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Band sawing in short order

Small shops can use a band saw efficiently

By Dave Burkhart
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Many metal fabricators, machine manufacturers, welding repair shops, and steel service centers encounter unique metal separation problems, particularly with band sawing. They often have to cut a variety of metal grades, shapes, and sizes with only a few band saw machines.

Unlike large production cutting applications in which the same or similar material is cut in large quantities, diverse and small-quantity cutting orders can make it difficult for shops to establish the best combination of blade type and tooth size to achieve optimal cutting efficiency.

Most fabricators would like to use a single blade to cut everything from thin-walled structures to large solids without changing the blade or altering machine settings. The following tips can help increase the potential for efficient cutting without having to change blades.

Tooth Selection

One of the most important factors to consider when band sawing is matching the tooth form size with the size of the piece to be cut. The most common mistake is selecting a tooth form that is too fine for the cross section of material being cut.

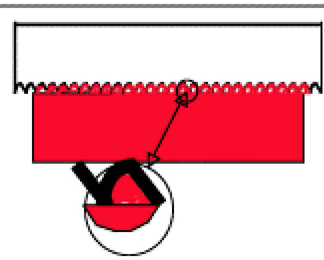

Figure 1
Filled gullets restrict a band saw blade's downward feed movement into the workpiece and ultimately reduce blade life.

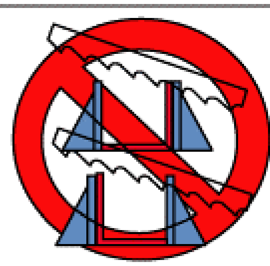

Figure 2
If angle iron is oriented with the flat leg resting on the base of the workholding vise, the blade will cut the narrowest cross section of the angle iron form, often resulting in tooth strippage.

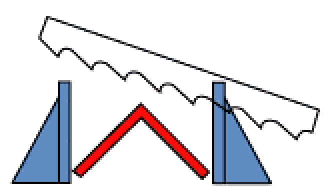

Figure 3
Clamping angle iron in the shape of an A with the two edges resting on the base of the workholding vise lets the band saw blade cut through a relatively constant cross section of material.

It's common to think that the more teeth put in the work, the better the blade will cut. For example, when a blade with a relatively fine tooth pitch of 10 teeth per inch (TPI) (in which the distance between each tooth point is 1/10 inch) cuts 4-in.-wide steel plate, the tooth points cut across the surface, steel chips form on the leading face of the tooth, and these chips accumulate in the gullets between the tooth points.

When the blade advances a relatively short distance into the workpiece, the gullets become progressively filled with chips (see **Figure 1**). When this occurs, the filled gullets restrict the downward feed movement of the blade into the workpiece. The tooth points begin to rub the workpiece rather than cut into the material. This rubbing action creates frictional heat, which ultimately softens the hardness of the tooth points and reduces the blade life. A tooth size that is too fine for the piece being cut cannot be made to work efficiently.

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On the other hand, the tooth form may be too coarse for the cross section of material being cut; for example, a 4- to 6-TPI variable tooth form cutting a 2-in. round tube with a 1/8-in. wall thickness. This blade may cut thin-wall pipe successfully by adjusting the downward feed of the blade into the work, but it's important not to overload the tooth points by allowing the machine head to feed too quickly. It's quicker to adjust the feed rate of the machine for several pieces than to change the blade.

Part Orientation and Clamping

For the best blade performance and life, it's important to orient structural shapes correctly relative to the blade approach. With angle iron, for example, its L shape often leads users to orient the piece with the flat leg resting on the base of the workholding vise. This orientation will cause the blade to cut the narrow thickness of the angle iron form, which can lead to tooth strippage (see **Figure 2**).

The preferred way to orient the angle iron is to clamp it in the shape of an A with the two edges resting on the base of the workholding vise. This allows the blade to cut through a relatively constant cross section of material (see **Figure 3**).

When cutting multiple pieces of angle iron, it's best to gang-stack them on edge (see **Figure 4**). This position allows the workholding vise to secure the bundle and prevent the pieces from moving during the cutting action, even if some of the pieces have irregular dimensions. This orientation also allows you to adjust the cross-sectional size of the bundle to match the tooth size being used.

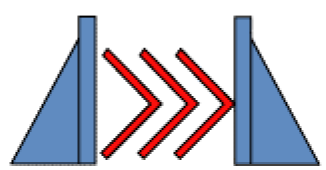

Figure 4
The best orientation for cutting multiple pieces of angle iron is to gang-stack them on edge.

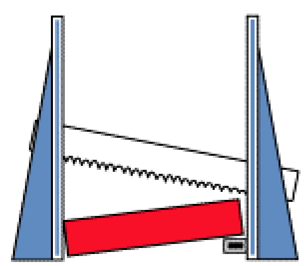

Figure 5
A small block of wood or metal can help you prop the plate and cut with a finer-tooth form.

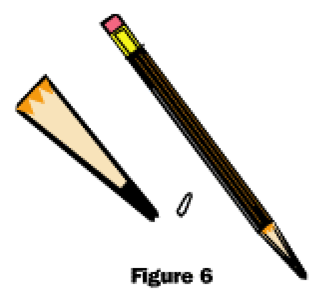

Figure 6
As with a newly sharpened pencil, you should apply light pressure at first with a new band saw blade to prevent damage to the tooth point.

It's always best to orient the part to achieve the most consistent cross section for the blade and secure the bundle as tightly as possible. Correct work orientation results in more efficient blade performance and extended blade life.

Placing a small block of wood or metal about 1/4 to 1/2 in. thick under the edge of the plate closest to the pivot side of the saw (see **Figure 5**) can help you cut steel plate successfully with a finer-tooth form.

Increasing the plate angle in relation to the blade reduces the cross-sectional area the blade will engage as it feeds through the plate. Using this technique, you can clear the chips from the teeth.

Blade Break-in

Tooth points are extremely sharp on a brand-new blade. Blade break-in procedures condition these sharp tooth point cutting edges with a slight radius and reduce the microchipping of the extreme edge of the tooth.

To understand blade break-in better, compare it to a freshly sharpened pencil with a very sharp point (see F**igure 6**). When you use the pencil for the first time, it's important to write with light pressure because normal pressure can cause the delicate pencil tip to chip off.

This same principle applies to a new blade's tooth points. Initial cutting with full feed pressure will microchip the extreme cutting edge and prematurely damage the tooth point. To break in a band saw blade properly, it's critical to maintain the proper band speed for the material grade being cut and reduce the feed force by one-half the recommended force. Proper blade break-in can extend blade life.