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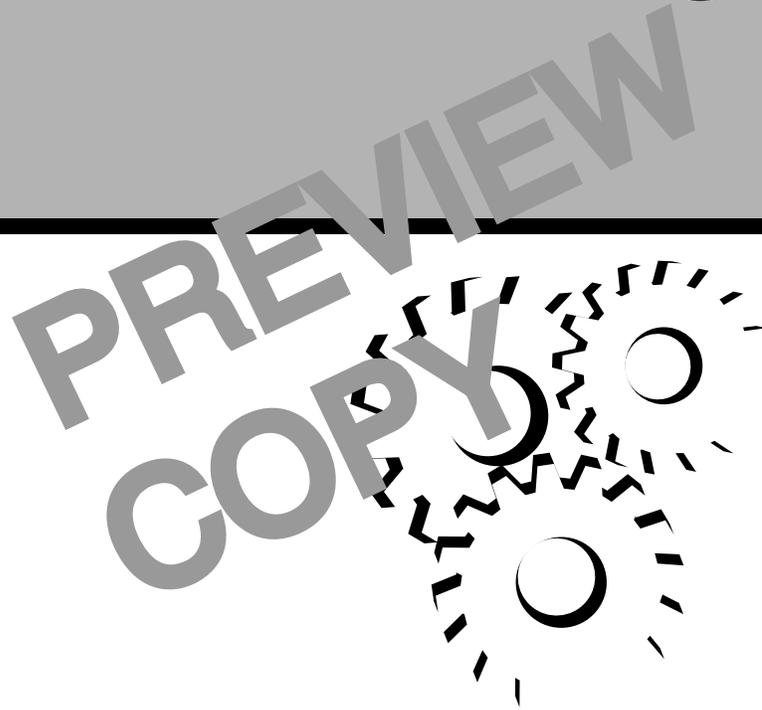
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MULTIPLE-MACHINE PROCEDURES

Lesson One

Power Sawing



TPC Training Systems

32801

Lesson


Power Sawing

TOPICS

Power Saw Functions

The power Hacksaw

Using the Power Hacksaw

The horizontal Bandsaw

Band Installation

Setting Up the Horizontal Bandsaw

Making the Cut

The Vertical Bandsaw

Using the Vertical Bandsaw

Setting the Blade

Vertical Bandsaw Safety

Sawing the Wheel-Puller Body

Filing the Workpiece

Internal Cutting with a Vertical Bandsaw

Welding the Band

OBJECTIVES

After studying this Lesson, you should be able to...

- List the three main types of power saws commonly used in maintenance machine shops and describe their appropriate uses.
 - Explain the primary difference between a hacksaw and a bandsaw.
 - Demonstrate how to install the band on a horizontal bandsaw.
 - Demonstrate how to set up a workpiece and make a cut on a horizontal bandsaw.
 - Describe the safety precautions to be taken when working with a vertical bandsaw.
 - Explain how to make an internal cut using the vertical bandsaw.
 - Demonstrate how to reweld the band of a vertical bandsaw.
-

KEY TECHNICAL TERMS

AISI 1.09 American Iron and Steel Institute
sfpm 1.14 cutting speed measured in surface feet per minute

Wheel-puller 1.24 fixture used to remove a wheel or gear from a shaft
CRS 1.25 cold rolled steel

Lesson One will acquaint you with the three basic types of power saws used in maintenance machine shops. It explains their characteristics and appropriate uses.

The Lesson also describes a sample project for each type of saw, with detailed instructions for setting up the workpiece. These instructions include step-by-step guidelines for installing the band in a horizontal bandsaw, adjusting the blade guides, and making the cut. You will also find details on setting the blade of a vertical bandsaw, using it (including making internal cuts), and welding the band. Safety procedures are emphasized throughout the Lesson.

1.01 The power hacksaw, the horizontal bandsaw, and the vertical bandsaw are three basic types of power saws found in maintenance machine shops. The power hacksaw is used for cutoff operations only. Bandsaws are used both for cutting off pieces and for cutting out profiles. However, the vertical bandsaw should never be used to cut off round stock. Round stock tends to rotate in your hands, and can be extremely dangerous. Always use a power hacksaw or a horizontal handsaw for round stock, and always clamp the round stock in a vise.

Power Saw Functions

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cutting out profiles. However, the vertical bandsaw should never be used to cut off round stock. Round stock tends to rotate in your hands, and can be extremely dangerous. Always use a power hacksaw or a horizontal handsaw for round stock, and always clamp the round stock in a vise.

The Power Hacksaw

1.02 Figure 1-1 shows a typical power hacksaw and its major components. The base supports the machine, and the frame holding the blade moves back and forth to produce the cutting action.

1.03 The power hacksaw is a reliable and easy-to-operate cutoff machine. For small-diameter rounds, angle irons, and small bars, a hacksaw is very efficient. Its main drawback is that it cuts for only a portion of the cycle. This means that, on mid-sized or

Fig. 1-1. Power hacksaw

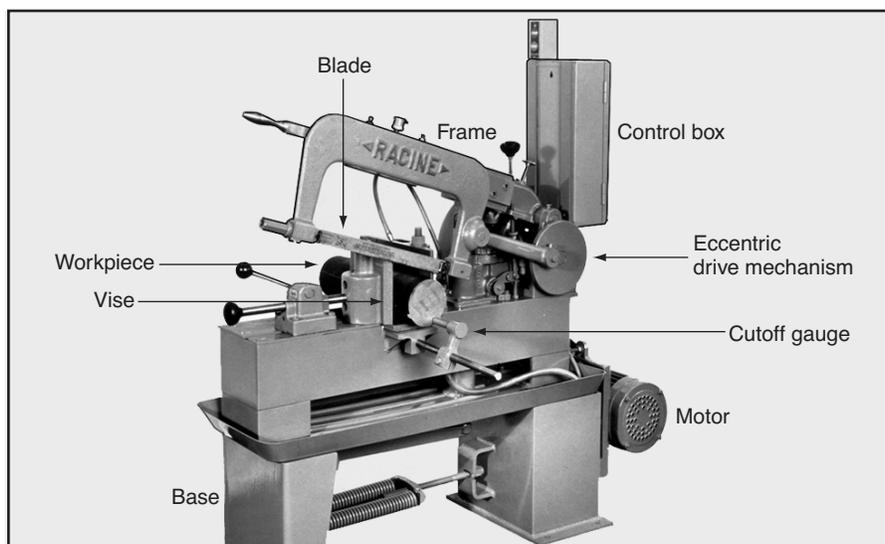
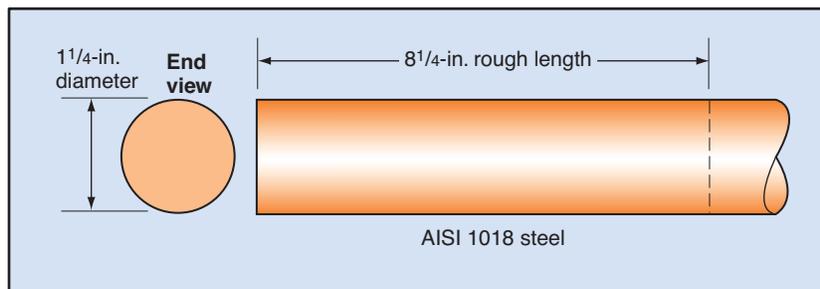


Fig. 1-2. Small-diameter round



larger workpieces, the power hacksaw takes longer to make a cut than a bandsaw does.

Using the Power Hacksaw

1.04 Figure 1-2 gives the dimensions of a workpiece that is to be machined into an 8 in. long pulley bar. You are to cut it to a rough length of 8 1/4 in. Before you begin the sawing operation, select a blade, using selection tables published by blade or power saw manufacturers. Blade length is largely determined by the range of work the machine is designed to handle. Usually, blade length is fixed, although some machines can use several lengths. Once the blade is selected, choose a cutting speed—again using manufacturers' selection tables.

1.05 Mount the blade in the frame with the teeth pointing in the same direction as the cutting stroke on your saw. Some hacksaws cut on the return stroke. Others cut on the outward stroke. Position the blade securely in the frame and tension it so that it is straight up and down.

1.06 Mount the workpiece in the vise and clamp it securely. Odd-shaped work may require special clamping techniques. There are several ways to measure and set the correct cutoff length for a workpiece.

1.07 Power hacksaws are usually supplied with a built-in cutoff gauge. You simply set the cutoff gauge to the length of stock to be cut off. Do this by extending the stock to the desired length, as measured from the good end to the closest face of the blade (Fig. 1-3). Then set the cutoff gauge so that it contacts the end of the workpiece at that distance. If you cut off more than one piece of the same length, loosen the vise after each cut and move the workpiece out so it

touches the cutoff gauge once again. This operation saves setup and measuring time.

1.08 If you use the blade with coolant, set the cutting speed a little higher than recommended. This practice will generally improve blade life. The cost difference between cutting wet and cutting dry is usually insignificant for small workpieces of mild steels. It can, however, be significant in hard-to-cut materials. With most hacksaws, the cutting speed ranges from about 35 to 150 strokes per minute. You will probably do most of your cutting at 60 to 120 strokes per minute.

1.09 Mild steels, such as the *AISI 1018* steel specified for the workpiece in Fig. 1-2, can be cut at high strokes-per-minute rates. For this job, set the rate at 120 strokes per minute.

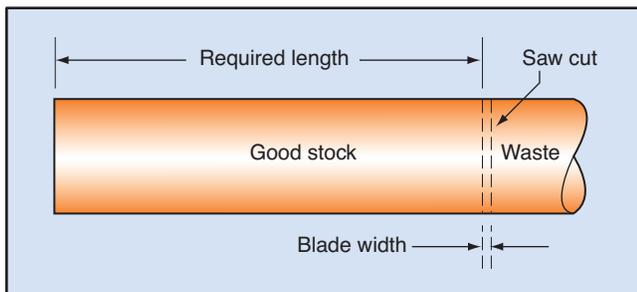
1.10 Make an initial light cut to be sure the blade is properly positioned for the cut. If it is not, reposition the work and reclamp it. Start the machine and feed the blade into the work, at the proper rate, until the stock is cut off.

The Horizontal Bandsaw

1.11 The main difference between the operation of a power hacksaw and a horizontal bandsaw is that the bandsaw blade moves only in one direction during cutting. The band is like a belt that forms an endless loop around two pulley-like wheels. This gives a much faster cutting action than a power hacksaw. There is no noncutting stroke and, therefore, no lost motion. Because the teeth are moving constantly, they tend to clean themselves continuously.

1.12 As your workpiece for the horizontal bandsaw, you will use another length of the same steel that

Fig. 1-3. Allowance for blade width



you cut on the power hacksaw. Refer to the sawing recommendations for AISI 1018 steel $1\frac{1}{4}$, in. in diameter. You can find sawing recommendations on the machine or in handbooks and operating manuals.

1.13 Figure 1-4 shows a typical blade selection wheel, which is mounted on a machine. The window in the wheel recommends the band type, pitch (number of teeth per inch on the blade), and band speed for various types of material to be cut. If cutting fluid or solid lubricant is needed, the selector will tell you which type.

1.14 In this case, because the workpiece diameter is in the 1 to 3 in. range, you will need an 8 pitch blade. Band speed should be set at 180 *sfpm* (surface feet per minute) for a 60 cycle motor, and 150 *sfpm* for a 50 cycle motor. Feed pressure is set at the factory and does not have to be set for

individual jobs. Most of the recently manufactured saws do have built-in regulators for the rate of feed, however.

Band Installation

1.15 To install the band:

1. TURN THE POWER SWITCH OFF! Raise the bandsaw head slightly.
2. Open the band wheel doors. Make sure that the catches securely hold the doors in their open position.
3. Use the adjusting screws to adjust the movable saw guide inserts (Fig. 1-5) so that they just touch the fixed inserts.
4. Then loosen the screws again by backing them off $1\frac{1}{4}$, turns. Do not loosen them too much or they may fall out.
5. Put on protective gloves. Place the blade over the wheels with the back of the band seated against the wheel flanges (Fig. 1-6 on the following page).
6. Turn the wheel that controls the band tension to remove most of the slack in the band (to keep the band on the wheels).

Fig. 1-4. Typical blade selection wheel



Fig. 1-5. One type of bandsaw guide assembly

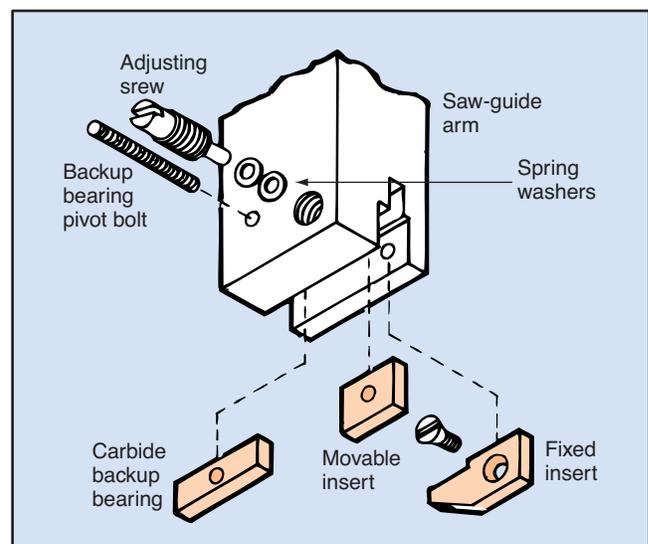
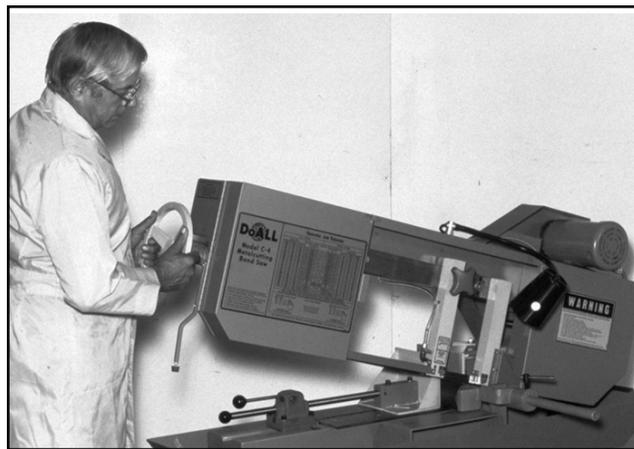


Fig. 1-6. Placing the band in the saw guides



7. With your left hand, grasp the band to the left of the left-hand saw guide. With your right hand, grasp the band to the right of the right-hand saw guide.
8. Twist the band 90° and slip it up between the saw guide inserts. The teeth must point downward and to the right.
9. Close the band doors and lower the bandsaw head.
10. Adjust the band tension. Do this by turning the handwheel clockwise (Fig. 1-7), on the following page, until the stop bolt contacts the large handwheel washer.
11. On most horizontal bandsaws, the right guide arm is fixed, while the left arm moves on a slide bar (see Fig. 1-6). Make sure the saw guide arms are set so as to be as close to the work as possible, but still clearing the work on either side. Loosen the adjusting knob on the left guide arm and slide the arm until it is in the desired position. Then tighten the knob.
12. Adjust the saw guide inserts by turning the adjustment screws clockwise nearly 1½ turns, until the guide inserts barely touch the saw band. The band is now installed and ready for use.

Fig. 1-7. Adjusting the band tension

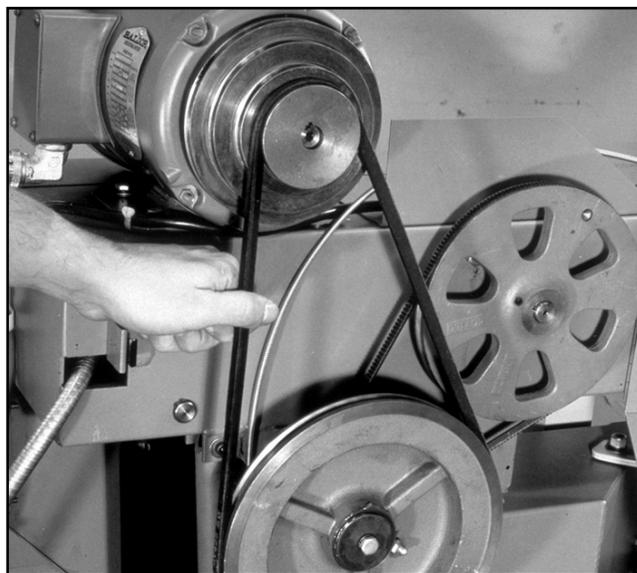


Setting Up the Horizontal Bandsaw

1.16 Setting the band speed. Band speed is controlled on most light-duty bandsaws by changing the drive belt position on a stepped pulley on the motor shaft (Fig. 1-8). On a typical machine, four pulley steps provide four band speeds. For example, you might have band speed options of 65, 90, 130, and 180 sfpm. To set the speed, stop the motor. Open the pulley housing door at the rear of the machine. Set the drive belt in the proper pulley step.

1.17 Setting feed force. Feed force should be decreased for thin workpieces and increased for hard-

Fig. 1-8. Four-speed, stepped-pulley drive



er and thicker workpieces. These adjustments are made by means of a feed regulator.

1.18 If you use cutting fluid, select the type and flow rate according to the recommendations on the machine or those supplied by the blade manufacturer. The flow should completely cover the band during sawing.

1.19 **Setting the vise.** The vise is clamped on this type of machine by means of a simple lever, as shown in Fig. 1-9. Steps for setting the vise for the workpiece are:

1. Scribe the bar stock where the cut is to be made. Place the workpiece on the table so that the length to be cut extends forward beyond the band.
2. Raise the vise clamp lever to release the sliding bar.
3. Push the “push/pull” knob on the end of the sliding bar to position the jaw firmly against the workpiece.
4. Lower the vise clamp lever to lock the vise jaw in place against the workpiece. To unclamp the work, move the lever in the opposite direction.

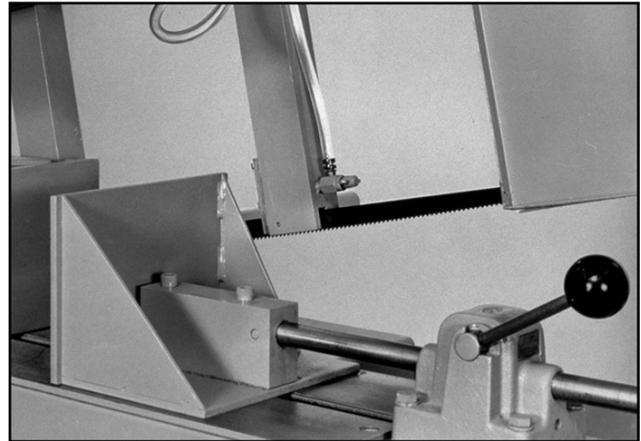
Making the Cut

1.20 The procedure for cutting the workpiece to an $8\frac{1}{4}$ in. length is:

1. Raise the machine head so that the band clears the workpiece by about $\frac{1}{4}$ in. Engage the head control (holding) lever or other locking device.
2. Adjust the saw guide arm.
3. Reposition the workpiece, if necessary, so that the blade will cut precisely through the scribed mark on the workpiece.
4. Reclamp the workpiece and check to see that it is securely held in place.
5. Check the band speed setting. Make sure the drive belt is set in the proper pulley step.
6. Turn ON the bandsaw.
7. If you are using cutting fluid, adjust the flow.

Move the head control lever to RELEASE. The head will now automatically descend to make the cut.

Fig. 1-9. Bandsaw vise assembly



The Programmed Exercises on the next page will tell you how well you understand the material you have just read. Before starting the exercises, remove the REVEAL KEY from your Trainee's Guide. Read the instructions printed on the Reveal Key. Follow these instructions as you work through the Programmed Exercises.

10 Programmed Exercises

<p>1-1. The three basic types of power saws used in maintenance machine shops are the horizontal and vertical band-saws, and the _____.</p>	<p>1-1. POWER HACKSAW Ref: 1.01</p>
<p>1-2. Round stock must be cut with a(n) _____ or a(n) _____.</p>	<p>1-2. POWER HACKSAW HORIZONTAL BANDSAW Ref: 1.01</p>
<p>1-3. The primary difference between a power hacksaw and a bandsaw is that the bandsaw blade moves _____.</p>	<p>1-3. IN ONLY ONE DIRECTION Ref: 1.11</p>
<p>1-4. The blade selection wheel mounted on a horizontal bandsaw should give you recommendations for lubrication (if needed), band type, pitch, and band _____.</p>	<p>1-4. SPEED Ref: 1.13</p>
<p>1-5. The first step in installing a horizontal bandsaw band is to _____.</p>	<p>1-5. TURN THE POWER OFF Ref: 1.15</p>
<p>1-6. Before you place the horizontal band-saw blade over the wheels, you should put on _____.</p>	<p>1-6. PROTECTIVE GLOVES Ref: 1.15</p>
<p>1-7. You are preparing to make a cut with a horizontal bandsaw. After you adjust the saw guide are, you may find it necessary to _____.</p>	<p>1-7. REPOSITION THE WORKPIECE Ref: 1.20</p>
<p>1-8. The last thing you should do before turning a horizontal bandsaw ON is to check the band _____.</p>	<p>1-8. SPEED SETTING Ref: 1.20</p>

The Vertical Bandsaw

1.21 Figure 1-10 shows a typical vertical bandsaw. This machine is used primarily to cut out special shapes and contours in a workpiece. Like the horizontal bandsaw, it uses continuous cutting action during operation. The blade drive systems are much the same on both vertical and horizontal bandsaws.

1.22 Some of the many applications of the vertical bandsaw are shown in Fig. 1-11 on the following page. For internal cuts, the band can be snipped, threaded through a hole drilled in the workpiece, and then rewelded.

1.23 The worktables on most vertical bandsaws can be tilted to make beveled or angular cuts in the work. Some vertical bandsaws have a fixed table, which means that the workpiece must be hand fed into the blade. Others are equipped with hydraulic or pneumatic power feed systems. A power feed system simply moves the table, thus feeding the work into the blade automatically. The bandsaw guide arrangement is the same, in principle, as that on a horizontal bandsaw.

Using the Vertical Bandsaw

1.24 Figure 1-12 on the following page shows a *wheel-puller* workpiece that calls for contour cut-

ting on a bandsaw. Because the vertical bandsaw blade pulls the workpiece down against the table, a minimum of workholding devices and fixtures is needed.

1.25 The finished wheel-puller body will be a little less than $\frac{1}{4}$ in. thick, $5\frac{1}{4}$ in. long, and about 4 in. wide. The print calls for AISI 1018 CRS (*cold rolled steel*). Use a $5 \times 6 \times \frac{3}{4}$ in. piece of flat CRS 1018 steel. All edges must be deburred prior to layout and sawing. Choose the better side to use for layout. Surface-sand this side and clean it with a cleaning compound. Apply layout dye. Lay out the piece for sawing.

1.26 To cut this workpiece, use a $\frac{1}{4}$ in. blade. Select a set of saw guide inserts of the correct size to match the blade (if your machine uses them). The size is stamped on the side of the insert. If the inserts are not wide enough, they will not give the blade proper support. If they are too wide, the blade teeth can hang up on the inserts and damage them.

1.27 If the blade has a backup bearing, make sure it is clean and not too worn for further use. Replace the backup bearing, if necessary. Mount the inserts in the guide body, as shown in Fig. 1-13 on the following page, and install the blade. Rotate the bandwheels by hand to make sure that the blade runs freely.

Fig. 1-10. Vertical bandsaw

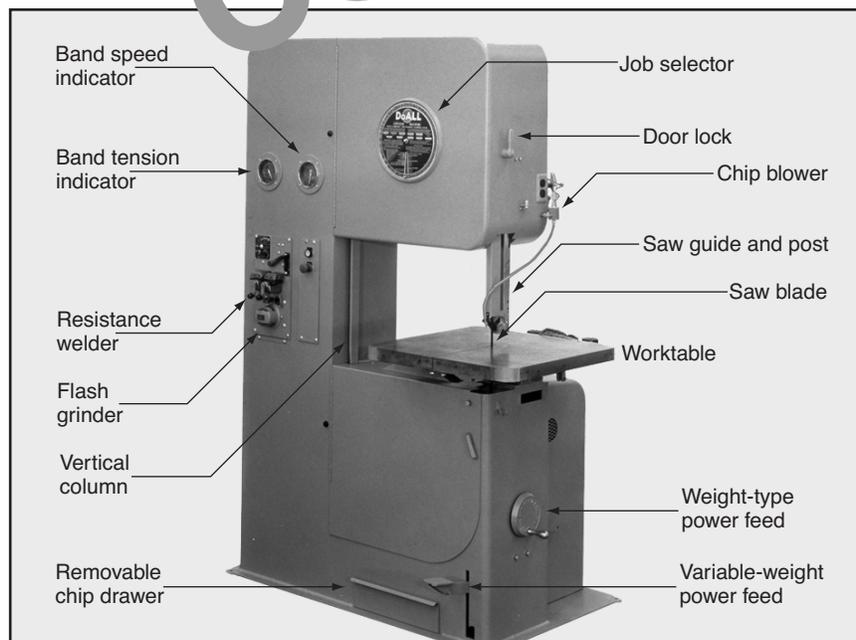
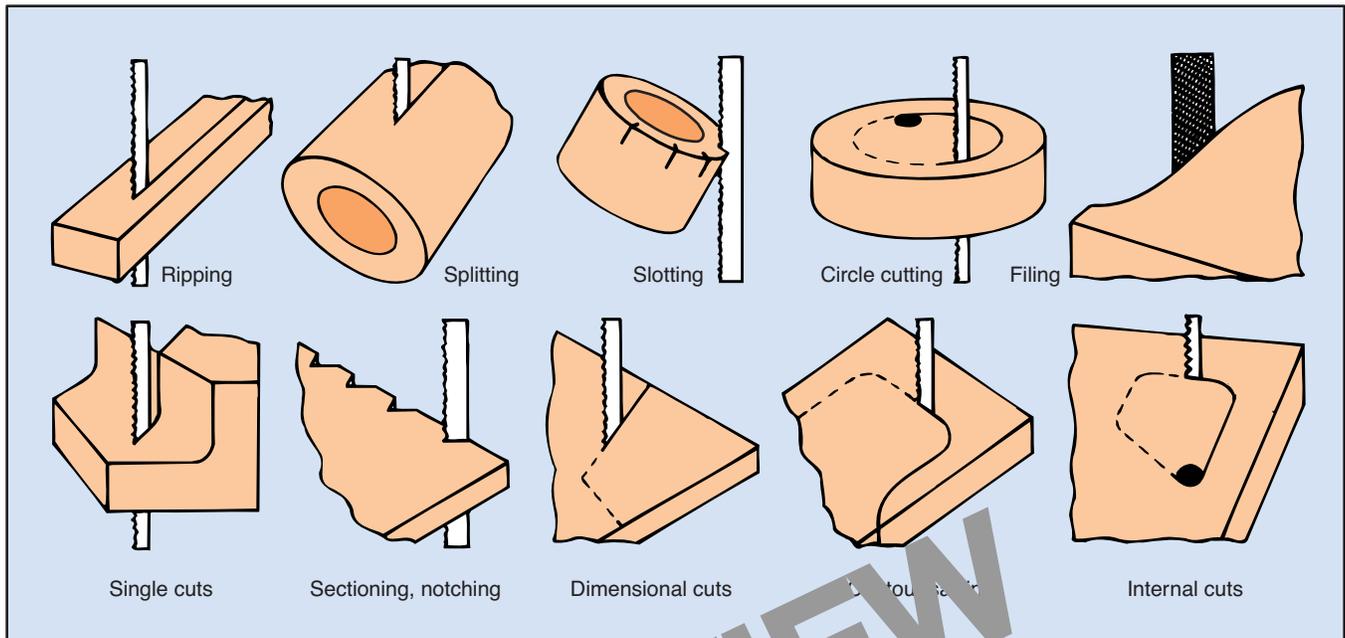


Fig. 1-11. Cuts made with a vertical bandsaw



1.28 Some machines use roller guides instead of two-piece guide inserts. Still others use solid, one-piece guide inserts, as shown in Fig. 1-14. These inserts have no separate backup bearings, and require no adjustment. However, the sizes are preset, and you must select a pair of upper and lower inserts to match the width *and thickness* of the band you are using.

Setting the Blade

1.29 With the guides and inserts in place, the next step is to set the blade so it will track correctly. You

must also set the band tension. Make sure the gearshift lever is in neutral, and put on protective gloves. Remove the filler plate (shown in Fig. 1-15) so that you can pass the band through the slot in the center of the table.

1.30 To place the band around the carrier wheels, grasp the band in both hands with the teeth facing you. The teeth in your right hand should point downward. If they do not, turn the blade band inside out so that they do point in the proper direction. Place the band over the upper wheel and under the lower

Fig. 1-12. Wheel-puller body workpiece

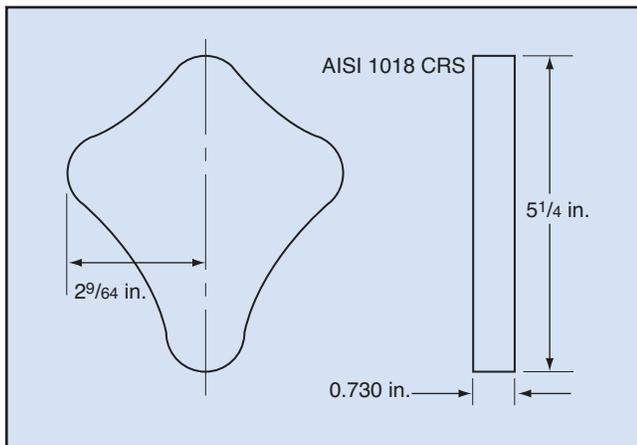
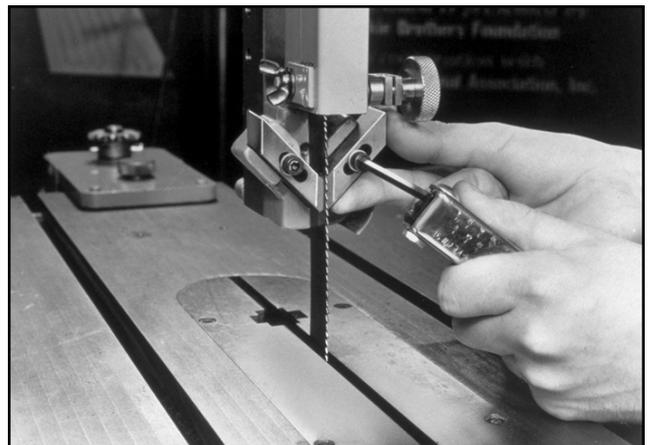


Fig. 1-13. Setting the inserts with the blade



wheel, and position it between the upper and lower saw guide inserts. The back of the band should just touch the backup bearing.

1.31 Using the hand wheel adjustment, take up the slack in the band until the tension indicator dial shows the proper setting for the type of band used. Also check the band alignment. The band should ride in the center of the rubber-crowned wheel. To make sure it rides properly, turn the upper carrier wheel by hand. If the band does not run directly over the center of the crown, adjust the upper band wheel. When the band tracks properly on the upper wheel, tighten the wheel locknut.

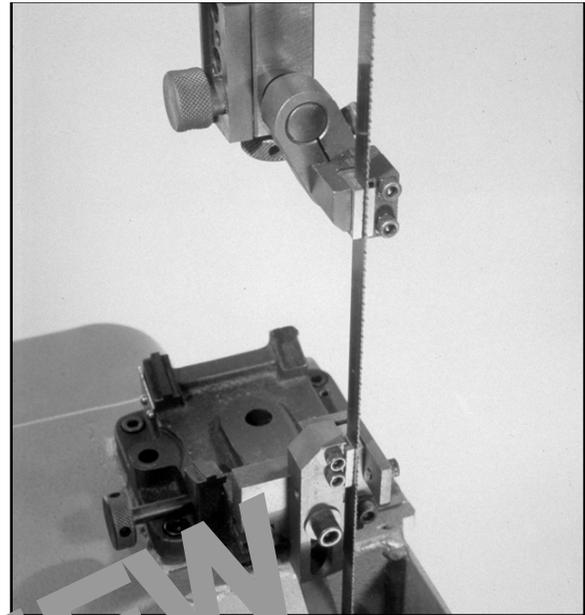
Vertical Bandsaw Safety

1.32 Any saw blade is a potentially dangerous instrument, because its teeth must be sharp. But a vertical bandsaw is a particularly dangerous power saw. Although it may look somewhat harmless, its blade moves at very high speeds, and your fingers and hands often must be close to it. When applying feed pressure by hand, you can easily forget that the resistance to your force will suddenly disappear as the cut is completed. Your fingers are likely to slide into the blade as a result. Your reactions are usually not quick enough to avoid cutting your fingers.

1.33 Because of the hazards involved, you should become thoroughly familiar with these bandsaw safety precautions:

- Make sure all guards are in place before using the bandsaw.
- WITH THE POWER SHUT OFF, lower the saw guide as close as possible to the workpiece.
- Wear proper eye protection.
- Roll up your sleeves; avoid having any loose clothing that can catch in the blade.
- Do not wear rings, a wristwatch, bracelets, or other loose jewelry when using the vertical bandsaw.
- Do not feed the workpiece too fast; the blade can bind and break. As you approach the end

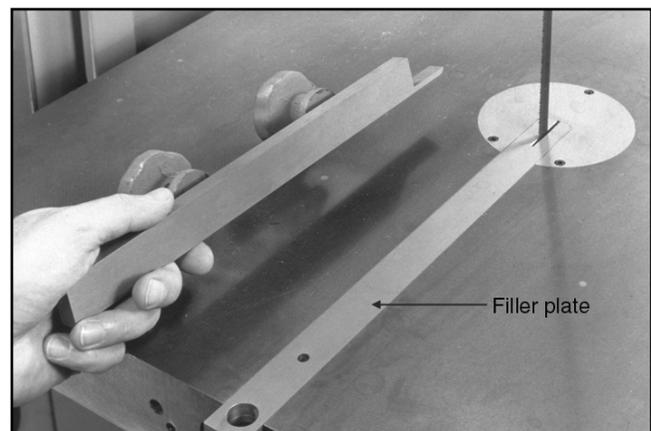
Fig. 1-14. Upper and lower blade guides assemblies with solid inserts



of a cut, reduce the feed pressure so that the saw does not break through the work unexpectedly.

- Use a pusher or work holding device, if you can, to keep your hands as far away from the blade as possible.
- Do not try to cut too sharp a radius. A quarter-inch blade will cut a $\frac{5}{8}$, in. radius, while a $\frac{1}{2}$, in. blade can cut no smaller than a 3 in. radius.

Fig. 1-15. Filler plate



- Keep the floor dry around the saw.
- Shift gears only when the machine is stopped, or moving very slowly.

Sawing the Wheel-Puller Body

1.34 Now you are ready to continue your project. Set the weight-type power feed (Fig. 1-10) to the rate specified in the manufacturer's tables. Mount the workpiece in the adjustable jaw recommended for use with this feed. Bring the upper guide down as close to the work as possible to ensure a straight cut. Start the band and adjust the coolant nozzle so the spray is directed at the point of cut.

1.35 Step on the feed pedal and advance the work to the blade to start the cut. Feed the work to the blade carefully, and continue cutting until you approach the first curve. Ease off a little on the feed pressure and turn the piece so the blade follows the layout line. Leave about $\frac{1}{8}$ in. extra material between the blade and the layout line for later cleanup and filing. When the blade has crossed the original cut line, the sawing portion of the job is complete.

Filing the Workpiece

1.36 File bands come in various shapes, widths, and tooth patterns. Typical widths are $\frac{1}{4}$, $\frac{3}{8}$, and $\frac{1}{2}$,

in. Tooth patterns range from 10 to about 20 teeth per inch. A file with 12 or 14 teeth to the inch is suitable for most maintenance filing jobs. Files with flat, oval, and half-round profiles are available for filing straight and curved contours.

1.37 For the wheel-puller, a flat file and an oval-shaped $\frac{1}{2}$ in. wide file, with 14 teeth per inch, are good choices. Use the flat file first. Mount the filing adapter post and replace the lower guide assembly with the one for filing. Replace the filler plate.

1.38 Mount the file band and set the band tension at no more than $\frac{1}{8}$, the tension used for saw bands. Make sure the file band tracks into the upper backup support, and aligns properly with the width of the lower support. Close the machine doors and set the band speed at 120 sfpm. Start the band motor and apply pressure on the workpiece by hand. File the straight and concave sections until metal has been removed to the layout line.

1.39 Stop the band drive and remove the flat file band. Mount the oval band. File the convex portions of the workpiece to the layout line. This filing operation completes the vertical bandsaw work for the wheel-puller body.

Internal Cutting with a Vertical Bandsaw

1.40 To make internal cuts, you must drill a hole in the unwanted internal section of a workpiece, thread one end of the band through the drilled hole, and weld the band back together again. Most vertical bandsaws have resistance-type butt welders (similar to the one shown in Fig. 1-16) mounted on the column.

1.41 You begin by cutting the band at the point of its original weld (so that it will have no more than one weld in it). Use the shear mounted on the bandsaw to cut the band. The butted ends must be square to each other.

1.42 You then sand the portions of the band ends in contact with the welder jaws so they are free of dirt, oil, or similar contaminants. Also clean the welder jaws after each welding cycle to remove any flash material. Such material can become embedded in the weld and prevent alignment

Fig. 1-16. Bandsaw welder and flash grinder



Welding the Band

1.43 Use the following procedures for welding the band:

1. Set the welding current and gap for the width of the band to be welded.
2. Set the UPSET FORCE knob to control the spring pressure that will force the butted ends together. Blade width determines the setting.
3. Place the blade ends in the jaws, with the ends firmly butted together. Make sure the band is properly threaded in the machine. After you have made the weld is no time to discover that the band's teeth point in the wrong direction.
4. Tighten the jaw clamps.
5. WEAR SAFETY GLASSES AND BE CAREFUL OF WELDING SPARKS. Push the weld lever to make the weld. Hold the control in the weld position until the joint has cooled.
6. Release one jaw. Return the welder jaw to the original higher position. Inspect the weld. If the weld is poor, shear it at the point of weld and repeat the process. If the weld is satisfactory, continue.
7. Clamp the jaw again with the weld located in the center of the jaws. The weld lever should now be in the anneal position.
8. Turn the ANNEAL SELECTOR switch to the proper setting for the blade width.
9. Push the ANNEALING button. The color of the weld area should be cherry for a carbon blade and dull red for a high-speed steel bimetal blade. Jog the ANNEALING button to cool the blade slowly.
10. Remove the band from the welder and grind the flash on both sides of the blade. Test the weld area against the width gage on the welding attachment to make sure the weld is no thicker than the blade. If it is too thick, grind off a bit more of the weld.

1.44 Be sure you do not remove too much material in grinding, because that can weaken the bond. When the band fits through the gage, return it to the welder jaws. Now clamp the band and jog the ANNEALING button until the weld is a uniform blue. This relieves any stresses created during grinding. The band is now ready for sawing. Mount the band and complete the internal cut.

16 Programmed Exercises

<p>1-9. A typical vertical bandsaw is used most often to cut out _____ in a workpiece.</p>	<p>1-9. SPECIAL SHAPES AND CONTOURS Ref: 1.21</p>
<p>1-10. Which type of saw is used to make internal cuts in a workpiece?</p>	<p>1-10. VERTICAL BANDSAW Ref: 1.22</p>
<p>1-11. When preparing to use a vertical bandsaw, make sure that the blade can run freely by _____.</p>	<p>1-11. ROTATING THE BANDWHEELS BY HAND Ref: 1.27</p>
<p>1-12. What two safety procedures should you perform before you set the band tension of a vertical bandsaw?</p>	<p>1-12. SET THE GEARSHIFT LEVER IN NEUTRAL; PUT ON PROTECTIVE GLOVES Ref: 1.29</p>
<p>1-13. When using a vertical bandsaw, you can minimize the danger to your hands by using a(n) _____.</p>	<p>1-13. PUSHER or WORK HOLDING DEVICE Ref: 1.33</p>
<p>1-14. As you approach the end of a cut with the vertical bandsaw, you should reduce the _____.</p>	<p>1-14. FEED PRESSURE Ref: 1.33</p>
<p>1-15. At what point on a vertical bandsaw blade should you cut the blade apart, preparatory to making an internal cut on a workpiece?</p>	<p>1-15. AT THE POINT OF THE ORIGINAL WELD Ref: 1.41</p>
<p>1-16. Before you reweld the vertical bandsaw blade, you should sand the _____ and clean the _____.</p>	<p>1-16. BAND ENDS WELDER JAWS Ref: 1.42</p>

Answer the following questions by marking an "X" in the box next to the best answer.

- 1-1. The blade of a power hacksaw is held in the machine's
- a. base
 - b. frame
 - c. vise
 - d. feed control
- 1-2. In comparison with bandsaws, the main disadvantage of a power hacksaw is that it
- a. cannot be used to cut round stock
 - b. cuts for only a portion of the cycle
 - c. is far more dangerous to the operator
 - d. is only suitable for large workpieces
- 1-3. When using a power hacksaw, you can make sure the blade is properly positioned by
- a. checking the cutoff gage
 - b. measuring the workpiece
 - c. extremely careful setup
 - d. making a test cut
- 1-4. The blade selection wheel of a horizontal bandsaw will give you recommendations for all of the following EXCEPT
- a. band type
 - b. feed pressure
 - c. pitch
 - d. band speed
- 1-5. When you are installing a horizontal bandsaw band, before you slip it up between the saw guide inserts, twist the band
- a. 30°
 - b. 60°
 - c. 90°
 - d. 120°
- 1-6. Which of the following is NOT a necessary preliminary check before turning on a horizontal bandsaw?
- a. Make sure the band speed setting is correct
 - b. Make sure the workpiece is securely clamped
 - c. Make sure the workpiece is properly positioned
 - d. Make sure the cutting fluid flow is sufficient
- 1-7. The vertical bandsaw can be used to make angled or beveled cuts by tilting the
- a. blade
 - b. guides
 - c. table
 - d. motor
- 1-8. If the saw guide inserts of a vertical bandsaw are not wide enough, then the
- a. blade will not be properly supported
 - b. teeth may damage the inserts
 - c. inserts may damage the teeth
 - d. band tension cannot be correctly adjusted
- 1-9. What is the FIRST step in welding a vertical bandsaw band?
- a. Set the UPSET FORCE knob
 - b. Tighten the jaw clamps
 - c. Set the welding current and gap
 - d. Turn the ANNEAL SELECTOR switch
- 1-10. After making the weld, the next step is to
- a. inspect the weld
 - b. allow the joint to cool
 - c. release on jaw
 - d. push the ANNEALING button

SUMMARY

Maintenance machine shops use three basic types of power saws: the power hacksaw, horizontal bandsaw, and vertical bandsaw. The main difference between a hacksaw and a bandsaw is that the hacksaw blade moves back and forth, cutting on only one stroke. A bandsaw blade moves continuously in one direction. Since there is no wasted motion, a bandsaw cuts faster than a hacksaw.

The power hacksaw is a useful cutoff machine for smaller jobs. For mid-sized or larger pieces, a band-saw can do the job in less time. Round stock should be cut with a power hacksaw or a horizontal bandsaw, and should always be clamped into a vise to prevent it from rotating.

A vertical bandsaw can be used for cutting out special shapes and contours in a workpiece. It is also used to make internal cuts. For this procedure, a hole is drilled in the workpiece, the band is snipped, threaded through the hole, and then rewelded.

The vertical bandsaw is potentially the most dangerous of the saws. Whenever possible, a feed system or pushing device should be used to keep your hands clear of the blade. Follow the other safety precautions listed in the Lesson. Do not count on your quick reactions—to do so is to court serious injury.

Answers to Self-Check Quiz

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|------|--|-------|--|
| 1-1. | b. Frame. Ref: 1.02, Fig. 1-1 | 1-6. | d. Make sure the cutting fluid flow is sufficient. Ref: 1.20 |
| 1-2. | b. Cuts for only portion of the cycle. Ref: 1.03 | 1-7. | c. Table. Ref: 1.23 |
| 1-3. | d. Making a test cut. Ref: 1.10 | 1-8. | a. Blade will not be properly supported. Ref: 1.26 |
| 1-4. | b. Feed pressure. Ref. 1.13, 1.14 | 1-9. | c. Set the welding current and gap. Ref: 1.43 |
| 1-5. | c. 90°. Ref: 1.15 | 1-10. | b. Allow the joint to cool. Ref: 1.43 |