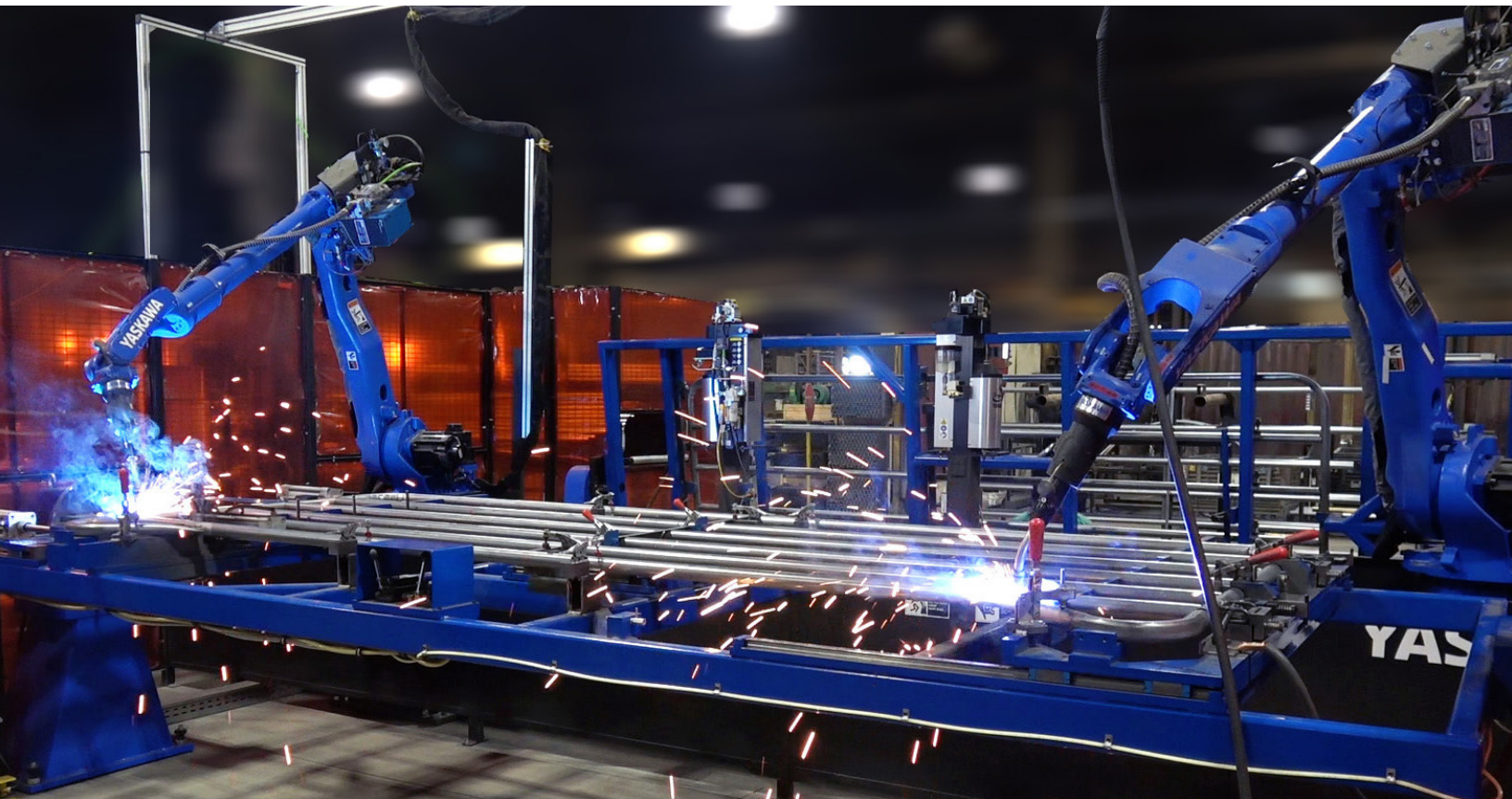


BEHLEN MANUFACTURING

STREAMLINING FLOW WITH FACTORY SIMULATION ENGINEER

Case Study



Behlen Mfg. is utilizing Factory Simulation Engineer to better configure its 900,000-square-foot facility to streamline and optimize production flow, and take advantage of emerging Industry 4.0 smart technologies.

Challenge:

Gain an understanding of how to best configure a production and assembly facility that is used by different business groups with varying processes to identify ways to optimize, streamline, and improve efficiency, productivity, and factory flow within the facility without incurring the cost of physical move iterations.

Solution:

Implement the DELMIA Factory Simulation Engineer role on the 3DEXPERIENCE platform to simulate factory flow and identify the optimal configuration.

Results:

- Scanned and created a virtual model of 900,000-square-foot facility
- Identified common uses, opportunities for collaboration across business units
- Improved collaboration across business units
- Set the stage for continually optimizing factory flow

Founded in a garage in Columbus, Nebraska, in 1936, Behlen Mfg. Co. has grown to become a world-leading metal manufacturer with diverse business units and more than 1,100 employees. Three of Behlen's business units operate out of the company's 900,000-square-foot fabrication, production, and assembly facility in Columbus. These include Behlen Country, the leading U.S. manufacturer of livestock equipment; Behlen Building Systems, a manufacturer of quality metal building systems; and the International and Diversified Products business unit, which consists of Behlen Grain Systems, Behlen Joiners (hydraulic presses), and Behlen Custom Fabrication.

Over the years, the operations of the multiple business units that utilize the massive Columbus factory have resulted in a collection of old, new, and custom-made equipment; various material stockpiles; a variety of furniture, cabinetry, and storage racks; and production lines and processes that overlap in certain areas, according to Process Engineer James Kucera, who works in the Manufacturing Engineering group. "With different operations utilizing various parts of the facility, our plant layout has become something of a hodge podge with certain jobs moving back and forth from one end of the building to the other when they could have benefitted from better flow within the factory plant layout," Kucera explains.



With this large of a facility, where we do a lot of everything with varying outcomes, we need a tool like Factory Simulation Engineer to help drive our lean principles.

— James Kucera, Process Engineer,
Manufacturing Engineering

"As we plan for the massive changes associated with Industry 4.0, we needed a solution for modeling everything in our facility that is more detailed than the 2D layouts created with AutoCAD® 2D drawing tools, so we can evaluate factory flow in a virtual model instead of engaging in time-consuming and potentially costly physical move iterations," Kucera says. "With a dedicated factory flow/plant layout solution, we can better configure our facility to take advantage of emerging Industry 4.0 smart technologies—including the Internet of Things (IoT), virtual reality (VR), robotics, cloud computing, analytics, artificial intelligence (AI), and machine learning—as well as identify cross-business unit collaborative opportunities."

As part of its effort to find a factory flow/plant layout solution, Behlen personnel attended MetalQuest Unlimited's demonstration of Factory Simulation Engineer, a role in the 3DEXPERIENCE Works business innovation portfolio, purpose-built for small and mid-size manufacturing companies. Developed by DELMIA®, this best-in-class solution runs on the cloud-based 3DEXPERIENCE® platform. Using a combination of detailed scans, 3D, 2D, and point cloud data, Factory Simulation Engineer enables manufacturers to model production facilities and simulate re-configuring of plant layouts to maximize material flow, boost productivity, and enhance collaboration. "The ultimate goal is to configure the plant in order to produce better products at lower costs, which is why we've invested in Factory Simulation Engineer."

DEALING WITH MORE THAN 80 YEARS OF CLUTTER

More than 80 years of operations at the factory, combined with the tendency of Behlen business units to grab available space whenever available, have resulted in a mixture of old and new equipment—some still being used and some not—a situation that contributes to bottlenecks that can impede factory flow. The first step in implementing the Factory Simulation Engineer role at Behlen was scanning the entire 900,000-square-foot factory to generate point cloud data, from which a virtual model is created. Kucera



The ability to simulate and understand the impact of different plant layouts on production flow with Factory Simulation Engineer is helping Behlen's multiple business units collaborate more efficiently and cost-effectively.

says the scan took a week to complete and produced more than 3 billion cloud data points.

"We've broken the data down into 56 sections in a 7-by-8 grid—each section is 210 feet by 120 feet and is made up of 700,000 cloud data points," Kucera points out. "It took a month and a half to process the data, which totals 2TBs, and we're in the process of modeling everything in the plant, including boxes, chairs, desks, tables, pallet jacks, trestles, conveyors, machines, cabinets, and trash cans, among other items. Factory Simulation Engineer provides more data granularity in our plant layout, making it easier to visualize the impact of potential configuration changes."

COORDINATING LEAN PRINCIPLES

With Factory Simulation Engineer, Behlen has laid the foundation for coordinating many of the lean manufacturing approaches that form the basis for the smart factories envisioned by Industry 4.0. Behlen will use the solution to evaluate material flows, process flows, and other types of work flows with the goal of improving efficiency and collaboration across the factory. "With this large of a facility, where we do a lot of everything with

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"One of the initial ways that we are doing that is through a commitment to standardization across all three business units and engineering groups," Kucera continues. "For example, moving forward we want all welding cabinets to be the same, and if we have the same type of equipment, such as a press, being used by two business units in two different locations, there's the opportunity to consolidate operations onto one press to become more lean."

SIMULATION DRIVES BUSINESS UNIT COLLABORATION

Instead of having the three business units fight for available space or be solely concerned with their equipment, Factory Simulation Engineer will provide a vehicle at Behlen for the different business units to collaborate more frequently and effectively—not only to improve the efficiency of their individual operations but also to uncover potential collaborative business opportunities. "The true north of all of our business units should be one common goal: Behlen's overall success," Kucera stresses.

"With Factory Simulation Engineer, we plan to have the capability to show the business units where there is commonality across their machines, equipment, and processes, and to visualize how individual moves—like bringing in new equipment or tearing out something old—will affect not just their individual operations but overall factory flow," Kucera notes. "This is critically important for driving lean principles as well as making sure that a re-configuration makes sense. For instance, one move may result in 20 related moves. With Factory Simulation Engineer, we will be able to visualize all related moves and make better decisions, and avoid situations where we need to re-configure two or three times because something was missed."