

Warner Electric

Boston Gear

TB Wood's

Formsprag Clutch

Wichita Clutch

Marland Clutch

Industrial Clutch

Bauer Gear Motor

Svendborg Brakes

Nuttall Gear

Warner Linear

Delroyd Worm Gear

Stieber Clutch

Ameridrives Couplings

Inertia Dynamics

Matrix International

Huco Dynatork

Bibby Turboflex

Twiflex Limited

Lamiflex Couplings

Kilian Manufacturing

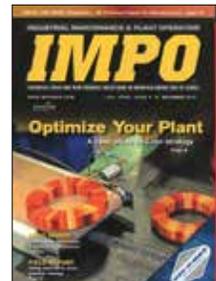
Guardian Couplings

Ameridrives Power
Transmission

Optimized For Efficiency and Value



As seen in
**Industrial Maintenance
& Plant Operation**
September, 2015



An Altra Industrial Motion Company

Optimized For Efficiency and Value

Warner Electric incorporates kaizen and lean manufacturing principles into design of a new, state-of-the-art facility



Warner Electric's world-class, 96,000-sq.ft. facility near Columbia City, Indiana.



A variety of electromagnetic clutches and brakes, including PTO clutches and brakes for use on consumer and commercial lawn tractors, agriculture equipment and diesel engines are manufactured at the new plant.

Warner Electric, part of Altra Industrial Motion, has just completed the development of a modern 96,000 square-foot plant near Columbia City, Indiana. The world-class facility allowed Warner Electric to consolidate production activities from three different manufacturing and warehouse locations in the Midwest and allows for future production expansion.

But perhaps more importantly, this consolidation gave Warner Electric the opportunity to develop a state-of-the-art operation driven by lean operational principles using the same operational excellence techniques deployed by Altra manufacturing facilities across the globe.

Warner Electric is a global leader in the power transmission products industry with manufacturing facilities in North America, Europe and Asia. The new Columbia City plant will manufacture a variety of electromagnetic clutches and brakes, including PTO clutches and brakes for use on consumer and commercial lawn tractors, agriculture equipment and diesel engines.

"We considered multiple locations for this new consolidated plant," said David Ebling, President of Altra's Electromagnetic Clutch Brake group. "Ultimately, we selected the Columbia City location since it allowed us to be located near our primary customers in the Midwest and Southeastern U.S."

"Another advantage of this location was our ability to retain the productive and well-trained 200-person workforce from our existing Columbia City operation," said Ebling. "The consolidation was a necessary step for us to maintain our market competitiveness."

Kaizen sensei helps guide plant layout process

The new plant provided an opportunity for a "clean sheet" facility layout. Several kaizen events were held during the summer of 2013 to establish the optimal equipment layout and material flow. The goal was to eliminate the wastes in movement, wait times and inventory throughout the entire production process. "We employed the services of a Toyota Production System sensei to assist us with this major undertaking," said Ebling. "Teams of up to 15 members each were formed, representing all levels of employees, from production associates, material handlers and engineers to corporate executives."

Each team began by mapping the current production processes of all products within two value streams. Cardboard cutouts of machines and equipment were used to experiment with plant layout variations. Each proposed variation was evaluated using lean techniques and measures including:

- Enhanced safety and ergonomics
- Optimized workflow
- Minimized travel
- Reduced inventory
- Minimized footprint
- Local point-of-use inventory storage

“We also had a separate team evaluate raw material, finished goods inventory and material flow,” said Stan Owens, Warner Electric’s General Manager. “The team developed a logical plan for our stock locations and shipping area. They also specified a material delivery system employing unique material handling equipment and dedicated associates using standard work for the delivery of components and removal of finished goods from the assembly cells to maximize efficiency.”

All these planning activities were directly aligned with Altra’s “Operational Excellence” and “Total Associate Involvement” initiatives that focus improvement efforts on the critical processes that provide value to customers. Customer satisfaction ultimately translates to long-term, profitable growth for the company.

In addition, the company has embedded principles of lean accounting into the operation. This enhances and accelerates the benefit to the operational aspects of the lean principles designed into the plant’s operations and product flow.

According to John Nuechterlein, Warner Electric’s Finance Manager, “Without having already pushed lean principles in our operations, we could never consider going down the lean accounting path. The benefits of lean accounting include more transparent, timely and actionable financial data for decision making, while reducing the waste found in traditional accounting systems.”



Stan Owens, Warner Electric General Manager (left) and David Ebling, President of Altra’s Electromagnetic Clutch Brake group.



The Columbia City plant management team consists of (from left to right): Crystal Cochard, Human Resources Manager; Joel Hallett, Mobile Power Value Stream Manager; John Nuechterlein, Finance Manager; and Dan Heise, MagStop Value Stream Manager.



Kanban cards, attached to all material containers, indicate quantities, descriptions, etc. allowing anyone to easily access correct materials.



All raw materials and finished goods at the plant are delivered and retrieved utilizing a unique trolley train system that cycles through the plant every two hours.



Work cells throughout the plant are ergonomically designed and arranged with CNC machines and part trays positioned for convenient access by operators.

Improved productivity right from the start

Optimized productivity begins immediately when raw materials are delivered to the plant receiving dock. All material receipts are initiated by an order to the supplier triggered by a kanban card from an empty container. Receiving and quality personnel, along with material handlers, all own and drive the process. Receipt transactions are executed within Altra's business system (SAP), but all physical locations, quantities, containers, etc. are shown on the kanban card with enough information for anyone to fully execute the process.

Lean accounting techniques require inventory be at the lowest possible level. This is achieved through a very responsive supply chain that provides smaller, more frequent deliveries tracked electronically with minimal intervention and only one internal transaction. "Although we still have room for improvement, we have made great strides in this area. We are rapidly reducing our inventory footprint while minimizing internal transactions," said Dan Heise, MagStop Value Stream Manager.

All raw material and finished goods at the plant are delivered and retrieved utilizing a unique trolley train system that cycles through the plant every two hours. Material handling associates are devoted to keeping production lines supplied with components. In order to reduce travel times, most materials are stored at the point-of-use rather than a remote central location.

Enhanced cell manufacturing for added productivity and safety

Warner Electric's highly trained workforce allows the company to assign multi-skilled associates (i.e., CNC operator/assembler) to work within each manufacturing cell. Cell Leaders support multiple cells for problem solving and continuous improvement.

These experienced associates are trained to solve problems and have the knowledge to quickly fix technical issues and overcome barriers to production flow as they arise. They also have the authority to stop production and reassign associates if necessary. Cell Leaders are also specially trained to identify opportunities to eliminate waste and are encouraged to make changes through team-based continuous improvement activities.

Work cells throughout the plant are ergonomically designed and arranged for enhanced worker comfort and improved productivity, eliminating wasteful movements and handling. For example, at the CNC machines in the cells, part trays are positioned for convenient access by operators. Roller conveyor systems are used where they eliminate lifting or handling in multi-station cells, allowing parts to move more quickly and easily between associates.

One of the key customer benefits of Warner's lean manufacturing work cell configurations is the ability to ship product quickly in response to customer requested design changes. Other clutch/brake manufacturers often require six-month lead times.

"Quick changeover techniques have been implemented making once difficult and time-consuming processes much easier and faster. These initiatives have yielded significant time savings – a typical changeover now takes 18 minutes versus 50 minutes a year ago," said Heise.

Automated part-eject functionality has been added to some processes to eliminate manual unload time and so operators do not have to reach or bend to retrieve parts. Pallet lifts and adjustable workstations are commonly found throughout the facility. These ergonomic features provide an added measure of convenience and safety for associates, which in turn, equates to added efficiency and productivity.

"We employed our corporate safety consultant early on in the plant configuration," said Owens. "Such items as fire extinguisher locations, view and access to exit locations, aisle creation, etc. were all carefully reviewed prior to our moving in." A safety team, consisting of all levels of associates, meets monthly to preform audits and review previous corrective actions. Safety at the facility is measured at the cell and plant level. Catered lunches and dinners are often enjoyed to celebrate safety record successes.

Utilizing the latest manufacturing technologies

Many "simple" but effective manufacturing technologies have been introduced to the new facility. An example is the use of "hanedashi," a Japanese term for automatic unload of a work-piece from a machine or fixture after the cycle is complete.

"Hanedashi encourages manufacturing technologies to provide automation to remove a part from a process," Heise explains. "This allows the associate to spend that valuable time loading the next part to the process and is a great ergonomic tool that reduces associate fatigue and minimizes repetitive motion injuries."

As part of its commitment to efficiency and quality, Warner Electric has invested in five state-of-the-art, right-sized CNC machines, which were installed at the end of 2014. The new machines allow for faster part production with improved accuracy.

Customer shipping requirement dates are tracked at the assembly cell level so that everyone is aware of customer expectations. Significant effort is made to compile customer forecasts and a monthly sales/operations/planning meeting is held to review future needs based on a current forecast. The kanban card system does a great job of keeping components available for production.



Ergonomic pallet lifts and adjustable workstations are utilized throughout the facility to provide an added measure of convenience and safety for associates.



Warner Electric has invested in five state-of-the-art, CNC machines, installed at the end of 2014. The new machines allow for faster part production with improved accuracy.



All associates attend a hands-on orientation program so product and manufacturing process knowledge is obtained quickly. Associates are encouraged to take advantage of the many available kaizen events and training opportunities.



Every day, value stream managers walk the floor as a team to evaluate visual management boards located in every production cell and get first-hand feedback from operators. The boards communicate cell demand, quality, productivity level, barriers and other important factors.



Associates now enter cell performance data details directly into an electronic visual management system for automated summation of near “real time” performance data. Large monitors, positioned next to the cells, display color-coded data for easier viewing by team leaders and supervisors.

‘Total Associate Involvement’ is a reality

All associates at the facility are encouraged to be actively involved in their own work environment. High participation rates are the norm for voluntary training programs, safety and social committees, and for the many kaizen events that are conducted.

“The participation and subsequent feedback we get from our associates are valuable measurements of our success,” according to Joel Hallett, Mobile Power Value Stream Manager. “In addition, associates have the ability to make changes to their work area through a suggestion program which is managed at the cell level. All suggestions are reacted to quickly and time is allotted to the associates so that they can implement their own recommendations where it is appropriate.”

According to Human Resources Manager Crystal Cochard, “All associates, hourly and salary, go through a tailored orientation program, including working in the production cells so product and manufacturing process knowledge is obtained quickly. The culture at the plant encourages associates to take advantage of the many available kaizen events and training opportunities.”

As financial data is available more immediately, fewer system transactions are needed, and the operation is visually managed. Decisions can be driven down to the plant floor where associates become ever more entrepreneurial. Said Owens, “This eliminates waste in the financial and management process and helps the value stream focus on those processes that add value for our customers.”

A good example of this personal responsibility principle put into action is the “poka-yoke” concept, a Japanese term for “mistake proofing.” Poka-yoke techniques are regularly employed in the assembly cells because the cell associates are responsible for their own quality inspection processes at the plant.

Every production cell is well equipped with visual management boards, which communicate cell demand, quality, productivity level, barriers and other important factors. The data is easily seen and utilized by production and management personnel to take corrective actions or to make continuous improvements.

Every day the value stream managers walk the floor as a team to evaluate the visual management boards and get first-hand feedback from the operators. Monthly plant-wide meetings are held to discuss quality and performance, from both internal and external sources.

“‘Total associate involvement’ concepts such as poka-yoke demonstrate how we’re committed to making quality a priority at Warner Electric,” said Owens.

On being good citizens

Special efforts were taken to ensure that the plant was as “green” as possible. “We engaged several environmental engineers from the Indiana Department of Environmental Resources and reviewed all the appropriate aspects of compliance,” Owens said. “For example, we met the criteria for no exposure certification, meaning we are exempt from having to submit a storm water plan since all our processes, equipment and materials are under roof.”

The plant incorporates energy-efficient bay fluorescent lighting and all machine coolants are recycled. All scrap, including paper is also recycled and returnable dunnage is commonly used.

Altra’s commitment to good citizenship includes community involvement, both in financial support and associate participation.

“The Columbia City plant frequently participates in community improvement programs, not only on a social level, but business as well,” said Cochard. “One of our Value Stream Managers is an active board member at the Fort Wayne YMCA. Annual ‘drives’ to support many social needs are encouraged by giving associates paid time off to support such activities.”

Many Warner Electric associates also participate in local area professional chapters associated with their particular functional expertise.

Careful planning yields positive results

“Our new plant layout and continually improved production processes increases flow-through and productivity, as it reduces waste. This enables us to produce more product on shorter lead times,” said Ebling.

“An experienced and capable supply chain coupled with our visually managed material processes, enables purchased component availability under volatile customer demand. This allows us to respond to customers in hours rather than weeks,” he said.

“One of the most significant measures of our success can be found in our production ‘up-time’ and ‘productivity,’ both of which are up over 15% year over year,” Owens explained.

About Altra Industrial Motion

Altra Industrial Motion (NASDAQ:AIMC) is a leading multi-national designer, producer and marketer of a wide range of electromechanical power transmission products. The company brings together strong brands covering over 40 product lines with production facilities in nine countries.

Altra's leading brands include Boston Gear, Warner Electric, TB Wood's, Formsprag Clutch, Wichita Clutch, Industrial Clutch, Ameridrives Couplings, Kilian Manufacturing, Marland Clutch, Nuttall Gear, Bauer Gear Motor, Svendborg Brakes, Stieber Clutch, Twiflex Limited, Bibby Turboflex, Matrix International, Inertia Dynamics, Huco Dynatork, Lamiflex Couplings, Ameridrives Power Transmission, Guardian Couplings, Delroyd Worm Gear and Warner Linear. For information on any of these technology leaders, visit www.AltraMotion.com or call 815-389-3771.



An Altra Industrial Motion Company

US (Application Assistance)

800-825-9050
www.warnerelectric.com

Europe

+33 (0) 2 41 21 24 24

Asia Pacific

For a list of our AP sales offices:
www.AltraMotion.com/ContactUs