Chantland MHS robotic Fuji palletizers in final testing at Chantland's Humboldt, IA, manufacturing plant.

Robotic Palletizers

CHANTLAND MHS
Material Handling Solutions

Chantland MHS

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Key Personnel

- John DeWall, Robot/Palletizer Sales
- Gary Lynch, Technical Service Mgr.
- Jamie Flot, President
- Steve Hartmann, Project Manager

Company Profile

- Design, manufacture, and system integration of bulk, bag, package and pallet conveyors; bag, box, drum and FIBC fillers, conventional and Fuji robotic bag palletizers.
- 90,000 sq. ft. manufacturing plant.
- Established 1943.

My tour of Chantland MHS's manufacturing facility in Humboldt, IA, began at the end of the assembly process as Project Manager Steve Hartmann took us to a Chantland MHS EC171 palletizer with a FUJI-ACE robotic arm.

The EC171 was being put through its final evaluation before being disassembled and delivered to its new owner. It was the perfect object lesson for Hartmann's introduction.

"First, note the overall design of the materials and components. The robust construction may appear to be excessive, however, our systems are designed to provide years of service in some very demanding environments," he says.

Next, he noted the name-brand components: bearings, gear drives, motors, and electronic controls. Most are universally available from industrial suppliers.

"Finally, note how these components are seamlessly fitted together into a cohesive unit. What really sets us apart is what you are seeing in front of you: an entire system set up with all fabricated and outsourced components hard wired, programmed and tested," he says. ▶

Technical Service Manager Gary Lynch

"This is not for show, it is a strategic decision that ensures 100% performance before leaving our shop. This allows for quick and efficient start-up at our customer's location," says Technical Service Manager Gary Lynch.

John DeWall, robotic sales, says customers who come to the facility to witness the shop test first-hand are often "shocked that we set-up the entire system for testing."

Fabrication

In some ways, if you have seen one metal fabrication shop, you have seen most of them: shears, press brakes, welders, and computer-controlled cutters that use water and grit, laser beams, and plasma to carve plates of steel into a myriad of shapes within tolerances of a few thousandths of an inch. Chantland's fabrication equipment is no exception.

"Our standout feature is our commitment to build to a standard of high quality, not lowest price," DeWall says. As an example, he notes the structural steel framing material used to support a robotic arm.

Project Engineer Jeff Olson.

Structural steel are individually assembled by welder Jerry Gardner.

"These robots have the capacity to lift over 400 pounds with an arm's length exceeding eight feet," he explains. "Combine those forces with the turning rotational forces and you realize that it takes an extremely sturdy base to withstand the strain of moving hundreds of thousands of bags during a machine's lifetime."

At the beginning of the production line, structural and plate steel that will become part of the system is being sawed, sheared and laser cut. Some of the pieces requiring tight tolerances are directed to the machining area before merging together in the welding bays. There craftsmen knit the pieces into the steel skeletons of a palletizing system before sending it to finish coating.

"Early in our history, the owner, Al Chantland, made a fundamental decision that has served us well," Hartmann says. "He decided that it is in everyone's long-term best interest to 'build quality equipment, then back it up'. It is a choice between being lowest cost or best built. The result of that 'better built' decision is what you see here – a lot of rugged reliability."

In another section of the fabrication shop, components for the end effector are assembled. These are the "hands" that do the actual work of handling bags, boxes, pails, and large cans handled by the robot.

"By building our end effectors, we have designed tools that integrate into the entire system. The fingers on the end effectors, the rollers that move the bags into position, and the electronic controls are designed in unison to be a system that operates seamlessly," explains DeWall. "In fact, we build virtually everything in-house except the robotic arm itself, which we import from Fuji in Japan.

Cecil Rezabek assembling a bag flattener conveyor.

The PLC unit (along the lower right side) and two variable speed motor controllers communicate to operate the robotic palletizing system. Controls for the Fuji robot are self-contained.

(above) The end effector and pneumatic bag flatteners are designed and manufactured by Chantland.

(above left) John DeWall adjusts a pneumatic bag flattening conveyor prior to disassembly and shipment.

(left) Brian Baedke completes wiring of the control panel.

Control Installation

At the heart of the robotic palletizer is the A/B PLC unit and its connected components.

"The electronic challenge is for each mechanical component to be able to communicate together through the PLC," says Lynch. "Each system is different. The larger the system, the greater the number of components, the more complex the main control center that brings everything together becomes.

"While there is no limit to the complexity of a system – merging multiple bag filling lines, for example, the operator interface remains uniquely user friendly."

The touch screen mounted in the master control panel allows operators to control the entire system while watching it operate. Changing bag patterns, stack heights or compensating for differing bag sizes specific to multiple product runs takes only a few moments at the touch screen.

As soon as the steel fabrication is completed, painted, and assembled, the electrical components are totally wired and connected. Then the PLC is programmed and testing begins.

At any moment, three or four fully assembled systems are being put through their paces in an expansive assembly area. A supply of filled test bags is stacked and restacked in every possible configuration.

The PLC program is evaluated for its performance during every conceivable possibility. When glitches are sometimes uncovered, they are corrected…that is the purpose of the factory test!

When testing is complete, the system is taken apart in segments and match-marked for field installation.

"When the system arrives at a customer's location, we know it can be in operation as quickly as the installation crew can bolt the pieces into place and reconnect the wires," Lynch says. "We typically start-up a new system and train operators in their facility in less than a week."

Joe Funk, editor