

### President's Message: We respect confidentiality



Jack Phelan  
President

To paraphrase a well-known business adage, businesses are often known by the customers they serve. Few presentations are made without references to at least several company names that resonate in a way that enhances credibility. You might call it a type of "business shorthand."

Yet, more customers are requiring their suppliers to keep their name and projects confidential.

Even though we understand the potential benefit of talking about our customers, we not only appreciate the necessity of confidentiality, we embrace it. Our work is more than simply designing and installing material handling systems for our customers. Our mission goes beyond selling cost-effective and reliable equipment. Our main job is providing our customers with a competitive advantage.

Simply put, we view all information between our company and our customers as proprietary. Because of this relationship with our customers—our client partners—we agree not to share or discuss their information with anyone.

Someone might ask, "If this is your policy, then why do you have case studies that describe what you have done for certain clients or issue press releases about projects you are doing or have just completed?"

Our policy is never to use a client's name or reveal any information about a project without that client's approval.

The core of our relationship with clients is trust. Because of this, there is never any question about where we stand: we practice what we call "implicit confidentiality."

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### Get started now Position your business to prosper in the economic recovery



John T. Phelan, Jr.,  
P.E., COO

Leading economic indicators show signs that many distribution sectors are stabilizing and are on track for recovery in 2010. The unforeseen force and speed of the economic downturn sent many companies reeling, rapidly retreating to a cost-reduction, survival mode. While the recovery is forecast to be slow and varied by sector, a dogmatic "let's get through this" is a paralysis-creating mindset companies can ill afford.

History shows that companies focused on cost cutting strategies during a recession seldom emerge as market leaders. McKinsey & Company, the prestigious international consulting firm, examined the pattern of declines and recoveries during recent recessions dating back to the 1970s. The February 2009 *McKinsey Quarterly* points out that in past recessions "businesses that followed countercyclical patterns of cash utilization and spending fared much better than those with purely defensive strategies."

Given the uncertain economic climate, mapping a strategic recovery plan is no easy task. There is an overarching sense that this recession means paradigm shifts of fundamental



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proportions, challenging the old ways of doing business. For companies to emerge stronger, increase market share and prosper when the economy recovers will take not only a realistic assessment of the business environment but also a serious, accurate self-diagnosis of operational capabilities, technological competence, skills, knowledge, flexibility and competitive positioning.

Here are nine reasons to start now:

**1. To gain a holistic understanding of all the supply chain functions and costs**

Controlling costs, maximizing productivity, increasing throughput, minimizing downtime and improving accuracy are traditional issues for companies that operate warehouses or distribution centers. Reduced workforces coupled with today's challenges of distributing a myriad of products and order sizes are a mandate to understand the new equipment, current technologies and systems on the market.

Understanding the opportunities, together with a comprehensive analysis of operations, broadens the thinking of the management team. The process can identify the top priorities and challenges that any new system must accommodate, without being handcuffed by department budget constraints and internal politics.

Now is the time to evaluate the supply chain process across the entire organization, to identify strengths and weaknesses and opportunities for improved integration, automation and efficiency. *Many anticipate that demand volatility will be a part of the new normal; the agility to react quickly and ramp up capacity in response to upticks, as well as adjust to downturns, is paramount to profitability.*

**2. To take advantage of the buyer's market now**

Buying assets at the bottom of an economic cycle makes good fiscal sense. In a move to leverage buying power in a disseminated market, United Airlines recently asked the two largest plane-makers, Boeing Co. and Airbus, to bid on an order to replace its wide body fleet.

Affordable and more flexible technology is available and now is the time to

research and determine what is the best fit for your company. *When the turnaround occurs, companies that have planned for it will benefit and operate from a position of competitive strength.*

**3. To understand your customers' pain**

Even before the recession, companies had begun to rethink distribution strategies. With more and more customers demanding shorter delivery times, proliferating SKUs as product offerings expand, and contracting product life cycles adversely affecting inventories, companies sought better ways to manage distribution. Some moved from the traditional hub-and-spoke network to smaller DCs closer to the point of sale. Others sought better segmentation of products or invested in more efficient, highly automated and environmentally friendly systems, still others reduced outsourcing from Asia.

Now is the time to get closer to your customer. It will give you key insights into how to improve your product and services. *Impeccable service no longer suffices; it's about improving your customer's economic performance.*

**4. To plan even with a reduced engineering staff**

With engineering departments downsized, and in some cases, eliminated, companies need time to properly execute a redistribution of responsibilities. Due to time constraints or lack of expertise, the remaining in-house engineers may be focused on ad hoc solutions rather than thinking about the "big picture" – a robust, yet flexible supply chain system that generates the level of cost reduction and quality improvement needed to be competitive.

Outsourcing is an option, a way to move from fixed to variable costs. Successfully outsourcing engineering functions requires careful selection of a partner that understands your business, your supply chain challenges, your customers' priorities and how to effectively work with your leaner organization. In some cases, a relationship that goes beyond a needs assessment and integrates planning and execution

can lead to quicker completion and measurable cost savings, as well as single source responsibility.

**5. To achieve market advantage with green initiatives**

While the economic crisis may have slowed green initiatives, they are essential for future business success and are becoming more affordable and cost-effective. For example, "green" conveyors provide a combination of efficiency, ergonomic design, low maintenance and energy savings, while offering incredible flexibility.

As compliance and regulation around green, as well as consumer accountability become increasingly prevalent, companies that are greener can tout their capabilities and gain market advantage. In addition, while staff turnover is less of a problem today, given the current economic climate, long-term, it remains an industry issue. An environmentally friendly work environment is leverage to attract the best talent.

**6. To be a top competitor among 3PLs**

As the 3PL industry continues to mature, the gap between customer expectations and the current technological capabilities of 3PLs is a challenge to the industry. Studies show sustainability, security and technology as the key, crucial areas on which 3PL providers must focus. The pressures to keep supply chain management efficient and priced right for customers dictate that 3PLs explore innovative technological solutions to retain and grow market share in the economic recovery.

**7. To provide ample lead time**

Whereas mature companies understand the time it takes to plan, design and implement a material handling project, fast-growing companies and others who aren't as automation-aware, have little idea. While time factors vary with the nature and complexity of the project, a good rule of thumb is that the design and cost estimate phase will take three to four months and implementation will take six to nine months. Reengineering jobs

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typically take longer, while installations in new buildings will be quicker.

### 8. To steal a bargain before costs rise

There is no magic crystal ball; however, it seems irrefutable that the enormous government debt incurred by the economic stimulus, the continued growth in unfunded liabilities such as Social Security as well as proposed initiatives such as national health care will be funded through additional taxes. Companies that have a plan in place and can take decisive action before taxes rise will have a significant economic advantage.

### 9. To be ahead of the curve

Conditions and demands constantly change and there is always a better, more efficient way to do business. While tweaking an existing business model may be enough for strong companies, for others, major changes in processes must occur to be competitive. The most successful organizations use this time to gain strategic advantage by overcoming inertia, dissecting the costs to deliver, streamlining internal processes, and leveraging technology to optimize the order-to-delivery cycle.

Continuing supply chain complexity,

costs, sustainability and customer focus will drive investments in optimization and modernization. Now is time to examine information technology and physical systems with an eye towards maximizing flexibility and real ROI.

To develop a successful plan and the proper positioning techniques requires a critical look at all aspects of a business. Once the evaluation of current positions and goals is complete, utilizing this time to move operations ahead of the competition will mean a strategic advantage during the economic upswing.



John T. Phelan, Jr.,  
P.E., COO

## FAQ Frequently Asked Questions

**Q. "How do TriFactor's Planned Maintenance and Service programs differ from those**

**available from other material handling integrators?"**

A. TriFactor offers five standard levels of Planned Maintenance (PM) and fully customized PM programs, along with routine or emergency services. Trained and experienced electrical and mechanical conveyor technicians perform all maintenance and work.

The core of all TriFactor's PM programs is caring for conveyor systems to mitigate the need for unscheduled emergency maintenance. That is why we call our PM program *TriFactor Care*.

Whether a planned maintenance program is monthly or quarterly, our factory-trained technicians always complete a *TriFactor Care* 64-point checklist and maintain that information both on-site and at our office.

The checklist includes chain alignment and lubrication, motor and reducer noise and temperature checks, belt wear, bearing noise, along with other inspections, lubrications and adjustments. Since we maintain duplicate records of each visit, customers can review inspection results at any time and our technicians are better prepared prior to scheduled PM visits by reviewing the service history.



TriFactor's Bill Waikem and Todd Bixby work on a control panel

Some common elements of our programs include 24-hour phone support and spare parts inventory record keeping. Phone support allows PM customers to speak directly with a technician anytime day or night to discuss their issues and obtain a satisfactory response.

The spare parts inventory record keeping is beneficial since it ensures that customers understand the stock levels of their critical spare parts, especially those with longer lead times.

### TriFactor's five Planned Maintenance programs

• **Bronze PM Program** This basic program covers quarterly PM visits, 24-hour phone support and spare parts inventory record keeping. It is ideal for the customer with a conveyor system of up to about 500 feet with 10 to 15 drives, and a small maintenance staff or none at all. Typically, this program costs about \$1,000 to \$2,500 per quarter and takes a technician between one and two days to accomplish a quarterly visit.

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• **Silver PM Program** This is ideal for customers with a conveyor system of 500 feet or more with a small maintenance staff, if any. The Silver program includes monthly PM visits, assistance with spare parts inventory record keeping, 24-hour phone support, up to 100 prepaid normal service hours, a 5% discount on additional anytime service hours and priority response and scheduling for emergency or routine service.

The increased visitation frequency and the 100 prepaid service hours for normal working hours are typically justified since the conveyor system is fairly large and the customer does not have in-house maintenance help with the ability to respond to emergency work, such as replacing a failed drive, replacing and tracking a new belt or any other failure within the conveyor system.

Also, PM customers enrolled in this plan are given higher response priority than customers on the Bronze plan or no plan at all, which has proven to be a critical and beneficial factor for customers that cannot wait entire shifts before getting a conveyor system back in operation.

• **Premium Plans** These programs are designed for customers with very large conveyor systems and a zero tolerance for downtime. **The Gold plan** includes standard monthly-preplanned visits plus 200 regular workday prepaid hours and 25 after-hours prepaid hours. **The Diamond plan** has a weekly walk through inspection, standard monthly pre-planned visits and 40 regular workday prepaid hours. **The Platinum plan** includes a weekly walk through inspection, the standard monthly pre-planned visits, 300 regular workday prepaid hours and 50 after-hours prepaid hours.

Included in all three of these plans are spare parts inventory record keeping, 5% discount on spare parts, 10% discount on additional anytime hours, one-hour response and scheduling for emergency or routine service and 24-hour phone support.

From a budget perspective, the basic Bronze package is typically priced at

approximately \$4,000 annually; while the most expensive package, the Platinum plan ranges upward of \$30,000 annually.

**Q. "How does TriFactor go about fulfilling its projects? Do you use sales engineers as designers? Is there a systems engineer who designs the system and then passes it off to a project manager when it goes into the field?"**

A. There are three basic project fulfillment models in the material handling industry. Smaller companies, lacking the in-house resources to take on larger projects, leverage their supplier partners' resources and the sales engineer acts as the liaison and project manager. This model works for more straightforward systems that rely on equipment from a single manufacturer.

Then, there is a second fulfillment model used by larger material handling systems integrators that separates the system design staff from the project management staff. That is, when a sales engineer brings in a project, a design engineer is responsible for providing layouts and cost estimates.

Once the project is sold, the design engineer issues purchase orders to vendors and then passes off the project to an engineer, typically called the project manager. The project manager then takes over and fulfills the supervision of the implementation portion of the project.

TriFactor uses a third model, a "cradle to grave" approach, when fulfilling projects. When a sales engineer brings us a proposed project, a mechanical or industrial engineer is assigned to it. That engineer is then responsible for designing the solution and estimating the cost. Additionally, this is the same engineer who will fulfill the implementation in the field and manage the installation, testing and system commissioning.

Experience indicates that we obtain optimum results by having one technical expert accountable for the success of a project. Additionally, customers come to trust the design engineer during the time the solution is being developed, while

switching personnel midstream not only causes confusion, but requires that the customer regain a level of trust with a new engineer at the most critical time of a project – when the equipment is being delivered and installed.

**Q. "I understand you have industrial and mechanical engineers who design and manage the integration of the conveyor and storage equipment. Are these the same people who oversee the electrical installation and the controls programming and testing?"**

A. Although TriFactor has a cadre of talented industry experts in the mechanical and industrial engineering disciplines who design system layouts and coordinate implementation, these are not the engineers who develop Programmable Logic Control (PLC) code, build Human Machine Interface (HMI) touchscreens, manage electrical installers or integrate WMS/WCS with the material handling system. Those tasks are the responsibility of our in-house electrical engineering staff.

TriFactor employs a full-time staff of electrical engineers who specialize in developing extremely complex controls and software that includes PLC code, Human Machine Interface code and a variety of other database information exchange scripting that is common in distribution center operations.

Additionally, the electrical engineers also act as the electrical project managers for the supervision of the electrical installation crews.

Finally, since TriFactor has a UL508a certified panel building shop, the electrical engineering staff designs the industrial control cabinets and supervises the assembly of all of the components that are placed and wired inside. Prior to the cabinets leaving the shop, the assigned electrical engineer downloads the PLC code and/or HMI code on the touchscreen and tests the cabinet to ensure that all connections are correctly terminated and the inputs and outputs are working properly.



Paul Hansen  
Project Manager

## Considerations when planning a palletizing operation

Over two billion pallets are in use every day, dominating the landscape in most warehouses and

distribution centers, while serving as the interface between the product and the mode of transportation.

In September of 2008, the demand for pallets was forecasted to increase, with experts predicting that warehousing will show the most rapid gain, rising six percent per year through 2012. Although these figures were before the dramatic affects of the recession and the collapse of the markets, the fact remains: more than ever before, companies will look for ways to increase productivity, minimize manpower, and save money with effective palletization.

Palletization is the task of taking cases and stacking them in layers on pallets for storage and/or transportation. It's how the stacking is done, whether manually, automatically or semi-automatically, that varies from warehouse to warehouse.

The amount and type of product being moved often determines which mode of palletizing will be used.

• **Manual Palletizing** is the most basic and also the most widely used method. Typically, workers remove cases from a conveyor line or an existing pallet load and stack them onto a pallet. The pallet resides on a pallet jack, forklift or the floor while being packed. The cases can either be stacked straight up (column stacked) or staggered (interweaving) in order to increase stability and sturdiness.

• **Semi-Automatic Palletizing** is used when case weight is a factor and workers are subject to back strain injuries, often resulting from manual palletizing. With a semi-automatic system, a conveyor delivers product to an operator who arranges the cases in layers on a variable height lift table. The operator utilizes a push button or a foot switch to raise and lower the load to the appropriate ergonomic height. This method increases efficiency and decreases back and shoulder injuries. Additionally, outfitting the variable height lift table with a rotating turntable also introduces efficiency and ergonomic benefits. With this feature,

after all of the layers are stacked onto the pallet and it is ready for stretch wrapping, an operator can stay stationary and apply the wrapping as the pallet rotates in front of him or her.

• **Automatic Palletizing** provides the fastest, most efficient and most ergonomically friendly method of palletizing. Currently, there are two common methods of automatic palletizing: **conventional** and **robotic systems**.

With the conventional method, cases travel along a conveyor and are delivered to a layer-building table, where the cartons are automatically turned and interlocked into the appropriate pattern. The pattern closely resembles a jigsaw puzzle and follows the specification that has been programmed into the equipment, thus eliminating human error. Once a layer is built, it can slide onto a stripper plate (sometimes referred to as a deck or apron); the stripper plate retracts horizontally, dropping each layer of cases onto a pallet load. This method is much like the old magic trick of pulling a tablecloth off without disturbing the dishes. Conventional automatic palletizers offer a broad range of speeds, with rates ranging anywhere from 10 to 200 cases per minute.

stacking products in a freezer, or when the need calls for "rainbow stacking," which has become increasingly popular, particularly in the beverage industry.

The task of creating rainbow pallets involves combining more than one SKU on a pallet, or customizing the pallets with various products. For a sports drink or soda company, it might be a pallet comprised of six or seven different flavors. The robotic arm picks up cases from multiple pallet loads to build layers of cases on one or more pallets, while delivering a more accurate count than with manual palletizing.

Rainbow stacking has become increasingly popular with mass retailers such as Wal-Mart, Costco, Sam's Club and many grocery store chains. These retailers are looking to keep their costs down by having distribution centers ship products to them that are already customized to each of their locations. Rainbow stacking provides the retailer with a customized shipment to meet their specific inventory needs. This method is valuable to the retailer because they can order precise amounts of products for a variety of reasons, most notably to match their supply with their expected demand.



A gravity conveyor routes cartons to an adjustable height lift table so workers can utilize manual palletizing methods.

With the **robotic method**, pallets are built by utilizing a robotic arm that has been equipped with an end effector (clamp, vacuum, etc...) to pick cases from one location, often a conveyor, and stack them onto a pallet. The robotic method has become a preferred mode of palletization when employees are required to work in a harsh environment, such as

Although robotic palletizers are the most effective method of building rainbow pallets, many companies have avoided using them due to the high cost and longer return on investment (an entry-level robotic system can cost at least \$125,000). But as the technology is

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refined and prices are dropping, providing a shorter ROI, robotic palletizers are gaining popularity.

Placing cartons on a pallet and moving them from Point A to Point B seems simple. Making sure the cartons stay on the pallet, however, is another matter, especially as the demands for increased throughput become a factor. Stretch wrapping is the most cost-effective way to keep loads secured on a pallet.

Just as with palletizing, there are several methods of stretch wrapping. The method that is best for your operation depends on desired speed and available budget.

• **Manual Stretch Wrapping.** This is the perfect method when the budget calls for a \$40 roll of film and a \$3 utility knife. Simply put, a worker grabs the end of the stretch wrap and walks around the pallet. It's slow, labor-intensive, and inefficient, but it gets the job done.

• **Semi-Automatic Stretch Wrapping.** If a company is stretch wrapping more than 15 loads per day, then chances are that some level of automation is needed to lower labor and film costs, as well as reduce the number of back injuries. There are two options. With the first option, a pallet load is manually placed (via forklift or pallet jack) onto a turntable; as the pallet rotates, the stretch wrap is wound around the cases. In the second option, the pallet remains stationary and a rotary arm spins around the pallet, encasing it in film. Although not always the case, the stretch wrap is often applied and cut automatically, eliminating the need for a worker to hook a corner of the wrap to the pallet and cut it upon completion. Both options are more efficient and cost-effective solutions when compared to manual stretch wrapping. In some cases, Semi-Automated Stretch Wrapping pulls the film so much tighter than its manual counterpart that it can triple the life of a roll of film.

• **Automatic Stretch Wrapping.** These systems incorporate conveyors in which the pallet load automatically passes through the stretch wrapping machine.

As the pallet load approaches the stretch wrapping machine, photoelectric eyes detect the load and instruct the system to automatically perform various tasks,



An automated stretch wrapper and truck door conveyor system.

including: indexing the load, attaching and cutting the film, wrapping, etc... In automatic systems, very little worker assistance is required.

In the distant past, the only way anyone knew what was on a pallet was to write the information on a piece of paper and tape it to the cases, either before or after stretch wrapping. But that inefficient system changed with the introduction of label printing and **bar-coding** in the late-1970s.

The principle of bar-coding is simple: a scanner differentiates the black bars from the white spaces and sends a decoded message to a computer. By identifying what's on a pallet, you know exactly where it is going and when it is received at its destination. It also gives distribution centers better control over their inventory by knowing precisely what product is coming into the building, where the product is stored, when the product is moved out of the building, and when it has reached its destination.

Palletization is basically a three-step operation: stacking the cases, securing the cases, and coding the load. Aside from advancements in technology, another change that may occur in the future is a shift from wood to plastic pallets, as companies look to keep

long-term costs down and reduce worker injuries due to damaged pallets, splinters and protruding nails.

Ninety percent of the U.S. pallet market remains wood. However, plastic pallets continue to make inroads, particularly in the pharmaceutical, food & beverage and grocery industries, because they are more durable, reusable, cost effective, and weigh significantly less.

It's estimated that there will be fifty million plastic pallets in use by 2012, and that number could increase as more companies turn to automation to increase precision. A traditional 48"x40" wood pallet weighs about 50-pounds and can bear a load of 3,000-pounds, while a plastic pallet weighs around 35-pounds and can hold a 4,000-pound load.

Plastic pallets, however, can cost two to three times more than wood pallets. The advantage is that a plastic pallet has a longer "shelf life," an important factor when you consider that 700 million wood pallets either have to be made or repaired each year, due in part to what is believed to be a decline in wood quality. In fact, some companies have departments that do nothing but repair damaged wood pallets.

Still, there are advantages to both: wood works well with a forklift, while plastic works best on a conveyor. There are also issues when using wood with pallet flow, particularly when you have a long train of pallets in the pallet flow lane and a wood pallet breaks or splinters somewhere in the middle.

One of the key elements in creating the most efficient distribution center is utilizing proper palletizing methods to suit your specific needs. The amount of time your facility stores inventory, the type of product being distributed, the budgeted allowance for new technologies, and the anticipated rate of ROI are all factors that must be carefully considered when determining the best palletizing method for your operation. After diligent deliberation of the palletizing plan, other warehouse necessities like stretch wrapping techniques and the physical makeup of the pallet material can be selected. The future of palletizing technology is sure to grow along with the increasing demand for pallets.



## Seven critical steps to planning a warehouse or distribution center

Craig R. Bertorello  
Vice President of  
Operations

There's no room for mistakes in today's economy—and that includes building or re-engineering distribution centers.

Because these facilities are critical components of the supply chain, they require a detailed planning process to ensure they meet return on investment expectations.

More than ever, the "measure twice, cut once" rule applies, since having to tack on additional capital outlays five, six, or seven years down the road is costly. The projection of inventory and how it is to be stored and moved are the driving factors, as a 20% deviation on a 200,000 square foot storage area can result in a 40,000 square foot shortfall or surplus.

In the final design phase, picking and storage will rule the day; yet they have opposing agendas. Large storage areas increase travel distances and reduce the picking efficiency. On the other hand, the ideal picking operation requires relatively small amounts of product stored in dedicated locations, relatively close to one another, which works counter to a facility's storage efficiency.

When considering the design and layout of a new distribution center, it's important to first consider which of the four scenarios most closely resembles your operation:

- **Low Activity / Low Storage Requirements.** This combination represents the simple, smaller warehouse operation. Rarely are automation or sophisticated storage and picking mediums or devices justified for these smaller operations. In most instances, floor storage, stacked pallets, simple pallet racks and/or conventional shelving are utilized within the facility, along with manual handling.
- **Low Activity / High Storage Requirements.** This combination typically calls for high bay, multi-level, high-density storage, and a random location strategy. Order picking can be manual or semi-manual.
- **High Activity / Low Storage Requirements.** This combination generally suggests a very condensed forward picking area supported by simple overstock storage. The high pick activity level often justifies automating the order picking system and the use of automated material handling systems.
- **High Activity / High Storage Requirements.** This combination is characteristic of a typical large distribution center. The high pick activity and high storage requirements often justify the use of exceedingly automated order picking systems, heavily automated material handling and sortation systems and high-density storage.

Once the storage and picking scenario is understood, taking into account economic forecasts (consumer spending habits down in today's stagnant economy could change over the next few years, and inventory requirements with it), the planning process is now off and running.

Keeping in mind that a distribution center may be a company's largest capital investment, as well as the final stop before the product reaches the customer (or doesn't), it's imperative the planning is done perfectly the first time.

To accomplish this objective, here are seven critical steps to follow when planning a warehouse or distribution center.

**1. Define goals and objectives.** These should be closely aligned with the overall strategy for the new facility. They can be defined as minimizing warehousing operating costs, maximizing picking productivity, or simply providing the best customer service. They can also be defined more specifically, such as maximizing cube utilization, providing maximum flexibility in the final layout to accommodate future expansion or changes in business, or maximizing efficiency and productivity with a minimal amount of resources.

**2. Document the process.** Review the existing or proposed methodology and process, and conduct personal interviews with the staff dedicated to all major functional areas within the process. Recent changes in the economy may have caused some downsizing and movement of personnel to work areas they may not be totally familiar with, so be sure to interview enough people familiar with each functional area. If those interviewed can't identify areas of opportunity for improvement in their department or area, you should look to interview more from that department or functional area as there is always room for improvement.

**3. Collect information and data.** Collect any and all information specific to the new facility. Since it is best to work from inside the facility out when considering new construction, don't let any building constraints restrict design. When considering existing space for the new facility, make sure the information includes accurate drawings showing column sizes and locations, dock and personnel doors and locations, ceiling height restrictions, and ceiling girder/joist construction. It is also important to collect all relevant product information pertaining to the number of stock keeping units (SKUs) to be stored and picked within the facility, along with their dimensional measurements, weights, order history, and velocity data.

**4. Analysis.** Once information about the building and the inventory has been collected, a thorough analysis should be performed in order to determine if the goals and objectives can be obtained. The analysis should answer the following questions:

- How well does the product flow into, within, and out of the facility?
- Does the forward pick area (pick modules) hold sufficient inventory to avoid excessive replenishment requirements?
- Is the storage system and area large enough to accommodate the inventory including any required safety stock?
- What type of conveying and sortation equipment will be used?
- What are the staffing requirements?
- Does the operating budget include staffing, maintenance, utilities and the cost of the information system?
- How well will the facility adapt to a change in operating requirements?

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- How effectively will the warehouse management system work with the automated material handling system?

If the analysis determines the goals and objectives can be met, the detailed solution and project plan can then be developed. If they cannot be met, then management should determine an alternate plan of action such as modifying the goals and objectives or making substantial changes to the building design.

**5. Create a detailed project plan.** This plan should identify all the steps required to create the warehouse or distribution center layout, including the overall goals and objectives, and the results of the information and data analysis used in developing the plan. The project plan should contain the major tasks to be undertaken, the resources needed to achieve each task, and how much time should be allotted to accomplish the tasks successfully.

The project plan should include start and end dates for all tasks, as well as availability of resources. Once the plan has been developed, it should be reviewed and checked to be sure the timeline is realistic and attainable, as the available occupancy date of a new facility will dictate equipment delivery and installation.

**6. Implementation.** The implementation phase of the project is when the “rubber meets the road.” It’s during this phase that the layout is transformed from concept to reality. All resources within the new facility need to work together to ensure the project plan’s goals are met. Since there is a set order in which components of the system should be installed, delivery of all

products is carefully coordinated so as to arrive at the time when it is needed.

Like a race car which is tuned to perform its best at each individual race track, this phase is when the system gets tuned for peak performance. Timing for the sortation systems and merges are set to maximize throughput. The pitch to be used for the carton and pallet flow racks is adjusted in order to meet the user’s satisfaction.

The time from establishing system goals to completion can in some cases be over a year and, on occasion, changes are requested during the implementation phase in order to meet the most current objectives. It’s important to remember that all of these changes or deviations from the original plan must be well documented so that expectations for all stakeholders are managed properly.

**7. Post-project review.**

Once the project has been completed and inventory is moving smoothly in and out of the facility, a closeout meeting should be scheduled. This session will include a discussion with the implementation team as to whether the final layout was implemented as originally designed and approved, and to confirm that any changes were appropriately documented. This step is critical for future project planning.

A well-designed and

well-planned warehouse or distribution center offers multiple advantages in the fight to remain competitive and successful.

By taking the necessary steps to see the project through from start to finish, the result will be a facility that operates efficiently, uses space effectively, maintains cost control, and in the end achieves its ultimate goal of meeting expectations.



An overview of a well-planned distribution center, showing an overhead conveyor with an integral “pusher” sortation device and shelving setup for an “each” or split-case picking operation. In the far background is double-deep pallet rack storage lift table so workers can utilize manual palletizing methods.

## Upcoming Seminar

### Seven critical steps to planning a warehouse or distribution center

**Why you should attend?**

- You will learn how to properly design a layout tailored to your operation’s need
- You will learn how to position your company for future growth
- You will learn how an efficient design can get the highest return on investment
- You will learn the elements needed to create a detailed project plan

**Presenter**

Vice President of Operations  
Craig R. Bertorello

**Two convenient locations**

**Wednesday, October 21, 2009**  
8:30 am Registration and Continental Breakfast  
9:00 am—11:00 am Seminar  
Radisson Hotel, Jacksonville, FL

**Wednesday, October 28, 2009**  
8:30 am Registration and Continental Breakfast  
9:00 am—11:00 am Seminar  
TriFactor Learning Center, Lakeland, FL

**Who should attend?**

- Presidents and CEOs
- VPs of Operations
- VPs of Engineering
- Directors of Distribution
- Warehouse/Distribution Managers
- Staff Engineers

There is no charge for the seminar, but seating is limited so you must register. Call 1-800-282-8468 or visit <http://trifactor.com/Seminar-Information-and-Sign-Up>.



John T. Phelan, Jr.,  
P.E., COO

## Innovative material handling is just what the doctor ordered when distributing health care products

A company that develops and distributes medical implant devices, surgical instrumentation and biologic services to hospitals and physicians throughout the United States proclaims on its website a commitment “to making every day a

Great Day in the O.R. for the surgeon, the operating staff and, above all, the patient.”

But it wouldn't be a “great day in the O.R.” for the doctors, staff and most certainly not for the patient, if a new knee joint, a replacement hip, a supply of bone cement or any number of prescription drugs didn't make it to the hospital, were damaged or had expired.

More than 13 million prescription medicines and healthcare products are delivered to 144,000 pharmacies, hospitals, nursing homes, physician offices, clinics, government and other providers every day. Before these medical products and components, many of them on a life-saving mission, make it into the hands of the medical staff or the patient, they must be shipped from the manufacturer to a hospital or pharmacy by way of a distribution center.

These impressive facilities, many measuring hundreds of thousands of square feet, are often equipped with the latest in high-tech equipment and state-of-the-art computer software. This technology is designed to interact smoothly and efficiently with thousands of different products, sizes and styles in a fast-paced, high-pressure environment where speed and accuracy rule the day.

The immediate challenge of ensuring the smooth and timely flow of product within the distribution center often starts with the daunting task of keeping track of the thousands of SKUs on hand as the health care industry continues to expand and the number of products available on the market increases. This challenge might seem no different than those associated with distributing any other finished good in a completely different industry, but remember, we are dealing with products that are under the scrutiny of the federal government and have a significantly higher liability exposure than most other goods.

Therefore, when growth occurs for companies that distribute health care products, the switch to a more accurate and very efficient automated system is often done early. Additionally, automated distribution systems enable distributors of health care products to manage inventory in real time, process orders quicker for shipment, customize the auditing requirements prior to shipment and also provide a host of reporting services. These reporting services are extremely customizable so that distributors can make operational decisions that improve their customer's satisfaction level, which is naturally one of the main goals for which all businesses strive.

Switching to an automated system inside the distribution center typically means using multiple technologies such as A-frames, pick-to-light, pick-to-voice, vertical carousels, a Warehouse Control System along with a discipline of frequent re-slotting of products to make sure the proper SKUs are stored and picked from the right systems. Utilizing these technologies also mandates the need to

have many different storage mediums to properly handle all the SKUs on hand according to how quickly they move. For example, slower moving products might be stored in and picked from shelving, while faster moving products might be stored in and picked from carton flow or pallet flow rack with personnel being directed visually by lights at the pick face or by voice through a head set.

The advantage of the widely used A-frame technology is that it can also serve as a unitized sorter – automatically dispensing individual product into unique orders. It is especially advantageous for higher velocity SKU's and is also extremely accurate. This is why one of TriFactor's customers, a leader in the ophthalmic industry, utilizes multiple A-Frames in their operations to dispense small cartons of unchanging dimensions into totes running down the middle of the A-Frames prior to final packaging, labeling and shipping.

However, as previously mentioned, the downside is that it does require a relatively small uniform product size that does not often change and the system must be manually replenished. But many pharmaceutical companies still find that when working with various product sizes, order profiles, and SKU velocities, where a blend of speed and order accuracy is essential, that A-frame technology is often most effective.

Because of the type of products being handled, it's imperative that the proper storage medium be put in place, particularly when dealing with products that have shorter expiration dates and are often under strict FDA regulations. This is where FIFO (First In, First Out) plays an important role, as does ensuring the accuracy of returns. Therefore, utilizing carton flow rack coupled with either pick-to-light or pick-to-voice in the order picking process assures that items are picked in the same order that they were stocked in a fast and accurate manner.

Finally, from a storage point of view, there are challenges when dealing with products that must stay frozen (such as bone tissue), goods that require special security measures (certain prescription drugs) and those monitored by government agencies (like the FDA), as well as areas that need to be equipped with humidity sensors, motion detectors and audible alarms.

When designing a material handling system for the health care industry, it also becomes quickly apparent that there is a unique mindset among management and workers that isn't often seen in other industries. Workers moving cases of pet food don't feel like they work in a pet store; workers handling cartons of Captain Morgan don't feel like they work in a liquor store. There is, however, a “medical culture” in the health care distribution community that permeates the industry, from the skills and education of the worker to the very environment they work in.

The health care industry appears to have a more narrowly focused and trained “industry-specific” workforce that tends to take their jobs very seriously, because if they don't someone's life could be in jeopardy. The industry as a whole demands a high level of system accuracy and a healthier and cleaner work environment with less noise, which immediately sets them apart from more traditional warehouse and distribution center opera-

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tions. These distribution centers often start the clean and quiet tone with the type of equipment they select.

Additionally, it is common in the health care industry for many companies to invest early in high technology distribution solutions not only to maximize efficiency, but also in the interest of creating a safe and ergonomically friendly work environment, where the distribution center is often as immaculate as the manufacturing facilities. A clean, quiet distribution center can often be used as a sales tool to show potential customers of health care product distributors the diligence that goes into packaging each shipment. The message conveyed to potential customers is clear – product will be delivered on time, accurate, undamaged and immaculate. That is not only what the end users want, it is what they demand.

Perhaps one of the major advancements in reaching these industry goals was the introduction of the 24V MDR conveyor, which is not only 40%-60% more energy-efficient, but also 45% quieter than traditional conveyor systems. Also, since this type of conveyor is driven off of low voltage motors, the need for large, greasy and loud A/C motors is eliminated.

TriFactor's first use of 24V MDR in the health care industry was in 2002 at a distributor of diabetic supplies. The system integrated both pharmacy and supply products into a unique automated order fulfillment solution that, to this day, runs like a well-oiled machine but is as quiet as a mouse. Since then, the company has grown dramatically and has expanded their operations from a very local concentration to a more regional basis.

When TriFactor installed a 24V MDR system for Exactech, the Gainesville FL-based manufacturer of medical implants and devices, Kevin Godwin, Exactech's Director of Customer Operations, noted, "One of the major impacts of the new system was the positive effect it has had on our employees, who are now working in a fully functional warehouse environment with the noise level of a library."

A conveyor system can be noise-free for one of two reasons: because it's an efficient, environmentally friendly system or because it's not running. That critical interruption is what needs to be avoided in an industry that can literally live and die on the need for speed, accuracy and minimum downtime. This is where proper maintenance becomes paramount to keeping productivity at its peak.

The health care industry demands a cleaner environment, not just for its employees but also for its equipment. A cleaner environment can be as simple as making sure ventilation filters are clean and conveyor rollers are kept in good working condition; but even this can create a challenge. Some medical product distributors have their conveyors on a carpeted floor as opposed to a traditional cement floor, which makes cleanup of oil and other



A tote enters a pick zone via a blue table-top plastic chain conveyor. Once the tote is picked, the picker slides it onto the 24V MDR takeaway conveyor en route to pack-out and shipping.

materials much more difficult. Equally important in maintaining a smooth operation is to make sure a system doesn't remain down because of a lack of spare parts, which should always be kept on hand in case of an emergency.

As consolidation in the health care industry increases, with large companies buying smaller ones and rolling their products into a single distribution center, the need for more space and better inventory control becomes an increasingly important factor. For instance, if a company has a certain amount of storage/distribution capacity in its facilities when it acquires another company's products, it either has to increase storage/distribution capacity to account for the new products or it has to become more efficient at how it handles its original products, since the same capacity now needs to accommodate and account for the new products.

The material handling industry must keep in step with the need for this ongoing growth and change. This can be as simple as configuring a system that is flexible enough to be manipulated with the ever-changing work environment, to literally "grow" as the company grows.

"When we went into a new building," says Exactech's Kevin Godwin, "it was important for us not to have a rigid system in place. TriFactor gave us a system that was very flexible, that actually allowed us to move 10-foot sections of our conveyor around to fit our requirements, like the train tracks you used to play with as a kid. This flexibility allowed us to handle our growth rate without any negative impact to our customers."

The material handling industry must realize that the health care industry has its share of special requirements that make it unique. Only by staying abreast of the latest technologies and regulations governing the health care industry, will our industry be able to stay ahead of the curve on the latest innovations in inventory management and automation, which will ultimately result in more efficient distribution solutions.