Trends in Material Handling

Bruce Tompkins, Principal/Operations, and Darrell Krasoski, Principal/Integration, Tompkins Associates, Raleigh, NC

The industry is responding to manufacturer demands for equipment that is less complex, but smarter, requires less maintenance and is more cost-effective.

Today's economy requires that every investment a company makes yields a quicker ROI than ever before. As manufacturers replace and upgrade material handling equip-ment, they are looking for solutions that can meet this requirement. The material handling industry is responding with new equipment, technology and systems that enable complete supply chain "visibility."

Equipment solutions

Sortation systems are used in distribution centers and warehouses attached to manufacturing facilities. They organize mixed products for dispatching to specific storage zones, palletized in specific unit-load configurations or routed to specific dock doors for shipping. High-speed sorters, common in distribution centers, are designed to be quicker, quieter and easier to maintain.

There are also new-design, mid-range capacity, split-belt sorters being used where loads and rates are below the economic range of high-speed sorters. These new sorters often allow several units to be employed in areas where manual sortation was traditionally used.

Lift truck manufacturers have also developed new technologies. One innovation is the AC-motor-driven truck. While these are slightly more expensive initially, extra value is provided by superior acceleration and higher lift speeds, which can mean fewer vehicles and fewer drivers, thus a better ROI.

According to one maker, by eliminating the requirement for drive and lift motor brushes, AC technology reduces service requirements and parts costs. Cooler-running AC motors also minimize heat-related issues with wiring, bearings and brakes. It is anticipated that there is an average savings of $400 to $450 per year in maintenance per vehicle, as well as more uptime.

Manufacturers of conveyor systems are also listening to these needs. A rapidly emerging technology in the live-roller conveyor arena is the 24-volt motorized drive roller (MDR) conveyor. MDR retains most of the positive features of line-shaft or belt-driven live rollers, but adds a number of unique advantages. Instead of a conventional gear-motor drive with a rotating shaft or belt driving a long conveyor, a 24-volt DC motor located inside the roller drives the zones of the conveyor. This allows for a high degree of flexibility and modularity in conveyor design. The plug and play zones make inserting a divert, merge or other module much easier than conventional designs. The MDR's per-ft. cost is somewhat higher than conventional conveyor, but it is a safe design. Each zone can be stopped safely with a bare hand; no emergency pull cords or e-stops are needed.

There is also reduced wiring cost and simplified diagnostics incorporated into the controls. A major cost savings is the reduction of electrical power to run the units.

Also, facilities using MDR conveyors show significant drops in the noise level (as low as 65 dba), a positive ergonomic feature.

Technology solutions

In the past, many considered material handling control systems simply a collection of mechanical and control devices that cause objects to be moved from one place to another within the walls of a manufacturing, warehouse or distribution facility. They were often treated as an inconvenient necessity simply conveyor or sorter controls rather than a competitive opportunity.

Particularly in manufacturing, material handling equipment and its controls were often isolated or scattered in what many referred to as "islands of automation." The "islands" were usually not linked to one another or a company's upper-level software. If they were linked, they usually had separate interfaces, or connections to that upper-level decision-making software. By necessity, each link was a separately created custom interface; there was no coordinated approach, no consistency and, likely, no visibility.

Today, more advanced material handling control systems provide an interface between equipment and upper-level software applications. They facilitate the exchange of information and data between material handling equipment with their data-rich controls to the upper level software systems usually a warehouse management system (WMS), manufacturing execution system (MES) and/or a legacy host system as a seamless operation. These more-advanced material handling control systems are often called warehouse control systems (WCS).

Some WCSs provide a single point of interface with the upper-level systems, coordinating all the otherwise separately required interfaces within their software. One, the Tompkins Control System, integrates WMS and real-time control of all equipment in the supply chain.

WCSs can be considered the middleware link or the glue between the floor automation and the decision-making upper-level software. The floor automation encompasses many components: bar-code scanners, vision systems, scales, label print and apply systems as well as traditional material handling controllers that control conveyors, sorters, AS/RSs, carousels, AGVSs and other material handling sub-systems. Architected and configured correctly, these WCSs can bridge operational gaps in and between organizations and customers/suppliers providing real-time data to speed up processes, information and delivery.

Technological advancements such as voice-recognition systems are steadily gaining in popularity, as many industries are beginning to use these systems effectively. In the manufacturing environment, voice-recognition systems can provide increased productivity and reduced picking errors while picking parts for a kit or assembly, or in the warehouse picking parts for orders. The hands-free communication that voice-recognition systems allow provides the operators direct communication with a computer via a headset. Operators are able to keep both hands on the equipment they are operating while receiving instructions from the computer, resulting in a safer working environment.

But because of their cost, voice-recognition systems must be evaluated carefully. For example, they may not function properly in a facility where the noise level is too high. As the technology matures, however, and concerns about accuracy and cost are solved, the value of hands-free communication technology is expected to grow.

Supply chain visibility

The concept of supply chain visibility has been gaining momentum as more manufacturers learn the value of looking at the entire supply chain. Optimizing performance within the manufacturing operation is no longer enough to generate the level of cost reduction and quality improvements needed to remain competitive. As new technology becomes available, companies are looking for systems that connect with each other and with other systems for greater visibility throughout the supply chain and for information sharing.

The greatest impact of this advance in manufacturing is in industries such as retail and pharmaceuticals because uptime and responsiveness are critical. Manufacturers need a faster, more accurate flow of information for processing and handling systems, both on the factory and on warehouse floors. These systems then must be interconnected to communicate to higher-level information systems such as WMSs and transportation management systems (TMS). These systems will tell customers and suppliers the status of their parts and materials in real time. Decision-making will also be pushed down to the factory and warehouse floors, as the equipment has the increased ability to talk to each other. This provides decision makers greater insight into the true status of their processes so adjustments to schedules, manpower and other resources can be made proactively instead of reactively. It also will automate the communication process when machines are communicating directly with each other and adjusting processes as needed in real-time.

For example, a conveyor system may have unplanned downtime that will delay shipment of parts by an hour. If those parts are being delivered just in time to another factory, this information can be communicated upstream and adjustments to schedules made to eliminate downtime in the upstream process. In addition, the expectations for speed and lead-time reduction in manufacturing will continue to increase as lean concepts and technology improvements gain widespread use. With reduced lead-time comes the need to react faster and communicate quickly and accurately when things change.

As newer technology becomes available, expectations of speed and accuracy are heightened. This increases the need for equipment that is flexible and that can communicate in real-time, allowing for upstream and downstream communication, and as a result, greater ROI for the whole. The manufacturing sector is increasingly seeing WMS and TMS linked to each other and to higher level systems and material handling control systems that link equipment and software, including traditional program logic controllers (PLCs) and PC-based controllers. Most of these systems can be linked into existing technology.

Today's material handling systems combine complex machinery and information technology that can facilitate value-added operations and contribute to supply-chain excellence. Systems need to be carefully integrated with one another and with other parts of operations. Also, both information technology and physical systems have to be flexible, scalable and easily updated.

Tompkins Associates is a global leader in providing Total Supply Chain Solutions through operations consulting, technology implementation and integration. The company provides end-to-end supply-chain solutions that enable its clients to increase profits and reduce costs. Headquartered in Raleigh, NC, Tompkins

Associates has offices throughout the U.S. and in the UK, Canada, Mexico and Australia.

Source URL (retrieved on *09/02/2014 - 3:14am*):
http://www.impomag.com/articles/2003/01/trends-material-handling?qt-most_popular=0&qt-recent_content=1