



THE MANAGEMENT OF MOTION™



WHITE PAPER

What is New in Distribution and Warehousing

Diverse material handling automation in the distribution and warehouse environment is starting to pick up steam, taking a cue from manufacturing best practices.

Labor issues in distribution and warehousing have been a primary concern in evaluating the application of material handling automation. In some cases, especially in multi-shift operations, the labor is excessive, expensive, and sometimes inefficient. The location of the distribution center or warehouse is another critical factor. Often, the best place to locate a distribution center (DC) or warehouse is where the land is the cheapest. Because these areas often experience very thin labor pools and resources, automation becomes an easier decision.

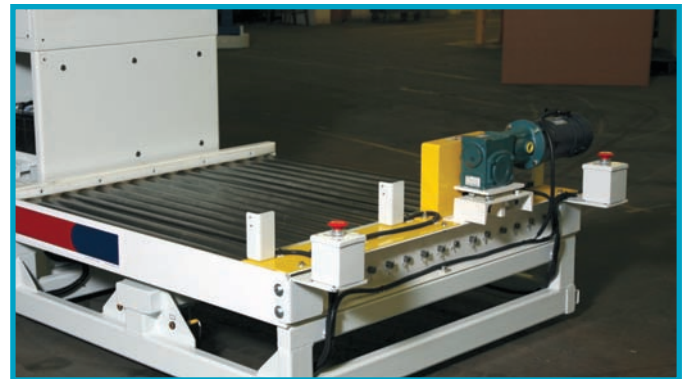
There are certain types and levels of automation that have existed in DCs and warehouses for some time. Many facilities have a type of conveyance system along with high speed sorters. Depending on the business model and the process, the conveyor system can be linked to a high density storage system such as an Automatic Storage/Retrieval System (AS/RS) or carousel configuration. Weighing, labeling, quality checks and packaging can also be accomplished with varying degrees of automated systems.

The Last Frontier

The advent of Automated Guided Vehicles (AGVs) and Automated Guided Carts (AGCs) has begun in distribution and warehousing in the last couple of years. Fork style AGVs are now able to mimic what a manual fork truck can do, without a driver. They can move a load from point to point, in and out of racks, and they can load and unload a semi trailer in a designated pattern of choice. Dual fork AGVs can move two loads at a time for increased throughput.

AGCs have their own place in DCs and warehouses, often known as the “little brothers” of AGVs. AGCs are not as robust, nor do they have as high of a load carrying capacity. However, AGCs have carved out a niche in warehouse and distribution center applications where AGVs do not have a favorable ROI and are considered overkill to the application.

AGCs are perfect for the long, repetitive “milk runs” that are often an inefficient use of labor. They also can be used in picking zones or even to haul trash to a bailer. And AGCs can be set up with numerous types of fixtures to accommodate many tasks. The top of an AGC could have a power roll bed, a bin, or a scissor lift — depending on



what the task calls for. Some AGCs have forks as well for simpler pallet moves. AGCs can also be used as “tuggers” to tow a series of carts behind. In summary, there is usually an application for AGCs in most facilities if one thinks outside the box of traditional material handling.

The Path to Productivity

For years the guide path for AGVs was predominantly a conductive wire embedded in the facility floor. This method was very time consuming and expensive to install as floors had to be saw cut. System flexibility was also constricted because changes to the guide path were not easy to make.

The sophistication and flexibility of guidance systems in the last 5-10 years has essentially led to a rebirth of AGV applications. Laser guided and inertial guided vehicles systems have supplanted wire guidance in most recent installations. Laser guided systems require a laser unit mounted on the vehicle to read targets that are strategically placed in the DC to achieve positive positioning. The inertial guided systems operate in a “dead reckoning”



mode similar to a military missile. An on-board GPS interacts with a host computer for positive positioning. In either case, the system remains flexible for changes and there are less physical intrusions to the facility.

AGCs operate with less sophisticated guidance methods than most AGVs. A common guidance method is using a magnetic tape that is adhered to the facility floor along the intended path. There is a magnetic device on the underside of the vehicles that allow the path to be followed. The tape is relatively simple to install and changes to the path are quick and easy. The latest AGC guidance system to hit the market is a vision system utilizing a series of stereo cameras to record the environment as the vehicle navigates along its pre-trained, target free path. It looks like the Jetsons are closer to reality than we once thought.

Can We Talk?

Well, yes we can. Advancements in guided vehicle technologies have also proliferated communications between the vehicles and the computers controlling the distribution center functions.

Most AGV vehicles today are equipped with an on-board computer control device of some type. These devices accurately monitor the intended path of each vehicle in the distribution center. Where multi-vehicle systems exist, there are various software programs available that provide real-time control and monitoring. These programs can route vehicles from various locations to programmed destinations, monitor vehicle status and program status. The vehicle control programs can also integrate with various Warehouse Management Systems (WMS) packages, whether they are custom created or an off the shelf package.



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The control of AGCs, on the other hand, is largely limited to programming the guide path. However, there is emerging technology that will allow AGCs to communicate with a WMS, similar to AGVs. Guide path programming of the AGCs is usually Windows-based software, allowing changes to be easily made by the end user on a PC who has received some basic training. The facility needs to have a wireless transmitter in place to allow the AGCs to receive programming instructions from the PC. By design, the control of AGC vehicles is less complex than that of an AGV so that they will always have a niche in DC applications, respective to price and purpose.

The Compelling Reason

Choosing automation ultimately comes down to the return on investment (ROI). There are cases for automation in single shift operations, but the low hanging fruit resides in two and three shift operations. Labor is the obvious factor in looking at ROI for automation, but other ancillary factors exist — quality, injuries, inefficiencies, lost time, product damage, semi trailer damage, insurance costs and accuracy to name a few. AGVs can cost on the average from the high five figure range to the low six figure range per unit depending on what they are equipped with. There are additional system costs for hardware, software, and programming. The more vehicles in a system and the more complex the moves, the higher the system cost will be.

AGCs can start in the high four figures for a very basic unit. More sophisticated AGCs can cost upward of mid five figures. The installation and programming is fairly easy and cost effective. The facility staff will usually be trained in a short period of time to program and run the system and even perform the installation and subsequent changes.

Is automation for everyone? No. However, if DC facility and warehouse managers and engineers think beyond the existing operations paradigm, they may realize more opportunities and applications for automation than they ever considered.

About AHS

AHS is a full-service provider of supply chain solutions that helps streamline processes, improve employee productivity, and increase return on investment. AHS is uniquely equipped with multiple divisions to provide the complete spectrum of products and services to develop the best solutions for our clients. Whether re-designing an existing distribution center, building a new facility, or simply updating equipment, AHS can assist you with any project.