

TRAINING WELDERS

in Advanced Manufacturing Philosophies Nets Employability

BY KRISTIN WILSON

As of September 2010, the U.S. manufacturing sector grew for the 14th consecutive month, leading some economists to speculate that, as with the Great Depression, American manufacturing will lead the economy out of the recession. It's a little bit of good news in a long stream of depressing employment reports. Career and technical educators contribute to the growth of this sector by training career-ready graduates for increasingly high-skilled manufacturing jobs. However, skills aren't the only important aspect of career-readiness—so are work philosophies, like a commitment to continuous improvement. Great plant managers do not issue dictates from the office suite. Instead, they include everyone involved in production in discussions about process improvement. Training career and technical education (CTE) graduates in how to contribute to these discussions will make them more employable. This article relates how one manufacturer, Dant Clayton Corporation in Louisville, Kentucky, applied lean manufacturing philosophies to its welding shop, and describes how educators might incorporate lean philosophies into instruction in all skill areas.

Continuous Improvement Philosophies in the Workplace

Lean manufacturing has its roots in the Toyota Production System, in which every employee is charged with continually thinking about process improvement and waste reduction. The core lean philosophy is to eliminate any use of materials or labor that does not result in value for the customer or prevent waste. Lean is not a top-down but a vertical philosophy. All employees must understand and identify waste and participate in management discussions about how to eliminate it.

Lean has been a part of production thinking for more than two decades, and as the philosophy has matured, a number of application models have appeared. Two of the more popular are the Kaizen event and the 5Ss. A Kaizen event is a restructuring of a work area by disassembling and reassembling it based on standardization and waste reduction. Part of the Kaizen philosophy is to humanize work so that anything overly hard or frustrating is eliminated. Similarly, the 5S philosophy is composed of five concepts (five words that start with “S” in Japanese) that guide the continuous improvement of a production process; their English equivalents are sorting, straightening, cleaning, standardizing and sustaining.

Not only have companies reported increased productivity after applying these two models, they have also reported improvements in safety and job satisfaction. For CTE educators, helping students learn how to apply the philosophies may increase workers’ job readiness and job performance.

Dant Clayton Corporation

Dant Clayton manufactures aluminum bleachers, stadium seating, and grandstands in a 350,000-square-foot facility with around 50 shop employees. The St. Louis Cardinals baseball stadium and new University of Louisville Papa John’s

football stadium are two examples of Dant Clayton’s recent work. In addition, Dant Clayton’s seating can be found across the country at athletic fields of all sizes and types. The company’s primary products are stadium grandstands with a steel I-beam structure, alum-a-stands or bleacher seating constructed entirely of aluminum, and press boxes. Dant Clayton prides itself on its slip-resistant decking that is comparable to a concrete surface, as well as its continuous-weld deck construction that moves water down structures, preventing dripping bleachers that are difficult to maintain and keep clean.

Brian McBurney, the maintenance supervisor at Dant Clayton, says his workday is shaped by phone messages reporting “various things being broken or misplaced.” McBurney is also a first responder and a member of the OSHA Safety Team at Dant Clayton, so when a workplace injury occurs, McBurney is there. When it comes to accidents involving equipment or people, McBurney believes a continuous improvement mindset can improve the quality of the workplace.

McBurney took me on a tour of Dant Clayton’s facilities, then we talked about Dant Clayton’s operations and how they have applied the continuous improvement philosophy by conducting Kaizen events and incorporating the 5S model into job performance expectations. Finally, we discussed larger trends in workforce development, specifically how teaching lean philosophies might result in CTE graduates who are better able to contribute to the growing expectation that every employee can improve the production process.

Employee Training

There are three broad job classifications at Dant: machinist, welder and general assembly. “The buzzer goes, they put their heads down, hoods down, and they fit, weld and assemble; they cut, punch

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holes and drill. Move in another stack of material and go at it again,” McBurney said of a typical day in the shop.

On the steel side, being a welder fitter is one of the more challenging jobs. McBurney said: “Those are the guys that actually have a skill set that they can take the drawing and actually put it to the beam—do all the layout...most of the drawings are like a 2D type drawing. There’s no 3-D. It’s on a piece of paper and it is hard to do unless you’re skilled, to be able to look at it and decipher which side of the beam they’re talking about. Cause a lot of times they show 3 different views, the top, the bottom, and the side.”

Employee training is an important aspect of worklife at Dant Clayton. Employees train on new equipment, software and management strategies both at the workplace and off-site. In addition, employees cross-train, so steel shop welders will also learn welding jobs in the aluminum shop. McBurney sees cross-training as particularly important for smaller operations like Dant Clayton because some jobs may be performed by a single person: If that person is absent, production may slow down considerably or even come to a halt.

“We get people from different areas to learn another person’s job so when that person gets sick or takes a vacation, we can slide someone in there. They know exactly what to do and they can keep up with the piece count for the day.”



◀◀ Brian McBurney and Kristin Wilson visit in the aluminum shop.



◀◀ A worker in the assembly area.



◀◀ A new Peddinghaus structural drill in the stringer cell area.



◀◀ A welder working in the steel shop.

PHOTOS COURTESY OF KRISTEN SUNDELL

Continuous Improvement in Action

Productivity is a key priority at Dant Clayton, which uses Key Performance Indicators (KPIs) to establish workload expectations. KPIs ensure that Dant Clayton employees understand how much they need to produce; however, they don't alert employees to potential waste or encourage thinking about how the process or the products they generate might be improved. To this end, Dant Clayton has turned to lean philosophies. McBurney and other Dant Clayton employees participated in training on the lean manufacturing philosophies and approaches, specifically on how to conduct Kaizen events and apply a 5S philosophy to work performance.

Because Dant Clayton's business revolves around sporting events, the winter months can be slow; however, in the spring, when "things start ramping up," waste becomes a serious production issue. An employee walking around the work area looking for a misplaced measuring tape is an example of waste, as is packing materials left lying on the floor, creating a trip hazard. Prior to Dant Clayton's adoption of lean principles, McBurney said he could look around the shop and see waste "everywhere."

As part of its training, teams of employees were assembled to conduct safety and job audits. As a maintenance supervisor, McBurney is a part of this team; so too are a mechanical engineer, production employees and management. After an audit, everything is moved out of the workspace and the area is rebuilt based on Kaizen philosophies: waste elimination, safety and continuous improvement. It's an intense amount of activity that generates stunning results: "I have to disconnect and reconnect equipment and things. We're painting lines on the floor; we're using stencils to make shadow boards for tools. It's amazing how you can take an area and in three to five days completely disassemble it, turn it, twist it, flip it upside down, reassemble it, and just

stand back and go, 'Oh my gosh.' And then people go back to work."

In terms of employability, productivity and safety, McBurney is convinced that continuous improvement philosophies, like Kaizen, will strengthen American manufacturing most when it's the welder, the machinist and the general assembly person applying these philosophies to their thinking about their jobs.

The impetus for one Kaizen event was the purchase of a new structural drill for what employees call the stringer cell area, "where we weld up the stringers for the bleachers." The structural drill that processes raw I-beams before they move into the area was outdated and had become a bottleneck in the production process. Dant Clayton ordered a new drill and had its employee team conduct a Kaizen event while they waited for it to arrive.

The team noticed many inefficiencies and occasions of waste, including tools that were stored on the floor or on top of welding power supplies, flat surfaces being used as storage areas, and infrequently used small parts were being stored in difficult-to-access bulk containers. To respond to this waste, the team began eliminating surplus items and any tool that was not used regularly. The same process was applied to outdated equipment. Whenever the team could not come to a consensus, the plant manager cast the deciding vote.

Results of the Process

The team rebuilt the stringer cell area by aligning tables vertically, relocating welding power supplies away from work areas, designing shadow boards for tools, building ergonomically correct pallet carts, and installing shuttle trays under tables to store and move parts. Once I-beams are processed through the facility's new structural drill, cranes move the I-beams into place on welding tables. Carts are then used to bring stringers to the area from inventory. Dant Clayton employees now sustain this rebuilt area—and hence uphold



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the last of the 5S principles—by putting tools back on shadow boards, keeping the area clean, and constantly thinking about how to improve the process. McBurney said that the welders' response to the Kaizen event has been enthusiastic: "They like it; they love it; it's great."

Dant Clayton has seen improvement in all areas: There is "better safety. Cleanliness is much better. There's a better attitude. Their throughput of parts has increased. Consumables have gone down. It's all-around better," said McBurney. Continuous improvement has become a responsibility that everyone assumes, from the assembler to the CEO.

How Continuous Improvement Could Change CTE Instruction and Training

Career-ready means more than just mastering skills: It means having a continuous improvement work philosophy that is focused on reducing waste and maintaining a safe work environment. CTE graduates with an awareness of and training in these philosophies and practices increase their employability, productivity and safety. The employee who is able to apply continuous improvement philosophies will be a part of a growing company and a stronger American workforce. McBurney reiterated, "The American workforce should be known for the pride the workers take in their product and their job area.

Trade school would be a great place to learn this!"

The Dant Clayton story has implications across CTE fields. The old stereotypes about CTE are challenged by lean manufacturing philosophies. Approaching CTE knowing that graduates will be expected to constantly consider improvements in manufacturing processes and work with employees from maintenance to management means educating differently. Training in welding changes from progressing through welders—brazing to stick welding to MIG welding to TIG welding—and becomes challenging students to demonstrate how their knowledge of welding can improve the production process specifically and the industry generally. Teaching students to weld becomes teaching students to improve their industry, thereby strengthening the American workforce. **I**

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