

Section 1 - Theory of Operation

Introduction

The Model CX-2000 uses Orbital's proprietary Orbiting Blade Technology. Prior to the commercial availability of Orbiting Blade Technology from Orbital Technologies, Inc., there were two primary technologies found in production wire processing equipment – Rotary Blade Technology and V-blade Technology. Also available, though much less prevalent due to the high cost of the technology, is Laser Stripping Technology.

In order to obtain the maximum application flexibility of your Orbital Technologies, Inc. equipment, a general understanding of how an Orbiting Blade stripper works is desirable. This section will look at the theory behind Orbital's exclusive Orbiting Blade Technology.

Orbiting Blade Technology

An orbiting blade wire stripper uses a uniquely designed cutter blade consisting of a steel or carbide "plate" with a hole sharpened to a knife edge, (see Figure 1.)

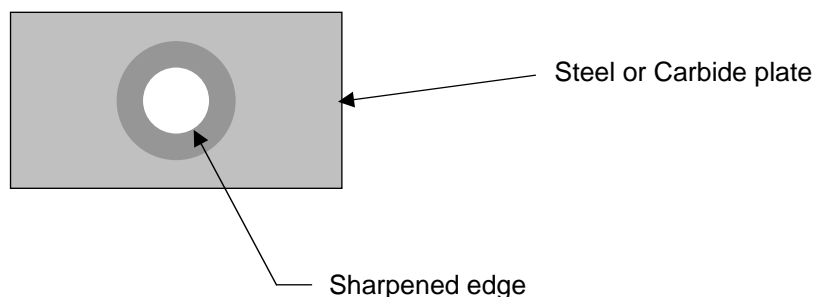


Figure 1. – Typical Orbiting Cutter Blade

To cut the layer(s) of a wire or cable, the wire is inserted through a guide bushing (used to center and support the cable) directly adjacent to the cutter blade and through the sharpened hole of the cutter blade. Next, the cutting edge of the blade is orbited around the wire as it is fed toward the wire to the desired cutting depth (see Figure 2.)

This is accomplished by a unique mechanism that generates the orbiting action while allowing the radius of the orbit, and hence the diameter to which the blade cuts, to be completely adjustable.

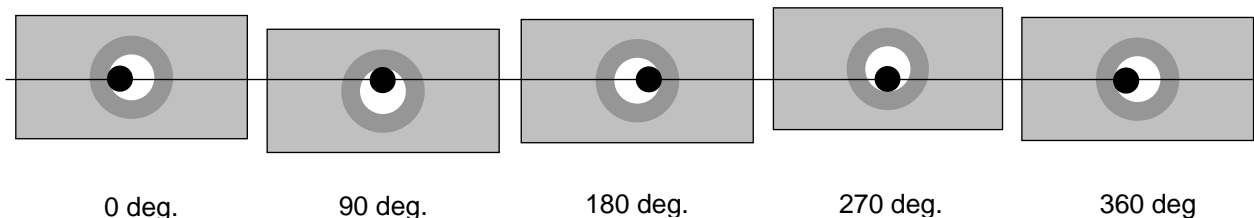


Figure 2. – Path of Orbiting Blade

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Since the blade is orbited completely around the circumference of the wire, it produces a clean and consistent cut. And, since the full 360° of the cutting edge is used to sever the wire, the blade life is typically much greater than that of a rotary type stripper.

A typical rotary type stripper uses one or two blades and, like the orbiting blade stripper, cuts completely around the circumference of a wire. But the rotary stripper uses only a single point along the cutting edge of the blade(s) to do 100% of the cutting. Hence, one key advantage of an orbiting blade stripper over a rotary stripper is greater blade life.

Another advantage of an orbiting blade stripper over a typical rotary stripper is the square cut that is produced. The blade of the orbiting cutter is moved at an exact right angle to the axis of the cable, providing a perfectly square cut. In most rotary machines, the blades move toward the axis of the wire on an arc, which has the tendency to “point” the cut shoulder rather than giving a perfectly square cut.

One potential disadvantage of an orbiting blade stripper as compared to a dual-blade rotary stripper is in the strip slug removal capabilities. The typical dual-blade rotary stripper has two opposing blades that sever the layer(s) to be removed. After the layer(s) are cut, the blades are also used to pull the slug off the end of the wire. This is possible because the two blades “capture” the slug during pull-off. See figure 3.

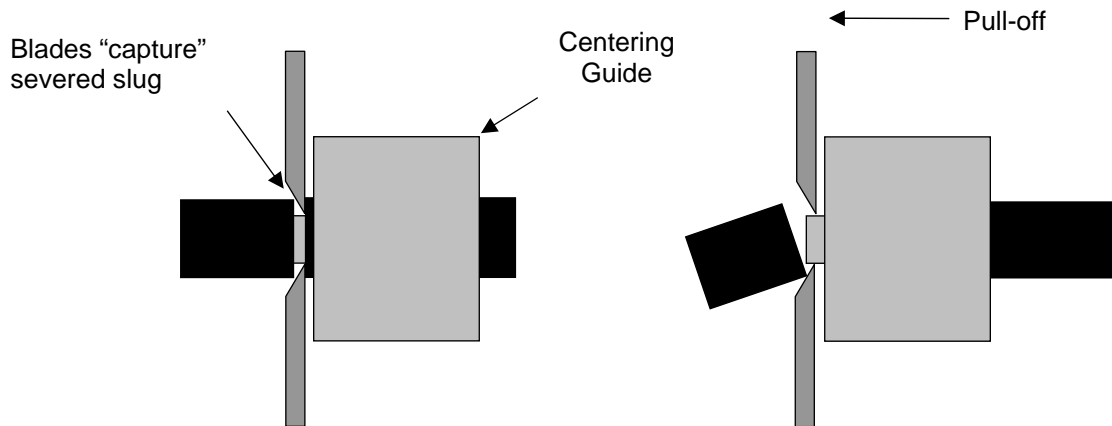


Figure 3. Rotary Stripper 2-Point Slug Removal Method

The orbiting blade stripper has only a portion of the blade engaged with the severed slug at pull-off time. In most instances, this limited blade engagement is not sufficient to pull the slug off, since the wire has a tendency to deflect away from the blade edge as the blade is moved along the wire.

To compensate for this situation, a pair of “Gripper Blades” are added to grip the severed slug before pull-off. Additionally, the Gripper Blades can be used alone for stripping. There are many types of hookup wire, for example, that can be stripped using just the gripper blades for both severing the jacket and pulling off the slug. This can improve production rates on jobs where a precise rotary type cut is not required.

On the CX-2000 programmable orbiting blade stripper, the amount that the Gripper Blades grip the slug is fully programmable, referred to as the “Pull Diameter”. Since the blades that pull the severed slug are independent of the cutter blade, it is not necessary to program a blade withdraw amount (typically referred to as “stepback” or “wayback”). Just program the “Cut Diameter” that the cutter blade should cut to (“CUT” parameter), and separately program the diameter the gripper blades should close to remove the slug (PULL parameter under Diameter data section).

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Another characteristic of an orbiting blade stripper that is worth noting is the fact that the cutter blade cuts in an offset manner. Unlike a dual blade rotary stripper that has two opposing blades that tend to help capture and cut the cable on center, the orbiting blade stripper cuts by “pushing” against the cable as the cutting edge is orbiting around it, using the wire guide bushing to act as the cable stop (see Figure 5 below). The more clearance there is in the wire guide bushing, the farther off the cut axis (cut center) the cable will be pushed.

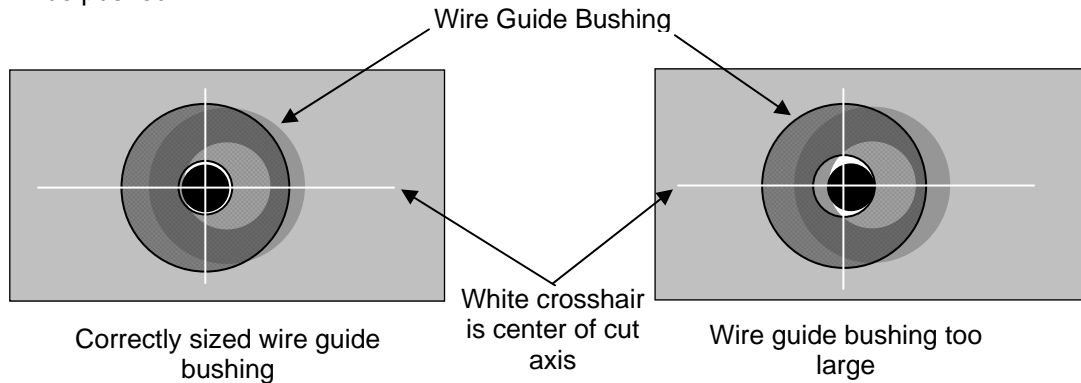


Figure 5. – Cut Offset vs. Wire Guide Bushing Fit

In an orbiting blade stripper in which the cut diameter is programmable, the farther the cable is offset from cut center due to excessive bushing clearance, the deeper the blade cut diameter will need to be programmed in order to achieve the correct cut results. This may result in programmed cut diameter values that vary considerably from the diameters actually measured from the cable. Essentially, the cutting depth is required to compensate for too much clearance in the guide bushing, or other tolerances in the cutter mechanism. Aside from the cut diameter programming issues, in most cases this offset characteristic has a minimal effect on strip quality and repeatability.

It is important to use a wire guide bushing that is correctly sized for the cable being processed. The optimum wire guide bushing size is typically .003" - .005" larger than the average measured cable outer diameter, depending on the cable characteristics. It is possible to obtain satisfactory stripping results with considerably more clearance than this, due to the fact the cable is always offset the same amount wherever the blade is in its orbit. However, the most precise strip results will always be obtained with a correctly sized wire guide.