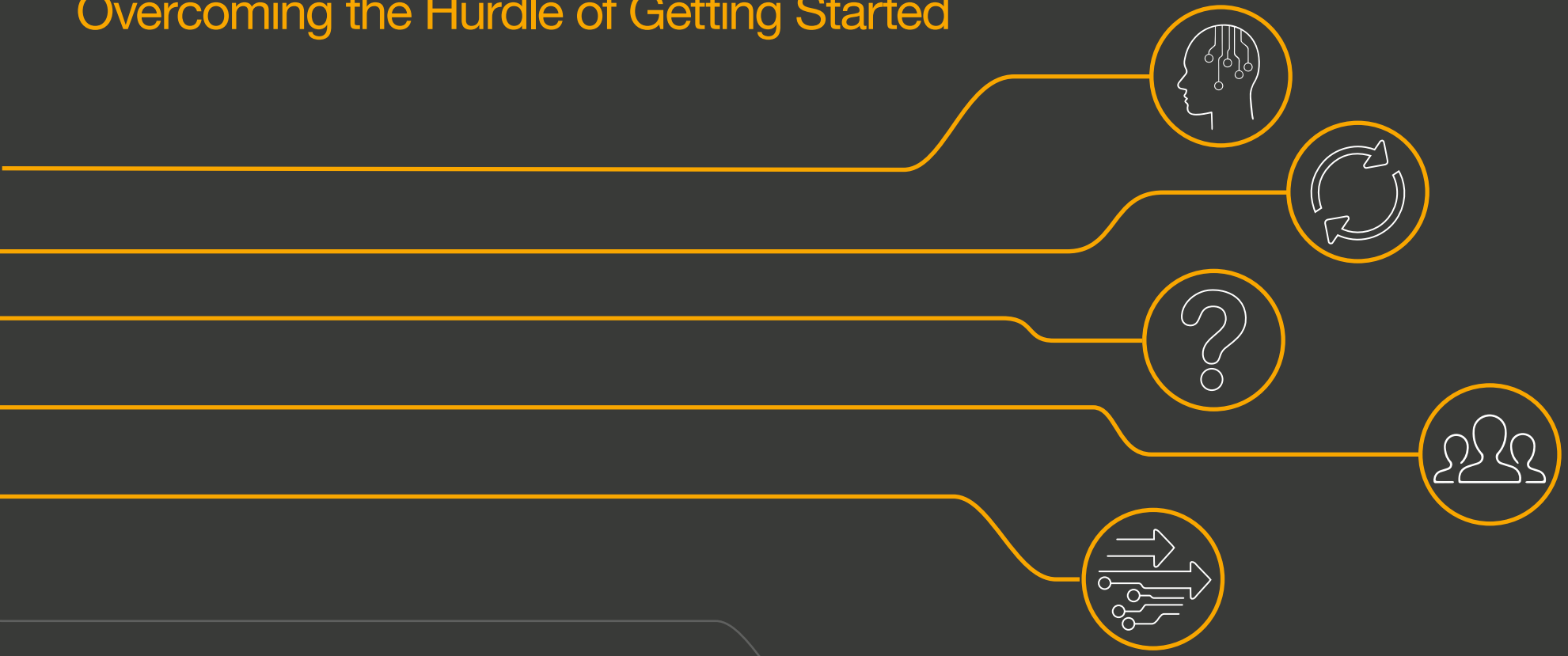
The Time to Automate Is Now

Overcoming the Hurdle of Getting Started



Introduction

Sometimes just getting started with automation can be the hardest step in a company's warehouse automation journey. Understandably, there is reason to hesitate, investigate and authenticate before purchasing and integrating any new automation technology. The stories of false starts and overhyped benefits can make the decision even more difficult.

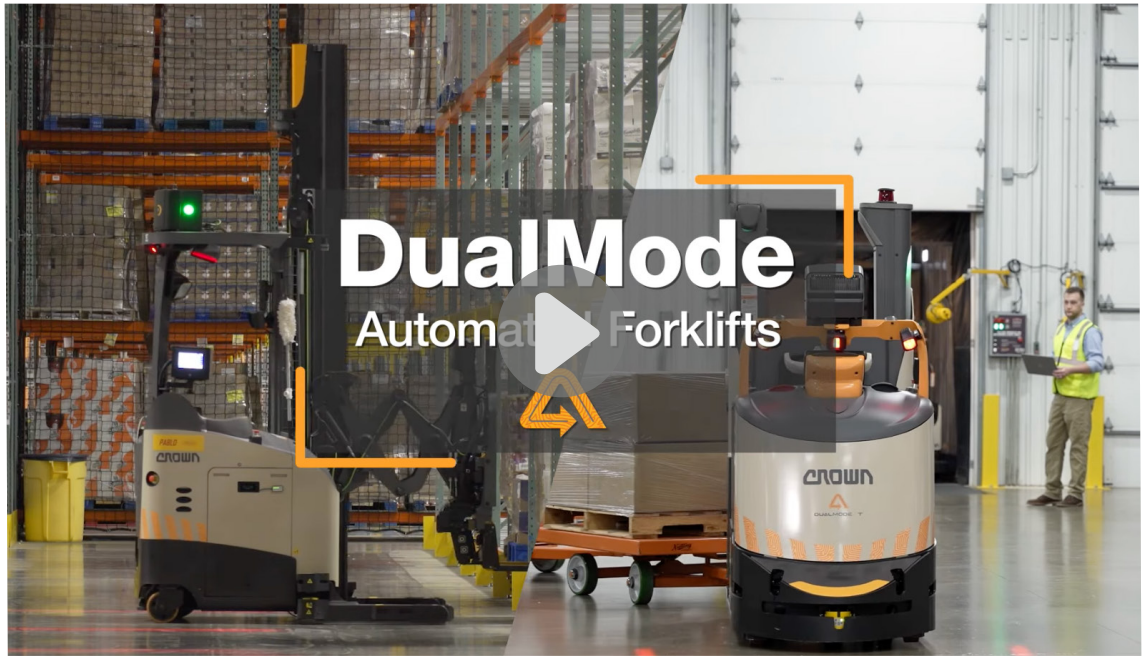
Maybe you're concerned that starting too early might render your chosen solution obsolete due to technology's accelerated change of pace. Or you think there's value in waiting, to learn by observing the actions of other companies. Maybe you've decided that you should wait until the technology is fully mature and your questions and concerns will be more readily addressed with off-the-shelf solutions.

Virtually every operation has its own unique requirements. There will be challenges and issues directly inherent to your operations and the processes and applications you have in place. Even with a flexible automation system, you'll have to investigate how to integrate automation with your unique circumstances. It will require adjustments to your processes to obtain the best results. You won't begin to identify how your processes will be affected until you commit to adopting some degree of automation. Throughout the process, you'll encounter unique issues that no amount of planning could have foreseen.

Introduction

Many of the challenges you currently face, including hiring challenges, supply chain disruptions, and changing consumer demands, can be either resolved – or significantly diminished – with automation technology that exists today. A combination of experienced advisors and proven technologies, such as those provided by Crown Equipment working in collaboration with JBT Corporation, can help ensure that your technology solution is successfully integrated and aligned with business objectives.

No matter your reason for hesitation, now is a good time to consider starting your warehouse automation journey. Today's modular, scalable and flexible automation solutions can be reconfigured and adapted to changing conditions and new processes to fit a variety of applications. The enabling hardware continues to become more advanced and affordable at the same time that software updates are being used to add new capabilities and functionality.



And while not every application can be automated due to process, facility or load quality, beginning the journey allows you to take that into consideration and determine where and how to start.

This e-book from Crown Equipment is designed to help you consider not only what, how, and why you should automate but also how taking the first step can affect your operation and your workforce.

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Adopting an Automation Mindset

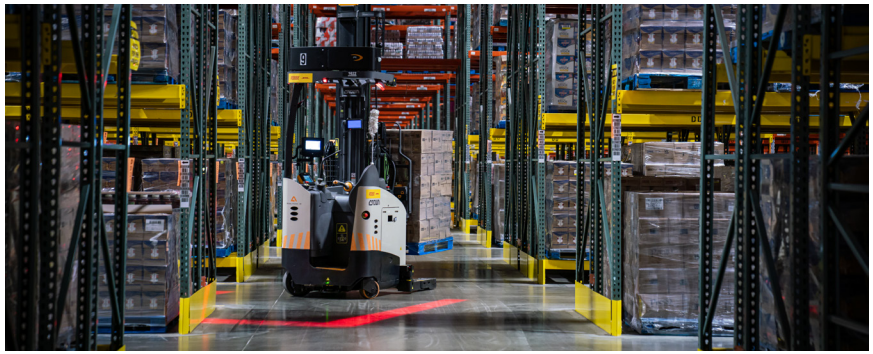
Adopting an Automation Mindset

CONSIDERING THE BENEFITS OF AUTOMATION

Any significant technology investment and deployment needs to be adequately assessed and researched to determine the right fit and best approach. Beginning your automation journey, or taking the next step in that journey, should be no different. Adopting automation is an investment and should be strategically planned and handled with care in order to realize the desired return on that investment.

While cost and complexity can be valid concerns, beginning your automation journey can provide valuable benefits for your operations when done correctly and deliberately. Much of the technology involved is proven and available today.

Realizing tangible benefits requires that you first adopt the right frame of mind, one that looks beyond industry hype and unrealistic expectations and focuses on the genuine operational challenges you are trying to overcome and/or the tangible goals you want to accomplish.



While cost and complexity can be valid concerns, beginning your automation journey can provide valuable benefits for your operations when done correctly and deliberately.

There are many benefits that automation can provide when properly integrated into your operations. Some of the benefits may include:

- Decreased workforce requirements
- Reduced operator fatigue
- Improved safety performance
- Increased productivity
- Enhanced accuracy
- More consistent throughput
- Less risk of damage to goods
- Heightened operational flexibility

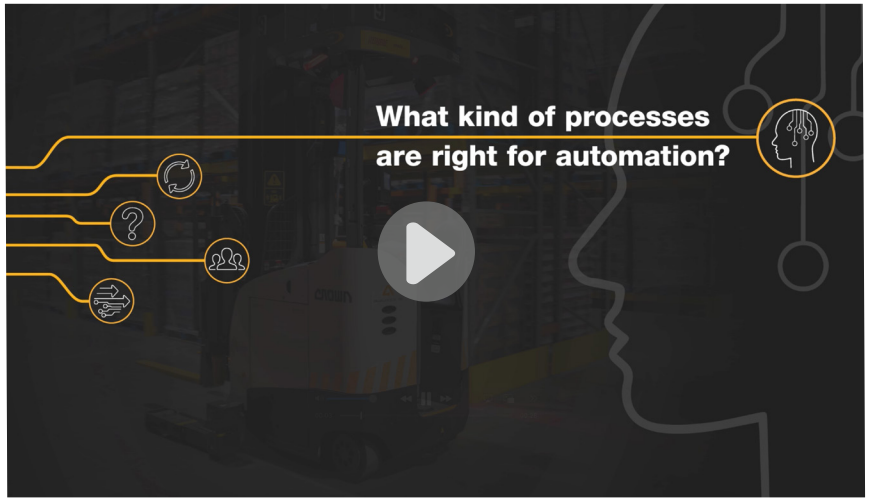
Before moving forward with any automation deployment, you need to have a good understanding of why you are doing it. What are you trying to overcome or accomplish? Which combination of the above benefits are you trying to realize? What is the order of priority?

Adopting an Automation Mindset

IDENTIFYING SPECIFIC TASKS TO AUTOMATE

You also need to identify the tasks and equipment within your operations that are ideal candidates for automation. Not all of your warehouse tasks will be able to be automated. This often depends on the available technology, the amount of customization and complexity involved and how easy it is to incorporate new workflows and processes to integrate the automation.

Some of the warehouse tasks that have shown to be ideal candidates for automation include load transportation throughout the warehouse, pallet putaway and retrieval and order picking, transportation of finished goods from manufacturing to warehouse and delivery or replenishment of WIP materials throughout assembly process.

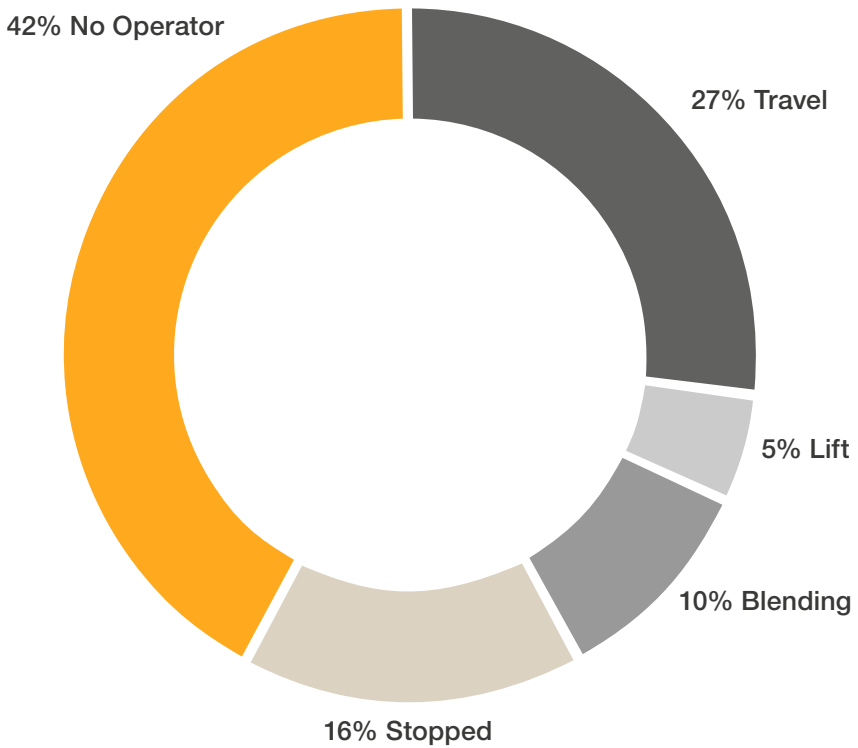


"Our manual forklifts travel an estimated 25 million miles per year in our facilities, which makes pallet movement an excellent candidate for automation. Indoor robotic transport can increase the efficiency, accuracy and safety of double-deep pallet putaway and retrieval tasks without requiring any significant changes in the infrastructure."

Brian Gaunt
Senior Director of Accelerated Digitalization
DHL Supply Chain North America.

Adopting an Automation Mindset

Productivity Detail



BENCHMARKING YOUR PERFORMANCE

It helps to have a good understanding of how your forklifts are being used and how and when pallets are moving in your facility. Where can warehouse employees be relieved of non-value tasks so they can focus on more strategic and value-adding tasks that enhance operational performance?

Telematic systems like Crown's **InfoLink® operator and fleet management system** can also play a vital role in the implementation of forklift automation, identifying potential use cases, informing your automation strategy, measuring performance and helping you ensure success.

Depending on how your system is set up and the measurement metrics you are using, you can gather a wealth of data about your operations and how your pallets are moving throughout your facility.

Traditionally, the use of these systems has been operator- and equipment-centric, providing insight into the performance of both. While there are options for connecting them to warehouse management systems (WMS), the practice is not as common as one might think. However, forklift telematics can provide a more holistic picture of warehouse activity when connected to other warehouse systems.

Adopting an Automation Mindset

This becomes even more important as more automated and semi-automated vehicles are added to a fleet. The added connectivity and the data gathered can help you manage the process and determine if objectives are being met. Automated solutions are effective and contribute a return on your investment only when they are in operation, so it is equally important to understand when they are idle.

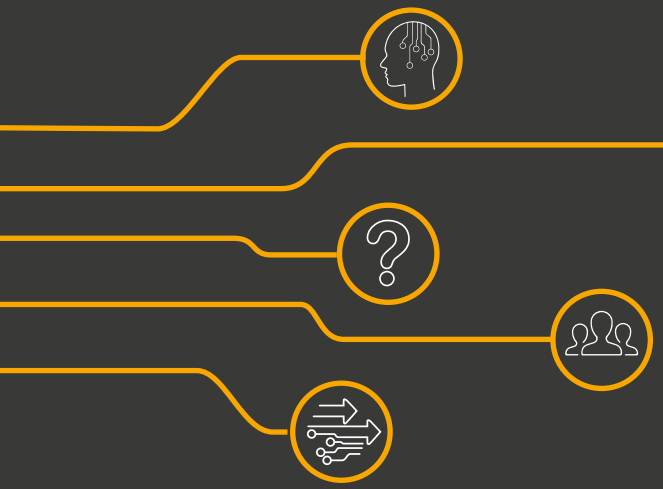
SETTING REALISTIC EXPECTATIONS

Remember, any effort to introduce automation into your facility should be guided by a realistic plan with achievable expectations that can also be scalable based on success and growth. You should develop a clear path for a tangible return on investment and determine a process and mechanism for building upon your success. This will help you strategically grow and evolve your automation efforts as you continue your journey.

10 QUESTIONS TO ASK WHEN INTRODUCING

AUTOMATION TO YOUR WAREHOUSE

Weighing Fixed vs. Mobile Automation



Weighing Fixed vs. Mobile Automation

In the first chapter of this e-book, we discussed overcoming the initial hurdles that can block the path to automation by setting realistic expectations and defining processes where automation can deliver the most value.

Once you have cleared the path for automation, you'll face perhaps the biggest decision you'll make on your automation journey: whether to pursue a strategy that relies on fixed assets or one that uses mobile assets. While there may be environments where fixed and mobile automation work together, where to focus initial investments can set the direction for warehouse automation and determine how quickly its benefits can be achieved.

SELECTING THE RIGHT APPROACH

By fixed automation, we mean installing equipment, such as shuttles and conveyors like those shown at the left, into the warehouse to automate manual processes. These solutions are often semi-permanent and may even become part of the assumed infrastructure of a facility.

Mobile automation systems, such as the tow tractor and cart system shown at right, work within the existing infrastructure of the warehouse to automate manual processes. These solutions include autonomous mobile robots (AMRs), automated guided vehicles (AGVs) and automated forklifts.

Both approaches can be valid and deliver the key benefits highlighted in Chapter One, including reduced labor requirements and increased productivity. But there are meaningful differences in the investment required, the amount of disruption to operations and how quickly the benefits of automation can be realized. The path that is right for your organization will depend on multiple factors:

Weighing Fixed vs. Mobile Automation

- **Tolerance for disruption:** Deploying fixed assets for automation will generally require significant disruption to warehouse operations. Existing inventory may need to be consolidated in one warehouse area—or moved to auxiliary locations—while new fixed equipment is installed. In some cases, the entire warehouse may need to be shut down to accommodate equipment installation. Mobile automation can generally be deployed with minimal disruption to warehouse operations as it doesn't require significant changes to infrastructure or removal of existing equipment such as racking systems.

- **Speed to results:** Fixed automation may deliver more dramatic improvements in warehouse density or throughput than mobile automation, but the time to realize these benefits can be much longer due to extended development and deployment times and the potential for wholesale process changes associated with these systems. For warehouses struggling to address near-term productivity challenges, mobile automation can enable a much shorter path to results.

- **Operational stability:** One challenge with fixed automation is these systems may not adapt to changes in order profiles, production plans or customer behaviors. A mobile approach to automation can more easily adapt to changes in warehouse operations or be re-purposed to new applications within the warehouse—or other warehouses—when requirements change.

- **Capital investments:** In addition to longer deployment times, fixed automation systems typically require a much higher capital investment than mobile automation. Mobile automation technologies also lend themselves to smaller pilot projects that can validate their value, refine processes, and then scale following proof of concept.

Mobile automation will often prove to be the best choice for organizations looking to address hiring challenges quickly. These technologies represent a lower risk entry point into automation with the potential for faster ROI and reduced disruption to operations.

Weighing Fixed vs. Mobile Automation

SELECTING MOBILE AUTOMATION TECHNOLOGY

AGVs and AMRs have their place in an automated warehouse, but their application is limited to the specific warehouse tasks they are best suited to support. Automated forklifts are more versatile and may serve as the most appropriate entry point to automation in warehouses where larger loads must be moved or where pallets need to be put away and retrieved.

Automated forklifts can benefit from years of research and development by leading material handling companies, both in the manual counterparts and the technologies that enable automated operation. They have matured to the point where they can be deployed with confidence. Forklifts are inherently flexible due to their mobility and can be deployed without changing existing warehouse infrastructure. By deploying automated forklifts in applications where they are well suited, warehouse operators can address one of the most pressing problems they face today: a lack of skilled workers.

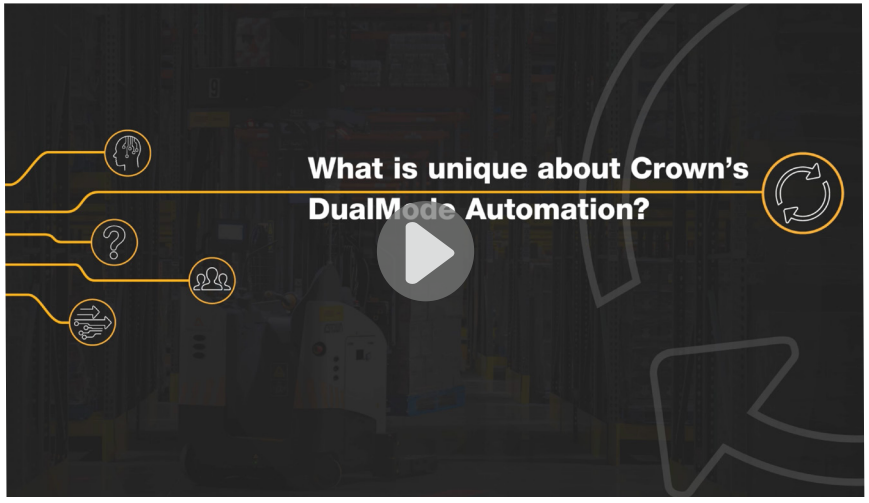
Unlike AGVs and AMRs, automated forklifts also provide the flexibility to operate in manual modes, further enhancing the flexibility associated with mobile automation. This is known as dual-mode operation and should be considered an essential feature of an automated forklift. It allows the forklift to deliver more value than a dedicated robotic system that depends on directions provided by the warehouse management system (WMS).

Operating automated forklifts in manual mode streamlines automation management by making it easy to manually move vehicles to accommodate dynamic changes in the production plan, retrieve vehicles from the floor, move them into storage, deliver them for maintenance, or use them in unique situations. Manual mode also facilitates faster exception handling. Should the forklift encounter an unexpected exception, such as a pallet in an aisle or an incorrectly positioned load, an assigned “tender,” usually managing multiple automated forklifts, can easily switch to manual mode, address the issue identified by the forklift, then return the vehicle to automated operation.

Weighing Fixed vs. Mobile Automation

Dual-mode forklifts aren't just manual forklifts equipped with automation technologies. They have been designed from the ground up as automated vehicles while retaining the flexibility to operate in manual mode when required. This approach is preferable to "bolting on" automation to a manual forklift and provides the flexibility required by many warehouse applications.

With automated dual-mode forklifts, warehouses can operate more predictably, have greater visibility into product movements and don't have to compromise the versatility that makes forklifts so valuable to warehouse operations. Because the lift trucks are integrated with the WMS, there is continuous visibility into their location as well as the loads on the forks, and the vehicles can perform consistently over multiple shifts.



CONNECTING AUTOMATED FORKLIFTS TO THE WMS

In an automated forklift deployment, the WMS interfaces with the forklift traffic management system to direct the activities of the lift trucks when in automated mode. It may be necessary to unlock additional functionality within the WMS to support automated forklifts or implement an automation control software layer between the WMS and the traffic management system to support automated vehicles.

This is necessary because the WMS relies on the operator in manual operations to make multiple decisions on how best to perform a particular task. For example, when putting away pallets, the operator may have the discretion to place pallets in the closest open location. In an automated environment, the WMS needs to know where all pallets are located and provide specific instructions to the forklift for each putaway and retrieval. In addition to unlocking additional functionality within the WMS, it may also be necessary to revise processes within the WMS to support automation. This often results in defining new automated processes rather than attempting to automate existing manual processes.

Once the systems are connected and operating in the pilot phase, forklift traffic should be monitored to identify areas or situations that may create congestion or work stoppages, or reduce the productivity of automated vehicles. Subtle changes to processes can typically be implemented to minimize congestion and maintain smooth traffic flow.

Weighing Fixed vs. Mobile Automation

It is important to work with your automation partner and WMS provider throughout this process to determine if additional software is required to ensure tasks are defined to the level required by automation and processes are put in place to minimize congestion.

USING TELEMATICS TO OPTIMIZE AUTOMATION

Telematics can be valuable in planning for automation and ongoing management and optimization of automated forklifts. The operational data captured by telematics can be analyzed to understand fleet requirements and utilization and guide decisions on how and where automated forklifts can deliver greater value. The data can also be used to help determine the appropriate number of automated vehicles and defining processes for them.

Once automated vehicles are deployed, telematics provides a more holistic view of fleet utilization and performance than the traffic management system. Telematics systems, such as **Crown's InfoLink operator and fleet management system**, bridge the gaps that exist in the traffic management system when dual-mode vehicles are operated in manual mode, as well as providing visibility into the performance of manual, semi-automated and automated vehicles through a single platform.

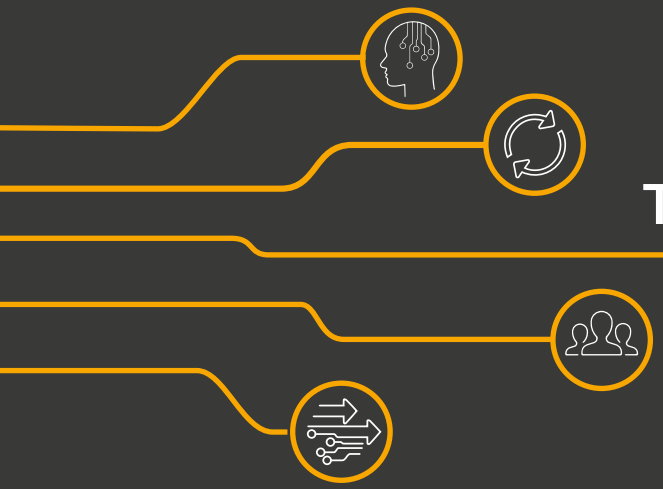
This holistic view of operations is valuable in gaining a better understanding of vehicle utilization and performance and enabling faster response to alerts. Suppose an automated forklift's travel path is blocked by an unexpected obstacle, such as a pallet left in an aisle. An alert can be sent to a mobile device providing the reason for the vehicle stoppage and its location.

The connectivity and insights provided by telematics systems are becoming vital to efficient warehouse management.

The connectivity and insights provided by telematics systems are becoming vital to efficient warehouse management, and their value is enhanced when automated forklifts are added to the mix of vehicles being used in a warehouse.

READ THE **DUALMODE APPLICATION OVERVIEW**

Taking Your First Steps Toward Automation



Taking Your First Steps Toward Automation

Technology's pace of change can sometimes be daunting when you are looking to purchase and deploy a technology-based warehouse solution like automated forklifts. It may be easy to become paralyzed when determining the right time to invest in new technology. "How long should I wait?" "Will the next version have exactly what I need?" "At what point is the technology 'done evolving'?"

The pace of technology is not likely to slow down anytime soon. Fortunately, technology has advanced to the point that many of the challenges you currently face in your warehouse can be addressed with forklift automation technology that exists today.

The inevitability of change can be offset to some degree by the modularity, scalability and flexibility inherent in many of today's automation solutions. Many of these technologies can be reconfigured and adapted to changing conditions and new processes. Software updates are often used to add new capabilities and functionality that were not available when the technology was originally deployed.

Taking Your First Steps Toward Automation

MOVING BEYOND ASSUMPTIONS AND BIAS

One of the biggest hurdles that you need to clear in order to take a more informed, strategic approach with automation is moving beyond your misconceptions and bias. Only then will you be able to identify the right automation technologies and warehouse tasks to be automated.

One of the biggest misconceptions many companies have is that they assume automated forklifts simply and equally replace manual forklifts and operators. It is important to understand that you are not simply automating a manual task. You should look at the entire process or workflow that is being impacted by the introduction of automation. This will help you determine the right automation technology and the right task that can be realistically automated from a cost/benefit perspective.

If you have several manual forklifts moving products from Point A to Point B during a single shift and replace them with automated forklifts, the productivity level may actually decline. Most automated forklifts available today do not yet operate at the speed of manual forklifts driven by experienced operators. However, most automated forklifts can operate more consistently and across multiple shifts, which can offset some of the productivity lost in pure operating speed. To maintain the volume levels of the warehouse and produce the same number of incoming and outgoing

pallets, you may also elect to make additional changes to your processes and your fleet to address any one-to-one comparisons in productivity between manually operated and automated forklifts.

For instance, if you currently have a forklift that unloads pallets from trucks and transports them to another location in the facility, automating this entire process may require two different types of vehicles: one capable of unloading the truck and one that can efficiently transport the pallets. An alternative approach may be to automate just the horizontal transport of the pallets and continue to use the manual forklift to unload the truck. In this scenario, you are not replacing a manual forklift but adding an automated forklift to your

Taking Your First Steps Toward Automation

application with the intent to improve overall productivity. This approach may also require you to create a new process to ensure efficient handoff of pallets from the manual forklift to the automated forklift.

Companies who have unsuccessfully attempted automating the entire process may be biased against further exploring automation opportunities.

Companies who have unsuccessfully attempted automating an entire process may be biased against further exploring automation, but they may be missing out on opportunities to improve productivity or creatively address workforce challenges. They may wrongly believe that automation is not ideal for their facilities or the technology is not yet mature enough. To overcome this bias, these companies need to commit to learning from their mistakes and determine why an automation attempt was not a success.

Perhaps the right automation technology wasn't selected or the application chosen wasn't suitable for automation. Maybe the planning was insufficient to ensure the desired outcomes were achieved. Maybe the needed infrastructure and process changes were not identified to support the deployment. Whatever the reason, do not to let a failed first attempt eliminate future opportunities to automate.

Taking Your First Steps Toward Automation

OPTIMIZING LEVELS OF STANDARDIZATION

There are two ways to think about standardization when considering automation technologies to purchase and implement. First, there is the level of standardization that comes from implementing best practices from previous, successful installations of the technology by others.

While each application and environment can differ, this type of standardization achieved through the experience of others provides a starting point to plan and deploy the technology. By working closely with your technology provider, you benefit from their knowledge of the technology and also their experience with deploying it while working with a variety of companies on similar installations. This combination of knowledge and experience provides a solid foundation on which to build and then customize your approach to overcome challenges and meet your unique requirements.

As you begin to consider your own operation, it is time to introduce the second form of standardization, which is vital to many automated vehicle deployments: standardizing internal processes and requirements. Regardless of the technology and application, you will most likely need to make changes to your operations.

For instance, if you deploy an automated forklift for pallet putaway and retrieval, you'll need to standardize the handling and condition of your pallet loads. Palletized materials that are not properly stacked and shrink-wrapped can impede the function of the automated forklift, resulting in exceptions that bring your system to a stop. Uniformity and quality assurance in your pallet loads will help facilitate consistent operation and improve efficiency and productivity.

The more you can standardize your processes and control pallet load quality, the better the interaction of your automated forklifts with your environment. While the immediate benefit is to the automated task, identifying and implementing such improvements can positively impact your entire operation. In many cases, these opportunities for improvement, like improper shrink wrapping or skewed pallet loads, existed before the automated technology was introduced. The installation simply serves as the catalyst to address them with needed adjustments.

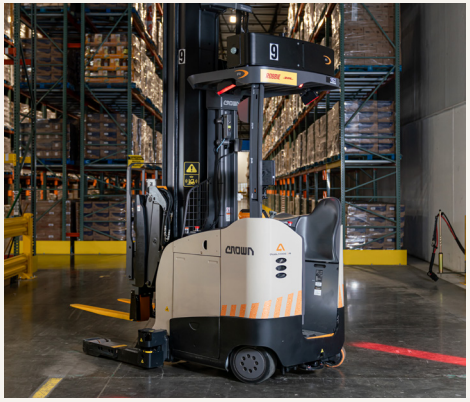
COMMON TYPES OF
WAREHOUSE AUTOMATION

Taking Your First Steps Toward Automation

CUSTOMER **RESULTS**

DHL SUPPLY CHAIN

Revolutionize the Warehouse with Crown DualMode Automated Forklifts



APPLICATION

DHL Supply Chain, part of Deutsche Post DHL Group, is a leader in contract logistics and known for its innovation in leveraging new warehouse technologies to achieve better results. As a part of its companywide digitalization strategy, it is implementing automation technology – including autonomous guided vehicles (AGVs) – to optimize operations across the supply chain.

CHALLENGE

DHL Supply Chain warehouse facilities see millions of pallet movements per day and their forklifts travel an estimated 25 million miles per year. High-reach, double-deep pallet positioning with a manual forklift is a challenging maneuver that requires substantial operator training and demands a significant workforce capacity – workers that could be focused on other higher-value tasks – especially in today's competitive job market. DHL Supply Chain decided its pallet warehouse environment was an ideal candidate to benefit from automation and turned to Crown to find a solution in Crown's DualMode R 1000 Series reach trucks.

SOLUTION

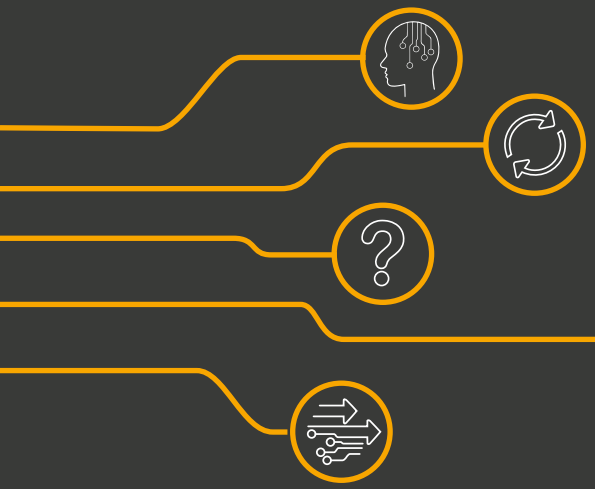
In automated mode, Crown's R 1000 Series reach trucks checked all the boxes for DHL Supply Chain. They operate with increased efficiency, accuracy, reliability and safety for high-reach, double-deep pallet putaway and retrieval without requiring any significant changes in warehouse infrastructure. Crown's AGVs operate at the speed and precision needed to get the job done, safely maneuvering alongside warehouse employees while handling full pallet putaway and retrieval up to six levels high. Skilled employees are reassigned to manage multiple automated reach trucks rather than operating one on their own.

Crown's DualMode automated system helps ensure resiliency in the supply chain with reach trucks available to operate 24/7/365 with high reliability. This degree of flexibility is key to meeting customer needs while managing the demands of an ever-changing supply chain environment and workforce.

RESULTS

- Increased productivity with **20% greater efficiency in pick and putaway times**
- **Multi-shift reliability** enhances uptime and 24 / 7 / 365 availability
- **Improved supply chain resiliency** during changes in workforce and customer needs

Engaging the Workforce Through Automation

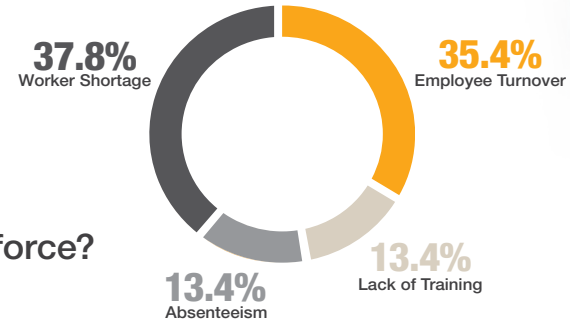


Engaging the Workforce Through Automation

Where introducing automation into the warehouse once required a high level of sensitivity to workers' concerns regarding how the technology would affect their assignments and tasks, today's workforce is more likely to embrace automation. Organizations that are leaders in technology implementation, such as **DHL Supply Chain**, have found that workers appreciate the value of automation, and expect a certain level of technology in their work environment. Effective use of technology has even become a tool in recruiting and retaining warehouse workers.

Nevertheless, introducing automation into the warehouse represents a change that directly affects workers, and change management strategies should be embedded into any implementation plan.

Which of these
major issues
are affecting your workforce?



Engaging the Workforce Through Automation

UNDERSTANDING THE IMPACT ON WORKERS

Change management strategies can best be shaped by having at least one implementation team member that can view the plan, and the resulting changes to processes, through the lens of frontline workers. This helps ensure an understanding of how automation will affect workers and what employees will expect and experience during and after the implementation. For systems such as dual-mode automated forklifts, this should include clear guidelines regarding when the forklifts should be used in manual mode and defined processes for suggesting revisions to the guidelines and providing feedback on the overall system.

Your automation provider may also recommend a human-centered implementation audit as part of the planning process. This audit is structured to identify concerns or issues related to potential human interaction with the new technology. It also helps identify process or system changes required to ensure an effective, safe integration of automation into warehouse workflows.

"The definite advantage of the Auto Positioning System is that it levels the playing field, so a new employee who begins versus one who has been doing it for six months, within a short amount of time they should be able to meet the same productivity standards. It has reduced the training time from six to eight weeks down to four weeks."

Michael Eljaiek
Warehouse Manager
Southern Glazer's Wine & Spirits

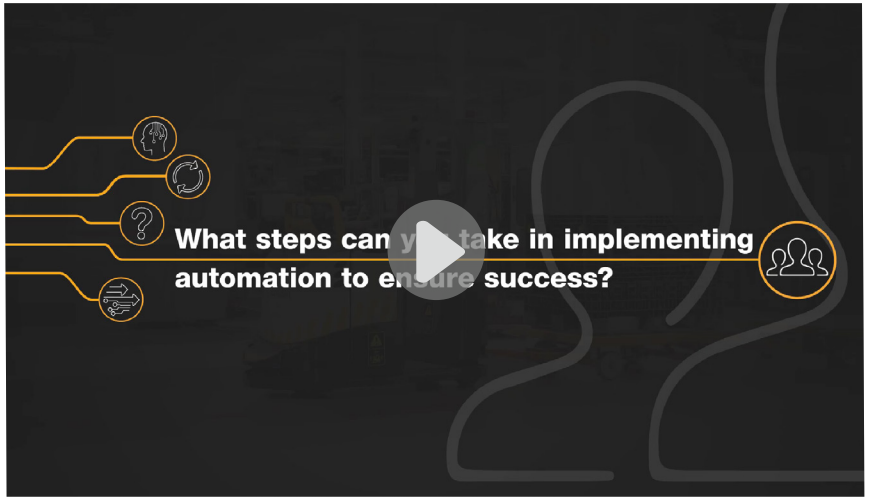
Engaging the Workforce Through Automation

TAILORING THE PLAN TO THE WORK ENVIRONMENT

In many cases, automation is most successful when processes are tailored to the automation. That requires a clear understanding of how processes are being performed and how automation will affect them. Will human interaction occur while equipment is fixed in place, while moving through dynamic areas, or both? What exceptions may be encountered by automated forklifts that humans intuitively deal with and how will they be handled?

To understand whether work environment changes are required, have a team member document how employees perform their functions in the warehouse before automation is implemented. After implementation, observe the employees again to determine the impact of the automation. Doing this will uncover possible issues or challenges to successful technology adoption before they become problematic.

To truly maximize the benefits of new technology, managers should view each system as part of a larger whole within operations. With the human factor included in planning, the implementation team will be equipped to optimize processes for automation to ensure a smooth transition and quick path to productivity.

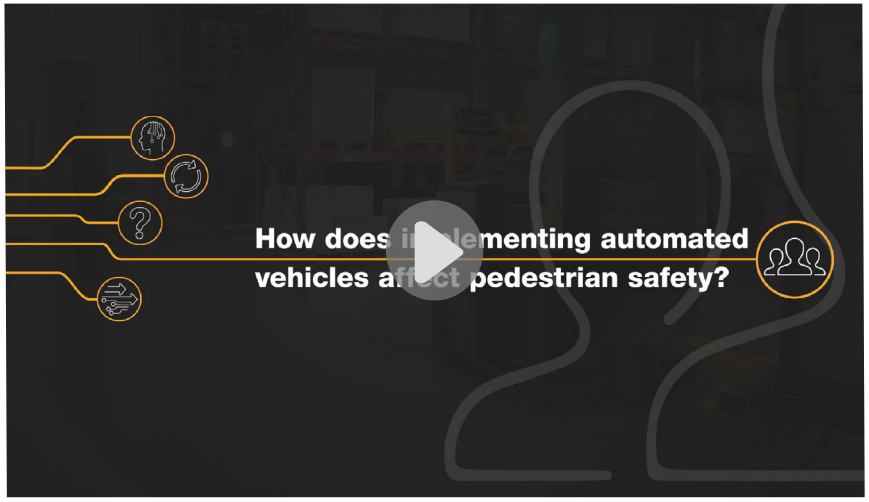


Engaging the Workforce Through Automation

TAKING A COMPREHENSIVE APPROACH TO TRAINING

Training is a vital part of any automation implementation plan. Too often, training doesn't go far enough in how it is conducted and who in the organization receives it. By focusing on both classroom and hands-on instruction, training can drive meaningful behavior changes among operators, supervisors, trainers, technicians and pedestrians.

Supervisors, in particular, play a vital role in the success of new technology by helping personnel apply their training on the job. Supervisor training programs can prepare supervisors to spot at-risk behaviors and environmental hazards and provide positive and constructive feedback that encourages lasting change.



ENHANCING WORKER PRODUCTIVITY

The goal of most automation deployments today is to better leverage the skills and expertise of the workforce by automating repetitive tasks and enabling workers to focus on high-value tasks. However, complementary intelligent operator assist technologies can also support this goal. Here are some technologies to consider:

The goal of most automation deployments today is to better leverage the skills and expertise of the workforce.

- **Operator-assisted picking:** If operator productivity in picking applications is a key driver of innovation, an operator assist solution, such as **Crown QuickPick® technology**, may prove to be the most feasible and effective approach. This technology can yield productivity improvements of up to 25%.

- **Operator-assisted pallet positioning:** For high-reach applications, locating and traveling to specific pallet positions can be time-consuming and drain productivity. **Forklift Auto Positioning technology** ensures reach trucks take the most effective route to the next rack location, increasing operator productivity up to 25%.

Engaging the Workforce Through Automation

- **Forklift Connectivity:** Implementing forklift telematics, such as **Crown's InfoLink operator and fleet management system**, can automate compliance processes, reduce impacts and increase fleet utilization. By providing a centralized data source for the fleet, managers can identify underperforming operators and receive alerts whenever an impact occurs, enabling rapid investigation into causes and severity. With impact monitoring in place, operators typically become more aware of behavior and actions that may result in an impact. These systems may also monitor operator behaviors and provide safety reminders and contextual coaching to reinforce or modify behaviors as needed.

- **Integrated Safety Features:** A variety of intelligent sensors and systems are being integrated into forklifts to help reinforce correct operating practices and improve safety. Stability and traction control systems leverage the intelligence designed into the forklift to prevent potentially dangerous operation. Solutions incorporating Crown's Proximity Assist and Geo Assist technologies utilize advanced sensors and software, including technologies such as Lidar, ultra-wideband and telematics, to alert the operator and adjust forklift performance parameters based on the task, location and environment to promote safe, productive operations.

10 KEYS FOR SUCCESSFUL

AUTOMATION IMPLEMENTATION

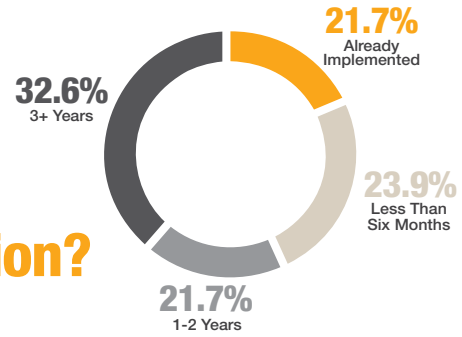
Advancing Your Automation Journey

Advancing Your Automation Journey

Every journey starts with the first step and, in the case of warehouse automation, that first step is often the hardest.

In the earlier chapters of this e-book, we discussed the various obstacles to automation, highlighted the differences between mobile and fixed automation strategies, reviewed the automation technologies that are available and discussed the importance of engaging warehouse personnel in your automation journey. In this chapter we will discuss how the automation journey begins and how it could evolve over time.

What is your timeline for implementing an **automated solution?**



TAKING THE FIRST STEP

Every journey starts with the first step and, in the case of warehouse automation, that first step is often the hardest. It requires an understanding of where warehouse automation can most effectively deliver value, selecting the right solution for your application and developing the business case.

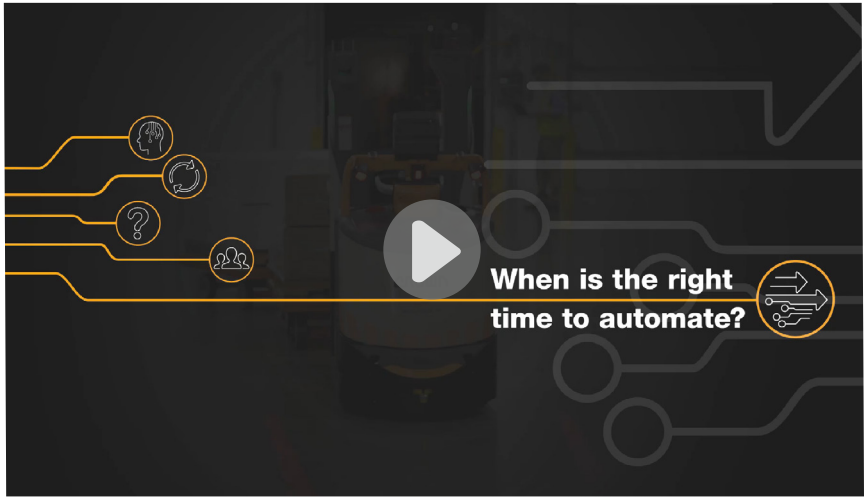
This can be a lengthy process for some organizations, but there is also a strong sense of urgency today to make more effective use of technology in the supply chain. As the supply chain has become an increasingly important strategic differentiator, it has attracted board-level attention in many organizations. Senior executives are now asking for digitalization and automation strategies that can help their organization better adapt to workforce challenges and ensure continuity in business operations and customer service.

Technology has also advanced to the point where the risk associated with automation is much lower than it has been at any time in the past. This is particularly true for automated forklifts, which present automation opportunities for a wider range of applications than virtually any other technology.

Advancing Your Automation Journey

Forklift manufacturers have continued to advance this technology, and today's generation of automated forklifts are proving capable of handling some of the toughest tasks in the warehouse. Industry leader **DHL Supply Chain**, for example, is successfully using automated forklifts for narrow-aisle, high-reach pallet putaway and retrieval. This task, which requires a very high level of skill when performed by manual operators, is now being performed by automated vehicles.

Clearly, the time is right for warehouses to take the next step in advancing the efficiency and predictability of their operations through automation. They will likely find willing sponsors on the executive team and can take advantage of proven technologies that address their most pressing operational challenges.



Advancing Your Automation Journey

LEARNING FROM THE LEADERS

In addition to proven solutions and an organizational appetite for automation, warehouse managers embarking on automation today have access to best practices from industry leaders to help guide their implementation strategies.

One of those practices is to focus the initial implementation on a specific use case and develop a pilot program that enables the organization to get comfortable with the technology before more wide-scale deployments are attempted. Mobile automation technologies are particularly well suited to support this strategy.

As mentioned in previous chapters, automation systems will typically require the addition of some WMS functionality or a dedicated automation control system, because automated systems require more specific instructions on how to perform certain tasks than people do. The pilot program gives warehouse managers and their automation partners an opportunity to test these more tightly defined processes, and identify and resolve common issues such as congestion and unexpected exceptions.

SETTING REALISTIC EXPECTATIONS

A pilot program can also provide insight into how the typically slower operating speeds of automated vehicles, versus their manual counterparts, can be offset by their greater availability and reliability, which may result in an overall increase in productivity. However, one trap some organizations fall into when first deploying automation is to expect significant improvements in productivity or efficiency too soon. There is a ramp up period associated with virtually all new technology deployments, and it isn't unusual for key metrics such as productivity to be temporarily interrupted during this period.

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Organizations experienced with deploying automation expect these performance hiccups and account for them in their implementation plans and communications with executive teams. They understand that initial results aren't indicative of the long-term value automation can deliver and that the implementation isn't complete at startup. It begins with careful monitoring, continued refinement and open communication with both frontline workers and executive sponsors, which is required in the period following startup to achieve projected results.

BUILDING ON SUCCESS

A pilot program creates the platform for an organization to test software integrations and optimize processes. Once those tasks are performed and the new technology is delivering on expectations, it's time to look for opportunities to expand the use of automation to other areas of the warehouse or other use cases, effectively amplifying the benefits realized through the pilot.

In the case of automated forklifts, **forklift fleet and operator management systems** can be valuable tools for developing plans to scale automation in a strategic manner that prioritizes opportunities where additional systems – whether piloting more vehicles or implementing complementary technologies such as AGVs – can deliver the most value.

These management systems provide a holistic view of forklift utilization, safety and operator productivity across the warehouse, including both manual and automated vehicles. This enables the development of a data-driven expansion strategy and facilitates better reporting to senior management on the value automation is delivering to support the business case for the next phase.

Advancing Your Automation Journey

MOVING FORWARD WITH CONFIDENCE

There is no “plug-and-play” approach to warehouse automation. Developing an effective automation strategy requires an understanding of the specific challenges a particular warehouse is facing and a thorough evaluation of the automation technologies available to address those challenges. But there are proven solutions available today as well as best practices for implementing and scaling those solutions.

Choosing a warehouse automation partner with proven solutions and experience guiding users through the process of planning for and deploying automation allows warehouse operators to move forward confidently with automation that delivers value today and creates the foundation for the future of warehouse operations.

TIPS FOR HELPING ENSURE
AUTOMATION SUCCESS

BEFORE YOU **AUTOMATE**