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There's a Method to His Madness…Advanced Building & Components Overhauls Its Wall Panel Line by Molly E. Butz

For one small-town wall panel manufacturer in America's heartland, up-to-the-minute automation was the answer to a material flow and handling nightmare.

To an outsider, it might seem over the top or even the work of a madman, but for Randy Johansen, president of Advanced Building & Components, Inc., all 220 feet of automated wall panel paradise made perfect sense. Completed in late July, Johansen and long-time business partner Larry Peterson had brand new equipment installed in their production facility in Mead, Nebraska.

Technically speaking, wall panels tend not to be highly engineered products like their roof and floor truss cousins, and their benefits are more strongly associated with jobsite labor savings than anything else. For Johansen's plant, however, wall panels were a materials handling nightmare. A self-proclaimed "materials handling freak," Johansen's obsession with efficiency began very early on, when he started framing with his father at 12 years old. "I was a very efficient carpenter," Johansen said, "My dad made it perfectly clear that if I was going to be successful I had to make every move count. So I did. I had processes for everything I was doing in the field." In 1997 when ABC's panel plant came to life in a small, crowded building in Omaha the material handling problems were evident early on. Even their move to a more spacious plant in Mead, a small suburb of Omaha, wasn't enough to meet Johansen's efficiency concerns.

"Every time something changed—say we needed eight-foot studs instead of nine—we had to sort the materials and then shift them around in the plant or move some of them outside and bring new materials back in. It was causing a lot of disruption," Johansen noted. "From the very beginning, material flow was a source of frustration. And, even if you stockpile lumber, inevitably you'll run out of something. You might be able to find what you need in stock and get more delivered, but you've still got employees standing around and waiting."

There had to be a more efficient way, and that's just what Johansen found. By applying some of his "old school" processes to his current in-plant production procedures, Johansen worked closely with his equipment supplier to develop machinery that would meet his needs. "I came up with a task," Johansen explained. "It was simple. I said, 'I want to put studs in one end and I want them come out over here without having to handle them again. This is what needs to be accomplished; it shouldn't be that difficult.'"

MORE COMMUNICATION EQUALS INCREASED PRODUCTIVITY

In the end, Johansen's "task" meant that there needed to be more communication between the software and machinery as well as more automation within the production line itself. And that's what he got, lock, stock and barrel: an unmitigated material handling machine!

Each wall panel, from design to delivery, is a product of the "brain" in the system, the software. The network in the production facility is fairly extensive, and continually communicates with the wall panel and networking software which links the individual stations together to keep production moving. Integration of each of the stations in the production line helps to eliminate the material handling issues. Because computer monitors with keyboards are set up at key points along the line, production personnel can regularly access real-time information and complete their part of the wall. And, all of the equipment is software fed, which keeps the people and the lumber moving at all times.

Though the software certainly plays an extensive role in the proficiency of the production line at ABC, the equipment plays an equally important role. Many new features and additions have helped make Johansen's material handling dreams a reality.

Three saws on the line take care of all of the cutting. The saw at the front of the assembly line cuts all of the specialty pieces and puts any necessary markings on the wood with laser technology. Another saw sits off to the side part way down the line and cuts all of the materials needed for sheathing. Amazingly enough, these are the only two places on the line that any amount of inventory needs to be stored.

The third saw is built in to the component processing center where some pieces are cut to length and used to fabricate rough openings for windows and doors or made into headers and plates. In Johansen's facility, the component processing center uses an overhead conveyor system to deliver the lumber as necessary.

THE PROCESS

Beginning at the front of the line, here's how the equipment works. (Not only to efficiently build wall panels, but also to streamline the process along the way.) One bunk of 2x4 or 2x6 lumber is set up at the front end of the stud delivery system, which sits at the beginning of the assembly process. As the lumber is fed into the first station, three laser eyes sight, crown and cull the studs when necessary. Then the individual pieces of lumber move up an incline conveyor and are sent overhead where they are sorted and delivered to one of the two manned stations below. In some cases, the studs are sent all the way down the overhead system to the beginning of the framing station. The sorting is done automatically by the software

COMPUTER STATIONS ARE SET UP AT KEY POINTS ALONG THE WAY TO KEEP THE MATERIALS HEADED IN THE RIGHT DIRECTION AT THE RIGHT TIME.

THREE SETS OF NAILING TOOLS MAKE THIS TURRET BRIDGE THE FIRST OF ITS KIND.

running the machinery and the lumber is stored in “holding areas” along the way when needed. Underneath the overhead stud transportation system is the component processing center where one employee builds wall components and another employee builds openings.

ABC’S NEW CRANE AUTOMATICALLY STACKS EACH PANEL AS IT IS ROLLED OUT OF THE END OF THE ASSEMBLY LINE.

No random carts containing bundled pieces are needed. No extra stock is stacked in the aisles. All of these loose studs, wall components and rough openings are conveyed, in order, to the front end of the framing table.

Here, ABC personnel can begin assembling the various parts as they are delivered to the station. Just off to the side of the main production line, the sheathing saw is busy preparing OSB, Styrofoam® or sheet rock for the next step.

Once the wall panel has been assembled and clamped in place, the automatic framer machine advances the panel through fixed nailing stations at up to 60 feet per minute. The framer’s stud sensors and nail-on-the-fly technology ensure quality control and give the framer operators time to locate the wall panel’s sheathing and move it to the squaring station. With sheathing tacked in place, the panel takes a ride under the turret bridge which has three sets of nailing tools, each set loaded with a different kind of fastener. The software tells the bridge which set of tools to choose for the application and can even change tool selection in the middle of a wall. The final resting place on the line is under the smart crane, yet another unmanned position. Full 16' rows of panels are stacked, one at a time, and made ready for the delivery truck. Moreover, the plans for the panels associated with each project are sent through the software to the production floor in a specific order so that they are manufactured and stacked in the way that will be most efficient for installation in the field.

All the way down the line, the software and equipment continually work hand in hand to make sure each piece of the puzzle fits snuggly in place. And, Johansen is pleased with the effect this high-level of automation has had on his overall material handling. “The key is this,” Johansen told SBC staff, “we only handle each piece of lumber once. No lost parts, no extra pieces. Each piece of lumber is moved down the line in an orderly fashion.”

“We can run an average [wall panel] every three minutes,” Johansen continued. “On a less automated line, if you have a person that takes three minutes to find a certain piece, they’ve just lost a [wall panel] in those three minutes. That’s ten feet of wall. That’s a $100 bill.” And for Johansen, there’s no question that the new line helps material flow. “Now everything is right where it needs to be, when it needs to be there.” What’s more, the by-product of the streamlining is easy housekeeping. Johansen noted, “There are no culled studs laying on the floor, no stacked parts or even inventoried wood. It’s neat and clean all the time.”

Though Johansen admitted that this purchase pushed his general return on investment rule of thumb, he’s convinced that this enhanced automated line is “just the beginning.” With the bugs worked out, the new line is quickly approaching Johansen’s goal of producing double the product of ABC’s second wall panel line. “Every new piece of equipment has a learning curve, and we installed all new equipment,” remarked Johansen. “But, even in a couple of months, we’ve seen a big difference in output.” That’s pretty quick work with only 13 employees on the line.

Now, he’ll tell you if he can please himself, he can please anyone, but Johansen takes everyone’s opinion very seriously. “The biggest compliment that we’ve gotten on the new line came from right here in-house,” Johansen noted. “My floor supervisor, Rita, really seems to prefer the more conventional production methods, and has expressed from time to time that all of this automation seems a bit much. But just the other day she asked when we were

going to add the material handling automation in front of what we call Line 2. That really tells me something, and I'm thrilled to death." Johansen added that although they aren't currently in the process, he's confident they will be automating Line 2 at some point in the future.

You can think of it like an episode of TLC's "Overhaulin'" for your wall panel manufacturing facility, but for Johansen, it was more like a "Clean Sweep." And although these high levels of automation may not be for everyone, for Johansen, they're working out just as he expected. If you ask him point blank why he did it, why he invested all manner of resources into this new Henry Ford-esque production line, he is very direct. "Because I'm crazy," he'll say, "that's a lot of it." You can tell that's just his cover because you can visualize his master plan as his descriptions unfold before you. Now he's meeting his goals on a daily basis, turning ordinary lumber into software-designed wall panels with a system that's neat, orderly and just-in-time.

Don't let him fool you, there is a method to his madness, and Johansen's got 220 feet of material handling nirvana to prove it.

Wall Panel Wisdom

Don't know the first thing about wall panels? Here's the skinny on some basics:

- Wall panels are generally not engineered components (as opposed to roof and floor trusses)
- Wall panels can easily be engineered to account more accurately for the flow of loads through the structure and reduce stud spacing in the process. This is often referred to as Optimum Value Engineering.
- According to data from the Framing the American Dream project, framing the 2600 square foot project house with wall panels (as opposed to stick framing the walls) cut the man hours on the jobsite by 71.5 percent. (26.5 hours versus 93 hours)
- Both sheathing and building wrap are often applied to the finished panel in the manufacturing facility
- According to WTCA membership data, 25 percent of WTCA members manufacturer wall panels.
- In addition to being set by hand, walls panels can also be set by either a crane or forklift.
- Bracing is crucial when setting wall panels.
- For best results when using wall panels, the building's foundation must be level and square.

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