



INDUSTRIAL EQUIPMENT

REACH NEW HEIGHTS

# GUIDE TO PROVEN WAREHOUSE SOLUTIONS

Improve Productivity and Efficiency. Minimize Costs.



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# FOREWORD

The correct layout and usage of your warehouse means everything to your bottom line. This e-book, created by the material-handling experts at Toyota, will help make effective warehousing easier, to make your bottom line bigger.

From beginning to end — designing your warehouse to Kaizen after it's finished — we've covered it all. Use these tips to work smarter, not harder, and do more, better.



**Note:** This is an interactive PDF. Simply click any web address or underlined link to access expanded content online.



## KEY TERM

### **Kaizen**

A business philosophy based on making positive changes on a regular basis to improve productivity.

01



# HOW TO DESIGN THE OPTIMUM WAREHOUSE



# WAREHOUSE DESIGN

## It Pays to Get It Right

Designing the optimum warehouse means designing something that will withstand the test of time. Think about what your business might look like 15 to 20 years from now. Will it have grown substantially? What happens if you don't need your warehouse anymore? Can it be easily adapted to another use, such as office space?

Your perfect warehouse is one with the functionality to meet your current needs and the adaptability to accommodate your future needs. Let's start designing it.



## LOCATION

### First Things First

**Location.** This is your first big decision. And here's the key consideration in making it: What's the objective of your warehouse? It might be to facilitate the shortest lead times possible. To improve your current logistics. Or another objective altogether. Whatever your objective, it should inform your decision.

Another up-front consideration: Do you need a stand-alone location? Or can you replace or add on to an existing structure? Knowing what kind of demand you need to serve will help you make a decision about where to locate your warehouse.

### ★ BEST PRACTICES

One of the biggest issues in effective warehousing is **lead time**. A good rule of thumb is to place your warehouse as close as possible to your customers.

# SPACE PLANNING

## Measure First, Build to Fit

**Data.** There's no better guide for designing a warehouse that fits your business. What is a warehouse? It's a box. Warehouse space planning helps you fill the box to best meet your needs. Your data will tell you what size warehouse you need to build, what work cycles it should accommodate and more.

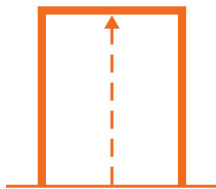


### WHAT YOU NEED TO KNOW



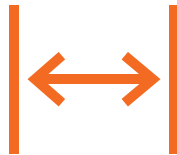
#### ► Ceiling Height

The clear ceiling height determines how high your materials can be lifted. This measurement should take into account the lowest ceiling-mounted components — sprinklers, lighting, HVAC system, etc. Forklifts should also be reviewed for lifting height to ensure they can safely reach the highest racking when loading or unloading materials. Many localities regulate ceiling and racking height. Check local regulations before proceeding.



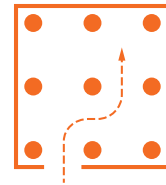
#### ► Easy Access

Don't overlook building details that require easy access. This includes electrical panels and water shut-off valves. Lowest-door height is also a major consideration. To ensure your building is up to code, work with a local contractor to review regulations.



#### ► Aisle Width

Determine aisle width based on the type of forklifts you plan to use in your warehouse. A forklift should pass easily through the aisle without making contact with racking or stored materials. Aisle dimensions are measured load to load to accommodate pallet overhang, but should also consider the forklift's right angle stacking position. A 10' rack-to-rack space may really be 9.5' when measured load-to-load. Overhang is approximately 3" for each side of the pallet.



#### ► Column Spacing

Structural columns in your warehouse — if you have them — will dictate your racking design and aisle widths. In some instances, storage is lost if pallet positions are blocked by columns. Designing around columns and the flow of materials requires you to reconsider your warehouse layout, even if the setup has been in place for years. Flipping the racking (e.g., vertical to horizontal) can hide columns within the racking, exposing more of the warehouse floor. If you use electric forklifts, you'll need to factor in where to house chargers. They're commonly found within racking, along a wall or in a separate battery charger room.



SEE MORE



Watch [this video](#) for help with effective warehouse design and space planning.

02



**HOW TO  
CHOOSE THE RIGHT  
MATERIAL-HANDLING  
EQUIPMENT FOR YOUR  
WAREHOUSE AND  
BUSINESS**



# FINDING THE RIGHT FORKLIFT

## One Size Does *Not* Fit All.

You don't want the forklift that works well in someone else's warehouse. You want the forklift that will work best in yours. Finding it requires some research, but it's not exactly heavy lifting. The space-planning data you collected up front will come in handy. And you can also enlist the help of a trusted Toyota expert.

## ★ HELP CENTER

Get useful forklift advice from  
a [Toyota Expert near you.](#)

## 1 KNOW YOUR CAPACITY

“How heavy is my typical load?” “How heavy are my heaviest and lightest loads?” Knowing the answers to these questions is key to selecting the forklift that's right for your warehouse and work. Do plenty of research, look for outside help if you need to, and be sure to plan ahead for future load-size increases. Your Toyota dealer is a good resource.

## 🔑 KEY TERM

### **Forklift Capacity\***

The measurement of how much weight a particular forklift can lift. Capacities begin around 2,000 lbs. and can go to 72,000 lbs.

\*Based on a 24" load center



## 2 DECIDE HOW TO POWER YOUR EQUIPMENT

### FORKLIFT FUEL

Forklift power comes in electric and internal combustion (IC) varieties. Which power source is right for you depends on how and in what kind of environment you use a forklift. We list the pros and cons of electric and IC below to help guide your decision.

## ELECTRIC



Electric forklifts, pallet jacks and stackers now account for 65% of forklift sales.

#### ► Electric Advantages

- **Better for the environment:** Electric forklifts produce zero emissions. They do, however, still need to be maintained, which requires oil and other lubricants.
- **Operator ergonomics:** Electric forklifts generate less noise and vibration, reducing operator fatigue.
- **Decreased repair costs:** Electric forklifts have fewer moving parts to maintain and repair. AC motor technology further eliminates brushes, a component prone to failure in non-AC forklift models. Better speed control is another benefit.
- **Typically lower long-term fuel costs:** Electric forklifts use rechargeable batteries.

#### ► Other Considerations

Electric forklifts have lower lifetime fuel costs. Their initial cost is higher (but you are in effect paying for all the fuel up front). This includes the cost of the battery, and an area for charging, watering and cleaning the forklift. Many electric forklifts are at a disadvantage in an outdoor application, especially if the environment is wet.

## INTERNAL COMBUSTION



IC forklifts account for about 35% percent of forklift sales. They dominate outdoor, around-the-clock or high-throughput applications.

#### ► IC Advantages

- **Flexible application:** IC forklifts are good indoors and outdoors. They do well in rain and other inclement weather.
- **Multi-shift use:** IC forklifts narrow the fuel savings gap with electric forklifts over multi-shift use. Many times, swapping out an LPG tank or refueling at a pump is much quicker than charging a battery, even if opportunity or fast charging.
- **Typically Faster:** Besides the Toyota 80-Volt, IC forklifts have faster travel speeds and acceleration. This can negate the need for additional equipment and personnel to move the same amount of product.
- **Lower initial cost:** IC forklifts require only an investment in propane tanks and a propane tank storage area to be operational, but unlike with electric forklifts you will then be paying for fuel as you go.
- **Easy to refuel:** IC forklifts do not require a lengthy recharging period. An empty propane tank can be easily replaced in 5 minutes. This advantage becomes especially important over multi-shift operation.

#### ► Other Considerations

Purchasing an IC forklift requires providing ventilation in the warehouse to safely handle emissions. Engine noise and the physical requirements of changing propane tanks can increase operator fatigue. Finally, for applications that don't specifically require an IC, the lifetime costs of maintenance, repairs and fuel should be compared with those of an electric forklift.

### 3 KNOW YOUR AISLE WIDTHS

#### LESS THAN 10 FT. WIDE?

You will need a narrow or very-narrow aisle forklift.

#### BETWEEN 10 FT. AND 12 FT. WIDE?

You will need a narrow-aisle or warehouse specialized forklift.

#### MORE THAN 12 FT. WIDE?

A wide variety of IC and electric forklifts will work.

### 4 PICK A MAST

The mast, or upright, is the vertical assembly on the front of a forklift that raises, lowers and tilts the load. Different masts are used for different applications. It's important to choose the correct type for your application. Attached to the mast is the carriage, which attaches the forks to the mast. When purchasing a forklift, pay close attention to the mast to understand its capabilities and limitations.



#### ► Two-Stage Mast without Freelift

One channel, limited lift height. Unpopular option on traditional forklifts. Its limited capabilities can create problems loading trucks.



#### ► Two-Stage Mast with Freelift

Typically lifts to heights of 10–11 feet. Two-Stage masts are typically used for loading and unloading trucks and in low-level applications.



#### ► Three-Stage Mast

The most common mast type. Consists of three sections that extend the forks to their maximum lift height. Hydraulic cylinder in the middle of the mast, referred to as “primary lift cylinder,” raises forks and carriage near the top of the mast prior to the sections staging up. Three-stage masts typically lift to heights of 15–16 feet and are most commonly used in distribution centers, warehouses and other high-height applications.



#### ► Four-Stage Mast

Four sets of rails that raise load to typical lift height of 20 feet, with select models reaching up to 30 feet. Primary lift cylinder raises forks and carriage near top of mast prior to sections staging up. Can load and unload higher-tiered stacks than the two- or three-stage masts, but requires increased caution due to high lifting heights. Most commonly used in distribution centers, warehouses and other high-height applications.

#### ! IMPORTANT

Different masts have different collapsed heights. Know the clearance measurements in your facility before purchasing your forklift.



## HOW TO CHOOSE

In selecting a mast, consider these three key questions:

1

► **How high do you need to lift?**

Measure your highest shelf. This determines your lift requirements. Now add another 6"-8" to your measurement. This extra space gives a forklift operator additional clearance to lift above the rack, and avoid dragging the product as it's loaded or unloaded.

2

► **How low should your lowered/collapsed mast be?**

Some forklift applications call for entering and exiting doorways. Walk through your building and measure doorway heights. This determines your lowered-height requirement. Forklift operation on trailers also affects mast selection. Ask your freight partner for trailer specs.

3

► **If you load product onto trailers, do you double stack?**

In a trailer or other confined space, two features come into play: **free lift** and **load backrest**.

**Free lift** is the distance the carriage/fork assembly can be lifted without increasing the lowered height. Many forklifts have free lift, but some masts have full free lift. This is advantageous when lifting and stacking in trailers.

A 48" **load backrest** is standard on most forklifts. During lift, the load backrest raises beyond the mast. Depending on your warehouse's height restrictions, you may need a modification to avoid damage to ceilings and ceiling-mounted equipment.

★ **SPECIAL MODIFICATIONS**

Custom fit a forklift for your specific work requirements with a Toyota Special Design Request. [Request A Quote.](#)

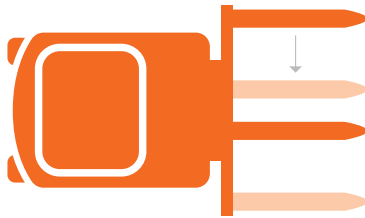
 **EXPERT ASSISTANCE**

To find the mast best for you, request a full site survey from your local [Toyota Dealer.](#)

## 5 CHOOSE YOUR FORKLIFT ATTACHMENTS

Forks are the most popular forklift attachment, but they're not right for every application. Some loads require a different attachment. Others benefit from additional attachments to help the forks do their job better.

With the right attachment for your application, you can boost productivity, reduce the risk of load damage, ease stress on the forklift and make the forklift operator's job easier, allowing them to do more.



### ► Side Shifters

One of the most popular attachments. Without leaving seat, operator can shift forks up to four inches left or right to pick up a not perfectly aligned load. Save forklift wear and tear. Available in single and double units to handle one or two pallets at the same time.



### ► Fork Positioners

Without leaving seat, operator can automatically adjust fork spread to fit different pallet sizes.



### ► Paper Roll Clamps

Operator can clamp onto the sides of a roll of paper without damaging or crushing it. Useful in a variety of applications. Attachment of choice when a load is not transportable by pallet.



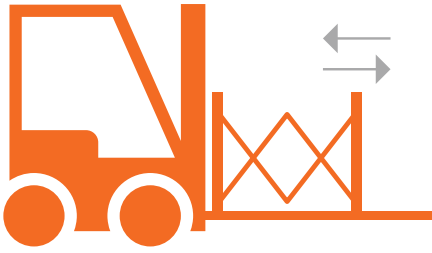
### ► Flat Surface Clamps

Commonly used to transport washers, dryers, refrigerators and other non-palletized goods.



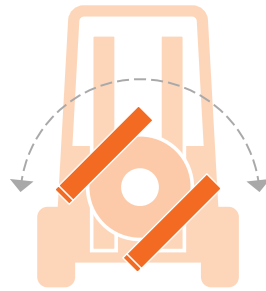
### ► Carpet Poles

Heavy-duty coils used to transport large rolls of carpeting, steel and other materials.



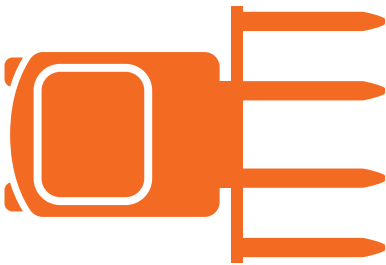
► **Push/Pull**

Eliminates need for pallets, reducing pallet costs. Loads carried on cardboard or plastic slip sheets with a lip. Load is pushed off the forks by this attachment. Most popular in food-processing warehouses.



► **Rotators**

Forks attached to rotating apron that can turn 180 degrees to 360 degrees. Most often used where bins or containers are stored and transported. Contents can be carried in bin and dumped into another container.



► **Multiple Load Handlers**

Double or triple forklift productivity by adding second or third pair of forks, allowing operator to pick up and transport multiple loads side by side. Often found in beverage- and food-handling warehouses.

★ **ATTACHMENT BENEFITS**

- Higher productivity
- Lower operator stress
- Time and money savings
- Operator can make adjustments without leaving seat

03



# WAREHOUSE SAFETY



# SAFETY FIRST

## Act to Prevent Accidents

Material handling within a warehouse presents the potential for injury. Most of those injuries can be avoided, however, by properly training equipment operators and pedestrians, and by following OSHA standards.

The first step is recognizing where and why accidents most frequently occur, and how to prevent them.

## COMMON CAUSES OF FORKLIFT ACCIDENTS



Haven't built your warehouse yet? Keep these points in mind for when you do.

### ► Behavior/Operations

- Excessive speed
- Riding with elevated load
- Improper backing up technique
- Improper turning, braking or accelerating
- Improper warning notifications
- Poor communication
- Riding on forks
- Horseplay/stunt driving

### ► Conditions

- Malfunction of brakes, steering or transmission due to improper maintenance
- Leaks in hydraulic systems
- Poorly stacked pallets
- Pallets in need of repair
- Too heavy of a load
- Unstable load

### ► Workplace Design

- Crowded or cluttered aisles
- Obstructions at intersections and doors
- Volume of traffic in work area
- Working and walking in same general area
- High noise and/or poor lighting
- High grade ramps and multiple surfaces

### ► Corporate Policy

- Lack of proper training
- Time constraints
- Lack of proper equipment
- Poor forklift maintenance
- Age of forklifts

## CREATING A SAFER WAREHOUSE ENVIRONMENT

### ► Pedestrian Safety

- Create clearly marked pedestrian walkways physically separated from forklift lanes by railings or barriers (when possible)
- Clear permanent aisles and passages of obstructions (safety regulation requirement)
- Appropriately mark areas where mechanical handling equipment is in use (safety regulation requirement)
- In absence of separate walkways (the ideal), allow for adequate pedestrian areas alongside forklift lanes
- Use walkway striping to identify pedestrian areas

### ► Additional Pedestrian-Safety Best Practices

- Require pedestrians to wear safety gear: helmets, tearaway colorful vests, headphones linked to safety warnings
- Install detection systems: flashing lights or warning sirens triggered when pedestrians are present
- Install sensors or beams triggered when forklifts approach, alerting pedestrians
- Install flashing "Caution" signs in active forklift traffic ways
- Add convex mirrors at intersections so operators and pedestrians can see around corners
- Install railroad-style crossing gates where forklift and pedestrian pathways intersect

## SAFETY TRAINING

### ► Forklift Operator Need-to-Knows

- Always make eye contact with pedestrians and yield to them
- Stop, wait, sound horn and proceed cautiously at all intersections
- Walk a route first to scout for issues, especially in cluttered areas
- Use a spotter in areas where visibility is impaired
- Warn approaching pedestrians with horns or alarms
- Don't move trucks without a clear view of route: always face in direction of travel
- Start, stop, travel, steer and brake smoothly
- Never allow anyone to stand or pass under a load or lift mechanism
- Never carry people on forks

### ► Advice for Pedestrians

- Do not rely on forklifts to stop suddenly and maintain load and truck stability
- Stay clear of all forklifts in operation
- Never assume you have the right-of-way
- Forklifts often have a wide rear swing radius
- Falling loads from forklifts or storage racks can be as dangerous as a collision
- Use pedestrian walkways at all times
- Recognize and obey all posted signs
- Do not ride on forklifts unless authorized, and then only on lifts designated for riders

## ADDITIONAL SAFETY STEPS

### Safe Equipment Guidelines

One key way to avoid forklift-related accidents is to ensure equipment is in good condition on a regular, consistent basis. Start with a pre-operation inspection that follows a carefully maintained checklist. If the forklift passes, have the operator turn on the truck and inspect all of the running parts of the machine to ensure that propulsion, braking and other systems are fully functional. If they find any red flags, lock out the offending forklift, tag it "Out of Service," and notify supervisory personnel.

### Don't Rely On Your Track Record

Poor judgment is one common cause of pedestrian forklift injuries. Complacency is another. A longstanding history of safe operations doesn't rule out future mishaps. Even well-trained workers can become complacent and thus fail to remain properly alert to the possibility of accidents.

Keep your guard up. Ensure that occupants of a facility are properly trained and equipment properly maintained. And make sure the facility itself is properly designed for safe forklift and pedestrian use. Doing so increases your odds of maintaining a safe workplace moving forward.





# WAREHOUSE ACCESSORIES

## Be Seen, Be Heard, Be Safe

Toyota forklifts are rigorously designed with safety in mind. Toyota offers a full line of related accessories as factory options or via Toyota Genuine Parts and the one-stop shop STARLIFT Parts program.

Toyota recommends that you consult with a safety expert before adding additional accessories to your forklift. Also, it's worth remembering that the best way to stay safe in a material-handling environment is by requiring that all employees are properly trained in forklift operation standards and warehouse safety.

### SAFETY ACCESSORIES WORTH CONSIDERING

Particular applications may benefit from these forklift accessories:

- Flashing lights
- Backup alarms
- Additional mirrors
- Fire extinguisher
- Driving lights
- Ear protection

Even more beneficial, however, is always following and reinforcing safety precautions. Remember: The most important safety feature is a well-trained, observant operator.

# T-MATICS: THE NEXT STEP IN ACCOUNTABILITY

## In the Know, Ready to Act

T-Matics, exclusive to Toyota, gives you the power to increase your company's culture of safety and accountability with data — the cold, hard facts. Let's start with the facts about T-Matics.

### ► What is T-Matics?

A fleet management tool that tracks and reports operating behavior of a forklift and/or a forklift operator using a Vehicle Management System (VMS).

### ► What is a VMS?

A system that facilitates the transfer of operating data from a forklift to individuals via standard or customized reports.

### ► What size fleet benefits from T-Matics

Toyota has two T-Matics products. T-Matics MOBILE and T-Matics COMMAND. T-Matics MOBILE is advantageous for any size fleet and operates entirely via cellular signal. T-Matics COMMAND is ideal for fleets of at least 10 or more forklifts. It can operate over cellular or WiFi, and is a more comprehensive telematics solution.

### ► Which option is better for me?

It depends on your needs and application. T-Matics MOBILE is a forklift-based, cellular solution, meaning the data will transfer anywhere an appropriate cellular signal is detected and will transmit data on the forklift only. T-Matics COMMAND is a facility-based forklift and forklift operator management solution, meaning the forklift must stay within a certain range of the facility and can transmit data on the forklift, as well as the individual forklift operator. T-Matics MOBILE is a more economical solution designed to transmit data on forklifts of any fleet size, including rental fleets, while T-Matics COMMAND is a more customizable and comprehensive solution designed for larger fleets operating in a single facility or campus.

### ► How can Toyota T-Matics save me money?

Toyota T-Matics is a fleet management tool that reports on the utilization, productivity and maintenance needs of an individual forklift, an entire fleet and/or an individual forklift operator. T-Matics will help create accountability among forklift operators, reduce damaging impacts, plan maintenance schedules and provide the data needed to effectively manage fleet sizes, material handling operations and logistics in the workplace. T-Matics measures data and facilitates data-driven operational decisions.

### ► What makes Toyota's fleet management solutions stand out?

Toyota takes a consultative approach to fleet management. Toyota's fleet management team, along with its extensive dealer network, has saved Toyota customers tens of millions of dollars leveraging data and decades of experience.



### ► What are my installation options?

All T-Matics products can be installed in the field by Toyota's extensive dealer network of Toyota Certified Technicians or factory installed on new forklift purchases.

### ► What software installation does Toyota T-Matics require?

Only an Internet browser is required. Both T-Matics MOBILE and T-Matics COMMAND are capable of web-based reporting.

 [SEE MORE](#)



Watch [this video](#) to find out if T-Matics is right for your fleet..

# WAREHOUSE SAFETY CHECKLIST

Easy as 1, 2, 3

Whether your warehouse is up and running or still in the planning stages, remember to be sure of these things:

- All outlets are working
- All lights are working for high visibility
- Your warehouse is void of slip or trip hazards
- Your warehouse is void of fire hazards
- Fire extinguishers are in working condition
- Eye wash stations are present
- Alarm systems are in working condition
- All work sites are clean and orderly
- Toilets and washing facilities are clean and sanitary
- Exits are clearly marked and free of obstructions
- Your warehouse has proper ventilation and climate control
- Your employees are trained for various emergency situations
  - Fire
  - Dangerous weather
  - Lockdown situation
  - Medical emergency
  - Accidents
  - Etc.

**Note:** This is only a basic safety checklist. A checklist based on a full warehouse safety audit can include more than 100 items.



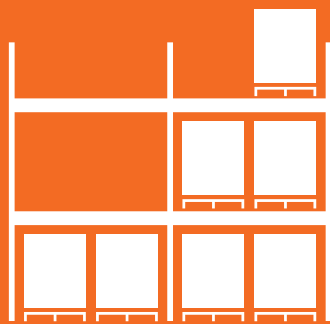
**EXPERT ASSISTANCE**

It's imperative that your warehouse checklist complies with safety regulations. To find out more about the warehouse safety regulations in your area, **contact your local Toyota Dealer.**

04



# WAREHOUSE RACKING 101



# RACKING

## Where the Pallet Meets the Load

Selecting the best warehouse racking for your application can be overwhelming. To make it easier, first review your current process for moving product and look for any challenges to eliminate. Meeting with a storage and handling consultant is another useful next step.

### KEY CONSIDERATIONS



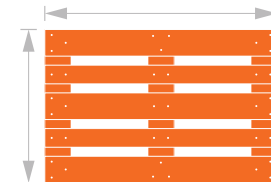
#### ► Where do you plan to store the product?

The designated location will determine the length, width and height of the racking. Take note of obstacles preventing easy access or safe equipment operation, including overhead obstacles, such as heaters. If you know the number of pallets you need to store, ensure that the location allows for this amount of space.



#### ► What types of forklifts are in use?

The types of forklifts available will dictate the aisle width between racking. For example, a sit-down counterbalance forklift will need a larger aisle compared to a stand-up reach truck, and this may decrease the amount of installed racking. Determine if you must use the forklifts already at the facility or if you will budget for a unit that may be more effective than your current equipment.



#### ► How large are the pallets?

The size of the pallet and the weight of the material will determine how many pallets can be stored on each shelf of racking; however, you must adjust dimensions if you have product overhang. If you have multiple pallet sizes, consider racking options that allow for flexibility.

500 lb

L  
FIFO

#### ► What is the weight of the pallet?

Record the weight of the heaviest pallet to determine proper storage capacity to handle the load. The density of the product may also give you the option to double stack the product.

#### ► How is your product distributed?

Your racking must be built to handle distribution processes in the warehouse. If your process is First In, First Out (FIFO), racking options are different from Last In First Out (LIFO) process. Examples: FIFO — single deep rack; LIFO — deep reach rack, push back rack. If your production has a busy season, determine if the product can be stored in bulk.

05



# HOW TO MINIMIZE COSTS AND MAXIMIZE EFFICIENCY



# PLANNING AND BUILDING

## Know Your Business

### What Kind of Warehouse is it?

- Small, with little or no automation
- High-bay, multi-level, high-density
- Move product rapidly, no storage
- Move product rapidly, also store product
- \_\_\_\_\_?

fill in the blank



Knowing the kind of warehouse you have — and the space and racking that dictates — is the first key to minimizing costs. You can plan accurately and avoid wasting money.

## 5 KEY STEPS

# 1

### ► Outline the objective for the warehouse

What's your goal: Move more product? Save money by moving current volume more efficiently? Outline a clear objective. You can't hit the target if you don't have one.

# 2

### ► Collect all the research you can

This was mentioned earlier but bears repeating. Research is critical to designing the correct warehouse for your business the first time. Key facts to dig into are what volume of product you move and store, what kind of processes you use, and how well those processes work for you. Accurate measurements of your physical space and clearances are also a must.

# 3

### ► Review your objective

After doing your research, look back at your objective. Can you meet it with the resources you have to work with? Be realistic. That way you can make necessary changes early in the process. And avoid winding up disappointed at the end.

# 4

### ► Create your project plan

Yours should be very detailed. Clearly define each part, including who is responsible. Include scope and completion dates. Constantly review the plan. If it becomes clear at any point that it's not going to be met, alert people right away. That gives you time to adjust accordingly.

# 5

### ► Go forth and conquer

You've outlined, researched, reviewed and planned. Now the real work begins. Getting your warehouse outfitted, and up and running. Hopefully you've identified most of the potential roadblocks, but a few will inevitably crop up. Just remember to keep your original objective in mind and adjust your project plan as needed.



# WHEN THE WAREHOUSE IS OPERATIONAL

## Efficiency in Action

Use these tips to work toward that perfect balance within your warehouse operation daily.

- ▶ **Outsource if you need to**  
Only need a service for a few SKUs? Sometimes you can actually save money by allowing someone else to do the work.
- ▶ **Put your fastest-moving product nearest the shipping doors**
- ▶ **Create color-coded labels**  
Give each customer a unique color. Make sure every single order for that customer has the correct label.
- ▶ **Don't make decisions based on assumptions**  
Use data.
- ▶ **Never stop training**  
Safety training. Job specific training. Refresher training, safety and job-specific. Never stop training. It breaks bad habits and reinforces good ones.
- ▶ **Ask your employees questions**  
They're the ones up close and personal with the work. They'll likely see issues before you do.



06



# TPS: REPORTING FOR DUTY



# THE TOYOTA PRODUCTION SYSTEM

## Eight Steps, One Dramatic Result

Implementing the Toyota Production System (TPS) — sometimes referred to as “lean manufacturing” or a “just-in-time” system — helped Toyota achieve high productivity and profitability. TPS has become well known and closely studied worldwide as a result.

*“All we are doing is looking at the time line from the moment the customer gives us an order to the point when we collect the cash. And we are reducing that timeline by removing the non-value-added wastes.”*

– Taiichi Ohno, founder of TPS



## EIGHT TOYOTA PRODUCTION SYSTEM IDEALS TO PUT INTO ACTION TODAY

# 1

### ► Think Long Term

Base management decisions on long-term philosophies, even at the expense of short-term financial goals.

# 2

### ► Respect people and partners

Grow leaders who live the philosophy. Respect, develop and challenge your people and teams. Respect, challenge and help your suppliers.

# 3

### ► Just-in-time

Each process produces only what is needed by the next process in a continuous flow. Parts are delivered on time, in real time, and are only the parts needed for the current task.

# 4

### ► Jidoka

“Automation with a human touch.” When a problem occurs, the equipment stops immediately to prevent defective products from being produced. Jidoka began with the Type-G Toyoda Automatic Weaving Loom in 1924. The Type-G would stop as soon as it detected a broken thread, which prevented defective products.

# 5

### ► Selectively add and substitute overhead for direct labor

When waste is stripped away from your value-adding workers, you need to provide high-quality support for them, as you would support a surgeon performing a critical operation.

# 6

### ► Don't make it a top priority to keep your workers busy and making parts as fast as possible

Only produce to customer demand. Making your employees work as hard as they can, just for the sake of getting the most out of them, will lead to overproduction and less profitability.

# 7

### ► Genchi Genbutsu

“Go see for yourself.” Don't make any decisions based on assumptions; explore issues and opportunities for yourself.

# 8

### ► Kaizen

“Continuous improvement.” Under Kaizen, Toyota continually makes improvements to production and products.

07



KAIZEN

改善

# KAIZEN

## Always Be Improving

Your warehouse is complete. Now it's time to start the Kaizen process — a process that never ends. The word Kaizen means continuous improvement. It's something we focus on heavily at Toyota, constantly improving our processes and products, and working smarter.

Focusing on Kaizen allows Toyota to be leaner and to improve the bottom line. It can do the same for you.

## 改善 HOW TO PRACTICE KAIZEN IN YOUR WAREHOUSE

### ▶ Implement the “5 Whys”

Start by identifying issues in your warehouse. Then follow up with the “5 Whys” to get to the core of the issue. It may require more than five questions.

#### For example:

- There's a puddle of oil on the shop floor, but why?
- Because the machine is leaking oil, but why?
- Because the gasket has deteriorated, but why?
- Because we bought gaskets made of inferior material, but why?
- Because we got a good deal on those gaskets, but why?
- Because the purchasing agents get evaluated on short-term cost savings.

### ▶ Standardize the improvement process

By establishing a process for everyone to follow, you can continue the improvements throughout the lifespan of your warehouse.

### ▶ Identify issues.

### ▶ Set targets for improvement.

PLAN

DO | ACT

CHECK



**INDUSTRIAL EQUIPMENT**

**REACH NEW HEIGHTS**