Inca Bandsaws
Models 340 and 710

Of all woodworking machines, with the possible exception of the lathe, the bandsaw is at once the simplest and the most subtle. Its performance can be more affected by proper tuning and adjustment than any other machine. To operate with maximum efficiency, the wheels, blades, guides, table and fences must be adjusted correctly in relation to each other. Of all these, we have found the greatest variable to be the blade. At present our blades are of American manufacture, made by the Olson Saw Blade Co. We have found, over many years, these are the most consistent.

The blade of a bandsaw is a long strip of steel with hundreds of teeth. Each tooth must be set and sharpened exactly as all the others. The blade must be welded precisely in a continuous circle with the weld smooth and clean, without burrs so that, if the blade is laid on a flat surface, the entire blade will lie flat. That depends in part on the skill of the mechanic who does the welding. Because there can be differences from one blade to another, the bandsaw user must be prepared to adjust his machine to compensate for variances.

The most common problems you are likely to encounter are:
1. Vibration- usually due to improper belt or blade tension, loose parts, or rarely, unbalanced pulleys or band wheels.
2. Tracking difficulty
3. Poor cuts or wandering of the blade

1. Blade Tension:
A measure of force on a blade. It is measured in pounds per sq. inch of section. An interesting fact is that tension on any blade, whether 1/16" or 1", should be the same. Only the force required to achieve that tension will be different.

A smaller blade has a smaller cross section, and thus requires less force to create the same tension (in lbs/sq. in) of a larger blade. That is the reason that tension indicators on any bandsaws are *not accurate*. These gages measure force generally by the movement of a spring; it will show the force, but lacks the ability to indicate *actual tension* on a particular blade. So to properly set tension the user must use subjective means.

The following method, developed at Garrett Wade, seem to be the most meaningful. It relies on the purpose of the blade tensioning, which is to hold the blade taut and straight on a line tangent to the two wheels.
Install the blade and apply tension. While sighting along the blade between any two wheels, stop when the blade has gone from a circle to a straight line. Increase the tension a bit past this point. Adjust the tracking and recheck the tension. Generally excellent results follow this method. (Experience will dictate whether this tension, or slightly more or less, works best on this blade.)
Another check, which requires more experience with the bandsaw, is to pluck the blade as you would a guitar string. The tone you are looking for is pure and clear, with neither harmonies nor overtones, the tone should subside quickly and evenly.

2. Tracking.

Inca Bandsaws are designed with flat tires rather than crowned ones. This allows you to track larger blades with the teeth off the front edge of the tire, improving blade life and tire wear. The blade position is not critical. No harm will come to either blade or machine if the blade is not in the same position on each wheel.

Tracking is adjusted after tensioning. Guide bearings should be out of the way when changing blades. Rotate the wheel by hand and turn the adjusting knob in small increments. After each adjustment, rotate the blade at least three full revolutions to make sure the blade reaches its new position.

When desired blade position is reached, adjust the thrust bearings behind the blade. It should be almost touching the blade. Rotate the blade to recheck tracking; the blade may touch the thrust bearing occasionally and that is normal. As a final precaution, turn the adjusting knob 1/8 turn further in the direction that would run the blade against the thrust bearing. (A precaution to insure that under high starting torque, the blade does not jump forward.) Also it will smother any tendency of the blade to move forward when suddenly released from the pressure of a heavy cut.
Blades should be positioned 1-2 mm (0.040"-0.080") from the outer edge of the thrust bearing, which is mounted eccentrically on its shaft; adjust by rotating the bearing shaft.

Tracking Problems

If, under proper tension, there is great difficulty tracking, try another blade or two and see if you encounter the same difficulty. More bandsaw problems are caused by poorly made blades than any other factor.

3. Setting the Blade Guides

Thrust bearings have been covered. Side guides are of two types. Metal or "Cool Blocks" on the 340 and roller guides on the 710.
Solid metal guides should not touch the blade, but should be adjusted fairly close to it, typically leaving the thickness of a piece of paper between the blade and the guide on either side. Thus the guide will not bear directly on the blade, but will rub occasionally as you cut or as the cut turns.

Cool Blocks may touch the blade because the material is not hard metal, but graphite impregnated composite.

On ⅛" and 1/16" blades, roller bearings should be placed about 1/64" to 1/32" back from the gullets. Cool Blocks are required on the 340 and they may touch the teeth of the blades without harm. With wear, solid guide block faces may need to be ground flat from time to time.

On the 710, make sure the side guides have their shafts turned so that the slot cut in their sides is 90° from the slot in the holders. Over-tightening or using a screwdriver to pry apart the jaws of the guide holders may break the holder.

4. Drift and Wander

Drift is the phenomena in which the blade will not cut straight. Straight ripping, mitering and crosscutting become difficult. When resawing, it may cause a bow across the height of the board.

Causes can be insufficient tension, poorly set guides, too many TPI, or feeding too fast. Another cause may be a blade in which the set of the teeth is greater on one side than the other. It will pull the teeth through the cut faster on the side with too much set.

To compensate, the blade may be stoned, while running, on that side. An easier procedure is to offset the fence so that it leads into the direction of the drift. This will cause the drift to cancel out. Alternatively, cutting along a drawn line without the aid of the fence will allow you to follow the cut whether it leads left or right. Experimentation is sometimes the best teacher.
For Resawing, use wider blades with fewer TPI; on the 340 use a ½" blade with 3 TPI; on the 710, use a ½", ¾", or 1" blade with 3 TPI.

5. Scroll Work
Plan your entrances and exits so you don't have to back out of a cut. Inevitably, you will forget and try to reverse out of the cut while the saw is running, with the result that you will pull the blade away from the guides and off the wheels. The tension will release suddenly and a loud bang will let you know you've disobeyed this elementary rule. Instead, turn off the saw and gently work the wood backwards out of the cut.

Tracking 1/16" & 1/8" Blades

Because their narrow width makes them difficult to weld perfectly, 1/8" & 1/16" blades are often more difficult to track than wider blades. Proper tension is more critical. The best way to tension a blade is to sight along the two wheels. Note the point where the blade is pulled flat between them. Tension slightly past this point and pluck the blade with a finger. The resulting tone should be clear, subsiding quickly, with no harmonics or overtones. Improper blade tension, either too much or too little, can account for a lot of breakage.

If when tracking, the blade has a tendency to wander in or out on the wheel, adjust it so that it is tracking toward the back of the wheel. Use the thrust bearings (and roller guides where applicable) to keep the blade from backing off the wheel. Don't worry about the blade exerting excessive pressure on the thrust bearings when idling; the normal pressure when sawing is much greater. In order to use the thrust bearings most efficiently, it is important that the blade intersects them close to their outside edge, not toward the center. That is why they are installed on an eccentric shaft.

Tracking problems can be a result of wheel misalignment: (Applicable to the Model 340 only) Check as follows: Install a blade with its teeth behind the wheels' face. Tension the blade but don't worry about tracking it. Next, place a straightedge against the faces of the two wheels. By adjusting the tracking knob in or out you should be able to find a point where the straightedge contacts both wheels at two points. The wheels will be on the same plane (this is not necessarily the same setting at which the blades will track well, it is simply an indication of alignment). If there is no setting where this can be achieved, an adjustment is needed. The adjustment is made by loosening the bolts that attach the motor to the frame and placing metal shims between the motor flange and the frame, altering the angle of the wheel.

Install the dust chute by removing and reinstalling the lower thrust bearing through the large hole in the dust chute. Insert the self-tapping screw through the small hole in the saw chassis (directly below the table tilt adjustment knob) into the untapped hole in the chute. Insert and back out the screw once or twice and wipe off the threads to prevent the screw from splitting the plastic. Take it slowly. It is a close fit, so don't worry if the blade touches the plastic chute.
Attach the table to the trunnions.
The Rip fence includes an auxiliary fence which will lie flat on the table and prevent veneers from sliding under the fence. Remove it for standard work.
Blade guides should be upgraded with "Cool Blocks²", which work with any size blade. You need not keep them behind the teeth for narrow blades. The material will not damage the teeth.

Addendum to the Manual

Blade guides are now adjusted by thumbscrews or with a straight screwdriver. Allen keys are no longer required.
Inca Manual:
Page 4, 5: Electrical diagrams are obsolete.
Page 6: Tracking saw blade teeth slightly off the rubber tire is not suggested for smaller blades. Track in the center of the tire. See Tracking Guidelines.
Page 7: Table insert is stock no #310.17
Page 12: Para. 4.6: fretsaw blade guides should be replaced by "Cool Blocks"

Tensioning and Tracking: Ignore the manual here. Blades aren't always the exact length they ought to be. You are striving for a straight blade between upper and lower wheels, with a tension tight enough to prevent twisting and excessive side play. This is largely an experimental process best arrived at through trial and error. Track the smaller blades generally in the middle of the tire. Larger blades (ie. ½") may need to have the teeth hang over a bit simply to fit the guides better).