NHLA – "Hardwood Matters"

Bandsaws as "Power Transmission Equipment"… part 2

Our last conversation proposed looking at your wide bands as means of delivering the power of the bandmill into the wood through the handful of teeth in the cut at any given time. We talked about benchwork, the process of stretching the body and back edge of the saw so that the cutting edge is drawn tight first as the saw is strained up, allowing the "tire" on the cutting edge to transmit the power and momentum of the bandmill wheels into the cut.

The actual interface between the saw and the wheel beneath the cutting edge is of particular importance in getting power to the teeth. Typically a saw should be run with the bottom of the gullets sitting about 1/4" off the edge of the wheel. Keeping this distance small is important for a couple reasons. First and foremost is that this part of the saw, the inch or so under the gullet is the area we are counting on drawing tight first so that the cutting edge is rigid and to do this it needs to be supported by the wheels. If it is hanging off the bandmill in space it clearly is not drawn tight and will not become rigid enough to stand feed without deflecting. If this critical strip of steel is going to deliver power properly it must be supported and driven by the bandmill wheel.

The other key reason to control the distance between the bottom of the gullet and the edge of the wheel is crack prevention. If this dimension is held small it forces the entire length of the tooth to bend evenly while it is traveling around the wheels, but if this dimension is allowed to grow too large, say 3/4" or more, the bending to conform to the wheel will be focused where there is less resistance – the deepest part of the gullet. The constant flexing of the steel at the bottom of the gullets will cause fatigue that gets concentrated in that spot instead of being spread throughout the length of the teeth, this will inevitably lead to gullet cracks that form right out of the bottom of the gullet. To deliver power and to avoid cracks it's important to keep the saw properly tracked on the mill, with a small distance between the edge of the wheel and the bottom of the gullets.

Of course controlling this distance won't do any good unless the leading edge of the wheel is in good shape, meaning flat in relation to the rest of the wheel face. The front edge of the wheel typically wears quite quickly and is the main reason that it's necessary to grind the wheels periodically. As this leading edge wears it effectively moves the tire deeper into the saw. This will eventually let the leading edge go slack (relatively) and at that stage problems with cracking and deviation in the blade are unavoidable. The conventional rule of thumb is that wheels should be ground annually in a one shift operation. Prolonging this does not save on wheel life, as it just requires more stock removal when the wheels are ground. For the saw to deliver power in the cut it has to be well supported by the leading edge of the wheel – no exceptions.

The next key to power delivery is the saw guides, specifically their alignment and wear patterns. Like the edge of the wheel, the leading edge of the saw guide is absolutely vital, but it's not made of either steel or cast iron! Saw guides wear quickly and have to be machined frequently, meaning with every saw change. By examining worn guides when they are changed you can very quickly see that it is again the leading edge that wears most quickly (usually along with the

part of the guide that supports the back edge of the saw, the same pattern you'll see on the wheels of the mill). That makes sense – it is where the saw is tightest.

The "tightest part of the saw" is a real, tangible concept. You can prove it to yourself in just a few minutes. Immediately after a saw change fire the band mill up and get the saw tracked in. Have the mill shut down, let it coast to a stop and lock it out, but don't let off the strain. Carefully reach around the saw (saw stopped, mill locked out) and push on the cutting edge until you can move it of the guide slightly, then do the same thing with the back edge and the center of the saw. The cutting edge should be the most difficult to move, followed by the back edge, the center should be the easiest to move off the guide. On a double cut the front and back cuts should be about the same, with the front cut perhaps just a bit tighter.

It's very important to see that the top and bottom saw guides are dead parallel to each other. If they are just a little cross-lined (out of parallel) the saw is twisted between them and can quickly be drawn tight on a diagonal line instead of down the cutting edge. This leaves the cutting edge loose and free to follow the path of least resistance. Most bandmills have a top guide that moves up and down with changes in the depth of cut. Over a period of time as this top guide shifts it will wear the ways it moves on, leading to a twisting motion as it shifts, creating cross-line between the top and bottom guides. It's important to check how parallel the guides are throughout this range of movement and stay ahead of any repairs required.

If saw guides are displaying unacceptable wear either a change in the guide material or the installation of a quality guide lubrication system can help immediately and is a small investment in relation to the importance of guide performance. The work done by several of our customers has made me a believer that paying close attention to saw guides often gives an impressive payback, quickly and easily.

These are a few of the key "big picture" factors in delivering power through saw teeth.
For sure there are many other things that are important, perhaps we can talk about more of them another time, but hopefully this helps to see your saws in a different light.

This article appeared in the March 2009 edition of "Hardwood Matters" and is reprinted with permission from the National Hardwood Lumber Association (www.nhla.com).