Automation

by Jerry Koskovich, P.E.

straight talk

Where the industry is.....where it's going.....what it means to you.

This is the first in a series of informative articles on automation focused specifically on manufacturing structural building components. The articles will be authored by Jerry Koskovich, an automation forefather in our industry, with contributions from other automation specialists. The intent of the series is to provide manufacturers with greater background on manufacturing automation concepts and trends and how they impact our industry, and most importantly, how fabricators can determine their best automation path.

at a glance

- ❑ This is the first article in a year-long series by Jerry Koskovich on automation.
- ❑ It takes many, many years to perfect a machine, according to Koskovich.
- ❑ As the industry progresses in automation, some suppliers may have to change in order to properly accommodate our needs.

What started out as an automated simmer a few decades ago has now—by most anyone's definition—reached full boil. If you attended the BCMC show in October, you could almost see the steam—most every booth seemed to have the word "automated" in its sign, ours included.

While I've played a part in automation since the introduction of our component saw in 1985, I don't pretend to know exactly where the industry is. Or exactly where it's going. Or even exactly what the industry is right now—because of the kind of changes in industry fundamentals that are taking place.

But I will put all the automation cards I know down on the table and look at them together with you. This much is for sure—automation has brought about huge changes in the building components industry. And, at a minimum, fabricators are almost compelled to at least know what's going on if they're to survive, let alone prosper.

My concentration will be on automated plant equipment and largely as it applies to production and assembly of structural building components. I'll call on others within the industry to assist with these articles, certainly when it falls out of my area of expertise. Indeed, I may even call on some folks outside our industry—especially when they're in a manufacturing sector that has already gone through the transition to automation that we're going through now.

The Fully Automated Plant

For starters, I'll give you my definition of automation: any computer controlled machine or device that makes the process of producing and assembling building components more efficient. In addition, we may take a look at ANYTHING that makes the process faster, easier, safer, more accurate, or reduces the amount of labor required to do it—ideally, all of the above.

The ultimate, fully automated plant would operate something like this. A customer of yours would electronically transmit building plans to your sales and design office. With a push of a button or a click of a mouse, your design software would enable you to automatically translate the builder's plans to structural components, satisfying all the necessary engineering and building codes in the process.

The translated information would be electronically transmitted to your fabricating plant where computers would orchestrate most everything. Automated saws would cut and ID-code the components, automatically picking and feeding themselves the necessary material. Components would then be delivered to assembly stations via an automated conveyor system network which would sort and direct the components to the appropriate work station by reading their ID codes.

Having downloaded the component IDs and truss configuration to the press work station, an automated jigging system would quickly move pucks into position outlining the truss. An overhead projection system or laser would show workers exactly what size, orientation and position the plate was to be applied at every panel point.

With today's materials the following isn't practical, but in the ideal automation world, a robotic arm could pick and position the components and plates for assembly.

Once assembled, the finished trusses would be transferred to a stacker and banding location. Ideally the bundle would go directly onto the delivery truck bed, thereby creating a true just-in-time scenario. The truck would be equipped with a dash mounted GPS navigation system, giving complete routing directions. Since the site is likely a new address, it may only get the driver into the immediate area, but certainly he'd be no worse off than he currently is.

The business side of the software that monitors all of the preceding steps would then report back exactly how much the job cost and simultaneously generate an invoice for your builder-customer as the delivery truck pulled out of the yard.

All of this may sound somewhat futuristic, but there's little that I've just said that isn't already being done in this or

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other industries. I've over-simplified everything, of course, and certainly there are many challenges to be overcome. Indeed, there will likely be other automated ways to accomplish the same things...but it's all possible.

Where We Are Now

Near as I can figure, less than half of the fabricating plants in our industry have even begun automating. Many plants are being "consumed" by larger conglomerates—sometimes, it would seem, just for their customer base.

I can't statistically support the notion that the larger plants or conglomerates are more automated. But I can say that most of those I see doing the consuming are seriously into automation or strongly considering it—even if it's by default—when purchasing an automated plant.

Truth is, to be competitive and profitable, most plants must invest in some automated equipment. When properly used and maintained, it's not just more efficient, in general it's dramatically more efficient. It is the one factor the user can control. Let's face it, most truss plants have certain fixed costs and then there are other costs that fluctuate with market demand.

Due to the factory facility and employees, overhead is more or less fixed. Every company has them and needs them. The other market-driven costs are lumber, truss plates, production labor and certain other commodities that vary with demand. Again, for the most part, unless you are a very large consumer, you probably won't have much of an advantage over your competition. That's where automation comes in.

Generalizing, whatever the automated machine, it likely does it faster, better and safer than the manual function/machine it was designed to replace.

Regardless of size, the truss and wall panel plants that are correctly using automated machines can produce more product faster. As a result, production per man hour will be far better. In other words, the cost per truss or wall will be greatly reduced.

A fringe benefit of automated equipment is it will probably put out a noticeably better product—components are cut more accurately, everything is professionally marked and fits together like it should.

The caveat is, all other factors being equal, automated plants can deliver jobs quicker, provide a higher quality product which enhances future business, and best of all, can bid jobs more competitively or, more to our liking, make greater margins. Conversely, less efficient plants will find it increasingly hard—overwhelmingly harder at some point—to compete against their more progressive competition.

The good news is that, again, due to the unique nature of how automation impacts the processes of our industry, even

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a small plant—say under a few million dollars in sales (we've equipped start-ups and plants with less than a million dollars in sales)—will find that they can pay for their automated equipment in labor savings alone in under 18 months. Often under 12 months. With larger operations as fast as nine months.

> It takes years to perfect the machines that are being (or have been) developed.

How Do You Get There?

When do you as a fabricator decide to take the plunge into automation? Unlike the electronics industry where today's TV is next month's obsolete model, our industry doesn't move that fast. Speaking from experience, it takes years to perfect the machines that are being (or have been) developed. Most never do truly attain perfection and that includes those we've developed over the decades.

When people ask me why we didn't have some newly introduced function on a machine they bought a few years earlier, I remind them that the new Lincoln doesn't look much like Henry's Model T. Yet both machines did what they needed to do when they were presented to the market.

My point is, if you're waiting for the perfect machine, you are likely going to be disappointed. Worse yet, you'll be losing market share while your competition is working with a less than perfect machine.

We, as well as most other manufacturers, try to make our what-to-innovate-next decisions based on where we'll achieve the biggest gains in efficiency for our customers. Once designed and proven out, we go ahead and get the equipment to the market—and design additional new features as we go, typically offering them as field upgrades.

We make sure the foundation equipment we're putting in the field performs, but we don't wait until we have every feature nailed down. And we certainly don't wait until we have every complementing piece of automated equipment we're planning designed and manufactured. We just make sure what we're doing today will fit into our fully automated plant plan of tomorrow.

And that's the first recommendation I'd make if you're waiting to automate. Don't wait until you have the time and money, or worse yet, for the perfect machine, before you start to automate. At a minimum, start educating yourself on what's available. Take a good hard look at your plant and identify the worst bottleneck. Then research automated ways to relieve it. Go for where you'll get the greatest efficiency for your investment dollar.

What Automation Means to You & Your Plant

There are the obvious benefits I've touched on—dramatically increased production, less labor required to do it, a higher quality finished product, and of course, a much improved bottom line. But the less obvious—like eliminating hazardous functions that might exist with pull saws and chop saws—are just as important, if not more so.

Employee motivation is probably the most obscure, but can have the greatest impact on your overall operation. Generally, employees like to do a good job, produce and sell an exceptionally good product, and have everything run smoothly and predictably. In order to assure that, you'll likely need to have at least one staff person to handle the TLC and troubleshooting when something goes wrong on your automated machine. Note: I said "when," not "if."

Then there are things like lumber optimization, made practical with automated equipment that can almost instantly cut lumber costs by six to eight percent. Even workers' compensation rates can be positively impacted by automation.

There are negatives to automation, too. Aside from the need for a qualified troubleshooter, you have to be prepared to look at your entire operation differently. For example, you can't double or triple your cutting efficiency and expect your assemblers to do so overnight (although we've found that production will typically increase by about twenty percent due to component accuracy).

You probably shouldn't be buying the very cheapest grades of lumber and expect your automated equipment to handle it. As noted previously with robots, automated machines like a semblance of uniformity in the stock they're required to handle. However, if you evaluate all of the benefits of an automated material handling system you'll find that you are money ahead as compared to the dollars saved by using the lowest grades.

Indeed, as we progress down the automation path, some of the suppliers that serve our industry—like lumber suppliers—may well have to change their ways to properly accommodate our needs. Such things have happened in other industries.

I've barely scratched the surface of the topics I'll cover in this series. Look for future articles that will address some of the questions and solutions I've alluded to in greater detail: everything from how to evaluate automated equipment to figuring payback. Laying out new plants for automation and re-shuffling existing plant layouts to accommodate automation. Even ways to help you generate new customers like you never have in the past.

If there's an issue regarding automation that you'd like to see explored, just email ***SBC*** your request and—to the degree I'm capable (or with the help of others)—we'll try to tackle it. SBC

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