

Manufacturing a Quantum Leap in 4 Days

By Raj Thakkar, vice president, global supply chain and sourcing for GE Energy Connections

Progress typically comes in stages, a steady pace of discovery and process refinement driving evolution over time. But sometimes quantum leaps occur. Over the course of four days in a town called Apodaca, Mexico, just outside Monterrey, 39 of our future operations leaders, a team from GE Digital and our local manufacturing team joined forces to achieve such a leap. Here's how they did it and what it means for our business.

Grant Permission to Innovate

The culture necessary to try, to fail and to improve must exist. This culture and permission is promoted among the [highest ranks at GE](#) and created the environment necessary to succeed. Our Apodaca team in particular is known for its willingness to test norms and existing good processes in search of great, wherever that search may lead. This is one reason Apodaca is one of eight [GE Energy Connections factories on the path to manufacturing brilliance](#).

Focus on Customer Pain Points

Innovation is directionless unless it solves a pain-point and improves customer outcomes. The products made in Apodaca, Mexico are 100% engineered-to-order and made-to-order, so the speed at which we can begin and complete a production process (lead-time), quality and cost are critical for our customers. Accordingly, that is where we needed to focus our efforts.

Get Lean

Digital is the new kid on the block and rightfully is getting a lot of attention. Connecting analytics to drive better performance holds immense value for businesses, but the 'industrial' in Digital Industrial can't be forgotten. While many [digital Energy Connections initiatives](#) are at work across the company, lean principles and continuous improvement remain as important as ever and lay the groundwork for digitally-enabled data analytics, optimization and real-time visibility. Our team held "Lean Action Workouts" on the factory floor

where the action was to think with their hands and iterate better processes. The team saw the need to get raw-materials more quickly from suppliers—and negotiated directly with suppliers to do it and cut inventory costs. With materials sourced more quickly, they rethought the factory’s “supermarket,” the plant location where workers go to select raw materials. In contrast to the digital world, the team physically had to rearrange raw materials to try different configurations with the goal of reducing lead times. One experiment lasted into the early hours of the morning as the team lugged thousands of pounds of copper across the shop floor to experiment with a new configuration. Building on this new layout, a moving fabrication line was created, safer standard work processes were put in place, and a new alert system was implemented to notify shop workers of quality and supply issues on the manufacturing line for quick resolution. This alert system, based on the Japanese “Andon” concept, moved the team from a paper-based alert/escalation process to a real-time audio/visual alert system on the shop floor, combined with email and text alerts to escalate issues quickly. The iterations worked: cycle time was cut by 75%.

Go Digital

With the factory running lean, the new kid on the block can come out and play. According to GE’s [recent Industrial Internet Industry report](#), nearly a quarter of executives view the cost of collecting machine data, as well as the quality of that data, as a top-three barrier to implementing a data analytics initiative. A team of 4 GE Digital developers worked alongside the Apodaca team to connect the manufacturing processes to the Industrial Internet quickly and cost-effectively. This cross-functional team was able to digitize line scheduling and create a digitized production board which provides real-time production visibility to our team anywhere in the world. The Andon process mentioned above was integrated into this system so management can see exactly when, where, what type and why issues are occurring, to understand downtime and improve productivity. The team is now exploring how to implement these developments in other GE factories. This shared knowledge across

businesses is part of what we call the GE Store, a key competitive advantage for GE.

Bottom line

Over the course of 96 hours we were able to:

- Reduce cycle time by 75%
- Reduce lead-times by a full day
- Eliminate overtime
- Improve on-time delivery to customers
- Increase moving line efficiency by 4%
- Cut inventory costs
- Reduce work in process costs
- Give hands-on experience to our future operations and manufacturing leaders

Consistent progress over time has its advantages and is the norm, but gathering a cross functional, passionate and enabled team together over a focused period of time to solve customer pain points can result in quantum leaps in performance.