Chapter 8
Sawmill Equipment and Operation

Military portable sawmills generally come in two configurations, the 50-inch, trailer-mounted sawmill and the 60-inch, semitrailer-mounted sawmill. The trailer-mounted mill is adapted to a single axle. The sawmill cuts softwood and hardwood logs. It is powered by a separate diesel or gasoline engine. The semitrailer-mounted mill is designed to saw rough lumber from softwood and hardwood. It is also powered by a separate diesel engine. Both mills have similar features. (When discussing any cutting operation, the sawyer is the crew member being addressed.)

8-1. Sawmill Components.

a. Headsaw. This saw cuts the log into boards. The circular headsaw is the most common type of headsaw in use. It consists of a flat, steel disk with the teeth cut around the circumference. The saw is mounted on a shaft, which supplies the power. A log is cut into boards by successive passes through the saw.

b. Headsaw Guide. This guide (Figure 8-1) is used on circular saws to steady the saw. When properly adjusted, the guide clears the saw by about 1/32 inch on both sides of the saw-blade rim.

c. Carriage and Trackway. The carriage is a movable track on which the log travels to the saw. The carriage consists of two main parts: the frame with wheels and axles and the superstructure, which controls the lateral movement of the log toward the saw. There are two types of superstructures, the log beam and the headblock.

(1) Log-Beam Type. The log-beam mechanism (Figure 8-2, page 8-2) operates on several bases made either of light metal or timber beams. The mechanism moves at right angles to the length and travel direction of the carriage, thus pushing the log into the saw according to the desired cut thickness.

(2) Headblock Type. The headblock type (Figure 8-3, page 8-3) consists of two or more bases fastened to the frame. In each base slides a knee; each knee is connected to a mechanism for pushing the log into the saw.
d. **Feed Works.** Small sawmill feed mechanisms used to control the rate of log feed to the headsaw may be operated in several configurations: straight friction; friction combined with belts and pulleys; belts, pulleys, and clutches; gears and clutches; and electric, hydraulic, or steam-piston drives. Except for the steam piston, electric, and hydraulic types, the feed works are geared to recede the carriage about twice as fast as advancing it. On all types, try to adjust the advance rate to the load capacity of the saw or power source. In the straight friction mechanism, the braking action and power transmission depend on the friction where the wheel and disk are touching. Carriage reverse is normally sluggish.

e. **Dogs.** Dogs are used on small mills to hold the log firmly on the carriage. Figures 8-4 through 8-7 (pages 8-4 through 8-6) show different dogs used in sawing operations. Dogs use either a spike or a hook to grip the log. The basic types are the fixed post with spike attached, the sliding post, the hammer dog with spike arm, and the boss dog with lever-actuated hooks.
f. Setworks and Receders. The function of the setworks (Figures 8-8 and 8-9, page 8-7) is to advance the log quickly toward the saw line by intervals, accurately held to the thickness being cut, and to reverse the process speedily. Precision in reversing the carriage is not vital. Setworks and receders may be lever-operated or power-operated (Figure 8-10, page 8-8) shows two power receders.

g. Indicators. Indicators (Figure 8-11, page 8-8) show the distance between the face of the log and the saw line, giving the thickness of the board being cut.

h. Log Turners. Portable-sawmill operations rarely use mechanical log turners. An experienced deckhand, with a cant hook, can turn logs under 20 inches in diameter as quickly as power turners can, and with less shock to the carriage. Semipermanent sawmill setups and mills, which run larger diameter logs, may install mechanical log turners.
Figure 8-4. Fixed-post, manually operated dogs
Figure 8-5. Housing-post, manually operated dogs
8-2. Crews. The efficient operation of the sawmill and associated facilities depends on the crew. Personnel and their duties vary; changes may be due to local factors.

a. Portable-Sawmill Crew. The crew of a portable sawmill will vary, depending on local conditions. When handling large, uneven logs, additional crew members may be needed on the log skids. Small- and medium-sized straight logs may require only two crew members to handle the skids. Two to four members are required to take the lumber from the edger and cutoff rig, depending on the sizes of lumber and the distance to the yard. One member may have to perform more than one operation when the crew size is limited. The following describes the various jobs performed by a sawmill crew:

- The sawyer is usually the sawmill foreman and is responsible for the crew's safety as well as for production.
- The block setter works closely with the sawyer, operating the setworks and the dogs on the front headblock.
- The dogger operates the dog levers on the center and rear headblock knees.
- The log skidder, working on the deck, keeps a supply of logs ready to be rolled onto the headblock base. This crew member also holds the log against the headblock knees when the log is being secured to the knees. If logs are heavy or crooked, one or two extra members may be needed on the log skids.
The off bearer is stationed at the tail of the headsaw to handle the boards sawed from the log. In most cases, the off bearer puts the board on the lumber rollers and moves the freshly sawed board to the edger. If boards do not require edging, the off bearer passes the board along the lumber rollers to the cutoff rig.

Figure 8-8. Lever-actuated setworks

Figure 8-9. Power-actuated setworks
Figure 8-10. Power receders

Figure 8-11. Indicators
The edger operates the mechanical edger to remove the bark edges or defective edges from the board.

The edger tailer removes the board, strip, end, and bark edges from the rear table. If a board requires end trimming, the edger tailer passes the board along the lumber rollers to the cutoff operator at the cutoff rig.

The cutoff operator runs the cutoff rig to square the uneven ends of the boards.

The lumber stackers carry the lumber from the edger or cutoff rig to the yard.

One or two members keep the cutoff rig and edger free from the accumulation of strips, slabs, knots, and ends. They also keep sawdust from accumulating in the dust holes under the edger and cutoff rig.

The millwright keeps the belts, accessories, tools and spare saws in good operating condition. He continually checks the power-unit engines and cutoff engines for satisfactory operation. The millwright and an assistant help replace saws and check their operation.

The millwright assistant helps the millwright. He also keeps the fuel tanks and radiators filled, as required.

The minimum crew size for the trailer-mounted sawmill is one sawyer, two log deckhands, and two off bearers. Their duties and responsibilities are the same as those above. For effective sawmill operation, crew members must understand their duties. Training must be sufficient to promote efficiency among crew members. It is especially important that the sawyer and block setter work closely together when scaling logs, preparing for cuts, and making cuts. Working as a team, the sawyer and block setter will adopt a few simple operating signals for figuring, turning, and sawing the log.

b. Yard Crew. The yard crew’s responsibilities will depend on the type of operation taking place. If lumber is not being stacked and dried but is being shipped as soon as it is sawed, three or four yard workers can keep the lumber moving onto the haul trucks. If lumber must be stacked, sorted, and stored, the crew size should be increased to handle stacking and shipping.


a. Trailer-Mounted Sawmill. The 50-inch, trailer-mounted sawmill usually is set up daily. During large operations, the mill is moved ahead to other skidways and away from the lumber, the slabs, and the sawdust. Ten to twenty thousand board feet is an average cut per setting.

(1) Setting Up the Trailer-Mounted Sawmill.

(a) Place the trailer-mounted unit within 3 feet of its desired position, longitudinally. Dig a hole about 6 inches deep in front of each wheel, so that when the sawmill is leveled, 50 percent of its weight will be removed from the tires. The base must be rigid for proper operation. Check for proper alignment of the drive belts, conveyor, and power unit.

(b) Secure a brace from the frame of the sawmill to the ground or power unit to compensate for drive-belt tension. If this brace is put between the sawmill and power unit, there should be some means, such as a jack, for increasing its length to have proper belt tension.
(c) Set up the sawdust chain and anchor it. Use a steel bar that is 3 or 4 feet long and about 1 1/2 inches in diameter. Sharpen one end of the steel bar and drive the bar into the ground at a slight angle so the top leans away from the center of the sawmill. This will prevent mill vibration from loosening the anchor.

(d) Secure the feed rope by passing the one end through the loop at the bottom of the feed lever. Hook the end of the rope securely on one of the hooks that is on the side of the lever used for tightening the rope. Pass the other end of the feed rope toward the log end of the frame under the carriage above the cross shafts. Pass the end down through the pulley on the extreme log end and back toward the center through the idler loop and over the top of the large feed drum. Make two complete coils around the feed drum from the side of the drum toward the saw. This will bring the rope end in alignment with the pulley close to where the frame hinges. Pass the rope up through this pulley and back toward the long end of the frame again. Be sure that the feed rope is above the cross shafts and under the carriage to the extreme log end of the carriage. Pass the rope up through the loop provided, and secure it through the hook bolt in the pipe winch. By tightening this winch, you can adjust the rope to the proper tension.

(e) To thread the reverse rope, proceed as with the feed rope except pull the rope in the opposite direction with only two coils around the drum. Feed the reverse rope from the bottom of the drum, not the top. After threading the feed rope and the reverse rope, tighten the winch on each end of the carriage until the feed lever is in a vertical position. Leave enough slack for at least 1 foot of movement when applying a reasonable amount of pressure. If you leave the ropes in overnight, slacken them at each end.

(f) After threading the ropes into the sawmill and checking the tension, be sure that the neutral position lock on the feed lever and the hand brake are set before operating the power unit and sawmill. Be sure that the lock pin, which prevents the carriage from traveling, is in a locked position. Remove the pin only after the sawyer is ready. Test the slack in the feed lever. Look for a slight forward or backward movement of the carriage as you move the set lever. With a little experience, you should be able to determine the proper tension on the ropes before releasing the lock pin.

(g) Make several short travels of the carriage. Increase the travel length until you have made several full length travels before attempting to take on the first log. Practice after every shutdown of the lumber sawmill to make sure that the carriage is in the clear and that the ropes are properly threaded and tightened.

The feed rope is usually 64 feet long and the reverse rope 56 feet long. With the longer feed rope, you can splice it once it is worn and use the feed rope as a reverse rope. One set of ropes should last through 40,000 board feet of sawing or about one week’s sawing, after the drums are worn smooth.

(2) Operating the Trailer-Mounted Sawmill. The controls for operating this sawmill are located on the sawmill carriage. They consist of the feed lever, the set lever, and the trip-release lever. The operator rides the carriage and stands facing the headsaw with all operating controls located to the rear. The dogs are adjustable to different size logs. Although the trailer-mounted
mill will saw logs up to 30 inches in diameter, the maximum desirable log diameter is 26 inches. Heavier, longer logs may tip the opposite end of the entire sawmill frame.

The husk of the sawmill does not have a clutch. If the power unit is in gear, the headsaw will be running and the carriage will operate. Before starting the headsaw, make sure that all personnel are clear of the drive belt and the headsaw. Ensure that the feed-set and trip-release levers are in NEUTRAL. Before placing a log on the carriage, test the carriage operation by moving it along the full length of the trackway several times. Make sure that the saw blade is running true.

To stop the mill, set all levers to NEUTRAL and either stop the engine or set the engine clutch in NEUTRAL. If the unit is to be shut down for an extended period, slacken the drive belt, the feed rope, and the reverse rope. Protect all mechanical parts of the sawmill from weather, ensuring that all belts and ropes are not exposed to rain or snow.

b. Semitrailer-Mounted Sawmill. This is a 60-inch sawmill that is operated about the same way as the trailer-mounted unit. You can saw larger-diameter logs with the mill.

c. Movement. Tactical situations, as well as the daily operation of the mill, may require movement to a new location. When this occurs, do the following:

- Remove the sawdust from around the auger, retracting the legs.
- Disconnect the power unit drive belt.
- Remove the guide rail and fold the frame.
- Remove the sawdust and soil that is in front of the wheels.
- Repair and or replace all worn, damaged, or missing parts.
- Lock down the carriage; check that all tools and equipment necessary for operation of the sawmill are with the unit and in good condition and move.

8-4. Sawing Procedures. The best methods of sawing logs in any operation depend on the demand for different grades and the desired thickness within each grade. A sawyer must know a few critical details relative to lumber grading to get the most from a log. Some details are the—

- Minimum width and length provisions of each grade, as a guide when slabbing.
- Defect allowance of a clear-face requirement of the grade, as a guide in log turning.
- Grade provisions applying to the lowest desirable grade, to avoid wasting time or making undesirable stock.

The edger must know the following details of grading:

- Minimum width and length provisions of each grade.
- Amount of permissible waste.
- Provisions covering standards of manufacture, particularly the standards applying to the crook.
The sawyer and the edger operator should consider the following details of grading:

- Minimum thickness, width, and length provisions for the grade rules that apply to dry lumber.
- Allowance for shrinkage in thickness and width in cutting green lumber.
- Edging of hardwoods to give the widest possible board in any fraction of an inch above the minimum required.
- Sizing of softwoods to give the widths in 1- or 2-inch intervals.

The following recommendations apply to milling hardwoods and softwoods:

- Clear faces should be taper-sawed to get the maximum possible footage in the upper lumber grades.
- Thin stock should be taken next to the slab to minimize edging waste.
- The centermost continuous core of the log (pith) should be sawed so it is enclosed in the center of the heartwood, where splits and checks are not considered a degrading characteristic.

8-5. Milling.

a. Softwood. The methods of sawing softwood logs differ mainly in the sequence used in turning. The two objectives of a sawyer are to recover maximum grade values and get maximum volume production per hour. It is not possible to get both by any one method. Either the frequent turning required to recover the maximum grade values reduces volume or the minimum turning necessary to get maximum production sacrifices grade. To get a balance between grade values and production volume, the turning procedure must be varied according to log qualities and sizes and mill facilities. No rigid set of instructions can be applied.

In the turning sequence, refer to the first log face to be sawed as Face 1, with Faces 2, 3, and 4 proceeding from top to bottom. Figure 8-12 (A and B) shows the faces of a log. Face 3 is opposite Face 1; Face 2 is opposite Face 4. Greater production volumes are possible by using the 1-3 sequence. Better grades usually result from some combination of 1-2-3-4 sequence. Heartwood will appear only in the last few cuts.

The sequence in which faces can be sawed is limited because adjoining sawed faces must be at right angles. To ensure this, turn the first face sawed to the bolsters or to the knees. On mills equipped with dogs incapable of preventing the log from turning while Face 1 is sawed, take a slab from Face 4 and turn the log that Face 4 rests on the bolsters. In the following instructions, assume that the dogs will hold the log firmly. If the dogs do not hold the log, change the procedure so that Face 3 is slabbbed and turned to the bolsters before Face 1 is worked.

(1) For logs of common grade quality that are 12 inches or less in diameter, use the 1-3 sequence, sawing near center from Face 1 and then turning the log 180 degrees and finishing it. If Face 1 is not worked to near center of the log, most types of dogs will not hold the piece as you work Face 3 past center.
Figure 8-12. Log faces and sawing procedures
(2) For logs of common-grade quality that are more than 12 inches in diameter, the 1-3 sequence has disadvantages. The edger operator can lose potential footage in the wide center boards through improper ripping. Lumber from near the center of the log tends to crook during drying. For these logs, use a 1-2-3 sequence if you use cant hooks for turning or a 1-2-3-4 sequence if you use powered equipment that turns the log up and over. When using the 1-2-3 sequence, Faces 1 and 2 are slabbed to produce boards of minimum width and Face 3 to end with a dog board (final board) of proper size. The 1-2-3-4 sequence produces the following results:

- Face 1 is slabbed to produce boards of minimum width.
- Face 3 ends with a cant thickness of 6, 8, 10, or 12 inches instead of a dog board.
- Face 2 produces a face of minimum width.
- Face 4 produces a final board of proper size as sawing is completed.

(3) A secondary refinement when sawing common grades is that knots should be toward the center and away from the edges of sawed stock. Try to place the log on the carriage so that the visible knots will be toward the center of the face rather than at the margin. Turn the log to bring Face 3 to the saw, which is slabbed and sawed the same as Face 2. By slabbing Face 1 as instructed, Face 3 will be taper-sawed without setting out the small end. Turn the log to Face 4 with the small end set out as for Face 2. Saw this Face 4 until common lumber develops. Before turning to another face, take out the taper by retracting the taper blocks, bringing the cant against the knees, and sawing the wedge to produce a cant thickness of 6, 8, 10, or 12 inches. If short pieces are usable, one or more short boards are taken in, straightening the cant. To end up with a dog board of proper size, the sawyer adds the thickness of the remaining saw kerfs and then slabs accordingly on Faces 3 and 4 of the log.

(4) If a log has two clear adjoining faces, place the log so that one poor face is to the saw and the other is up. Face 1 is slabbed and may be sawed lightly; Face 2 is brought to the saw and treated the same. Faces 3 and 4 are successive y taper-sawed deeply without use of taper blocks.

(5) If a log has two clear opposite faces, place the log with a clear face on top. After working Face 1 as described above, bring Face 2 to the saw, with the small end of the log set out, and work this face until common lumber develops. Next, saw Face 3 the same as Face 1. Taper saw Face 4 after the small end is set out. Before the cant is turned to another face, straighten the log.

(6) If a log has one clear face, place it on the carriage with the clear face against the knees. Doing so allows the clear face to be taper-sawed without using taper blocks.

The following instructions are for mills using equipment that turns down logs. For mills that turn up logs, turn the log either 180 degrees or 270 degrees after working Face 1, and modify the procedure to conform to this different turning system. For small mills having no demand for upper grades, saw around large logs as described except that the small end is not set out.
Rough softwood lumber that is to be either surfaced or surfaced and patterned must be edged and trimmed to widths and lengths that allow for the manufacturing of finished lumber of definite size standards. Usually, nominal widths are 2, 4, 5, 6, 8, 10, and 12 inches with even foot lengths. A slab that can be edged and trimmed to produce a 9-inch nominal width 11-foot long board should normally be sized to 8-inch nominal width 10-foot length. Since waste usually is excluded from surfaced or patterned material, edging and trimming should remove waste that will not be surfaced out.

A simple rule to guide the edger operator is that material should be edged to get the widest stock possible and the maximum even foot length but that the width should be reduced by 2 inches wherever 4 feet or more can be gained in length. The edger operator tentatively estimates the even foot length for a board of a given maximum width and decides if a width reduction of 2 inches allows for a length extension of 4 or more feet.

The edger operator should have definite instructions on the green width required for each width class manufactured in the mill. Basically, these widths depend on an allowance for planning, usually 1/16 inch per face planned. These allowances are added to the actual width standards set up for yard items by military specifications.

The edger operator should rip wide pieces into any series of widths that will raise the grade of one board above that of the wide piece. If no grade rise is possible, he should rip the piece to produce one board that is 12 inches wide. Other boards should be as wide as possible, avoiding the 7-, 9-, and 11-inch rip. Doing so avoids intersecting a knot that may fall out during seasoning and avoids ripping material so that the pith is at the edge.

The trimer operator trims to produce a desirable board of the maximum even foot length possible. Usually a 2-inch allowance in excess of the even foot length is made when trimming.

b. Hardwoods. When grade sawing random-size hardwood lumber, work the high-grade material from the better faces by taper sawing. Turn to a different face as the grade drops below that promised by adjoining faces. This process of working around the log is usually profitable if it results in raising the grade from No. 1 common to No. 2 common.

As the log is transferred to the carriage, the sawyer should decide how to divide it into four cutting faces and what the probable sawing sequence will be. A mirror at the deck end of the track allows the sawyer to see any end defects, which helps him determine the faces and the sawing sequence.

For clear, straight, sound logs with the pith as the approximate center, face division is not important, and the cutting sequence should be one that will not delay sawing operations. Therefore, at mills that turn down, the cant is down 90 degrees; at mills that turn up, the cant is turned at least 180 degrees from the first face. If the pith is off center, the log should be placed so that one face is perpendicular to the longest radius.

Logs with a straight crack are placed so that the crack is at the board edge that will be taken out in edging (Figure 8-12, A, page 8-13). The log is placed so that the crack coincides with the radius that is 45 degrees to the bolster and toward the saw. However, if Face 2 promises high-quality material, a slab is taken from Face 4 before turning to Face 1. Face 2 is taper-sawed.
so that a board of minimum useful width can be taken from the full length of the log. At right-hand mills turning down, the cutting sequence is usually 1, 2, 3, and 4. At right-hand mills turning up, the sequence is usually 1, 3, 4, and 2.

(3) Logs with spiral cracks (Figure 8-12, B page 8-13) are placed so that one end of the crack is in the same position as logs with straight cracks. The damaged zone is downward and back toward the knees. At mills that turn down, Face 1 is usually sawed until the crack appears on a board edge, then the other faces are successively worked.

Where spiral cracks extend one-third or more of the circumference, the unaffected faces are sawed deeply before short pieces are cut from affected faces. At mills that turn down, Face 1 is worked lightly, Face 2 deeply, and the cant is finished on Face 3. At mills that turn up, Face 1 is worked lightly, Face 3 is slabbed, Face 2 is worked deeply, Face 1 is worked close to the pith, and Face 3 is finished.

(4) Shake, rot, or spider heart (several splits radiating from the pith) that is restricted to the center does not influence how the log is divided into faces or the sawing sequence. The undesirable core is boxed and discarded. Logs with shake or rot in the out zone are placed on the carriage so that a cutting face is parallel to the straight line, thus connecting the ends of the arc of shake or the long axis of the rot area. The face affected is sawed last. Logs with wormholes should be placed on the carriage so the faces that are visibly free from holes are sawed before the log is turned to the affected areas.

The defects listed above usually are detected from the ends of the log. Defects detected by surface inspection, such as bud clusters, bird pecks, bulges, bumps, burls, butt scars, cankers, conks, holes, knots, overgrowth, and wounds, can be treated as a group, depending how they influence the face divisions and the sawing sequence. Defective logs range from those with few localized defects to those with many defects spread over the entire surface.

(5) Surfaces free of defect indicators are the basis for initially placing the log. The log is turned so as to cut the faces that produce the high-grade material before making deep cuts into the defective faces. For example, if a log has three high-grade faces, slab the defective face and then either turn down 90 degrees or up 180 degrees, depending on mill practice. Saw the defective face last.

If a log has one high-grade face, place this face against the knees. At mills that turn down, use a 90-degree turn for successive faces. At mills that turn up, saw the first face and then use the following turning sequence: 180 degrees, 90 degrees, and 180 degrees.

If a log has a clear face that joins another face having one or more defects that could be removed in edging, place the log so that these defects will be near the edge of the defective face. However, cankers, conks, holes, and large dead knots indicate extensive defects not likely to be removed by edging. Center them on the poor face (Figure 8-12, C page 8-13).

(6) Place logs with sweep on the carriage with the sweep facing out. Work the four faces successively in the sequence dictated by the turning equipment. Better grade recovery usually results when the widest boards are cut from the faces that are at the top and bottom with reference to the first face sawed.
(7) Face locations must be according to the factors just outlined. High-grade faces are usually sawed parallel to the bark. Low-grade faces are sawed in the most convenient way to speed up the work. If a high-grade face is opposite a low-grade face, saw the good face parallel to the bark. Do so either by placing the poor one against the knees and setting out the small end of the log or by placing the good face against the knees and slabbing the poor face first.

If high-grade faces are opposite each other and the log is characteristically free of defects almost to the pith, place one good face against the knees and partially saw the other good face without regard to parallelism. By doing so, you will taper-saw each good face and get high-grade log length boards. If the log has interior defects that extend beyond the pith zone, set out the small end enough to permit cutting a slab of uniform width the full length of the log. When the opposite good face is turned to the saw, repeat this process. After cutting this face and before turning the log to another face, straighten the cut by retracting the taper levels, setting the small end back against the knees, and sawing the face to produce a cant with opposite faces parallel. The purpose of this is to take out the taper from the low-grade material in the core instead of from the high-grade material in the outer zone.

(8) When slabbing parallel to the bark, the face of the slab should be the minimum width required: 6 1/2 inches for grades above No. 1 common and 3 1/2 inches for grades No. 1 common or lower. With any face, a 4-to-4 cut is usually taken next to the slab to minimize edging waste, but if the face is opposite a previously sawed one, slab it so that the final piece will conform to the intended item. Saw the faces of high-grade material deeply and the faces of low-grade material lightly. (The usual practice is to continue sawing the face until the grade drops to that of the adjoining faces.) Continue this turning either until the central portion is sized to meet construction item specifications or until the grade of lumber becomes substandard. For small mills that specialize in cutting factory lumber, such turning is justified as long as lumber better than No. 3 common can be cut.

**8-6. Edging.** Normally, material for random-size use is edged to get the maximum width possible in inches and fractions. For construction items, lumber is edged to conform to definite width specifications. Items, such as boxcar flooring and construction boards, may be made from a limited number of tree species and sized to a restricted series of widths, thicknesses, and lengths. The sawyer, edger operator, and trimmer operator must know the size, species, and allowable defect provisions of grading rules for such items. They should make the 1/16-inch allowance per inch of width to take care of shrinkage from the green-to-dry condition. Material more than three inches thick is normally edged on the headsaw. Most construction items are produced by the headsaw from squared cants and require no edging. The items that require edging are edged according to the size and quality specifications for the particular product. Because of the variety of products, general edging instructions cannot be given.

**8-7. Trimming.** Trim each piece two inches over the nominal foot. Trim boards below firsts and seconds so that the surface area of the waste or rot remaining on the board is about equal to the area of the sawed sound face of the trim (Figure 8-12, 4, page 8-13). For firsts and seconds, you must trim waste or rot in excess of one-fourth of the affected area within 1 foot of the end. At least one-half of the area of this last foot must have a clear face. For specific
construction jobs, trim each item so it conforms to the specific length requirements with defect provisions as listed in the applicable grading rules.

8-8. Sawing Oversized Logs. There is no efficient way to saw logs that are too large for the headsaw. The diameter of the saw should not exceed that needed to saw the larger logs. Table 8-1 shows the relationship between saw and log diameters. If you are sawing logs with diameters larger than any listed in Table 8-1, turn the logs about 1/8 inch instead of 1/4 inch. You should be able to square and saw the logs as with normal procedures. However, this method of turning wastes material and time. If you are sawing logs with diameters nearly twice the height of the portion of the saw above the bolsters, use the following procedure to reduce the log:

- Set the log and make the initial cut as shown in Figure 8-13, 1. Use dogs to firmly hold the log; feed the log slowly.
- Turn the log up 90 degrees and saw stock items. Stop sawing before reaching the log center (Figure 8-13, 2).
- Turn the log up another 90 degrees with the small end set out so that the ensuing saw lines will follow planes parallel to the first saw line taken. Stop sawing stock items before reaching the center (Figure 8-13, 3).
- Turn the log down 90 degrees and saw stock items beyond the center (Figure 8-13, 4).
- Turn the log down another 90 degrees and finish sawing (Figure 8-13, 5).

NOTE: You can use powered dragsaws and chain saws to reduce oversized logs to moments that you can cut on the head rig.

8-9. Size Standards. Lumber, timbers, and ties must meet the precise size standards give in military specifications. Inaccurate sawing can result in failure to produce standard-size timber and ties. Inaccurate shrinkage (green to dry) and sawing can result in failure to produce standard-size lumber and light framing material. The causes of inaccurately sawed lumber are—

- Faulty condition of the saw due to teeth being out of line, dull teeth, or incorrect saw tension.
- Worn bearing on the mandrel, the carriage wheels, or the setworks.
- Poor installation of the carriage and saw.
- Chips lodged between the log and headblock or on the tracks.
- Careless setting or miscalculation.
- Inaccurate manipulation of the dogs or using dogs that are mechanically unfit to hold the log firmly.
- Frozen timber or unequal stresses in the wood.
When selecting a sawmill site, avoid soft or spongy ground. The trackway, husk, and foundation timbers must remain absolutely level after the sawmill is erected. Safety should be the first consideration in sawmill operation. The sawyer, as well as the entire crew, must constantly be alert to avoid accidents that may cause injury. Every crew member should avoid forming careless operating habits that cause unnecessary wear and tear on the working parts of the mill. To prevent accidents, the sawmill crew should follow these safety suggestions:

- Always secure the sawyer’s lever in NEUTRAL before leaving an operating headsaw. Swing the neutral stop rest to the left and against the sawyer’s lever. This prevents the lever from being accidentally moved to either of the engaged positions.
- Make sure there is proper clearance between the headsaw and the three headblock bases before operating the carriage past the headsaw. Push the carriage past the saw by hand to check the clearance. Make sure that the head is stopped when checking the clearance between the headblock bases and headsaw.
- Use heavy gloves when removing or installing the headsaw. Watch your footing.
- Never apply nonslip dressing to the feed belt or backing belt. These belts must slide freely on the pulleys when the sawmill is idling.
- Keep trash, rags, and tools secured a safe working distance away from the mill.
- Do not allow slabs, waste, or sawdust to accumulate around or under the mill equipment. Keep the trackway clear.
- Avoid wearing loose clothing or working too close to drive belts, feed belts, pulleys, and the saw.
- Do not pile too many logs on the log skid.
- Use cant hooks and peavies to move and handle logs. Do not use hands, feet, or timber sticks for this purpose.
- Do not use broken, damaged, or dull cant hooks.
- Do not use a dull saw.
- Make certain that all logs are securely dogged before sawing begins.
- Stop the engines before starting any repairs on the sawmill. Remove the battery connections to prevent accidental or unauthorized starting of the mill.
- Stay alert concerning fires and fire hazards because the frequency of fire in and around sawmills is very high.
- Use the appropriate personal safety equipment to protect eyes, hands and feet.
- Use precautions when operating the sawmill under unusual conditions like mud and water because the foundation could settle unevenly. Check the sawmill to ensure that it is level. If needed, excavate under the foundation and block up the mill using solid building material.
- Distribute lighting evenly around the entire sawmill for night operations. Mount the lights high enough so the lights will not reflect in crew member’s eye or cast shadows on equipment. Place a small spotlight on the sawmill so that the sawyer can easily see the butt of the log on the carriage.
- Do not run wires for night lighting on the ground or above the ground where loading or unloading equipment may damage them. Protect all lights near the saws from flying chips and debris.