The Sound Of Science

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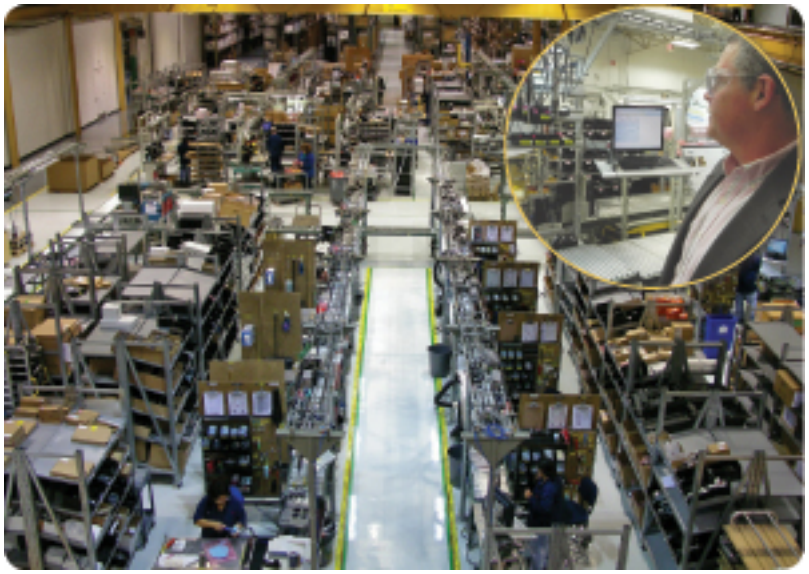

It sounds like something out of the future, but when George Lord alludes to “The Scientific Factory,” he doesn’t mean some sterile Orwellian assembly line. That said, there is nothing old-fashioned about ABB’s New Berlin, WI-based facility either. It is something in between, a solution to what Lord, managing director of ABB’s U.S. low voltage drives and motors operations, refers to as “a giant math problem.” But before we get into the mathematics…

An Ideological Shift

This all started when Lord, a 35-year veteran in operations and business management, transitioned from his post in Reno back to the Midwest to help drive operational excellence towards a competitive advantage for the New Berlin plant.

The ABB New Berlin team started its journey towards operational excellence in 2005, with a fundamental change in both the culture and product configuration. At that time, it was a traditional manufacturing plant: dimly lit, with inventory almost everywhere. Although the business had been successful up to that time, ABB saw a changing marketplace with evolving customer expectations. Led by its operational excellence manager, Ahmad Ashour, along with the whole New Berlin team, a major shift was made towards a late-configuration model for standard drives. In 2008, ABB began focusing on key metrics to drive not only internal performance criteria, but also better engagement with associates (the people doing the work) and a renewed focus on the customer.

In late 2009, an industry-wide slowdown affected the global economy and ABB started streamlining the supply chain to respond. While this period was tough, it was the spring of 2010 that was actually harder: The industry rebounded without

much warning or notice — and suddenly ABB was dealing with global shortages of commodities such as power semiconductors and film capacitors, but customer demand was very strong.

“Our customers were used to 90+ percent on-time delivery, but with the increased demand and supply chain issues, it suddenly got very challenging and by the middle of 2010, we were disappointing customers daily,” says Lord.

It was at this point that Lord took an outside-in view of his operations and determined the team needed more than short-run goals to get through the upswing of a renewed economy: They were going to need to tear this place and these processes apart, in order to build a new foundation that was truly conducive to the type of growth the plant was seeing. Lord put it to his team in August 2010 with the goal of building 10,000 units per month. At that point, a typical month produced somewhere around 5,000 to 6,000 units, so after the team “fell over,” Lord jokes, it got down to the nuts and bolts of how to reach these production goals. All members of the operations team, as well as business leadership, worked together to assure supply chain continuity and a unified front to the customer in the turnaround of the business.

MOST, Resource Calculators

In order to reach the monthly goal of 10,000 units, the New Berlin team was going to have to start to understand how long it was taking to get each piece out the door. Lord describes a moment where he and Ashour stood on the production floor one evening and watched operators walk station-to-station to fetch the materials required, wasting valuable seconds just based on a poor layout. It reinforced the fact that some of the time being expended on production was purely wasted time, not value-added time as determined by the customer.

So the team took to a strategy called MOST (Maynard Operation Sequence Technique), which is a predetermined motion time system that is used to set the standard time in which a worker should perform a task. As a supplement to this methodical time study, ABB New Berlin focused on one-piece flow, engaged with the assemblers using Kaizen activities, and rearranged the floor space so their materials were located in close proximity and in ergonomic spots on the production line.

These combined strategies worked to improve ABB New Berlin’s production efficiency, and in November of 2010, just a few months after the challenge was put to the team, they hit 10,962 units. “Now, nine months in a row, we’ve hit record production numbers that we’ve never seen before,” says Lord. “If you’d have asked in August, they’d have all said, ‘No way. It can’t happen.’ Sometimes you’ve got to push them to where they’re uncomfortable.”

Because of time studies like MOST, and being able to compare target goals to actual production levels, ABB New Berlin now has a pretty good handle on the level of resources it needs on a given day. Taking a plant-wide view of total resources, team leads begin each day determining which lines need which associates in order to

accomplish the daily customer demand. Rather than hoard resources, team leads drive the thinking that plant goals supersede individual team goals, and that the entire team functions, essentially, as a well cross-trained unit. In addition to the internal MOST studies, the team then looks at historical sales data, as well as future estimates, using monthly sales and operations planning to improve forecasted demand planning from a customer standpoint.

Another great way the capacity drive has been tackled is through a late finishing strategy that builds complexity into each product as close to the back door as possible. Lord likens it to an ice cream shop: “We stay as close to vanilla and chocolate until we get to the back door, performing that late configuration just before we ship to the customer with customized options and software.” With more than 7,400 customized configurations available, Lord prides himself on the fact that the complexity can be integrated into the pre-built basic (“vanilla”) design and sitting at the back door for shipment within 16 minutes: “It took a great team to develop the technical capability for us to achieve this goal,” he says.

The calculation is exact, because the team has worked hard to develop the numbers around accurate formulas. The scientific factory, by definition, is just this — the ability to predict, calculate, and get the product out the door as fast as possible, with the safety and quality built in.

Free Capacity

One of the most compelling parts of this story is how ABB was also able to increase production levels dramatically without changing its footprint. Part of Lord’s approach to the New Berlin plant’s ultimate success was in finding ways of creating “free capacity.” This, since his 2008 arrival to the plant, has been a huge priority centered around reducing the amount of inventory and improving line utilization through the use of simulation software.

In 2005, says Lord, 64 percent of the facility was being utilized to house inventory. In order to revise the footprint to lend itself to more value-added activity, ABB New Berlin recently partnered with ODW Logistics, a 3rd-party logistics provider and business solutions partner, who is able to warehouse inventory and offer multiple “milk runs” per day. This has allowed a just-in-time inventory method that has freed up space for facilitating these large production goals, without compromising the plant’s ability to access parts. “So then the production floor becomes very much about value-added activities,” says Lord. “We’re sending and tracking signals each day with a Kanban type of a system. I can see on my smart phone exactly where we’re at this second, because (the logistics provider has) built interfaces into our system.”

Ever-Evolving

ABB's most recent news centers around its acquisition of the industrial motor manu facturer, Baldor, a deal the company completed early this year. Lord will also be supervising the Fort Smith, AR team that comes along with this purchase. Along with the Baldor operations team, ABB is looking for ways to continue to ramp up production numbers and improve each team's ability to offer up some more unique packaging of drives — something Baldor was known for, and ABB has struggled with in the past due to lack of resources. Lord also knows that with the Baldor acquisition, "Demand is going to be there, big time, and we're going to have to start thinking about 13,000 to 15,000 units (per month), without significant additional capital investments."

With all this change, Lord makes it clear that it's the associates at New Berlin and Fort Smith who really drive the improvements. The feedback from operators "is so rich and complex" that the company really takes it seriously in figuring ways to integrate new value-added elements to its production. And as each facility improves, so does the company as a whole. "We're running The Scientific Factory across North America drives now; we're trying to make our production very much the same." The benefits here are evident: When one facility tackles a bottleneck, it can turn around and disseminate the fixes to other facilities, who can hopefully utilize the information as proactive data.

And, he says, "With our refresh of the product lines coming in the next two to three years, the Scientific Factory will allow ABB even more benefits. Well-documented and scientifically-designed production lines will facilitate our ability to tackle any plant bottleneck anywhere in the world quickly. The simulation software will allow us to optimize line layouts digitally prior to new investment, effectively allowing us to cut and paste production lines globally."

Lord refers to Ashour and his team as “our Batman.” That team has a toolbelt stocked with math, science, and good old-fashioned 6S (5S, plus safety, says Lord). Add that to the plant’s ability to drive speed as a competitive advantage, and it seems there’s no limit as to how fast they can go.

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