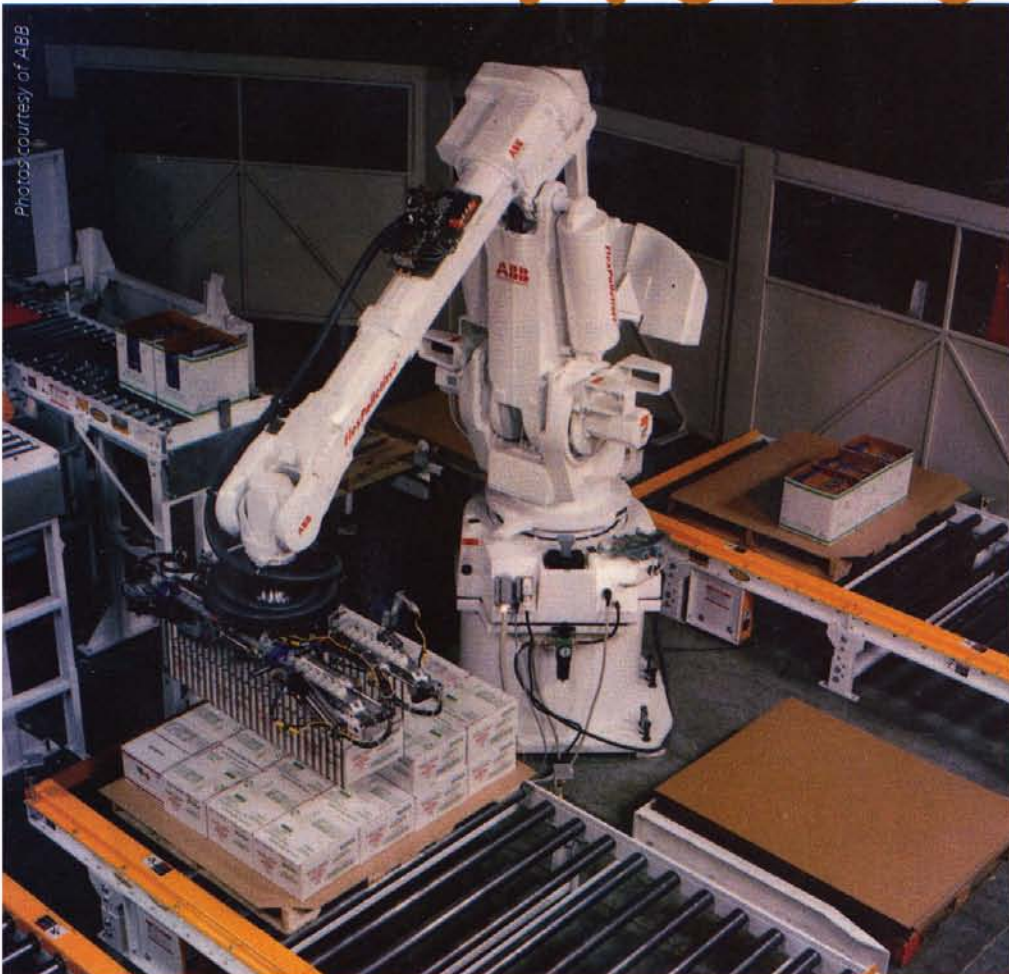


GOING ROBOTIC

Photos courtesy of ABB



Automation solutions improve productivity and reduce labor costs

By Tom Doyle and Mike Jorgensen
meat&poultry@sosland.com

Through the years, many industries have benefited tremendously from robotics and automation designed to improve manufacturing efficiency. Increased production speeds, lower direct and indirect labor costs, decreased downtime and overall improved productivity can all be direct results of properly designed and implemented automation.

As the cost of automation solutions continues to drop and the reliability issues of the past have been erased, more processors are realizing the benefits. Whether a processing plant is already using robotics or other highly automated equipment and systems, or just researching the possibilities,

there are a few simple considerations to keep in mind.

Building a collaboration

There are many different automation solutions and paths to choose from depending on the area of the plant and the goals. To ensure a facility selects a proper solution to meet its operating goals, it is important to work with a reputable, highly skilled engineering firm, integrator or equipment manufacturer.

First, determine whether they have experience with the type of automation being considered and a solid understanding of the industry where the technology would be applied. The

wrong automation applied to a problem, failure to match the cost of the solution to the savings expected, and other mistakes can result in expensive lessons. Whether considering an automated case packer or a robotic palletizer, the engineering firm, integrator or equipment manufacturer needs to have solid, in-house control.

Next, evaluate the professional background of the potential partners. Explore what expertise they have on hand. A full-service integrator should have experts on staff in many areas such as mechanical engineering, tooling and machine design and software controls engineering. When considering a robotic palletizer for example,

An R.P.L.S. incorporates visioning technology and accurately recognizes the position and orientation of portions on the conveyor.

a full risk assessment is required to ensure a safe implementation. Also, a full-service firm should have the expertise not only in designing the automated solution, but also should be able to fully support the implementation. Make sure the firm understands the opportunity and appropriately gauges the solution, including the costs, savings and other intangibles.

Maintenance is another, often overlooked consideration. A reliable automation solutions provider will assess a plant's maintenance capabilities, as well as provide training and support after startup. No business can afford to shut down for excessive maintenance, so it's important to investigate the services the integrator offers. For example, what kind of 24-hour support is available? Web support may not be enough to address a meat processor's needs should something major occur. Instead, look for partners that offer 24-hour, live support, where a service engineer is on call.

The right stuff

Many different robotic and automation solutions are already available. A great deal of individual automated equipment solutions have been developed, from specially designed slaughtering equipment to case packers to robotic palletizers and automatic guided vehicles. The greatest push these days is to automate the final packaging and palletizing areas using robots or other highly automated equipment. Leading edge solutions are moving into wash-down areas and providing direct-contact automated solutions.

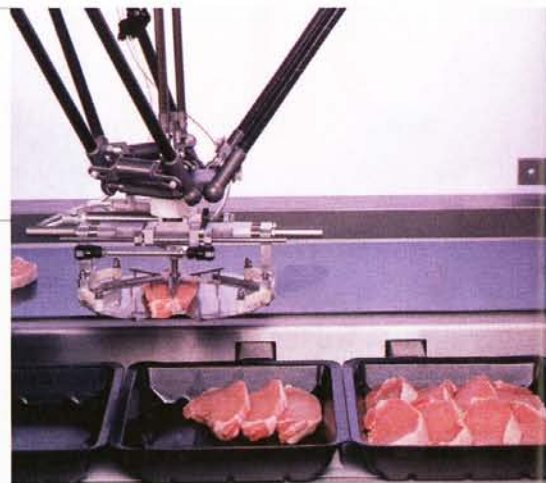
Engineers are also focusing on integrating processing lines, eliminating "islands" of automation. Coupled with this are improved data

collection and management systems. Human-machine interfaces have improved while H.M.I.s offer lower skill level access and control on one end, Integration improves the linkage and management of the overall line operation when used with the right programming and software.

The goal is to improve line performance and line management.

When it comes to working with an automation-robotics solutions provider, plant officials should ask the following questions before making purchasing decisions:

- What equipment solutions do they offer for this type of opportunity?
- What is the general cost and time frame for implementation, as well as the risks?
- Does the equipment meet U.S. Dept. of Agriculture standards?
- Will the solution work seamlessly with the plant's existing automated applications? This is very important because many plants don't integrate robotics and automation throughout, but rather piecemeal them together as they go. Solution providers with a strong controls background will design a plan to reduce bottlenecks and increase efficiencies.
- Does the solution aid in improving existing operations? If the design doesn't demonstrate the improvements to current operating procedures, a plant runs the risk of not getting the return on its investment.
- What materials are used to construct the equipment? Robots and automated equipment can be costly. To withstand the harsh environments and washdown environments of meat packing facilities, the equip-



ment should be manufactured out of materials that withstand high-pressure washdowns and chemicals. The electrical enclosures need to be NEMA 4/4X rated.

- Can equipment be located cost effectively for areas where there are not washdown conditions to minimize capital cost?
- Does the basic design provide a solid backbone to build on in the future? While a SCADA or MES may not be justifiable right now, the solution should be readily expandable.

Robotic options

Throughout history, technology has played a key role in enhancing the manufacturing process. Within the meat packaging industry, many new technologies are available to plants.

As the demand rises for convenience packaging in all shapes and sizes, line speeds increase and product life cycles shorten, the packaging line can benefit from the use of automation and robotics. Today's robotic technology offers solutions for product sorting, wrapping, stacking, packing and palletizing.

When product needs to be moved quickly and precisely, one at a time, robotic pickers are a valuable option for the meat and poultry industry. Designed with vision capabilities, some the more effective robotic pickers use visioning technology to locate product and perform inspections for defects. For example, if a piece of chicken is

defective or out of spec, pickers can be programmed to sort them out.

Automated picking equipment can increase throughput, with some able to perform up to 120 picking cycles per minute. Robot travel times also impact speeds. The use of robotics for packaged product handling is common in the United States and Europe. The direct handling of raw food products by machines is gaining acceptance in the United States, while it is much more common in Europe.

A robotic portion-loading system (R.P.L.S.) is a new option to the meat processing industry. It can pick single, fresh or frozen, bone-in or boneless meat portions or sliced, cooked meats from a portioning slicer, saw or conveyor and place them on trays or thermoformers, ready for packaging.

An R.P.L.S. incorporates visioning technology and accurately recognizes the position and orientation of portions on the conveyor, enabling its mechanical action gripper to lift, transfer and place the portion into its container.

Over the years, palletizing has seen many changes. The constant change in packaging design and size, coupled with the need for multiple cell applications, are well within the capabilities of robots because of their ability to palletize varying sizes and shapes of products. Robots are designed to handle the need to change pallet-loading patterns on the fly. With hard automation, this can be a huge undertaking, but with a robot, it's simply a matter of adjusting the programming.

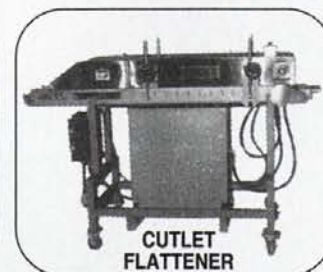
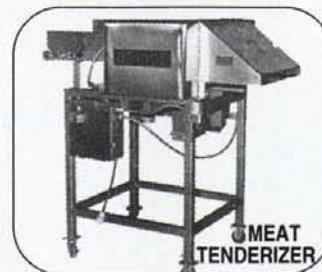
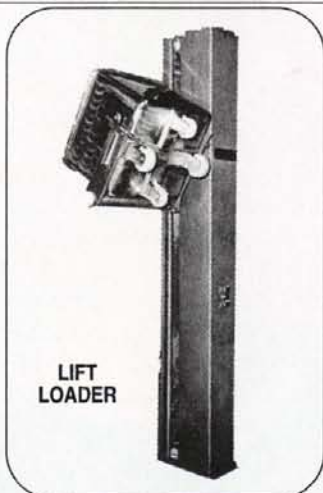
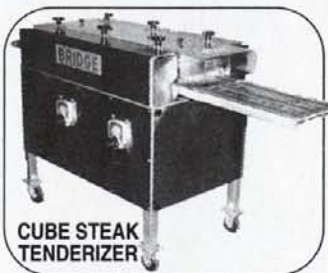
Palletizing is undergoing a paradigm shift in thinking. Traditionally used in European manufacturing processes,

the partnering of A.G.V.s and robot-based systems in a cell for a particular purpose, such as palletizing, creates a new set of efficiencies. By adding an A.G.V. to the palletizing processes, plants can eliminate pallet conveyors, reduce labor costs, increase plant floor safety and eliminate product and conveyor damage caused by human error.

Improved productivity

One of the many benefits to incorporating robotics and automation into meat packing plants is the reduction in labor costs. It's not just a matter of eliminating full-time positions, but reducing the number of on-the-job injuries caused by standing, lifting and repetitive motion. According to OSHA, back strain comes in a close second to the common cold for missed workdays. Unlike humans,

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robots don't experience aches, pains and strains from lifting heavy loads, or suffer from standing for long periods of time hunched over and performing the same task over and over.

In addition to reduced workplace injury risk, plants can also save on traditional labor costs. Because of the physical demands associated with labor in meat packing plant, it can be difficult to find employees. By incorporating robotics and automation, with many of the cell layouts, fewer employees are needed in those areas.

No matter the end product, the ability to make a profit is based on two defining things: whether a company can keep its labor costs down, thereby reducing its overhead, and whether it can increase throughput. Overall equipment efficiency is another key parameter to consider.

The proper balance in the line should ensure goals are achieved. Good design and accounting for downtime, surges and accumulation are all ways to make a higher performing line.

Before entering into automation and robotics, it's important a plant looks at its current operation and sets goals. These goals will help an architectural engineer or integrator develop a plan to meet the plant's expectations. It also gives the plant an opportunity to determine if the solution will truly improve its current operations.

A proper and well thought out automated solution can improve an operation within any typical payback requirements. Whether a company is building a new plant or adding automation to an existing area in a facility, by working with a qualified solution provider, it will gain a bet-

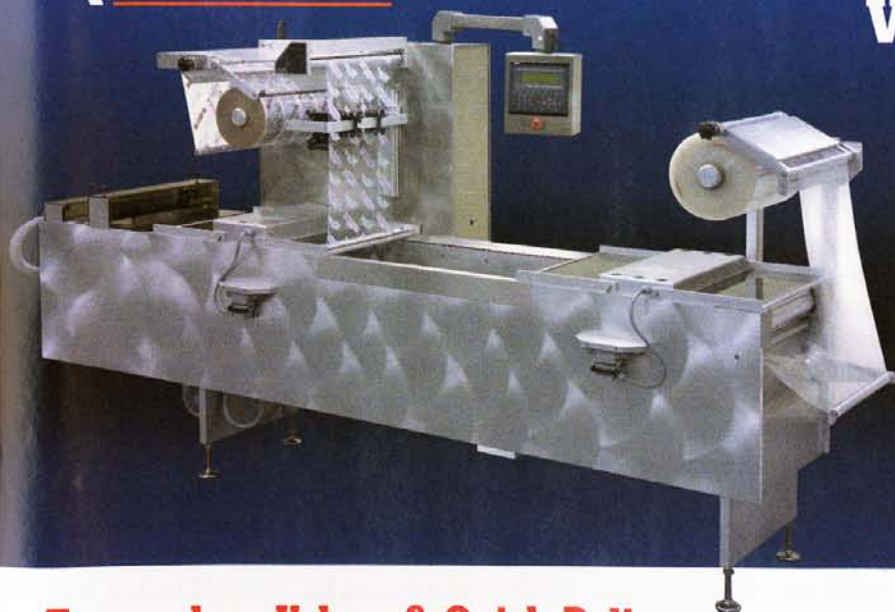
ter understanding of how automation and robotics can work to achieve optimum manufacturing process results. **M&P**

Tom Doyle, P.E., is the president of QComp Technologies, Inc., a robotics integrator providing automation solutions for a variety of industries. The company designs and builds automated robotic manufacturing cells, A.G.V.s and material handling systems.

Mike Jorgensen, is a project manager with POWER Engineers, an architectural and engineering firm with full food capabilities, including specialization in automation and controls integration.

We would like to hear from you— your comments and questions about this article are welcome. E-mail the author at: meat&poultry@sosland.com

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