about 12 inches apart, extending almost to the marked line. Then, use the felling ax to split the wood between the Vs off the log.

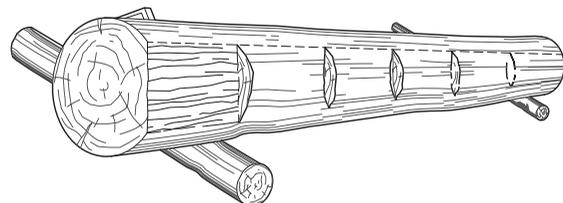




Figure 122—After cutting the juggling notches, use a felling axe to split the wood between the notches off the log.



Figure 123—After juggling, the surface of the log is relatively smooth and has vertical grooves. Match the appearance of the original logs. If the original logs show no sign of juggling or scoring marks, hew the replacement log with a broadaxe to remove the vertical grooves. If the original log is smooth, use an adz or drawknife after hewing to replicate the finish of the original logs.



Figure 124—When using a broadaxe to hew a log, some people stand with one leg on the ground and kneel with the other leg on the log.



Figure 125—When using a broadaxe to hew a log, some people prefer to stand with both legs beside the log.

Log Replacement



Figure 126—After carefully marking the cut with a chalkline, this man used a chain saw to remove slabs from a log in preparation for hewing. These days, Forest Service chain saw operators must be certified and wear gloves, a hardhat, hearing protection, a long sleeve shirt, chain saw chaps, boots, and eye protection.



Figure 127—You can use a large circular saw, in this case a 16-inch circular saw, to remove a slab from a log.



Figure 128—An adz in skilled hands can create a remarkably smooth surface on a hewn log.

Sill Logs and Spandrel Logs

Sill logs are the two bottom logs of a cabin. They lie directly on the cabin foundation, on two parallel sides of the cabin, and they hold up the rest of the structure. People sometimes flatten sill logs on the bottom to provide better bearing on the foundation. As the bottom logs of a cabin, they usually are the most susceptible to rot, and the ones that most frequently require replacement. Floor joists usually are notched into or hung from the sill logs. Sill logs can be the trickiest logs to replace because of their connections to the floor joists.

Spandrel logs lie directly on top of and perpendicular to the sill logs. If the cabin floor rests on a center floor beam, it probably is notched into the spandrel logs. Refer back to figure 4 to see the relation between sill logs and spandrel logs.

Carefully remove in one piece deteriorated sill logs and spandrel logs that have joists or beams notched into them so that you can use them as patterns for the replacement logs (figure

129). Temporarily support the joists and beams on cribbing or needles before detaching the joists and beams from the sill and spandrel logs.

If the sill or spandrel logs are deteriorated, the joists or floor beams notched into or hung from the sills or spandrels are likely also rotted on the ends that abut them. Check joists and floor beams carefully for rot, and repair or replace them before putting the sill or spandrel logs back in place on the cabin.

Use the techniques for cribbing, jacking, repairing, and replacing sill and spandrel logs explained in the [Log Removal and Replacement](#), [Shaping a Log](#), [Epoxies](#), [Structural Wood Splicing](#), [Surface Wood Splicing](#), and [Crown End Repairs](#) sections of this guide.



Figure 129—Preservation crewmembers prepared this new sill log for the Adams Ranger’s House (Salmon River Ranger District, Nez Perce National Forest, Northern Region) using the deteriorated original sill log (not shown in the photo) as a pattern for the floor joist notching.

Floor Joists

Floor joists run the width or length of a room or building and act as the floor support and the tie that holds the base of the building together. Floor joists in log buildings can be hewn or round logs, or rough-cut or dimensioned lumber.

Floor joists usually are mortised into or hung from the sill logs (figure 130). Joist ends usually rest in mortise pockets notched into the interior half of the sill logs so that the joist ends aren't visible from the exterior of the building. A less common style extends the mortise across the top of the sill log so that the joist ends are visible from the exterior (figure 131). Joists hung from the sill log usually rest on 2x lumber nailed to the sill log. The builders of some 20th-century cabins set the floor joists into or hung them from the concrete foundation stem wall (figure 132).

Replace the joists in kind and replicate them carefully if they will be visible; especially the joist ends. If the joists and joist ends won't be visible, shape them to be close enough to the originals that they provide proper support for the floor and fit into the hangers or the pockets in the sill log or foundation. Plane the tops of log joists to level the floor. Figure 133 shows original log floor joists that the builder planed level.

If the joists or joist ends won't be visible when you complete the preservation work, you can replace the joists with modern materials (figure 134) if doing so improves the structure or is more convenient. Preservation standards permit the use of modern building materials and methods when they won't be visible after you complete construction. This allowance is particularly useful when the original structure can't accommodate plumbing; electrical; or heating, ventilating, and air conditioning (HVAC) systems, or isn't strong enough to support modern snow, wind, or live loads.

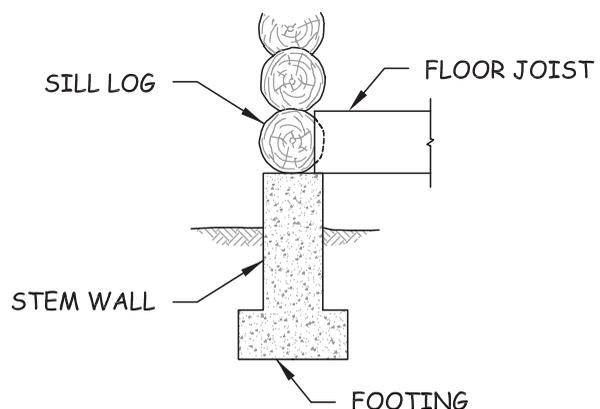
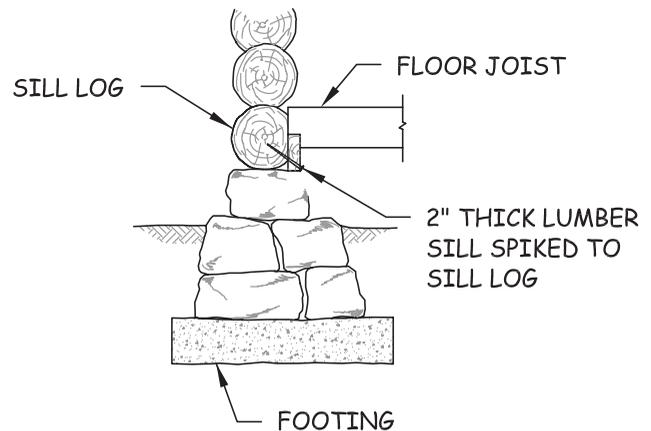
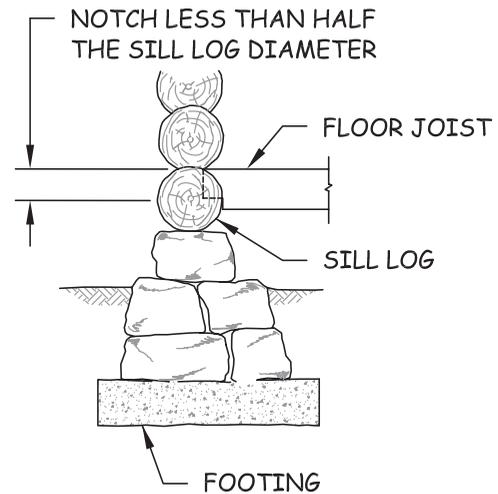


Figure 130—This drawing shows three methods for attaching floor joists. On the top, the joist is notched into the sill log. In the center, the sill log is hewn flat on the inside, a 2x4 lumber sill is spiked to the sill log, and the floor joist is notched to bear on the lumber sill. On the bottom, the sill log is notched on the inside to allow the floor joist to bear on the concrete foundation.



Figure 131—Preservation crewmembers replaced or repaired several logs of this lookout cabin. Just as in the original structure, the crewmembers set the floor joists in notches cut into the top of the sill logs. These notches are visible from the outside of the lookout cabin.

Log Replacement



Figure 132—The builders set the floor joists at the Bull River Guard Station (Kootenai National Forest, Northern Region) on piers cast with the concrete foundation when they constructed the building in 1907. Over time, the foundation failed. Preservation crewmembers reinstalled the original floor joists on piers cast with the new foundation that exactly matched the original piers.



Figure 133—The builders hewed the tops of the floor joists at the 1931 Square Mountain Lookout (Nez Perce National Forest, Northern Region) so that the flooring would be level.



Figure 134—Preservation crewmembers replaced the failed original floor joists in one of the early 20th-century cabins at the OTO Ranch in the Gallatin National Forest, Northern Region. They used dimensioned lumber joists supported by steel joist hangers that they attached to treated lumber rim joists set into the new concrete foundation.

It is easier to repair or replace floor joists if you also must replace the foundation. Once you remove the old foundation, you'll have more space to access the joists. Better access is particularly useful if the builders originally used inadequate floor joists. If the existing joists are inadequate, replace them with larger joists or add intermediate joists so that the floor won't sag or fail. Common joist spacing is 12 to 24 inches on center, depending on the load on the floor and the subfloor strength. If you aren't certain whether the original joists are adequate, have a structural engineer evaluate the joists, subfloor, and floor load. Have a design professional size replacement or supplemental joists that are suitable for the structure.

Use the same techniques for replacing log floor joists as those explained in the [Log Removal and Replacement](#) and [Shaping a Log](#) sections of this guide. Never repair a floor joist with a splice. Floor joists are subjected to considerably more bending stress than wall logs, and splice repairs will lead to failure of the joist. When in doubt about a joist's integrity, always replace it.

Log Removal and Replacement

If the inspectors identified one or more deteriorated logs in the building condition and historic assessment, your preservation strategy and project plan should state whether you intend to repair or replace the deteriorated logs. You'll need to remove all the logs that you replace and may need to remove some of the logs that you need to repair. Before you remove a rotted log, inspect it from both the inside and the outside of the building to determine whether it supports any structural features. If it does, determine before beginning the replacement process how you can take up the load using bracing and cribbing.

Keep in mind that removing a log can be dangerous to you and the building, so jack, crib, and brace the building thoroughly and carefully at each stage of the replacement process. See the [Raising and Leveling](#) section of this guide for

information about how to properly support the building. Remember that chinking and daubing will crack and fall out during the process and that you will have to replace them. Interior finishes, doors, windows, and floors may also be affected.

To begin the replacement process, first free the deteriorated log from the notches and other logs. If the deteriorated log is the sill log, jack and crib beneath the spandrel logs and raise the cabin off the sill log. Floor joists often are notched into or hung from sill logs. If the floor joists are attached to the log you are removing, make sure to disconnect components that are attached to both the floor and wall, such as base trim or cabinets, before jacking or wedging. Also, be very careful to support the floor on jacking and cribbing while you remove the sill log.

If the log won't fall out, pound wedges between the sill log and the log above it to loosen and wedge the logs apart. Check for anchor bolts, lags, dowels, or metal stakes in the log before trying to pull out the log. Cut connectors using a reciprocating saw (sometimes called a Sawzall) if they won't release when you insert wedges.

If the deteriorated log is a spandrel or mid-wall log and the logs above and below are sound, free the deteriorated log by pounding wedges only far enough into the joint between the logs above and below it on the adjacent walls to free the log at the notching. For example, if the deteriorated log is on the north side, pound wedges between the logs on the west and east sides that hold the north log in place. The wedges should spread the west and east logs only enough to let the north log slip out. If the cabin has locking notching, cut off all (figure 135) or the bottom half (figure 136) of the end of the log above it at the notch and save the cut piece. Mark the cut piece with an identifier (usually a compass direction and log course number) so that you can reattach it later (figure 137). Then, slide or pull the deteriorated log out with straps, pry bars, peaveys, or other tools.

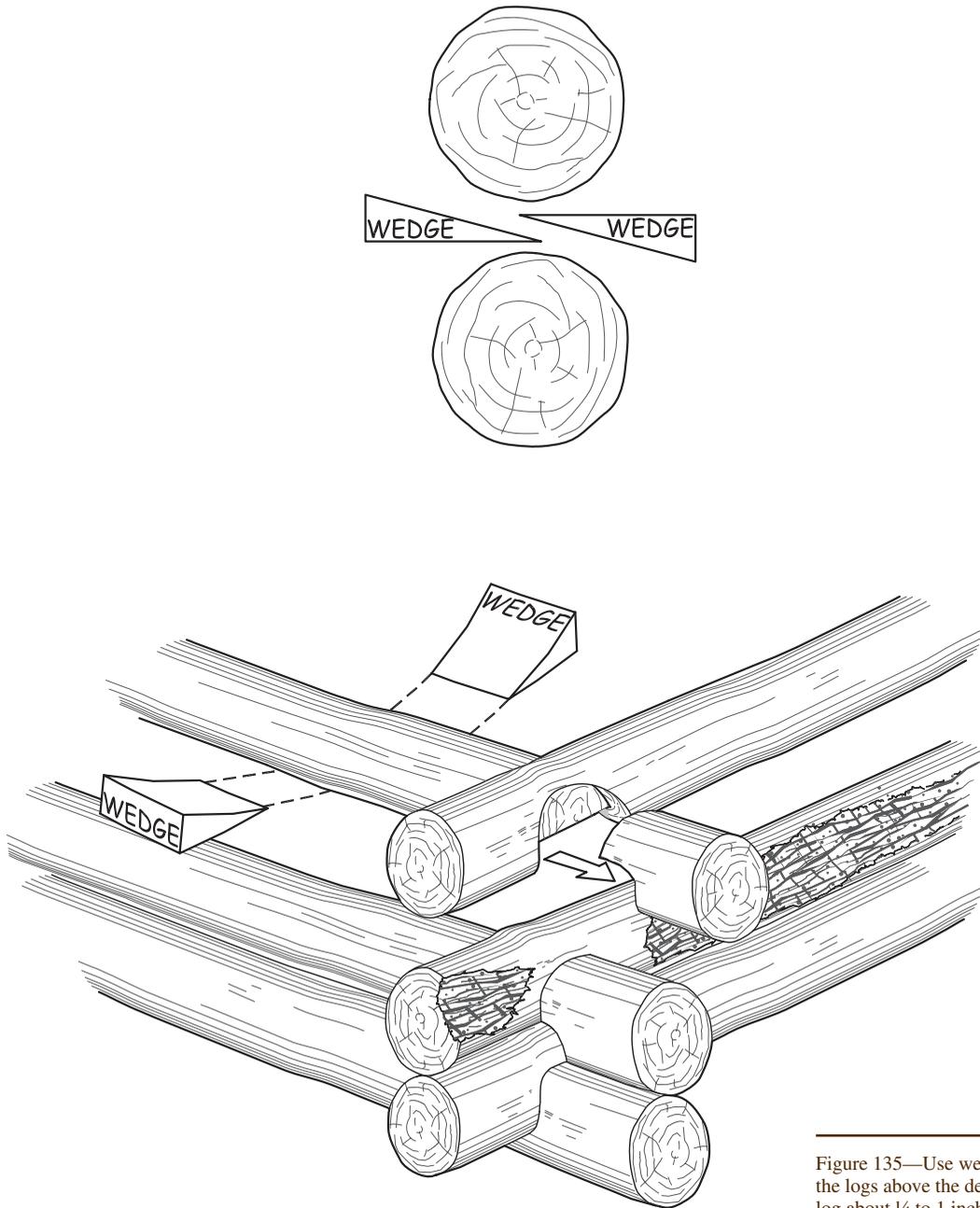


Figure 135—Use wedges to lift the logs above the deteriorated log about ¼ to 1 inch (shown much larger in the drawings for clarity). Cut off at the notch the full end of the log above to allow you to lift and slide out the deteriorated log.

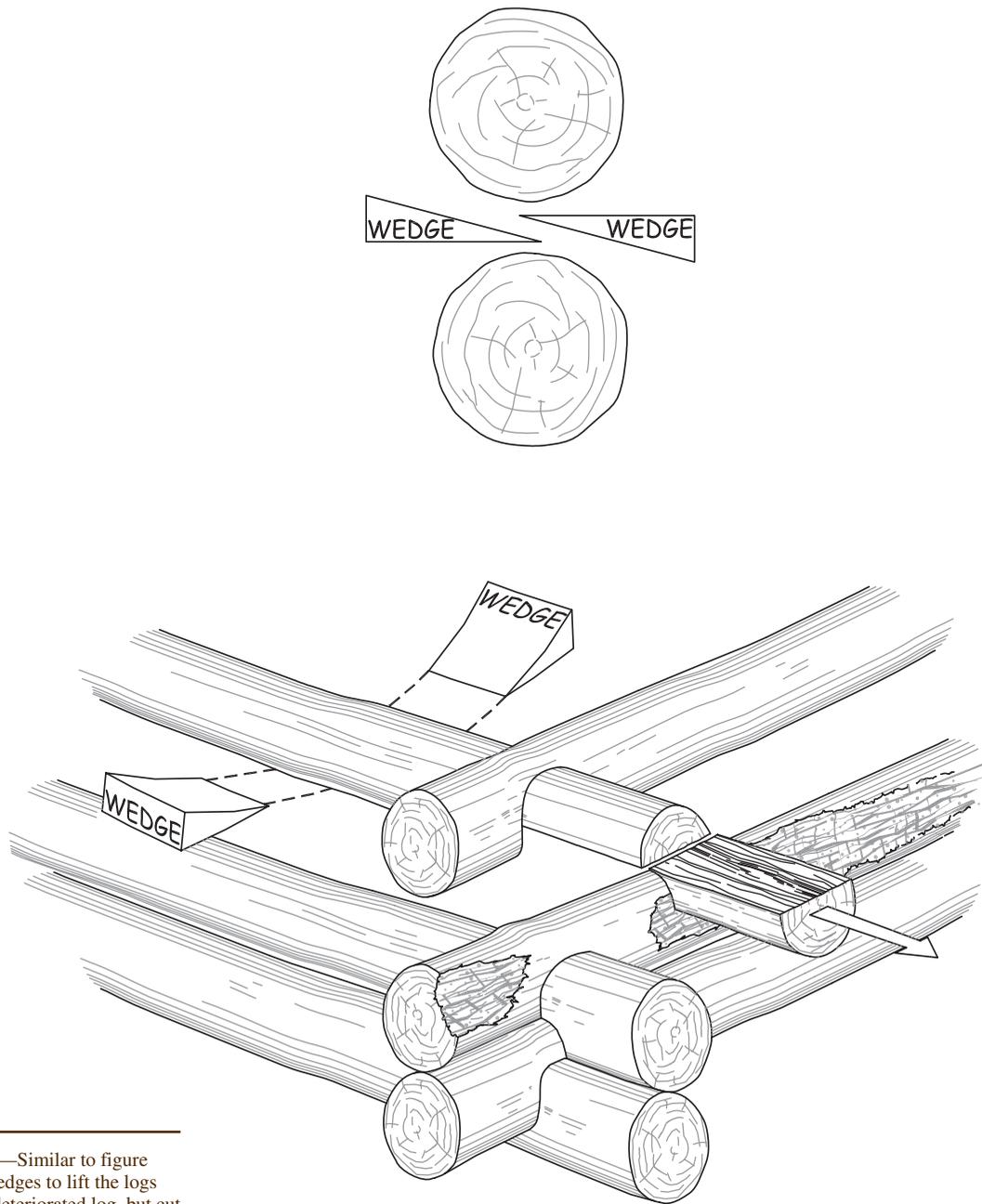


Figure 136—Similar to figure 135, use wedges to lift the logs above the deteriorated log, but cut off at the notch only the bottom half of the end of the log above.



Figure 137—If you cut off the end of a log to remove a mid-wall log, save and mark the piece so you can reattach it later.

If you can, retain in one piece the log that you removed. You can use it as a pattern for the replacement log, as explained in the [Shaping a Log](#), [Surface Wood Splicing](#), and [Crown End Repairs](#) sections of this guide. If you are replacing several logs, remove and label each log. Use the labels as a reminder of the order in which you should replace the logs in the building.

Keep in mind that the building becomes unstable when you remove a log, and even more unstable if you remove several logs. Be sure to adequately brace and crib the building to hold it safely in place.

After you shape the new log (see the [Shaping a Log](#) section of this guide) or repair the existing log (see the [Epoxy](#), [Structural Wood Splicing](#), [Surface Wood Splicing](#), and [Crown End Repairs](#) sections of this guide), put it in place using levers, pry bars, brute strength (figure 138), and usually some persuasion from big commander mallets. Mid-wall logs tend to be especially difficult to insert. Don't be upset if the log doesn't fit correctly on the first try—each log is unique and the fit of each log with other logs also is unique. Look for high spots that prevent the logs from fitting together

correctly and trim those areas (figure 139). The process of replacing logs usually includes putting the log in, marking places that don't fit properly, taking the log out, adjusting the log, putting it back in, and repeating the process until everything fits properly. If gaps between the new and existing logs are slightly wider than the original gaps, you may be able to camouflage them with chinking and daubing.

Figures 140 through 149 show the proper order for cribbing, jacking, removing deteriorated logs, and replacing logs in a small cabin. Because of the scale of the drawings, they don't show the necessary additional cribbing next to the jacks. As shown in the drawings, when you have to replace several logs, remove the wall logs from the bottom up, but insert the replacement logs in reverse order—from the top down (figure 150). As you put the replacement logs in place, adjust the jacking and cribbing to hold them in position. When the last log is in place, remove all the cribbing and jacks so that the cabin once again sits on its foundation (figure 151). The process is similar for larger buildings, but you will need to use additional bracing and support, such as needles, beneath the building.



Figure 138—This preservation crew is lifting a replacement log into position at the Landmark Ranger Station barn of the Intermountain Region’s Boise National Forest. One crewmember holds the shaft of a large mallet that he will use to knock the log into its final position.



Figure 139—Replacement logs usually need a little more trimming, even after an expert shapes them, before they fit properly into place.

Log Replacement

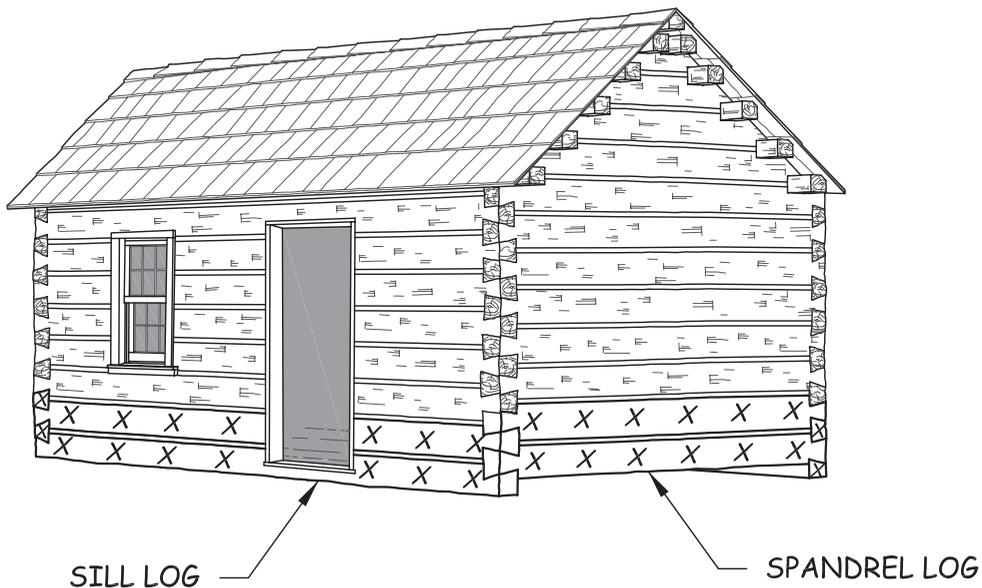


Figure 140—This drawing shows a small cabin with two deteriorated logs on each side. The logs marked with “X” are deteriorated. On this cabin, the sill logs are on the front and back of the cabin and the spandrel logs are on the ends. This is an important point, because the order of jacking and removal depends on whether the logs are on the sill side or spandrel side of the cabin. Each log on the sill side supports a spandrel side log, so if you remove them in the wrong order, some logs that you weren’t going to remove will separate from the cabin.

X - DENOTES DETERIORATED LOGS

Log Replacement

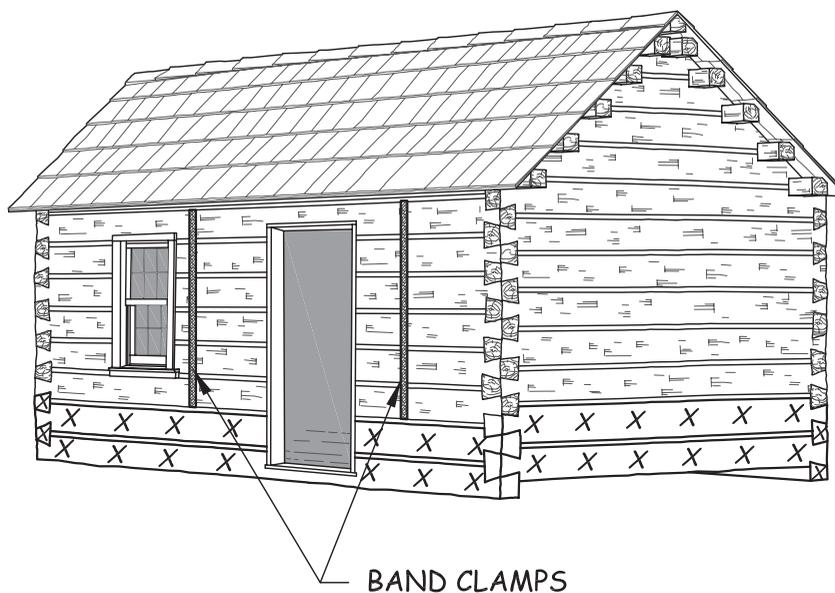


Figure 141—The first step is to place band clamps on each side of door openings and on each side of window openings that don’t have at least one solid log beneath the windowsill.

Figure 142—Next, if the spandrel logs on both ends of the cabin aren't well supported by anything other than the sill logs, crib and wedge them (using miner's wedges) to hold them at their current elevation. Then, cut openings through the rotted logs on both sill sides of the cabin to place two screw jacks under the front wall and two screw jacks under the back wall. A chain saw is the most efficient tool for cutting the deteriorated logs. Warning: rotten logs may crush when loaded if deterioration is severe. This drawing shows a cut through two log courses on the sill sides to get to a solid log that will support the weight of the cabin.

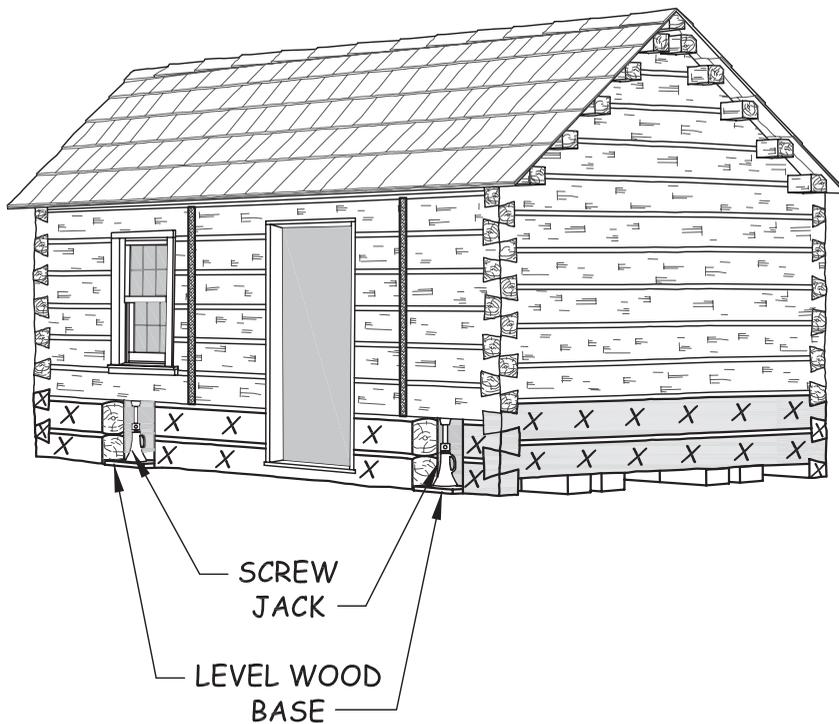
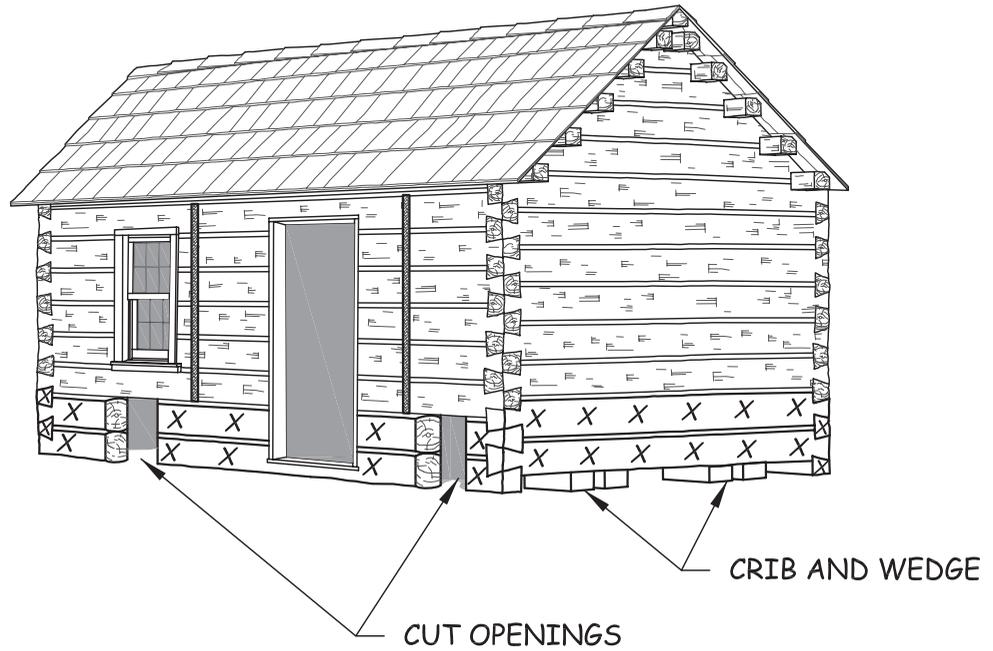


Figure 143—Next, place the screw jacks on level wood cribbing in the openings that you cut in the sill side walls of the cabin. Raise the jacks just enough so that they support the weight of the cabin. (Don't raise the cabin yet.) Then, remove the deteriorated (shaded) logs on only one spandrel log end of the cabin. Keep the deteriorated logs as templates for their replacements. Don't remove any of the logs on the other spandrel end of the cabin yet.

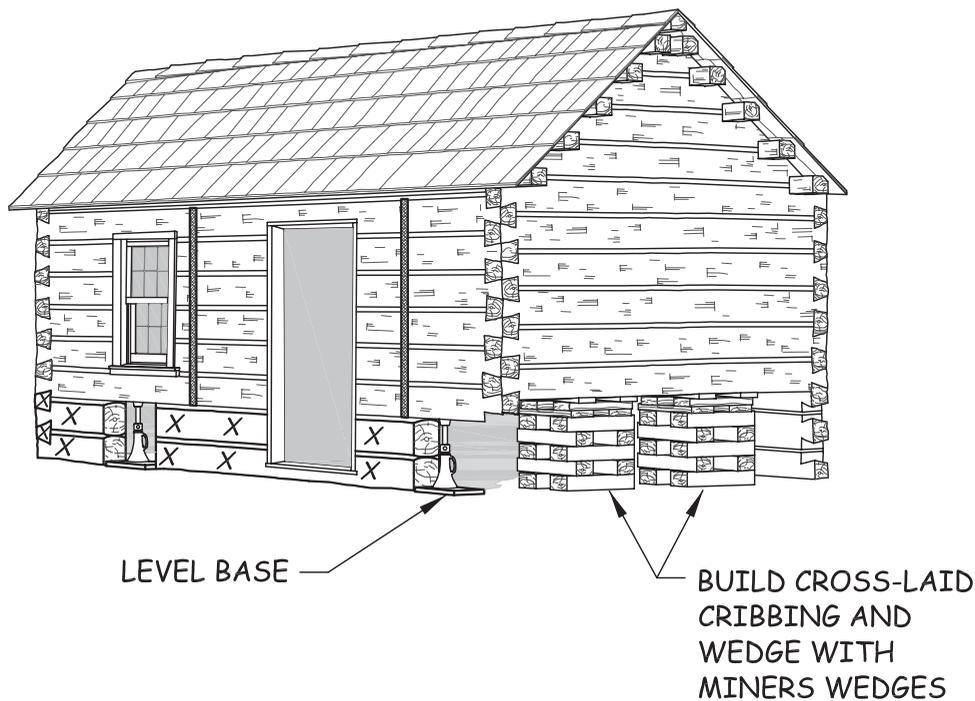


Figure 144—Level the earth and construct cribbing to firmly support the lowest solid log on the spandrel end of the cabin where you removed the rotten logs. Then, remove the deteriorated logs on the other spandrel end. Level the earth and construct cribbing to firmly support the lowest solid log on that spandrel end of the cabin.

Figure 145—Remove the remaining deteriorated logs on the sill sides (front and back) of the cabin. If any original logs are still sound and you can reuse them, carefully remove them in one piece. Store the sound logs and reinstall them in sequence. Keep the deteriorated logs as templates for their replacements. Now you can level the cabin. Raise the jacks a little at a time until the cabin is level. During this jacking and leveling process, be extremely careful to crib and wedge both spandrel walls frequently as you raise the jacks on the sill sides. You should also use additional cribbing next to the jacks (the cribbing is not shown due to the scale of the drawing). This strategy ensures that the cabin won't come crashing down if one of the jacks fails.

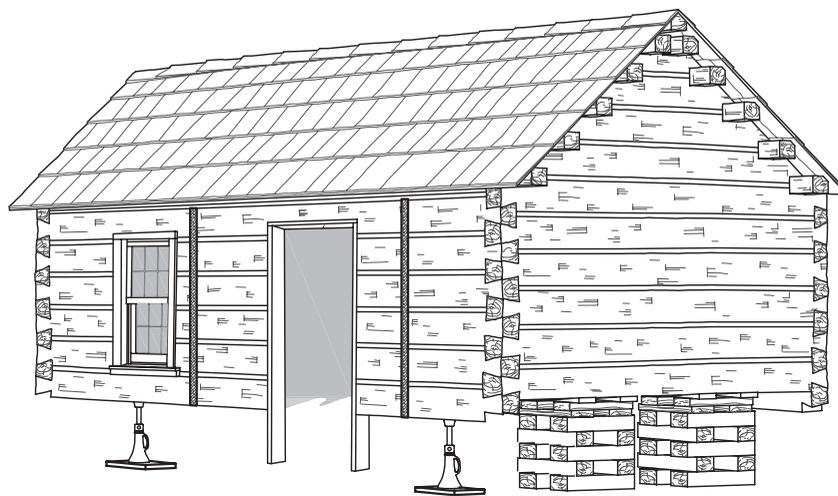


Figure 146—After leveling the cabin with the jacks, replace the jacks with cribbing that firmly supports all the logs. Cribbing now fully supports the cabin and the cabin is ready for repairs.

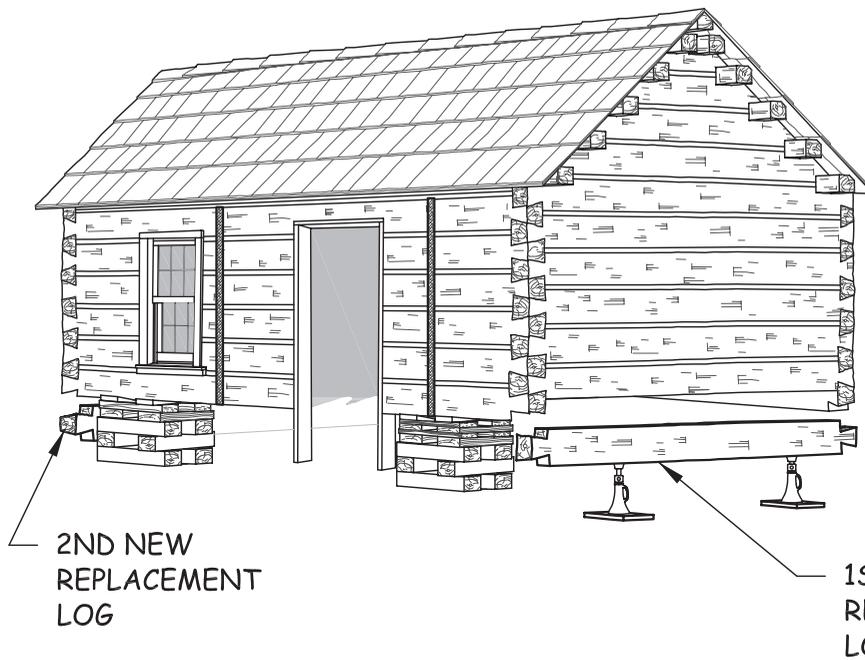
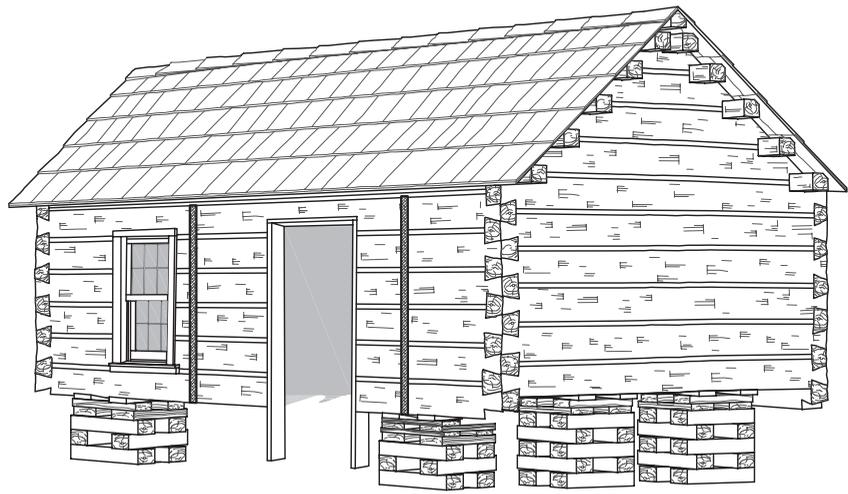


Figure 147—Fabricate a new replacement log for the highest log that you removed on one of the spandrel ends. The size and finish of the replacement log should be similar to that of the log that you removed from that location, and the notching should exactly fit the logs above. Carefully remove the cribbing from under the end of the cabin where the new log will go. Ensure that the side cribbing adequately supports the structure. Using screw jacks, position the replacement log under the spandrel end of the cabin. Crib the replacement log to firmly support the cabin and remove the jacks under the new log. Repeat this process for the second replacement log, which will be the highest replacement log on the other spandrel end of the cabin.

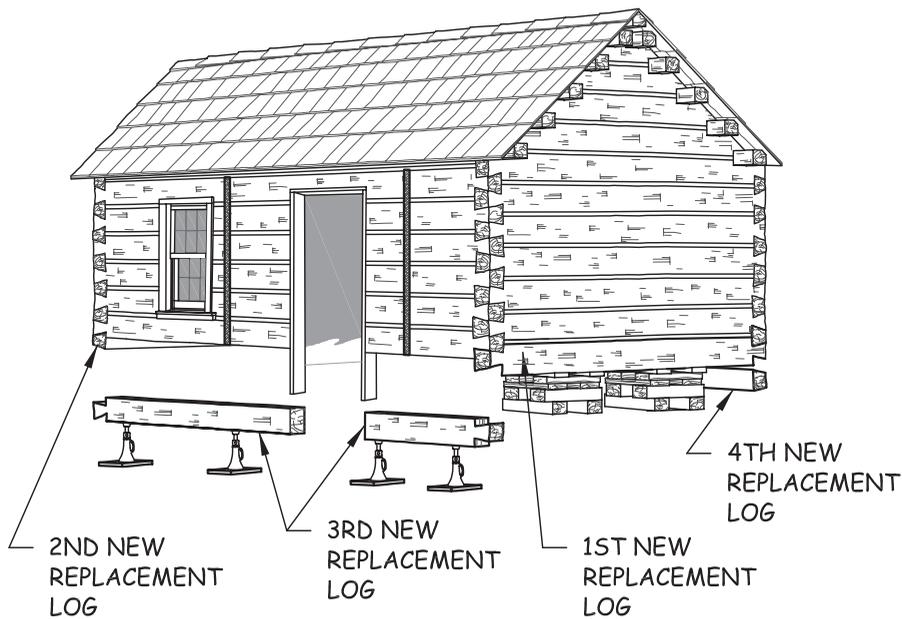
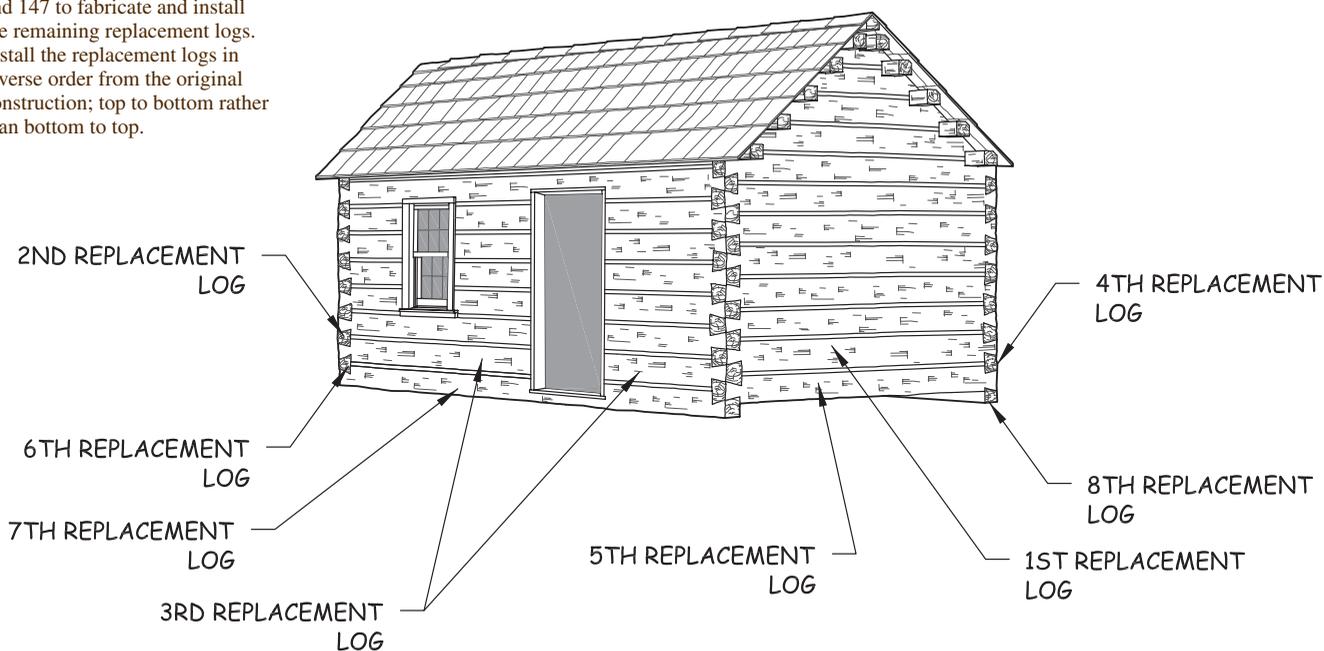


Figure 148—Fabricate the third replacement log for the highest log that you removed on one of the sill sides of the cabin. Carefully remove the cribbing from under the side of the cabin where the new log will go. Ensure that the spandrel end cribbing adequately supports the structure. Using screw jacks, position the replacement log under the sill side of the cabin. Crib the replacement log to firmly support the cabin and remove the jacks under the new log. Repeat this process for the fourth replacement log, which will be the highest replacement log on the other sill side of the cabin.

Log Replacement

Figure 149—Use the same process explained in figures 146 and 147 to fabricate and install the remaining replacement logs. Install the replacement logs in reverse order from the original construction; top to bottom rather than bottom to top.





Log Replacement

Figure 150—Set replacement logs in place from the top down. Trim the ends of the replacement logs to match the length of the original crown ends. Trimming is the only practical way to remove the red pencil lines. The new logs on this cabin aren't debarked because the original logs weren't debarked, although only a little bark remains on a few of the original logs. Most of the bark has long since weathered and fallen off the original logs.



Figure 151—Preservation crewmembers replaced the sill and spandrel logs, and this cabin once again sits on its foundation rather than on cribbing and jacking.

Once you put the replacement logs into their final positions, replace any crown ends that you removed to get the deteriorated logs out. Use epoxy to glue the pieces together and secure the repair with dowels, exactly like a crown end repair. Crown end repairs are explained in the [Epoxies](#), [Surface Wood Splicing](#), and [Crown End Repairs](#) sections of this guide.

Finish new logs in the same way that the existing logs are finished. If the existing logs are stained or painted, stain or paint the new logs with matching coatings. Carefully selected new paint or stain will look different for only one or two seasons, and then it will weather to look as though it belongs. If the original logs are coated with a linseed oil mix or a linseed oil mix with paraffin, treat the new logs with the same formula. See the [Using Paint, Stain, and Oil](#) section of this guide for information on log coatings.

Do not try to stain the new logs to match the color of the original logs if the original logs are not stained or painted. If you are unusually successful in matching the color, it might look good for 1 or 2 years. Over time, it will result in a long-lasting color mismatch because of differential weathering. Instead, leave the new logs untreated. After a couple of years, the new logs will weather to match the older logs.

Shaping a Log

After you remove the deteriorated log, use it as a pattern to shape the cured replacement log to match the original. If the replacement log doesn't match the dimensions and notching of the original almost identically, it won't fit properly into place. First, ensure that the diameter or hewn timber dimensions of the replacement log closely match the original log all along its length (figure 152). If the original log is coped or flattened, cope or flatten the replacement log. Use the techniques explained in the [Round Logs](#) and [Hewn and Sawn Logs](#) sections of this guide.

Log Replacement



Figure 152—To make shaping a replacement log easier, place it next to the cabin in its correct orientation. Measure to ensure that the dimensions closely match those of the log that you removed.

When marking level lines, plumb lines, or shaping boundaries on a log, use only a graphite pencil, blue chalk, or a blue lead pencil. Marker ink and red chalk won't wear off and will bleed through any paint or stain applied to the log.

After you shape the log, cut the notches. To begin this process, secure the log in its proper orientation on low cradles, sawhorses, or sawbucks. Next, mark a vertical plumb line and a horizontal level line on each end of the log (see figure 152) so you can “re-true” the orientation if the log accidentally rotates while you're cutting the notches. Use log dogs or log cleats to hold the log securely in place.

For most log work, use a log scribe with a double level to mark the outline of each notch before you start carving. “True” the scribe before each project. To true the scribe, use a bubble level to find a board on the building with an exactly vertical face or nail a board onto a nearby tree with the face exactly vertical. On this board, draw a plumb (straight up and down) line. Because the line is exactly plumb right to left on a board that is exactly vertical front to back, the line is precisely vertical in two dimensions and you can use it to true the scribe. Adjust the pencil point opening to slightly more than the largest gap between the logs to be fitted, and with both tips against the plumb line, adjust both levels to read “zero.”

Use the trued log scribe to mark the outline of each notch, using the original log as a pattern if possible. If the original is too deteriorated to use as a pattern, scribe the pattern using the existing logs above and below.

When carving notches between two new logs, match the notching style used on the rest of the cabin. Don't bother trying to exactly match the dimensions of the notches in the original logs that you removed—just carve the new notches to match each other.

Figures 153, 154, and 155 show how to use a log scribe to mark the outlines for saddle notches and steeple notches from adjacent logs. The process is similar for other notch types.

After you scribe the notch outline on the log, score the notch outline about ½ inch deep with a chisel. The scoring will prevent the log from splintering when you cut the notch, especially if you use powertools to cut out most of the notch. Powertools, especially chain saws, have a tendency to splinter cured logs. Do not remove too much wood at once. Remove what appears to be nearly the right amount, then move the log into place to check the fit and trim more wood out if necessary. Repeat this process for each replacement log.

Scribing Complications

Two situations commonly prevent using a scribe to copy the existing notch configuration to the new log:

1. Some logs are so deteriorated that not enough remains of the existing notch to copy.
2. If the log you're replacing is a mid-wall log, it isn't practical or wise to remove the adjacent existing logs just so you can position the replacement log for scribing purposes.

In these situations, make a pattern or use a dummy log.

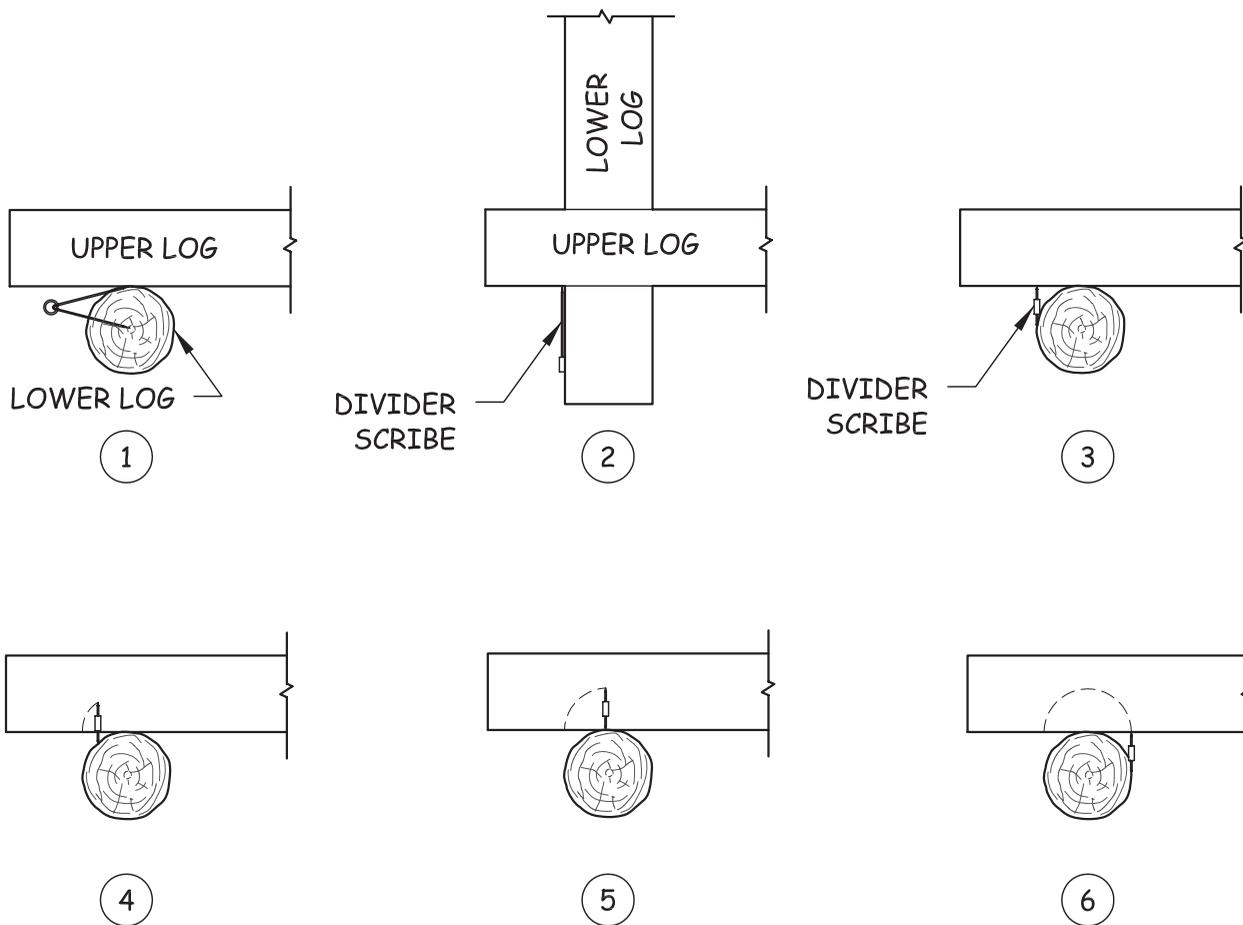


Figure 153—This series of drawings shows how to use a divider scribe to mark a saddle notch. For original log construction, start with the sill logs and work up. For replacement logs, start with the highest replacement log and work down.

1. Open the scribe to one-half of the diameter of the lower log and lock it in place.
2. Hold the scribe parallel to the lower log, as shown in this top view. Stand facing the side of the log to be marked and keep the points of the scribe aligned vertically during the entire scribing process.
3. Position the upper point of the scribe on the bottom of the upper log and the lower point of the scribe against the side of the lower log.
4. Keep both points tight against the logs and move the scribe upward in a circular motion to trace the outline of the curve of the lower log onto the upper log.
5. When you reach the top of the arc, move the scribe to the opposite side of the lower log.
6. Scribe the second half of the curve. Repeat this process for the opposite end of the log.

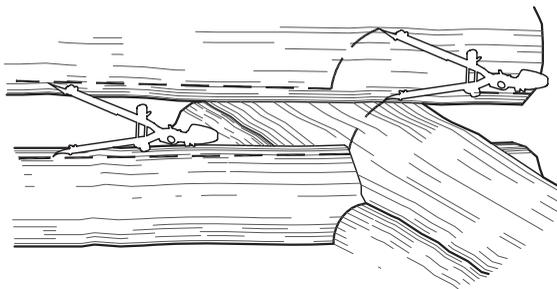
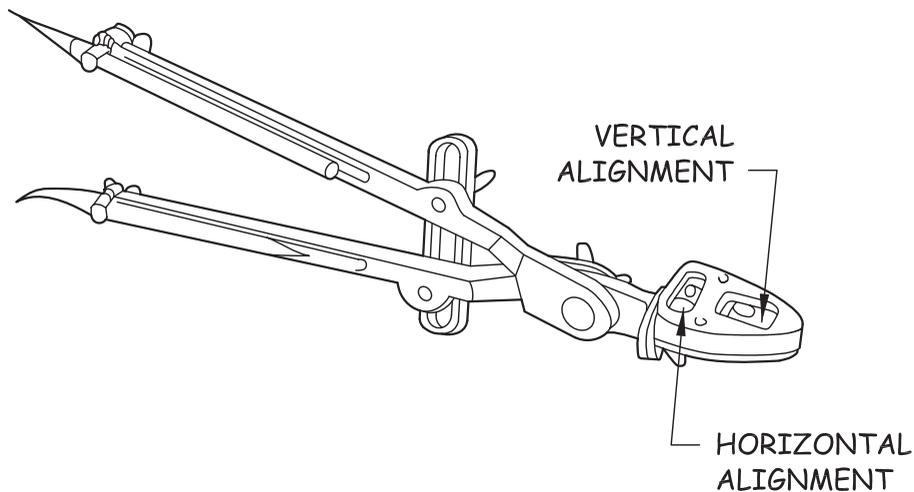


Figure 154—This detailed illustration shows a log scribe with a built-in level. It also shows how to use the scribe to mark a saddle notch on the bottom of a new or replacement log. Use the inner level to ensure horizontal alignment. Use the outer level to ensure vertical alignment.



Log Replacement

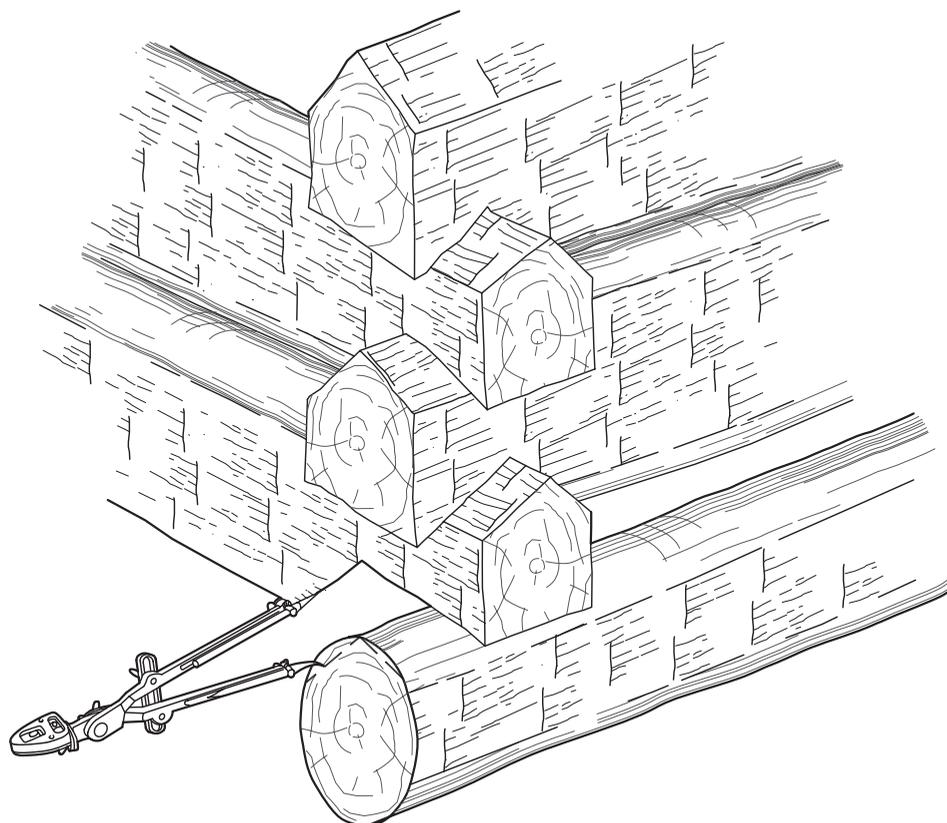


Figure 155—This illustration shows how to use a log scribe to mark a steeple notch on the top side of a replacement log.

Use only handtools to shape shallow notches. For deep notches, cut most of the wood out with powertools and dress the notch with handtools (figure 156) to erase the powertool marks. For example, use a chisel to take out the final inch or so of a notch that you rough cut with a chain saw.

When replacing several logs from the bottom of a cabin, mark and cut the notching in the top replacement log first and work down the building. Put each replacement log in place when you complete the notching.

To make a pattern, trace the notch from the adjacent logs on a piece of cardboard (figure 157) and then copy the pattern to the replacement log with a scribe, level, and tape measure.

For saddle notches and other simple notches, use a dummy (a log or portion of a log that matches as closely as possible the diameter and profile of the existing wall log that remains in place) to mimic a wall log still in the building. Shape the end of the dummy log to match the existing log, if necessary. Set the dummy log up on a sawhorse perpendicular to the replacement log. You must orient the dummy log to the log you are scribing as if both logs were in the building. Use the dummy log as a scribing guide (figure 158) to draw the notch on the replacement log. After you've marked the notch, cut it as previously explained. Be extra careful not to remove too much material at once because the dummy log probably will not be a perfect match for the log it represents.



Figure 156—Preservation crewmembers rough cut this steeple notch with powertools, but the carpenter is using a chisel to finish the notch shape.