

Warehouse Superstores

Hazards of Shopping in a Working Warehouse

Industrial warehouse and retail store in one

By John M. Mroszczyk

A 79-year-old Santa Monica woman was shopping with her daughter in a warehouse superstore. She was looking for some lattice to stake her flower plants. She never made it home. A 19-year-old forklift driver inadvertently knocked over a load of lumber that was stacked several feet above, crushing the woman to death (Maharaj). Was this fatality a freak accident? Reports of other customer fatalities and injuries suggest that it is not.

THE MODERN INDUSTRIAL WAREHOUSE receives, stores and ships a multitude of products and materials. Warehouse workers are trained to be aware of hazards associated with their work environment. OSHA standards regulate warehouse operations, mandate employee training and require employers to report injuries. These facilities are not open to the general public.

Operation of powered industrial trucks (PITs), and material handling and storage are key among the safety concerns that must be addressed by warehouse management. PITs move materials throughout the warehouse; their operation presents an array of hazards (see Swartz). Unsafe operation can lead to injury-causing events such as a load toppling from the forklift, workers being struck by forks, workers falling off pallets elevated by forklifts and trucks tipping over. OSHA 29 CFR 1910.178 and ANSI B56.1 provide mandates and guidelines for recognizing these hazards and preventing accidents.

In most warehouses, materials are stored on steel, multi-level pallet racks—often 15 to 20 feet high. Therefore, materials must be stored to ensure that they will not fall on

employees. OSHA 1910.132 requires workers to wear hard hats if exposed to overhead hazards. Material movement and handling must also be performed in a safe manner to ensure that materials—both those being moved and those already stored—do not fall. In addition, the warehouse floor must remain free of substances and debris that can cause slip/trip incidents.

Even with OSHA regulations and safety practices in place, warehouse workers continue to suffer injuries. According to the Bureau of Labor Statistics, 57 percent of injured workers had worked for their employers at least one year at the time of injury and 24 percent had five or more years of service. Three out of every five injured workers were not wearing personal protective equipment, and only 54 percent reported receiving job safety training at the time of their injury. More than one-half of the injuries occurred in the storage area of the warehouse (as opposed to the loading dock). Twenty-six percent were struck by falling, flying or swinging objects (BLS).

The Retail World

Large retail stores receive their stock from warehouses and display it for the public to buy. The merchandise is typically placed on shelves or racks that

John M. Mroszczyk, Ph.D., P.E., CSP, is a consulting engineer and safety consultant. President of Northeast Consulting Engineers Inc. in Danvers, MA, Mroszczyk holds a Ph.D. in Applied Mechanics from Massachusetts Institute of Technology (MIT), an M.S. in Mechanical Engineering from MIT and a B.S. in Aerospace Engineering from Boston University. He is a professional member of ASSE's Greater Boston Chapter and Administrator of the Society's Engineering Practice Specialty.



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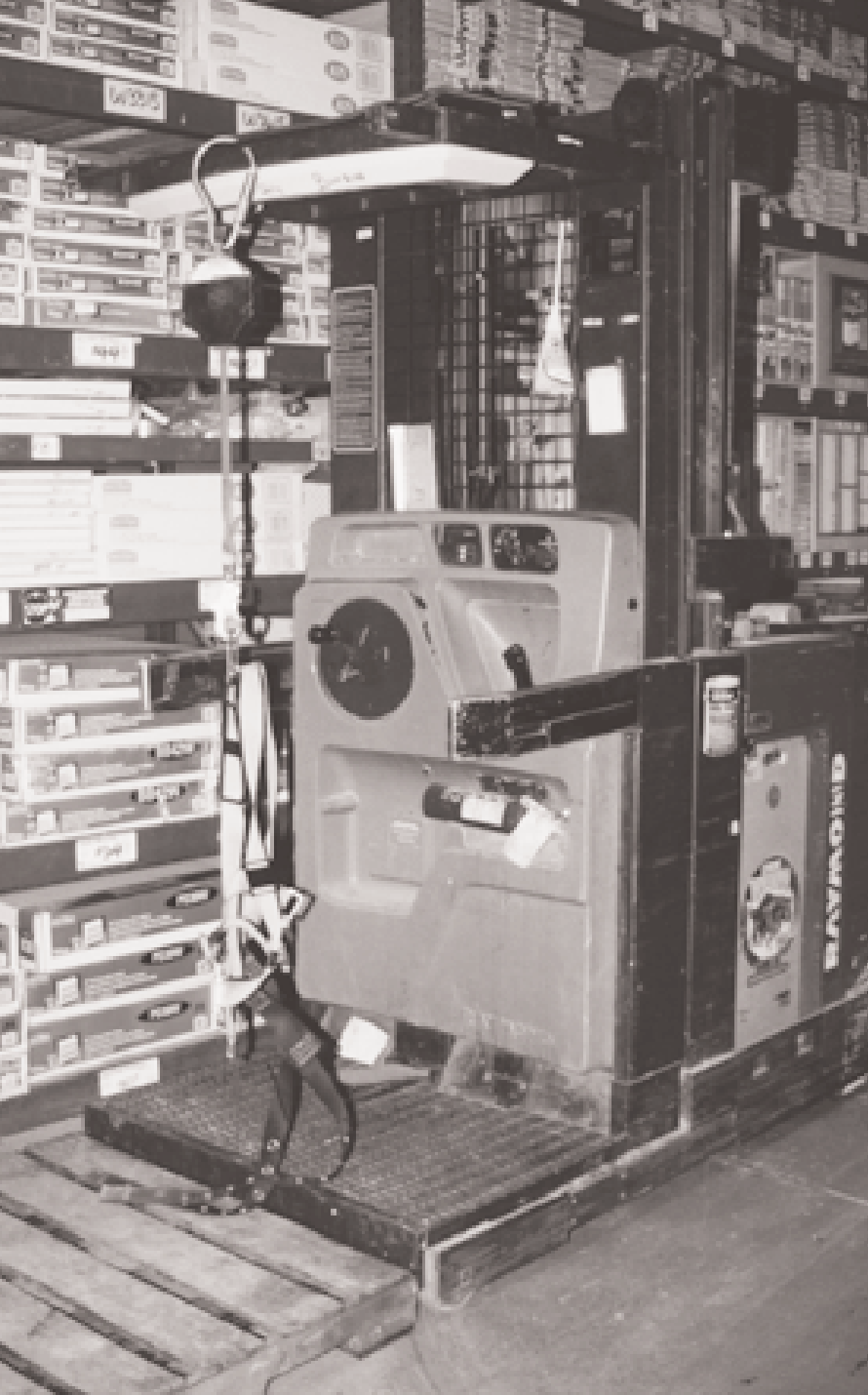


Photo #1 (above) shows a typical order-picking truck used in many warehouse super-stores. The truck has elevatable controls and a safety harness.

Photo #2 (right) shows an order-picking truck moving through an aisle with no "walker."



are no higher than an arm's reach. Overstock is stored separately (away from the display) and shelves are restocked using hand carts. A review of injury reports compiled by the Consumer Product Safety Commission indicates that customers have been injured in retail stores from slipping on foreign substances on floors; tripping on mats and objects left on floors; and due to automatic door malfunctions (CPSC). Display items containing sharp objects such as knives, slicers and glass have caused laceration injuries. And, while falling object injuries do occur, the "objects" are usually such things as a bag of beans, canisters, dishes or bottles of soda falling from a relatively low height. Rarely are customers killed in such stores.

Warehouse Superstores

The warehouse superstore is a blending of two types of facilities: the industrial warehouse and the retail store. Retailers save millions by combining the two functions, and consumers are offered a wide variety of products at lower prices. In most superstores, merchandise is displayed—from floor to ceiling—in bulk packaging on the same steel, multi-level pallet racks used in industrial warehouses. PITs operate while the store is open, moving among consumers to restock shelves and retrieve merchandise. In these stores, the warehouse floor becomes the showroom floor and the general public is invited to "help themselves."

The same basic safety principles that apply to industrial warehouses also apply to warehouse superstores. For example, PITs need to be operated safely, and merchandise and other objects must be moved or stored safely so that they do not fall or otherwise cause injury. There is one important difference, however: Warehouse superstores are open to the general public. Unlike industrial warehouse workers, consumers are not trained to recognize and avoid hazards associated with this environment. Consequently, the emphasis on safety is vital because it is not known how a customer will react in a given situation.

Since, as noted, injuries still occur in industrial warehouses despite established OSHA regulations and safety practices, it should be no surprise that consumers are being injured (and even killed) in warehouse superstores. The *Los Angeles Times* examined court records from around the country and published a report on the number of incidents involving falling merchandise in warehouse superstores. ABC's *20/20* and other news agencies have reported on similar problems. For example, a woman from Tulsa, OK, was killed when boxes of fabric softener fell on her. In 1992, a three-year-old girl was crushed to death by a falling door. In 1994, a woman in Edmonds, WA, was killed when a 3,000-lb. pallet of ceramic tiles collapsed on her. In 1997, a two-year-

old-girl was killed when a 100-lb. television fell on her. A 41-year-old Connecticut man was killed at a superstore when a 2,000-lb. pallet of landscaping timbers fell on him (Maharaj).

In addition to fatalities, consumers may suffer injuries while shopping in warehouse superstores. According to the *Los Angeles Times* article, one official of a major superstore chain acknowledged receiving 185 injury claims a week. Another major chain reported 26,000 customer claims and 7,000 employee claims during the six-year period ending in 1995. The total number of customer injuries and deaths in these facilities is unknown because, unlike the industrial warehouse, owners/operators are not required to report and record customer injuries and deaths. Based on the 185 claims per week reported by one chain alone, however, one can estimate that consumer injuries in warehouse superstores across the country may be in the tens of thousands each year.

Safety Committee/Safety Audits

Superstore management is responsible for establishing, implementing and

enforcing safety rules and policies. Daily safety audits should be conducted and documented, written reports submitted, and unsafe conditions promptly corrected.

To promote awareness of and create a concern for safety throughout the store, a safety committee should be established. This committee should include employee representatives from all major areas of the store. Committee members should review safety inspection checklists, incident reports and safety violations and suggest corrective actions. In addition, review of customer incident reports will help focus attention on problem areas. Safety policies and procedures should be reviewed and suggestions to improve store safety solicited.

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Photo #3 (left) shows a forklift moving through a crowded aisle with an elevated load and no "walker."



Photo #4 (above) shows cartons on the top shelf that have collapsed.



Photo #5 (above) shows the top shelf of a pallet rack. Note the cartons overhanging the side of the rack. One pallet is not placed evenly on the rack and overhangs the side.

Throughout these activities, management and committee members must remember that the store is open to the general public, which includes the elderly and small children. By making all employees aware of the need for a safe store and workplace, management can help ensure that safety procedures will be followed at all times and unsafe conditions promptly corrected.

Powered Industrial Trucks

In superstores, employees often operate order-picking trucks, forklifts and motorized hand trucks. Photo 1 shows a typical order-picking truck. These vehicles have forks to engage the load, elevatable controls and a safety harness; they allow operators to ride up with the forks and can elevate a load 15 to 20 feet. These trucks are generally used to stock shelves and to retrieve merchandise from pallet racks. Onboard controls allow the operator to steer and regulate speed and elevation.

Highlift fork trucks are rider trucks with a vertical upright, elevating mechanism and forks for engaging the load. These trucks can raise pallets 15 to 20 feet high for storage on racks. The operator controls the load from the ground.

Motorized hand trucks have lifting forks to engage the load and are controlled by a walking operator. They can be either highlift or lowlift models; highlift trucks have an elevating mechanism that is designed to elevate loads to upper rack levels; lowlift trucks can elevate a

load just high enough to clear the floor.

All safety procedures that apply to PIT operation in an industrial warehouse also apply to warehouse superstores (Swartz). Operators must be thoroughly trained according to OSHA regulations and ANSI B56.1. In addition, trucks should:

- be visually and operationally inspected at the beginning of each shift;
- be operated in a smooth manner, without sharp turns or abrupt speed changes that may cause the load or the truck to tip;
- never transport more than one pallet at a time and never travel with an elevated load as this can also cause the truck or load to tip;
- not be operated near a person who is standing near a fixed object.
- have properly stacked loads so they do not shift or fall during transit; palletized loads should be shrink-wrapped.

Other safety precautions must also be followed when operating on the showroom floor of a superstore. For example, a truck should never be left running and unattended, and operators should be trained to be aware of customers on the showroom floor. Photo 2 shows an order-picking truck moving through a narrow aisle; limited driver visibility coupled with a customer who is unaware that a truck is approaching or who steps out from behind a display

A safety committee should be established to promote awareness of and create a concern for safety throughout the store.

Photo #6 (below) shows several cartons on the top shelf without any type of restraint. The danger here is that a carton may get knocked off the shelf and fall.





Photo #7 (left) shows several shrink-wrapped pallets on the pallet rack. The pallets are all even with the sides of the rack. Shrink-wrapping reduces the risk of a carton being knocked off the rack.



Photo #8 (above) shows loose wooden planks placed in between the cross-members.

Photo #9 (right) shows kitchen countertops stored on the same wooden planks. Storing the countertops in this way is hazardous because they can fall in the spaces between the planks and strike a customer.



Photo #10 (above) shows lumber stored on cantilever racks. The retainer bars prevent the lumber from falling off the open sides.

Photo #11 (right) shows pushtype lawnmowers that are within easy reach of children.



can create a danger. Photo 3 shows a forklift moving through a crowded aisle with an elevated load. Again, limited driver visibility, the elevated load and consumer unpredictability make this a potentially dangerous situation.

The risk of a customer being hit by a truck can be reduced by the use of a “walker.” A walker is an employee who guides trucks from the receiving area, through the showroom and back to the receiving area. S/he should wear a fluorescent orange vest (for optimum visibility), check aisles and intersections, and direct customers away from the moving truck. In all cases, a truck should not be moved until the path is clear. A second walker, positioned behind the truck, can be helpful with the rear-end swing of a forklift. Furthermore, warning devices, such as flashing lights and/or audible alarms mounted on the truck, will alert customers that a truck is nearby.

Merchandise Displays/Storage

As noted, merchandise is typically displayed/stored in bulk form. It may be on the floor or on a pallet rack, stored individually, or stacked in piles or on pallets. Therefore, pallet racks and decking must be routinely inspected for damage or out-of-place

components. In all cases, merchandise should be stored so it does not fall and strike a customer.

The injury-causing potential of a falling object is great—and the object need not be a refrigerator. As an object falls, it gains momentum; for example, a 10-lb. object falling 10 feet can have a force of impact of 1,200 lbs.

or more. For reference, cranial bones will fracture under loads ranging from 830 to 1,530 lbs., depending on the shape of the impacting object (SAE J885).

Stacked cartons should be interlocked and limited in height so that they are stable and secure against collapse. Shrink-wrapping or banding is the best way to provide stability to a stack of goods. Care must also be taken not to stack heavy items on top of weak containers. Employees must be trained to break down and reform any stack in which the bottom layer has collapsed. Photo 4 shows an example of large cardboard boxes stored on the upper rack level; these boxes should be removed because some

As an object falls, it gains momentum; for example, a 10-lb. object falling 10 feet can have a force of impact of 1,200 lbs. or more.

Photo #12 (below) shows an overstock of doors stored in the aisle. The hazard is that one or more doors may be inadvertently knocked over and injure a customer.



lower boxes have collapsed. Cardboard cartons stacked on the floor should be placed on pallets or other platforms to protect against bottom-layer collapse due to moisture.

Merchandise stored on pallet racks should be stacked evenly without overhanging the sides of the rack. Any unevenness or lack of balance will increase the likelihood that merchandise will fall if disturbed. Top-heavy items (e.g., large air compressors) should not be stored on a pallet rack unless they are restrained by safety belts or chained securely to roof trusses.

Photo 5 shows several cartons overhanging the side of the rack. One pallet is not placed evenly on the rack and overhangs the side. Any damaged pallets should be replaced and pallet stacks checked often for overhanging and product collapse. Photo 6 shows boxes stacked on the upper level of a pallet rack without shrink-wrapping or other restraints. Photo 7 shows a stable, secure stack of goods; the palletized merchandise is shrink-wrapped and placed evenly on the rack.

Objects such as mattresses and doors should be stacked in vertical racks so that they will not fall on customers. Ladders should be restrained so they do not fall or slide. Bagged items such as concrete should be shrink-wrapped. Doors of kitchen cabinets and similar noncartoned items should be shrink-wrapped since opening a door can cause a cabinet to fall.

Often, a pallet of goods is placed on the lower

Photo #13 (right) shows a cluttered aisle. The bags of insulation can be easily knocked over, wallboard could be knocked over with a forklift and tripping hazards are abundant.

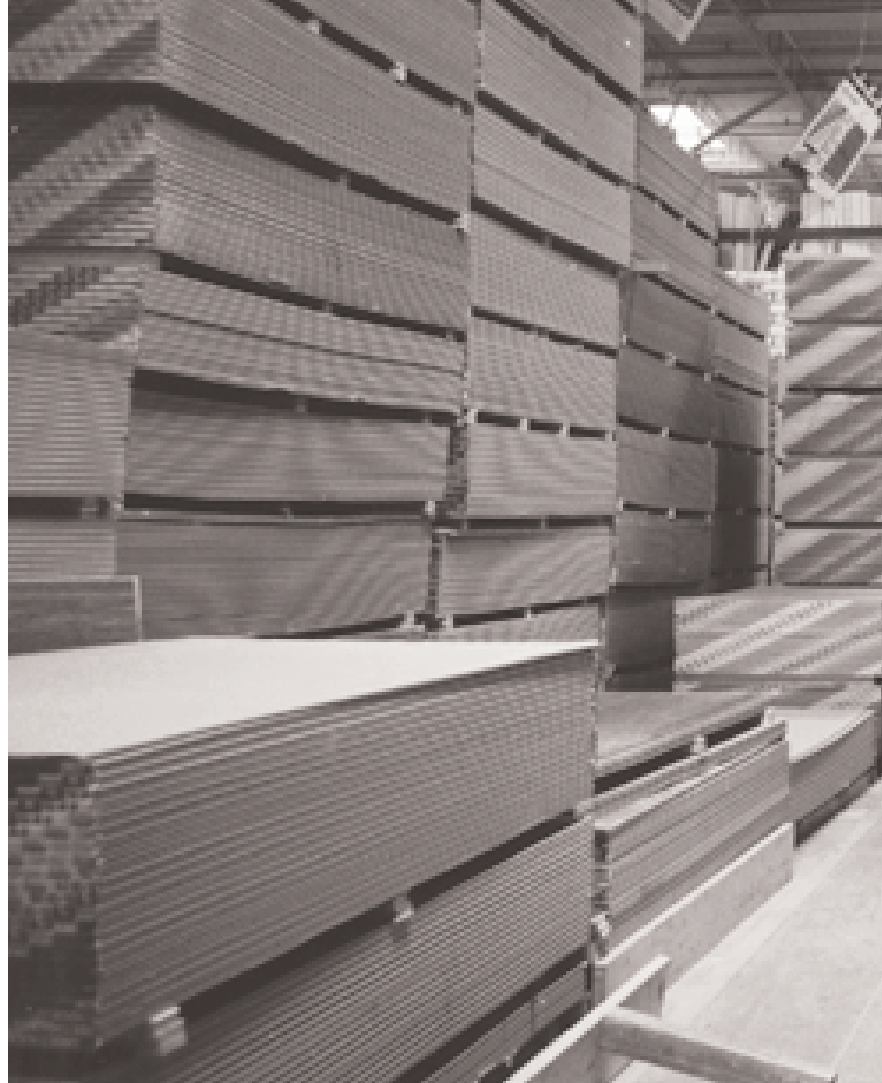


Photo #14 (above) shows a "demo" cart for handing out food samples to customers.

Photo #15 (above) shows a lift truck operating in a customer aisle. The aisle is not blocked off and there are no spotters.

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rack level with a second pallet directly on top of it. If the goods are within reach, customers may pull product from the lower pallet without realizing they are causing the stack to become unstable. At some point, enough product will be removed that the top pallet and stack comes tumbling down on an unsus-

pecting consumer. To remedy this problem, each pallet should be placed on a separate rack level.

Racks themselves can be hazardous. Many warehouse superstores use wooden planks placed between rack cross members as shelving to store nonpalletized items (Photo 8). The danger is that the individual planks may become displaced and fall, striking a customer. Planks can also shift, causing merchandise to fall. Photo 9 shows kitchen countertops stored vertically on top of the wooden planks; the planks can easily shift, causing a countertop fall and strike a customer. In most cases, this hazard can be eliminated by using wire or corrugated decking instead of individual planks, or by securing the individual planks.

Lumber is a common item in many superstores. It is usually stored or displayed in piles or on cantilever racks (Photo 10). Retainer bars fit into channels to prevent the lumber from toppling over the open side. The bars can be removed to restock shelves but should remain in place at all other times in order to prevent the lumber from toppling over the side if a customer pulls a piece from the bottom of the pile. Lumber stored in piles should be evenly balanced and banded. Lengths of tubing and piping follow the same general safety guidelines.

Extra care should be taken with any product that can injure a child. For example, chemicals such as pesticides should not be displayed within reach of small children. Photo 11 shows a push-type lawnmower within easy reach of a child; its sharp blades can lacerate or amputate a small child's finger. Any products that can cause lacerations (e.g., knives) should be enclosed in a display case. Furthermore, because sheet metal has sharp edges and corners, warnings should be posted where unpackaged sheet metal products such as metal studs or flashing are displayed. In addition, oddly shaped items such as bench vises, power tools, toilet bowls and generators should be secured so that they do not fall.

Housekeeping

Inspections conducted by the safety committee play an important part in reducing housekeeping-related injuries caused by slip-and-fall exposures and improperly stacked merchandise. Employees should be trained to remove debris or displaced merchandise from the floor. Pallets should not be left on the showroom floor because they pose a tripping hazard. Aisles should be neat and clear. Overstock should be removed immediately, since these items can present a tripping hazard or may fall and strike a customer. As Photo 12 shows, the overstock doors narrow the aisle, increasing the likelihood that a customer may stumble; the doors can also cause injury if they are unintentionally knocked over. Photo 13 shows a cluttered aisle with bags of insulation that can fall over, tripping hazards and stacks of wallboard. Care must also be taken when operating a truck near the stacks of wallboard and insulation to avoid knocking them over.

Foreign substances, such as liquids, food, wrappers or paper, should be removed immediately from



Photo #16 (above) shows a fork lift truck operating in a customer aisle with an elevated load. The aisle is not blocked off and there are no spotters.

Employees must be aware of hazards and must follow safety practices/procedures without fail. Management must encourage and enforce compliance with these practices.

the floor; even a short delay can result in a slip-and-fall incident. Consumer access should be blocked if the aisle is being cleaned; if this is not possible, warning signs should be placed around the area and/or an employee should remain to direct customers away from the area.

Somewhat unique to certain warehouse superstores are food vendors located just outside the checkout area. At times, food samples may be handed out (Photo 14); invariably, some food ends up on the floor, creating a slip-and-fall hazard. Therefore, no food should be allowed in the store. Employees working the demo carts should insist that customers consume the sample and dispose of the napkin before entering the store.

Stocking & Retrieving Goods from Pallet Racks

Another potentially dangerous situation occurs when merchandise is retrieved from (or placed in) pallet racks. The elevated load might fall or the forklift may knock merchandise off the rack into a customer aisle, causing serious injuries.

Therefore, under no circumstances should customers be allowed in the forklift work area or in the adjacent aisle. The forklift in Photo 15 is operating in a customer aisle while the store is open. The aisle is not blocked off and no workers (spotters) are present to direct customers away from the area. Photo 16 shows a forklift moving plywood from a pallet rack. Again, note that the aisle is not restricted and no spotters are present. In some cases,

the customer may be watching the forklift operate and, thus, be even less aware of potential hazards.

Many superstores use caution tape to discourage customers from entering a forklift work area (Photos 17 and 18). Use of caution tape alone presents several problems. The truck operator cannot watch both sides of the work area and the adjacent aisle and complete his work at the same time. Also, it is impossible to predict what customers will do. They may duck under the tape to retrieve merchandise; children can run under the tape and into a forklift work area.

To prevent these behaviors, spotters should be used to direct customers away from the work area. Depending on the situation, at least three spotters are needed: one at each side of the work area and one in the adjacent aisle facing the work area. Another alternative is to block the work area with netting rather than caution tape. Fewer spotters are needed with this method because customers cannot duck under the netting (Photo 19).

Conclusion

The industrial warehouse is a dangerous workplace where workers continue to be injured despite federal OSHA regulations and established safety practices and procedures. The operation of PITs and the presence of falling, flying and swinging objects account for a large percentage of industrial warehouse injuries.

Warehouse superstores invite the unknowing, untrained general public (including the elderly and

Photo #17 (right) shows a forklift operating in a customer aisle.

The aisle is blocked off with caution tape, but there are no spotters.



small children) into what is in effect a “working warehouse.” Millions of people shop in these stores each year—and none of them expect to be injured (or killed) while doing so. Yet, customer fatalities and large numbers of injuries occur each year, largely due to the all-too-familiar industrial warehouse hazards: PITs and falling objects. While the statistics do not suggest that everyone who enters such a store will be dodging forklifts and ducking for cover, this problem cannot be overlooked when safety devices, practices and procedures are available to significantly reduce the risk of injury.

Some superstore chains claim it would not be cost-effective to install safety devices such as fencing, rails, safety straps or netting to prevent merchandise from falling (Maharaj). One state—Massachusetts—initiated legislation that would require customers to wear hard hats in certain areas of warehouse superstores (Gatlin).

While a hard hat will not protect a customer from a refrigerator falling 20 feet, clearly protective and preventive measures must be taken. The first step is for warehouse superstores to establish safety practices and procedures. Employees must be aware of hazards and must follow safety practices/procedures without fail. Management must encourage and enforce compliance with these practices. In addition, customers need to recognize the hazards of shopping in a “working warehouse.” To that end, some stores play a message over the PA system that regularly warns customers of this fact. Customers should also be encouraged to seek help before reaching for merchandise stored on high shelves. Finally, warehouse superstores should be required to record and report customer injuries and fatalities. Consumers should not have to face an increased risk of injury simply to get variety and lower prices. ■

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Photo #18 (above) shows an order-picking truck operating in a customer aisle. The aisle is blocked off with caution tape, but there are no spotters.



Photo #19 (above) shows netting that is used to section off the lift truck work area from customer traffic.