Automation

straight talk

by Jerry Koskovich, P.E.

The "Hands Down" Winner of the Component Saw vs. Linear-feed Saw Battle

As the battle rages on, the author says there is one clear winner in his mind.

This is the second part of a series designed to help you better understand the fundamental differences between your automated saw choices...at least tell you everything I know as an equipment manufacturer.

Your goal in reading this, I'm assuming, is to figure out the best kind of equipment to have in your cutting operation...the equipment that will produce the most accurately cut components at the lowest possible cost. And to have at least one arm and a leg left after you pay for it.

I'm focusing on wood roof truss operations for the purpose of this discussion. There are a lot of parallels to wall panel operations and other wood component manufacturing, but enough differences that it would unduly clutter the discussion to include them.

In the first part of this article, which appeared in the September/October issue, I laid out the basic differences between an automated component saw with its multiple cutting heads and laterally fed lumber, versus an automated linear-feed saw with its single cutting head and lineally fed lumber. I've summarized things in the "Performance Comparison" on the facing page. Rather than simply give you "this saw versus that saw" columns with a bunch of check marks, I've put it all together and drawn the conclusions for you. (My wife tells me I'm good at drawing conclusions for other people.) Stick it up near your phone and you'll have a handy reference when you start talking to saw manufacturers. (I use the linear-feed saw as the base to compare from just to keep things simple.)

Now I'll take into account the cost of labor.

As I alluded to in the first article, the labor cost per part is all-important and can be the deciding factor in your automated saw decision. I can't tell you how many times I've seen automated saw buyers make their decision without properly considering the labor cost factor. The following over-simplifies things a bit, but gets to the core quickly and the conclusions are correct.

At the high-end extreme, if you purchase a linear-feed that dispenses the called-for lumber and transports it to the saw via an automated feed system, you will only need 1-1½ operators, or an average of 1¼.

1.25 operators x 8 hours = 10 labor hours x $15 per hour = $150 labor cost per shift

(Adjust the hourly benefit-loaded labor rate to fit your circumstance. But you don't

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at a glance

- ❑ Your goal in reading this, I'm assuming, is to figure out the best kind of equipment to have in your cutting operation…the equipment that will produce the most accurately cut components at the lowest possible cost.
- ❑ The labor cost per part is all-important and can be the deciding factor in your automated saw decision.
- ❑ I'd ask every automated saw manufacturer I was considering to look at my cutting operation and recommend which type of saw would provide the quickest return on investment for my operation.

PERFORMANCE COMPARISON

Single-Blade Linear Feed Saw vs Multi-Head Component Saw

QUALIFIER: This comparison is roughly based on the saws that we manufacture and uses the linear-feed as a base from which to compare. The fundamental differences between the two types of saws are substantially the same from manufacturer to manufacturer, but features from one manufacturer to the other can vary considerably.

Comparative Functional Capabilities:

- Cuts all parts that a component saw can
- Cuts parts a component saw cannot:
  - Short parts—down to three inches or less (a component saw's absolute minimum is about 12")
  - Any number of different angle cuts on a single part (a component saw is limited by its number of heads, typically translating to a maximum two cuts on one end of the part, two or three cuts on the other end).
  - Long scarf cuts—almost any length (a component saw is limited to the diameter of its blade, typically about 20").
  - Compound/bevel cuts—as well as rip bevels along the length of a component.
- Ink-jets most anyplace on up to three sides of the part (component saws can typically mark on only one side of the lumber in a fixed position)
- Produces accurately cut parts from crooked (curved along its short side) and bowed (curved along its wide side) lumber. No such accuracy-assurance features available on a component saw.
- Automatically selects, picks and feeds its own lumber. No such system available with a component saw.
- Cuts wall frame components. Not practical to cut wall parts with a component saw.
- Cuts a continuous stream of parts from a single piece of lumber - thus less drop-off than a component saw (which cuts one part from one piece of lumber).

Comparative Manpower Requirements:

- Cuts and marks components at peak capacity with one operator and, sometimes, a half-time helper (1-½ workers). A component saw requires two to three operators.

Comparative Strengths:

- Producing short runs—"onesies" and "twosies"—because there's no significant set-up time. Component saw production decreases with short runs (because of its cutting head set-up time).
- Producing very small, intricately cut parts and very long scarf cuts.
- Can all but eliminate hazardous, time-consuming pull saws and chop saws.
- Cutting and marking a full complement of truss parts in a continuous stream—no re-uniting parts cut at different times or from different cutting stations for assembly.
- Requires half the labor of a component saw.
- Lumber optimization. Can also automatically produce standard parts from any stock remaining.
- Marking parts most anywhere along their length on up to three sides.
- Cuts wall frame parts.

Comparative Weaknesses

- Producing higher quantities of the same part. Generally speaking, a component saw can produce more parts per hour if the average number of parts per set-up is five or greater…a linear-feed can produce more parts per hour if the number of set-ups per part is 3.5 or less.

Comparisons Relating to Plant Cutting Operations

- New plant: Might put more weight on the versatility of a linear-feed, one saw that can do everything…especially since a new plant probably doesn't know exactly what they'll be cutting and, theoretically, have no other existing saws.
- Existing plant with variety of saws that needs additional cutting capacity: Should take a hard look at what is currently being cut (number of set-ups). Consider future growth plans or changes in operation (wall panels?) that may change the part-requirements mix.

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need to plug in skilled sawyer rates.) Now if your parts mix is such that the new linear-feed saw is capable of producing parts at a rate of even 240 parts per hour, you will have produced 1920 parts with those 1¼ operators by the end of their shift (8 hrs x 240 parts = 1920 parts total). I'll knock that down to 1800 to account for coffee breaks, if a bunk of lumber isn't delivered in time, etc. So the labor cost per part is around 8¢ ($150 labor cost ÷ 1800 parts cut = $.08)

That same linear-feed saw without the automated feed system would take two or three operators, or an average of 2½. That would double your labor costs to produce the same 1800 parts. Your cost per part would be about 16¢. If you produce even several average 40-truss jobs a day figuring ten webs and chords per truss, that 8¢ difference can very easily translate to $50,000 or more in added labor costs per year.

Next let's look at the cost per part using a new automated component saw which requires two to three operators (I'll use 2½ for the math and the same $15/hr. labor cost). If your part mix and batching abilities are such that you could average three to four parts cut per setup and assuming the saw averages seven to eight seconds set-up time, you'd get about 240 parts per hour. Thus, your cost per part would be the same as the aforementioned linear-feed saw without an automated feed system...about 16¢ a part.

BUT, using this same component saw scenario, if your part mix was such that you averaged even five to six parts per set-up, your cutting production would jump to about 355 parts per hour which translates to around 8¢ a part. And, of course, that is parts of any length—it could be all long chords—whereas longer parts would negatively impact the linear-feed saw's production considerably.

The point is that labor costs per part should be the fundamental determinant in choosing an automated component saw or an automated linear-feed. To determine that, you need to look at:

- The type of parts you're cutting (and try to anticipate how that might change down the road).
- Your opportunities to stage parts for cutting in identical part batches...and your ability (and willingness) to sort the cut parts into complements of complete trusses for assembly.

Having done that, it's easy to figure the cost per part with the two types of saws. Then you have to determine how important the following are to your plant which would put weight on the linear-feed side of the scales:

- The ability to cut long scarfs...longer than approximately 20".
- The ability to cut very small parts, under a foot, and with multiple angles.
- The ability to cut wall frame parts.
- The ability to eliminate hazardous manual-saw cutting.
- The ability to reduce drop-off (scrap) down to two to four percent.

I don't mean to simply drive by the huge financial impact that reducing drop-off can have on your operation. But that's easy to compute and will vary considerably from plant to plant. Simply figure the difference between your current drop-off percentage and what you'd experience with a linear-feed saw and good optimizing software (four percent conservatively). Whatever the difference is, multiply that by what you spent on lumber last year. It can translate to tens of thousands of dollars even for modest size plants. (I will cover lumber optimization thoroughly—and it's a very deserving topic to consider—in a forthcoming article.)

Now, if you've followed me this far, the "hands down" winner of the best saw which I've been promising to step up to the podium is probably obvious.

The no-question-about-it, nothing-else-gets-even-close automated saw winner is...

A LINEAR-FEED AND A COMPONENT SAW WORKING TOGETHER AS A TEAM.

Partnering the two types of saws together is almost magical. By directing part types and runs to the saw that is most proficient at cutting them, you boost the efficiency of both saws dramatically. Short runs of identical parts and shorter parts go to the linear-feed...along with intricately cut parts, long scarfs and bevel cuts. Long runs of identical parts and longer parts are directed to the component saw. As a result, the linear-feed's production rate goes up to its peak 300-plus per hour. The component saw's production can increase by multiples, conservatively 50 percent. The combined result will be at least a 20 percent increase in cutting production over what you would get if you had two of either type of saw working side by side.

A component manufacturer we know who has several automated component saws and several manual component saws recently brought in an automated linear-feed saw. He reported back that he's now producing all of his parts with just one component saw and the new linear-feed. He was genuinely amazed.

Go with the component saw/linear-feed pair and you get all the benefits of both saws. You can produce literally any type part you need with far less labor cost, eliminate risky hand-cutting, get accurately cut parts consistently, have legible part markings for easy assembly, and reduce drop off...all at the same time.

And the Runner-up Is...

Your old manual component saw teamed with a new automated linear-feed. You direct the parts to the saws in the same way but, because set up is so much slower with the manual component saw, you probably will give it longer long runs of identical parts. That is, where you may give identical-part runs above of four or five to the automated component saw, you would step that up to six to eight parts per run for the manual. But you'd get a dramatic boost—likely double or triple the production—from your manual saw in the process.

Put the Analysis Work on the Manufacturer's Back

That's what I'd do. I'd ask every automated saw manufacturer I was considering to look at my cutting operation and recommend which type of saw would provide the quickest return on investment for my operation. They should be able to show you, in black and white and based on your actual production. Personally, I'd make them prove it before I got my checkbook out—which isn't that hard to do if the manufacturer is willing to invest the time.

Now for calculating payback.

I'd also look closely at the payback before I signed that check. That is, how long will that saw take to pay for itself—in hard dollars. I'll go through how to calculate paybacks and the factors that impact them in a future article. I'll also discuss lumber optimization which is one of those factors—a major one. I intend to use actual plant experiences as opposed to theoreticals.

In the meantime, if you have anything you'd like me to write about regarding automated equipment that I haven't covered or haven't written well enough, please let me know. SBC

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