Automation

straight talk

by Jerry Koskovich, P.E.

So Which Won the "Best Automated Saw" Battle?

Component or linear? Begin your journey to find the best saw for your operation here!

If you read the magazine ads, you'll see manufacturers claiming that the traditional multi-headed component saws are your best automation bet for producing roof truss parts. Flip a few pages and you'll see the more recently introduced single-blade linear feed saws making similar claims.

So which type of automated saw is really the better choice? How can you be sure that you're selecting the right type of saw for your operation...or that you're right in automating your cutting at all? How long will the right saw take to pay for itself in your plant—really pay for itself, in hard dollars?

You can get solid answers to these questions providing you're willing to first look closely at what you're doing now. Start by considering the following.

- How many of what kind of parts do you cut now?
- How many of those parts does your operation cut in a day, a week, the last four weeks?
- How many set-ups (changing saw head positions) are your saws performing to get those parts?
- How many man-hours are required to do that cutting...and at what hourly pay rate?
- Are you looking to complement existing equipment, or bring in a new primary saw, or are you starting a new plant from scratch?

For purposes of this article, I'm assuming that you're making roof trusses. (There are a lot of parallels to wall frame operations, but they're different enough that it would unduly encumber this discussion.) I'll also refer to our automated cutting equipment for examples so if I disparage anything along the way (which I have a tendency to do) I'm the only one that can complain. While there are significant differences between manufacturers' equipment, the fundamental principles are similar. My goal is to equip you with those fundamentals so you're down to comparing features and production rates of linear feed and component saws when you go out shopping.

The Big Picture—Component Cutting Requirements

Back in the days when a roof was a roof with the majority of trusses having identical components, automated cutting wasn't that important. Nowadays, it's almost like there's a contest to see who can design the roof with the fewest identical components and still keep the rain out.

According to a recent "snapshot study" we did of our automated component saws' production reports, some 92,000 different set-ups were required to cut approximately 400,000 parts! Over half of those 92,000 set-ups were done to cut only one or two parts! Obviously, hand-cranking manual component saw heads into position repeatedly only to cut a few parts is simply not practical.

The Big Picture—Multi-head Component Saws (Lateral-feed)

Component saws of most any ilk—manual or automated—will cut identical parts at about the same rate. That is, once their multiple cutting heads have been set up to achieve the called-for cut angles and part length, component saw feed rates are in a similar ballpark. So it all boils down to set-up speed. The fewer the parts cut per set-up, the more critical that set-up speed becomes to overall production rates.

Obviously, then, the faster the set-up speed of the saw and the greater the number of parts cut per set-up, the higher your component saw production. Also, the better you can stage parts for cutting by length—say from longest to shortest (typically from about 20' to down to a foot or two) so the transport frame has to move as little as possible between set-ups—the shorter your set-up time.

The Big Picture—Single Blade Saws (Linear-feed)

Picture any single blade linear feed saw that comes to mind—say a simple pull saw with a fence—and it's obvious that every inch of lumber has to pass by the blade in processing when cutting on both ends. So, unlike component saws, long parts increase production time for linear feeds no matter how simple the called-for cuts.

But set-up time for automated single blade saws is negligible—not really a factor. Unlike the typical automated component saw that takes an average of seven to eight seconds to set up blade angles on its cutting heads and alter the distance between its two sets of heads to accommodate the called-for part length, the single blade saw's cutting head location is fixed. It simply changes its angle and plunge cuts as the lumber is fed lengthwise by its blade. The plunge cutting itself

Continued on page 102

at a glance

- ❑ Component saw feed rates are generally similar, so overall production rates come down to set-up speed.
- ❑ For automated single blade saws, set-up time is not a determining factor in cutting speed.
- ❑ Batching similar parts can significantly increase production rates on a component saw, but batching will not make much of a difference with a linear saw.
- ❑ Linear saws tend to produce less wood scrap than component saws.
- ❑ Pure cutting production capacity is not the only factor that should weigh in on which type of saw you decide to purchase.

Automation Straight Talk

Continued from page 101

is astoundingly fast—the lumber does not sit still very long.

Since set-up time really isn't a production-rate factor for single blade saws, they can produce different types of parts—different lengths, different cuts—about as fast as they can produce identical parts. The number of cuts required does affect production rates but it makes no significant difference in production time if the cuts are all different than the last part cut—that is, two 3-foot parts with double angle cuts on both ends would take about the same amount of time to cut regardless of whether the called-for angles were the same for the two parts.

Thus, the two saws' fundamental "cutting strong suits" are:

- **Multi-head component saws:** High production capacity of the same part with up to five different cuts. Any length part produced just as quickly.
- **Single-blade linear feed saws:** High production capacity of dissimilar parts, "onesies - twosies," with any number of cuts. Production capacity increases as part length and the number of cuts required decrease.

There are other capability differences between the saw types, which I'll attempt to address later, but let's stick with the fundamentals that underlie everything for now.

Batching Becomes an All-important Issue

Assume for the moment that efficiency in cutting drives everything in your plant; in other words, it's your primary goal. With component saws, it's easy to see that you'd maximize cutting efficiency by batching parts for a given truss job to cut the greatest number of parts per set-up, staged in groups of longest to shortest length parts (or vice versa). That way, you'd have the fewest number of set-ups overall and, when the saw did have to perform another set-up, the transport frame movement to accommodate part length (which is the most time consuming part of component saw set-up) would be minimized. This batching approach to cutting would mean, of course, that you'd have to devote more labor to sorting out a complete set of parts for a single truss from batches of identical parts.

To illustrate the impact of this approach to cutting on production rates, a component saw and a competent operator/picker/catcher team can produce about 500 parts an hour when nine to ten parts are cut per set-up. Drop the parts per set-up down to an average of three or four and you'd see the parts-per-hour production rate cut in half...down to about 240 parts an hour. As you can see, the single biggest factor affecting a component saw's production capacity—by far—is the number of parts produced per set-up and, of course, the set-up time.

With linear-feed saws, batching wouldn't make much difference. It's all about the length of the parts and the number of

Continued on page 104

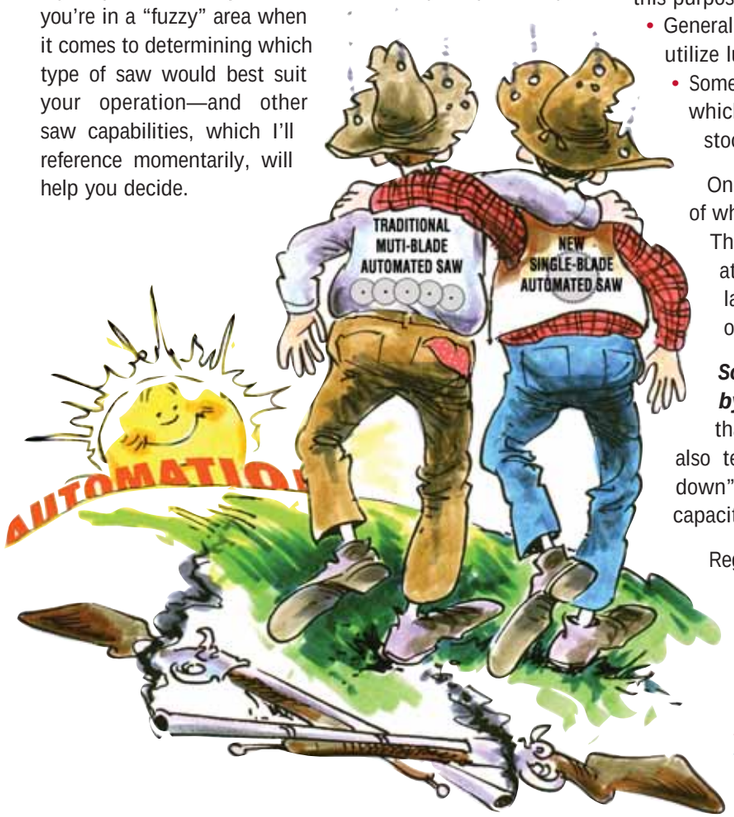
Automation Straight Talk

Continued from page 102

called-for cuts. If you're producing mostly smaller parts with only a few cuts each, you can expect cutting rates to be well over 300 parts per hour. If, at the other extreme, you're producing a lot of long chords and intricately cut webs (several cuts on both ends), you can expect the parts per hour rate to dip to 240 or less.

As a rule of thumb (based on our experience), in assessing the production capacity per hour of an automated component saw (lateral feed) versus an automated single-blade saw (linear feed):

- If the average number of parts cut per set-up is 5.5 or more, an automated component saw may be your better choice. However, you would likely have to do a significant level of part batching within the truss job (as opposed to cutting a single truss' worth of components at a time). And that could impact your truss assembly operation since you'd then have to sort out the parts needed for single trusses from the identical-part batches.
- If the average number of parts cut per set-up is 3.5 or less, an automated single-blade choice is more likely your best bet. And you could cut a full complement of components for a single truss in a continuous run—no batching necessary—without significantly impacting production rates.
- If your plant is cutting between 3.5 and 5.5 parts per set-up, you're in a "fuzzy" area when it comes to determining which type of saw would best suit your operation—and other saw capabilities, which I'll reference momentarily, will help you decide.



Thus, a component saw can produce more parts per hour in some plant circumstances...a linear feed can produce more in other plant circumstances.

It all depends upon the type of parts you're cutting, the opportunities for identical part batching, and the degree of overall batching and parts-by-length-staging that you're willing to go through. The winner of the "best saw" battle isn't really either saw. One can be a pretty clear winner in one plant, the other a pretty clear winner in another plant—if we consider just production capacity per hour of each type of saw.

But pure cutting production capacity is not the only factor that should weigh in on your which-saw-would-be-best-for-me decision:

- Component saws are more limited when cutting very short parts and performing long scarf cuts. And they can't cut compounds. Plants have to continue to use their manual saws for these kinds of cutting tasks. A linear-feed saw is a lot more versatile.
- Component saws have very limited marking abilities—just one place on one side of the part, typically used for a part ID number. Linear feed saws can mark anyplace along the length of the lumber, in some cases on up to three sides of the lumber.
- Some linear-feed saws can efficiently produce wall frame components as well—component saws are not practical for this purpose.
  - Generally speaking, linear-feed saws more efficiently utilize lumber—resulting in less scrap.
  - Some linear-feed saws have a material feed system which can select, pick and feed its own lumber stock. No component saw has such a capability.

One of the most important factors in your decision of which type saw to purchase is labor cost per part. That is, how much manpower does it take to operate each type of saw...and how does that translate to price per part? This is usually a big eye-opener to any potential buyer.

So the real winner can't be determined just by the parts per hour measure. But I'll leave that part of the discussion to another article. I'll also tell you that there is an indisputable, "hands down" winner when it comes to both production capacity and cost per part. By a long shot.

Regardless of whether you sort this out on your own or seek an equipment manufacturer's help, you will still have to know what's going on in your current cutting operation. That's the first can't-skip-it step: finding out what's currently going on in the cutting department of your operation. SBC

Jerry Koskovich is President of The Koskovich Company in Rochester, MN.

STRUCTURAL BUILDING COMPONENTS™

THE FUTURE OF FRAMING

www.sbcmag.info

Dear Reader:

The mission of ***Structural Building Components Magazine (SBC)*** is to increase the knowledge of andto promote the common interests of those engaged in manufacturing and distributing of structuralbuilding components to ensure growth and continuity, and to be the information conduit by stayingabreast of leading-edge issues. SBC will take a leadership role on behalf of the component industryin disseminating technical and marketplace information, and will maintain advisory committees consisting of the most knowledgeable professionals in the industry. The opinions expressed in SBC are those of the authors and those quoted solely, and are not necessarily the opinions of any affiliated association (WTCA) .

Truss Publications, Inc.

6300 Enterprise Lane • Suite 200 • Madison, WI 53719
608/310-6706 phone • 608/271-7006 fax
www.sbcmag.info • admgr@sbcmag.info