



## white paper

# The Changing Role of Maintenance in High-Speed Distribution Centers Resident Maintenance Programs Gaining Popularity as DCs Become More Automated

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Creating Logistics Results



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# Optimizing Sortation Throughput in High-Volume Distribution Centers

## Introduction

The management of maintenance functions in automated distribution centers, and particularly those DCs with high-speed, high-volume equipment is changing. Where once material handling equipment maintenance was done almost exclusively with in-house maintenance staff, today's highly automated DCs are now gradually shifting to the use of outsourced resident contractors to perform complete maintenance functions for the distribution center. While DCs traditionally have hired maintenance contractors and temporary employees for peak and specialized services, the concept of resident outsourcing represents a long-term, results-oriented relationship with a specialized outside company performing turnkey maintenance functions that traditionally were done by the DC's inside staff.

Resident maintenance programs provide distribution centers with on-site mechanical and/or electrical technicians who perform preventive, corrective and emergency maintenance, as well as operational assistance to ensure the material handling system functions at optimum efficiency. These programs have proven effective at increasing performance and extend the life of automated, high-performance DCs.

There are several reasons influencing this change to resident maintenance programs. The most critical is the desire to optimize system uptime. This requires a more comprehensive and systemized approach to maintenance than typically in place at many DCs. Additionally, as equipment becomes more automated and therefore sophisticated, the need for more technically specialized personnel, which the DC would not necessarily have on staff, becomes an issue. The increasing turnover rate of distribution center employees is also a factor, along with increased initiatives by senior management for distribution centers to become more accountable for key performance indicators (KPIs) and functioning more cost-effectively. Finally, the increasing desire to extend the life of the distribution center's capital equipment to reduce cost of ownership for the DC.





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## Maintenance Staffing Challenges

Ten years ago, material handling systems in distribution centers were mostly mechanically based. While there is still a strong mechanical component, today's high-speed, automated systems are much more dependent upon controls and software to operate these systems. The increased system complexity requires software and automation technicians with skill sets not traditionally found in its maintenance personnel.

Even non-specialized personnel require more extensive training on the high-controls-content equipment, such as operating an AS/RS (Automated Storage and Retrieval System), than with the more mechanical-based DCs. This has ushered in a new set of staffing problems for automated DCs. According to Rider & Associates, a supply chain consulting firm, a typical automated distribution center will experience employee turnover rates of between 50 and 60 percent per year. Employee turnover is expensive, with costs typically averaging 25 percent of a worker's annual salary. These costs factor into recruiting, selection, training and lost productivity expenses.

If the DC's automated system was installed more than three years ago, it's likely no personnel remain that were there during the initial equipment training. Keeping personnel trained on the material handling equipment has effectively become a continual process for DC managers.

## Higher Expectations for System Uptime and Longevity

The primary reason to perform maintenance on a DC's equipment is to prevent costly, unplanned shutdowns and maximize the life of the equipment. If the equipment fails, product can't get out the door. The costs of the equipment repair and the lost employee time are marginal compared to the loss of throughput, which in a high-volume DC could be as high as 20,000 cases per hour not processed because of a shutdown. Much of this can be eliminated with proper equipment maintenance.

Corporations are increasingly viewing their DC operations from a performance versus cost standpoint. Establishment and monitoring of key performance indicators (KPIs) for main-





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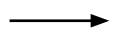
tenance, safety and system uptime within the distribution environment has taken on a whole new perspective with an eye toward maximum output, optimum equipment utilization and system longevity. Such metrics are monitored on a daily scorecard and used to measure current DC performance and to plan and adjust for future operations. The implementation of measurable KPIs for best practices and safety, security, and compliance regulations, as well as complex maintenance, repair, and overhaul (MRO) strategies is a structural component of resident maintenance programs.

Many DCs, though, take the “Don’t fix it until it breaks” approach. They will reduce the maintenance staff and run the system until it tears apart and breaks down, then fix it, and run it again until it breaks down. While this continuing cycle may save initially on reduced maintenance manning and short term spare parts costs, it negatively impacts the DC with unscheduled and uncertain stoppages and reduced system longevity.

Being able to locate potential problems and inefficiencies that would lead to reduced performance and degenerative operation ahead of time as well as scheduling proper preventative maintenance routines is critical. Running a high volume of cartons through a DC at a high velocity creates increased wear and tear on the system. These wearing forces can go unrecognized by a DC’s operational staff until the system’s throughput slows or begins to break down. This criteria itself is frequently the degenerating maintenance variable most missing with DC facility managers.

Without retrofit or equipment replacement, as a high-volume DC’s equipment ages its performance expectations diminish. The standard life span of conveying equipment running at high speed for 15 hours a day without proper maintenance is roughly seven years. After that period, conveyors and sortation equipment typically have to be retrofitted before lessened performance becomes a significant issue.

But high-volume, highly-automated conveying and sortation equipment can be maintained to run efficiently for much longer periods of time before the need for upgrade, and thereby reducing the total cost of ownership. It is not unusual for high-speed material handling systems to run for more than a dozen years in operation and still be going at 100 percent functionality. This necessitates, however, a very organized and comprehensive protocol at providing





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preventative, corrective and emergency maintenance on the equipment, a regimen that few distribution centers perform adequately.

The median uptime for highly-automated DCs is in the 93 to 94 percent range. This is no match, however, for distribution centers running rigorous pro-active resident maintenance campaigns with uptimes of 98 to 99-plus percent. Resident maintenance programs have proved extremely successful with increasing uptime, reducing the need for costly spare parts and significantly extending the life of DC systems, and ultimately reducing capital expenditures for new equipment.

### Profile of a Top-Tier DC Resident Maintenance Program

One of these programs is Dematic's resident maintenance program. Dematic is the largest manufacturer of material handling equipment in the world, with many high-speed, high-volume DCs using its resident maintenance program. A closer look at how its program is set up would present a clear insight into the functionality of these programs at a top-tier level.

Completely opposite to the "Don't fix it until it breaks" maintenance mode is Dematic's multi-layered approach to proactive maintenance. The multiplicity of the program's scheduled maintenance procedures and performance indexes cover every aspect of a functioning distribution center. The program integrates: (a) maintenance techniques and methodologies for state-of-the-art preventive maintenance; (b) a protocol for continuous improvements to be made on the system; (c) a predictive maintenance regimen; (d) determination and management of maintenance key performance indicators; (e) monitoring of crucial maintenance strategy elements such as spare parts management and control, maintenance control systems, documentation systems, administrative structures and maintenance team structures; (f) failure modes and effects analysis; and (g) corrective and troubleshooting maintenance actions. These overlapping functions ensure optimal operation of the material handling system and maximum system life.

Not all resident maintenance programs are alike, each has characteristics which give it a unique approach to resident maintenance. Because Dematic is both an equipment integra-





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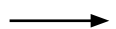
tor and manufacturer, it brings an OEM engineering insight into the mechanics of its installed operating systems as well as individual equipment functionality. The company has a huge installed base of its equipment within distribution centers and it keeps all of this information available in database format for every system. Technicians can access and evaluate any system's complete service history and makeup.

Dematic also maintains best practice libraries encompassing the company's entire installed base. It continually tracks maintenance trends developing in any service area of its systems through database entries. This allows its technicians to uncover and identify potential issues with a system even before they arise and can be addressed with preventive maintenance, if required. When corrected at an early stage, it prevents the need for emergency corrective maintenance later which could influence the uptime of the system. The result is savings in both time and money for the distribution center.

"Having technicians that are equipped with a strong general knowledge of material handling systems, as well as those possessing specialized skills in particular technical areas like software and automation operation is critical," says J. Scott Filgis, a resident maintenance site manager with Dematic. "This means that service personnel will understand the intricacies of any system's problem and will be able to provide a solution that fits into the scope of each DC's operation, whether it is Dematic's equipment or another material handling system. Also, because most of our DCs have Dematic systems, when we have a more complex system problem we have direct access to the people that initially commissioned the project, such as the engineers that designed it or the technicians that installed it."

"Resident maintenance functions encompass everything from mechanical to IT items," explains Filgis. "Replacing bearings in rollers, handling motors and reducers, electrical troubleshooting, changing the timing of diverters, troubleshooting variable frequency drives and reprogramming software. We also modify the system to enhance it, should a DC request this service. If a distribution center decides they want a different kind of functionality, then we can build that function into their system on site."

Dematic's system uses a maintenance and asset management software program that schedules all preventative maintenance, tracks breakdown maintenance and keeps inventory





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control of spare parts. It organizes and tracks equipment inventories, schedules preventative maintenance tasks, tracks motor run times, manages equipment costs, tracks equipment history, maintains labor records, generates work orders and a host of other reports.

When a system has a problem, defining where the problem lies can be a challenge. Dematic uses a graphic visualization program to tell technicians exactly where the problem is located. System manuals, including all of the parts for the equipment, are displayed on the visualization. It is a very efficient resource to identify where problem is located and finding the right part to resolve it.

Dematic maintenance technicians also provide hands-on training to a distribution center's operational staff. As DC personnel change frequently, this is usually an on-going program.

As a complement to its resident maintenance program for material handling systems, Dematic also provides resident facility maintenance, handling functions like dock locks, lighting, and heating and ventilation. Once maintenance technicians are permanently on site servicing the material handling system, many DCs see it as a natural and efficient move to leverage these assets for facility maintenance, which is indeed a growing trend within the more highly automated distribution centers.

For Dematic's resident maintenance program, the results have been very favorable. It is consistently achieving system uptimes of 98 to 99-plus percent – meaning that the system is running with no unexpected system downs due to maintenance issues. It also has a very high renewal for its resident maintenance sites.

### Maximizing a DC's Performance

Such a program has tremendous flexibility. It can be customized depending on the sophistication of the material handling system, or on the location, or it can be customized to accommodate different operational schedules – some clients might run 20 hours per day, seven days a week, others might run one shift five days a week. The program can be customized to accommodate a busy season where there would be a need for increased staffing. It can be customized to focus just on the maintenance of the material handling system, or it may in-



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clude the DC management or even the duties of facility-type maintenance. It can be customized to include different skill sets for technicians. Each distribution center has its own unique needs, and a resident maintenance program can be tailored to meet those needs – servicing both a manufacturer’s own equipment and third-party equipment.

## Conclusion

A well structured resident maintenance program can yield huge benefits for a distribution facility, such as: (a) flexible staffing as operational requirements change for peak seasons; (b) optimized uptime; (c) cost reductions through increased productivity and reduction in overall system maintenance costs; (d) dedicated maintenance staffing resources focusing on the material handling system; (e) improved equipment safety because of regular maintenance; (f) reduced parts consumption due to maximization of equipment life spans; (g) increased equipment longevity - a well prepared and executed maintenance program reduces the possibility of emergency or unscheduled maintenance and provides investment protection. Each of these help reduce the cost of ownership.

Not all distribution centers have automated systems. But for those that do, the focus on a comprehensive predictive maintenance strategy is critical to a truly efficient operating facility. But even better, a well-prepared and properly staffed resident maintenance program provides the highest possibility to optimize a distribution center’s performance.

## About Dematic

Dematic Corp is the world’s leading supplier of logistics automation solutions, systems and service. Dematic provides integrated material handling solutions that incorporate process improvements, material flow technologies, controls, and software to reduce operational costs, maximize productivity, and optimize supply chain performance.

For over 70 years, Dematic has proven to be a competent single source supplier that engineers, manufactures, implements and supports the core material handling technologies required to operate effective logistics solutions.

A global company with operations in 22 countries, Dematic’s North American presence includes an engineering/manufacturing headquarters in Grand Rapids, Michigan, and 18 sales/engineering/service offices. Prior to adopting the Dematic name, the company was known as Rapistan. For more Dematic information, visit [www.dematic.us](http://www.dematic.us).

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