Automation

by Jerry Koskovich, P.E.

straight talk

Where to Start

Jerry recalls the 1984 conversation that spurred his interest in automation.

In March of 1973, I began a career path shift that led me into the wood roof truss industry. For ten years prior to that, my career had been in government working with building code enforcement as a plan check engineer with Los Angeles County and later as Director of Building and Safety with the City of Rochester, MN.

During those earlier times, the wood roof truss industry was just beginning to get a toehold in the western markets. I remember checking the designs of some of the first nail plate connected trusses that came into the LA area. Calculations were done long-hand with slide rules. I still have mine.

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All through the seventies I worked with numerous truss companies as a third party inspector and forensic engineer dealing with roof collapses and other misfortunes that can befall a building.

Ultimately, in 1979, we delivered our first manual component saw. A few years later, in 1984, after having installed another manual saw in Florida, the plant manager, Bill Sauder, stunned me with the question, "When are you going to do something with automation?"

Forgive me for sharing what sounds like a résumé. I'm really not looking for work. I'm trying to make a point. Sometimes you can be standing so close to the trees you can't see the forest! Bill helped me see what was going on in the industry, and the world, more clearly. The computer was having an impact!

Studies he had done during the previous year indicated that his manual component saws, which were the standard of the industry, were spending more time doing the manual set-ups than they were cutting wood. A year earlier they had averaged about 25 set-ups per shift, and by 1984, they were struggling with fifty or more. The next week I returned home, and we began the design of the first automated component saw.

In the years that have followed, the demand for chopped up roofs has become the norm. So called "common trusses" are now uncommon!

While I haven't quizzed any manual saw owners about it lately, I believe I'm probably still safe in saying that doing 80 to 100 set-ups a shift on a manual saw is akin to running the four-minute mile. While there are some who can do it, it isn't the norm.

The point of all of the above (bet you thought I'd never get there), is that like my early experience, a lot of truss plant managers are so involved with the challenges of running the company and seeing to a million details, that they don't have the time to actually study and evaluate what is going on in the back room. That back room (aka, the production floor) is where the success or failure of the business is most likely to manifest itself.

If, for the moment, we assume that every truss plant is using a software package developed by one of the truss plate vendors, and we further assume that the design staff of the factory is competent, it may be reasonable to say that the efficiency of the average factory is no worse or better than its competition. Add to that, if the raw materials and labor costs for fabricating trusses is likewise on a pretty level playing field, it follows that the fabrication of trusses (or walls), is where the game is won or lost.

While I can say with certainty that I have been in factories that had outstanding crews, I can say with equal certainty, such workers are not the norm—the norm is the norm. I don't say this to disparage the average work force, but rather to emphasize that most work forces are truly average. Having said that, the challenge is how do you make an average work force exceptional? Or above average. There are at least two methods and I recommend them both.

Certainly, incentive programs are one of the most effective ways of boosting performance. I personally like this approach. It rewards employees for putting forth an extra effort. If you haven't worked on the production floor, give it a try. You'll have a greater appreciation for incentive programs and the people who can benefit from them.

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at a glance

- Studies conducted on manual component saws, once the standard of the industry, found that operators were spending more time doing the manual set-ups than they were cutting wood.
- Almost anything you can automate will likely be an improvement over the manual production method you are currently using.
- The average saw operator will do three to four hundred set-ups per shift with an automated saw.
- It doesn't do any good to have a saw that sets up in seven seconds if it takes much longer than that to get the wood moving through the saw.

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If your factory doesn't already have such a program, I strongly recommend you consider it. It'll improve production and you'll have a happier, more stable work force.

Of course the method most often mentioned when industries strive for more efficient production is automation. Fortunately in our industry, automated methods of doing the various functions of truss and wall production are becoming more available, and their use and acceptance more prevalent.

How and when does a component factory decide to automate? There are again at least two methods available to management. The first is the simplest for the plant without automated equipment. Just ask yourself if you want your company to grow and increase market share while improving your bottom line. If the answer is yes, then the next question is "what should I automate first?"

The point being, in this industry, most anything you can automate will likely be an improvement over the manual production method you are currently using—sometimes dramatically better! You'll be better off no matter what you do.

The other method leading to a decision to automate is to know and understand what you are currently doing in the various production processes. You'll want to look for the process that is causing the biggest bottleneck. In the average truss plant, cutting will usually take center stage.

As I noted above, the chopped up roof designs of today dictate that the number of set-ups on the component saw will nearly equal the piece count. Years of studying production reports generated by our machines shows that the piece count per saw set-up will typically vary from one to five. Most of our newest machines are showing an average of four. However, recognize that an average is just that—an average—it's not a "mean" number.

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You'll have to determine how many setups and pieces your current saws are producing on a per shift basis. In addition to that, you'll need to know how much and what is being processed on radial arm type saws. Once you have these numbers at your disposal, you'll be able to determine how much benefit can be achieved by installing an automated saw.

A rule of thumb I've used in the past is about a three-to-one ratio (or more), or an automated component saw will typically produce about three times as much as its manual counterpart. This, of course, assumes that the chopped up roof designs predominate, as opposed to doing nothing but five hundred-foot long chicken houses.

Over the past decade, well maintained automated saws will do set-ups in times ranging from as few as ten seconds to as many as 30 seconds depending on what they're doing. For example, most automated saws will take more time when doing extremely short components and when doing bottom chords, since they must relocate the material conveyors (and in some instances the overhead hold down conveyors) in order to sequence the movement of the saw blades. In the past and even today a good average set-up time for most saws would be about twenty seconds for comparison purposes.

With that in mind, the average factory will do three to four hundred set-ups with an automated saw. The above-average user will often do five to six hundred set-ups. They achieve these elevated numbers through efficient material handling and sequencing the cutting list so as to minimize the required movements of the transport frame (moveable end of the saw) when going from one setup to the next. This later function is a technique that should generally be applied with any component saw regardless of its level of automation.

I mentioned earlier that 80 set-ups per shift for a manual saw would be considered quite good. Today we have automated saws that average seventy to eighty set-ups per hour! Since piece counts are so low, the speed of set-up is critical in order to maintain total production at acceptable levels. In order to achieve the incredible number of set-ups per hour mentioned above, these saws must do the set-up, the operator must load the wood, then typically run an average of about four pieces, and finally go to the next set-up—all within about forty to fifty seconds total.

If the piece count per set-up goes up slightly, the total number of set-ups may fade slightly. The opposite is true if the piece count goes down. The thing to remember is that the automated saws don't necessarily process the wood any faster than the manual saws. Again, depending on what they are processing, the rate of thru-put will vary. You don't do 2x4s at the same rate as 2x12s.

Set-up speed, accuracy and reliability is what it's all about when it comes to automation. However, as I've said so often in the past, automated machines will likely make you change the way you do business. The key to getting the most production out of your automated saw is getting the wood to and from the saw. It doesn't do any good to have a saw that sets up in seven seconds if it takes much longer than that to get the wood moving through the saw. Make sure you make provisions for more pickers and most likely a live deck in front of your new saw.

With the above information, you should be able to begin evaluating your cutting system and seeing where an automated saw could improve your operation. Check with your favorite saw manufacturer as well, since if you can provide them with your factory's production data, the automated saw manufacturer may have a program that will spit out your projected payback.

With that in mind, beware of misleading statistics or production numbers presented by a machinery rep or numbers you might have seen in advertising or a show demo. I don't mean to imply that the rep or demo is dishonest, but rather that "all that glitters is not gold."

Remember, the salesperson always wants to show his machine in the best circumstances doing what it does best. What you have to decide is, "Does this information or demo truly represent what I need done," or is it a glitzy display with little or no practical application in your factory?

Ask for production reports from users that demonstrate a history of efficient production over an extended period of time, rather than something that might be the result of a staged event. Get a list of users you can contact for an unvarnished assessment of all of the virtues and pitfalls of the machine. Don't assume!

By this time you should be able to get a sense of what automation can do for you. If you're still interested, we'll talk more about payback in a future article. SBC

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