

# SK3600 Push Back System

## Safe Operating Procedures User Handbook



*This handbook contains important information for the safe and efficient use of push back rack systems. All operators must review and understand this information.*

**STEEL KING**®

## Thank you for purchasing a Steel King SK3600 Push Back Rack System.

A push back rack is different from any other rack design. Knowledge and application of the differences is critical for safe, efficient, and trouble-free operation. It is the owners' responsibility to:

1. Ensure that all operators are fully trained in the correct procedures as outlined within this handbook; and
2. That operators follow, in practice, all such procedures.

**Failure to operate your push back rack system as indicated within this handbook may result in serious injury or death, and damage to the rack system or the product stored within.**

Push back rack must be assembled and maintained in accordance with procedures specified for storage racks in general. See Steel King's Pallet Rack User Manual. Call for a free copy or download from [www.steelking.com](http://www.steelking.com). This handbook supplements, but does not replace the Pallet Rack User Manual.

### Guide To Symbols:



Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Caution indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.



Notice indicates information about a subject that is not safety related.

For more information or for questions on your push back rack system, please contact:

**Steel King Industries, Inc.**

**(800) 826-0203**

**[info@steelking.com](mailto:info@steelking.com)**

**[www.steelking.com](http://www.steelking.com)**

# **SK3600 Push Back System**

## **Safe Operating Procedures**

### **Table of Contents**

1.	Push Back System Introduction	4
2.	Pre-System Use Inspections	8
3.	Proper Loading Procedures	11
4.	Proper Un-Loading Procedures	19
5.	Fixing Jammed Systems	21

# Push Back System Introduction:

Push back rack systems are a high density storage solution. The advantage of a push back rack system is that all loads are stored and retrieved from the same aisle. This reduces the number of aisles needed in a facility, freeing up more space for storage. In addition, loads stored within a single level of a push back system can be completely loaded and unloaded independently of other levels, providing more selectivity than other high density systems such as drive-in racks.

Loads stored in each lane of a push back system rest on a series of interlocking, nested carts that roll forward and backward on a rail. The rail slopes gently toward the front of the rack system.

When a pallet load is stored in a push back rack, a trained fork truck operator pushes back the loads already in the system, hence the term "push back rack". This exposes an empty cart, which the operator gently lowers the load on to.

When a fork truck operator picks a load out of the system, the remaining loads in the lane will all roll gently forward. The speed of the carts must be controlled by the fork truck operator as they back slowly away with the load.

Push back rack systems provide a Last-In-First-Out (LFIO) inventory rotation.

# Basic Components

There are three basic components to a push back rack system (See Fig. 1):

1. Rack Structure, consisting of upright frames and horizontal beams.
2. Push Back Rails, on which the carts ride
3. Carts, which support the pallet load and roll freely on the push back rails.

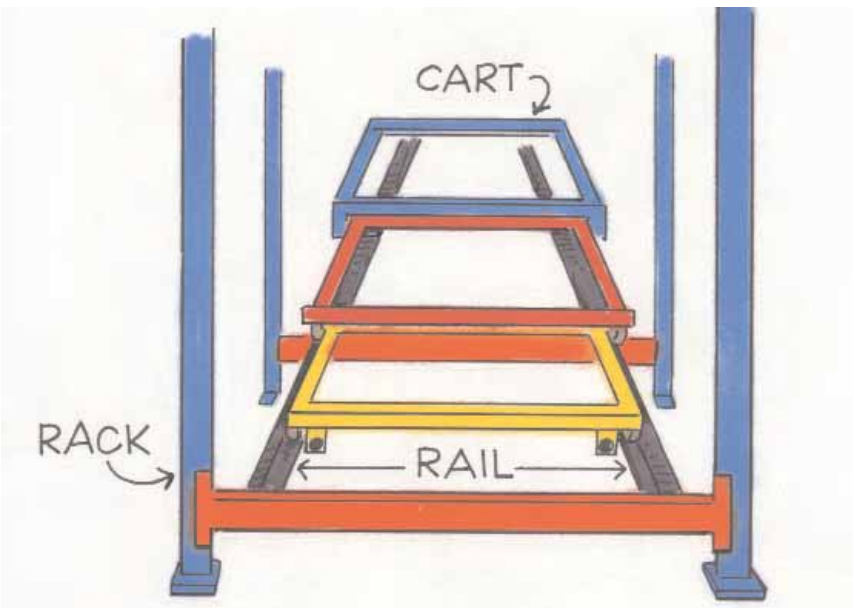


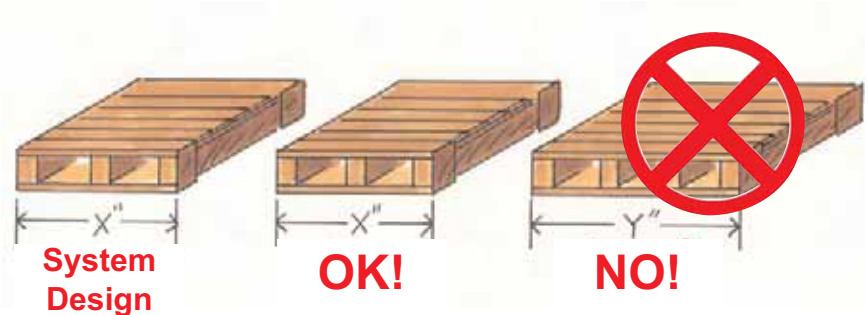
Fig. 1

**NOTICE**

*In order to properly use the push back rack system, an industrial lift truck with side shift capability of the forks is required.*

# System Design

The push back system installed in your facility was designed to handle pallets and loads of a particular size and weight. For example, if your push back cart was designed to use 40" wide by 48" deep pallets, do not use pallets that are longer or shorter than this size.



**Fig. 2**

Using pallets that were not designed to be loaded into the system can lead to:

1. Cross Stacking - See Page 16
2. Under utilization of the systems full capacity
3. Damage to the cart system and possible damage to the product being stored

Pallet load weights, in a single push back lane, should not vary by more than 500 lbs. In other words, you should not store a 2,000 lb load in the same push back lane as a 1,000 lb load.

Similarly, push back rack systems are not intended to be used for applications where the aisle-side pallet is “picked.” Removing cartons reduces the load weight of the last pallet in the rack and may cause the inside pallets to push the aisle pallet out of the rack..



**WARNING**

Loading pallets of varying weights within the same lane may cause the heavier loads to push the lighter loads out of the rack, possibly causing injury or death.

**Fig. 3**



***If you have pallet loads that vary by 500 lbs or more, Designate push back lanes to handle common load weights.***

# Pre-System Use Inspection Steps:

## Pallet

Before using a pallet in the push back system, fork truck operators need to examine the pallet style and pallet condition. Defective or damaged pallets may not allow the push back system to operate correctly.

Pallets should be GMA style pallets, with at least five (5) bottom boards running left-to-right. See Fig. 4



**Fig. 4**

*Standard GMA Pallet, with 5 bottom boards, and free from defects.*

Pallets should be free from splits, cracks and broken boards.



**CAUTION**

Defective pallets should not be used in a push back system. Immediately transfer the load from a defective pallet to another pallet prior to placing in the system.



# **Pallet Load**

Pallet loads need to be securely banded or shrink-wrapped to the pallet before placing in the push back system.

Having loads properly secured to the pallet will minimize the potential for shifting of your product when loading and unloading the system.

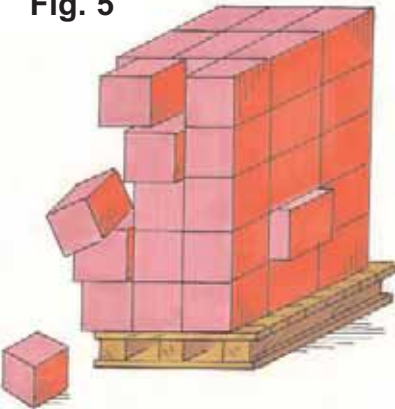


Unsecured loads may fall off the pallet and the rack system, possibly causing injury to people in the aisle.

Loads should NOT overhang the pallet on any side, including slip sheets, shrink wrap, carton flaps, improperly stacked boxes, etc.

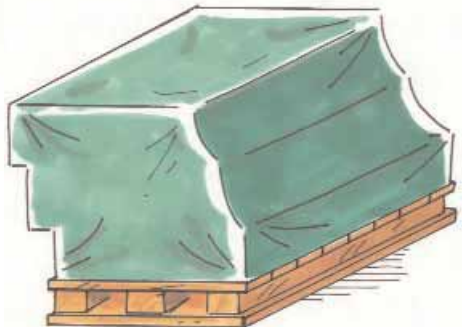
Loads overhanging the pallet could cause the push back cart to hang up within the rack system.

**Fig. 5**



*Unsecured loads may fall off pallets, causing injury and/or system failure.*

*Overhanging loads can catch the rack or other loads, causing carts to hang up.*



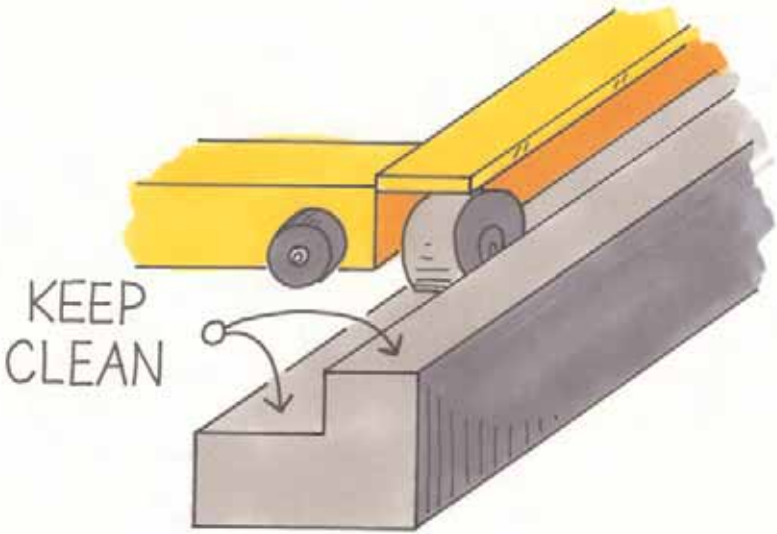
**Fig. 6**

# Push Back Lane

Fork truck operators need to periodically examine push back lanes to ensure that they are free from debris (wood chips, slivers, etc.). In particular, push back rails must be free of debris in order for carts to work correctly.



Debris left on push back rails may prevent carts from being pushed all the way back, returning all the way forward, or hanging up in the lane.

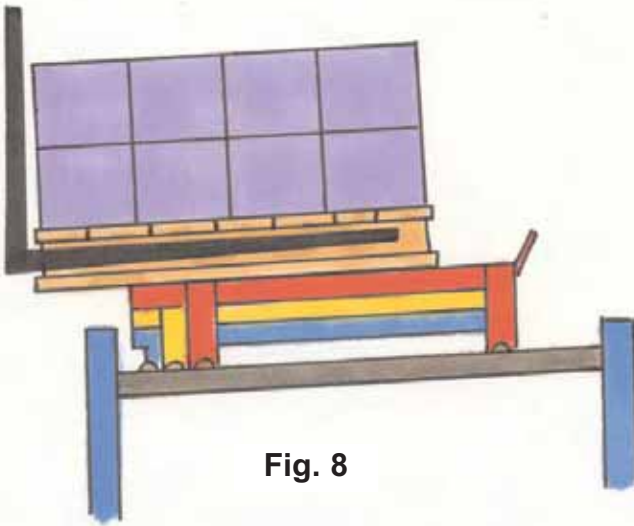


**Fig. 7**

# Proper Loading Procedures:

When ready to place a pallet load into the push back system:

1. Carefully pick up the pallet and slightly tilt the forks upward. Tilting the forks upward puts the pallet inline with the upwards slope of the push back system. See Fig. 8



*Diagram shows proper angle of forks for loading and unloading a push back system.*

2. Slowly move the pallet into the push back lane.



## CAUTION

Do NOT hit the rack structure when entering the push back lane. Impact with the rack system will knock the system out of plumb and create an un-safe and un-dependable rack system.

3. Position the first load no more than 3" above the top cart. Continue entering the lane until the pallet hits the back stop guide. See Fig. 9

The back stop tells the operator where the rear of the 1st cart is. Gently bumping the back stop guide successfully creates the correct spacing for the remainder of the carts in the lane.

Fig. 9



*Diagram shows pallet correctly placed in front of the back stop guide.*

**Back Stop Guide**

*Diagram shows pallet incorrectly placed on top of the back stop guide.*



Fig. 10



**CAUTION**

Do not set and/or drop loads on the back stop guides. This can damage the cart or the back stop guide. This results in a loss of structural integrity of the carts eventually leaving the lane inoperable.

4. **Before** lowering the pallet on to the cart, center pallet left-to-right by using your fork truck side shift controls.



**Load Centered  
on Cart**



**Load Not Centered**



**CAUTION**

Improper centering of a pallet load on a push back cart, can lead to:

- The load hitting the rack structure or loads in adjacent push back lanes.
- Undue stress or uneven weight distribution on the bottom boards of the pallet, potentially causing pallet boards to splinter, crack or break.

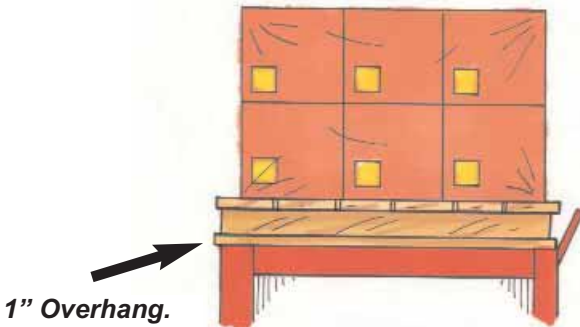
Improper centering of loads will eventually lead to inoperable lanes and unsafe situations.



**CAUTION**

Do NOT side shift the pallet load after it has been placed on the push back carts. Side shifting the pallet when the pallet is in contact with the cart can dislodge or damage the cart and/or rail.

5. Slowly lower the pallet to gently set it on to the top cart. The pallet should overhang the front of the cart by 1". See Fig. 13



*Diagram shows properly placed pallet, with 1" overhang on cart.*

**Fig. 13**



**CAUTION**

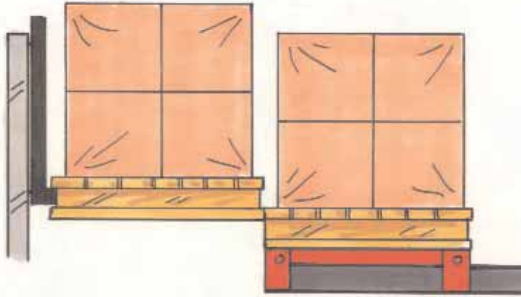
Do NOT **Drop** the load on to the push back carts. Dropping loads may cause bottom pallet boards to break, especially the rear bottom board as it supports most of the weight of the pallet at first.

6. Continue loading remaining carts.

**Step 1.** Position the next pallet load no more than 3" above the next available cart or rails.

Gently contact the pallet load in the push back lane with the pallet on the fork truck. The ideal process is for the pallet of each load to contact the other pallet, not the load itself. See Fig. 14

**Fig. 14**

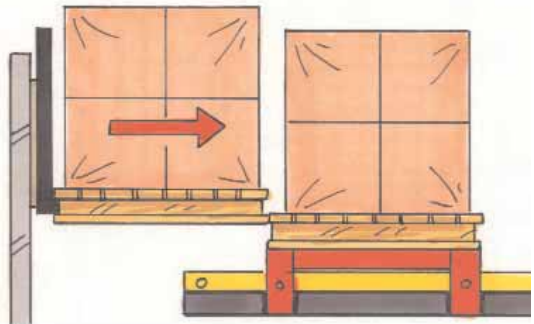


*Step 1, place next load 3" above load in system. Make pallet-on-pallet contact.*

**Step 2.** Using the pallet on the fork truck, push the rear position pallet back slowly until the lower cart (the one you are trying to load) starts to move backward, and exposes the next cart. See Fig. 15

***Operators should push back only one cart at a time.***

**Fig. 15**



***Step 2, using pallet on fork truck push back pallet in system.***

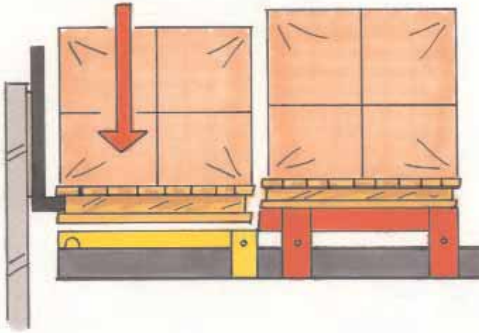


**CAUTION**

To avoid damaging merchandise or the push back rack systems, DO NOT position the load higher than 3" above the cart or rails; and DO NOT push the loads back too fast.

**Step 3.** Again, center the pallet to the cart or rails and **then** slowly lower it into position on the cart. See Fig. 16

**Fig. 16**



*Step 3, Slowly lower pallet on to open push back cart*

**NOTICE**

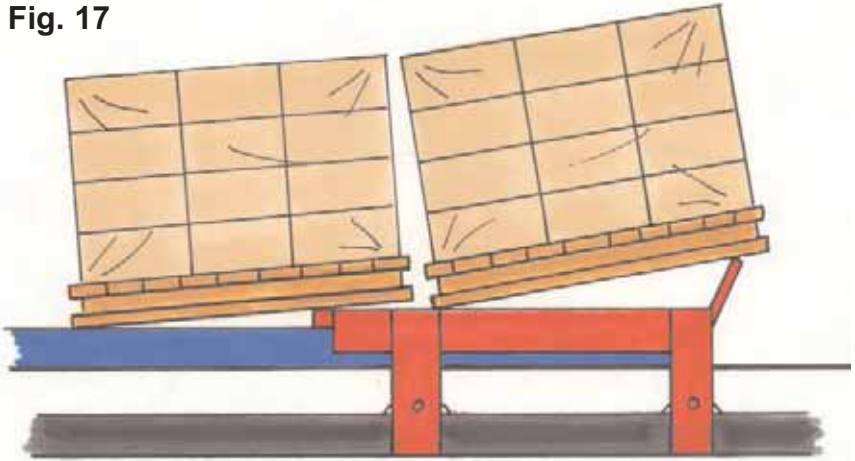
***When loading the push back system, operators must make sure they are loading only one pallet per cart. Failure to load only one pallet per cart leads to “Cross Stacking”***

**“Cross Stacking”** is where a pallet is placed in the system such that it is resting on two different carts. Each cart is engineered with dimensions that are supposed to prevent this occurrence from happening. There are basically two ways for “Cross Stacking” to occur:

- 1) The operator incorrectly places the 1st load on the 1st cart too far back; this can happen when the load is placed on top of the back stop guide as discussed previously. When the 1st load is too far back, the front of the 1st cart is exposed, allowing the 2nd load to be potentially placed on the exposed portion of the 1st cart. See Fig. 17



**Fig. 17**

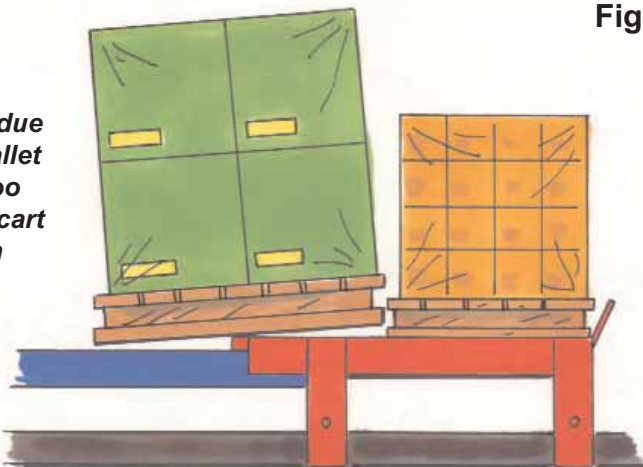


***Cross Stacking due to first pallet placed too far back and sitting on top the back stop guide***

- 2) The operator is using a pallet shorter than what the push back cart was designed to hold. Example would be an operator loading a 36" deep pallet on a cart designed to hold a standard 48" deep pallet. Loading the shorter pallet on to the 1st cart, and placing the load all the way to the rear of the cart, will cause the front of the cart to be exposed, again allowing the 2nd load to be potentially placed on the exposed portion of the 1st cart. See Fig. 18

**Fig. 18**

***Cross Stacking due to first pallet being too small for cart design***





## CAUTION

Cross Stacking can cause pallet, cart, and/or rail damage and may cause the push back system to fail or become inoperable.

## NOTICE

***If an operator notices a Cross Stacking situation has occurred, immediately remove the load that is over lapped and determine if the first load is too far back or is using the wrong size pallet.***

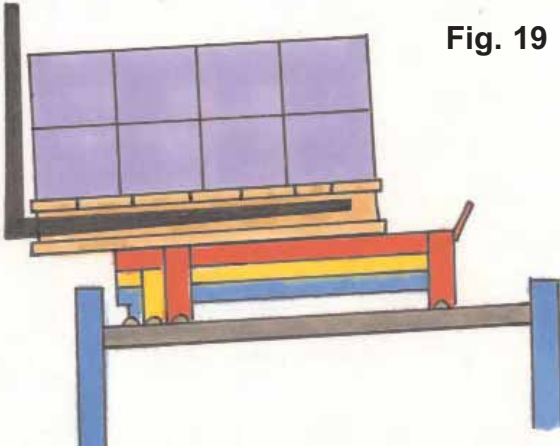
7. If an Operator senses any resistance while loading,



- Find out what is in the way.
- Slightly lift pallet off cart and shift the load to the side if the load is hitting the rack, or hitting the load in the next push back lane.
- If necessary, back the load out, reposition the load, and start again

# Proper Unloading Procedures:

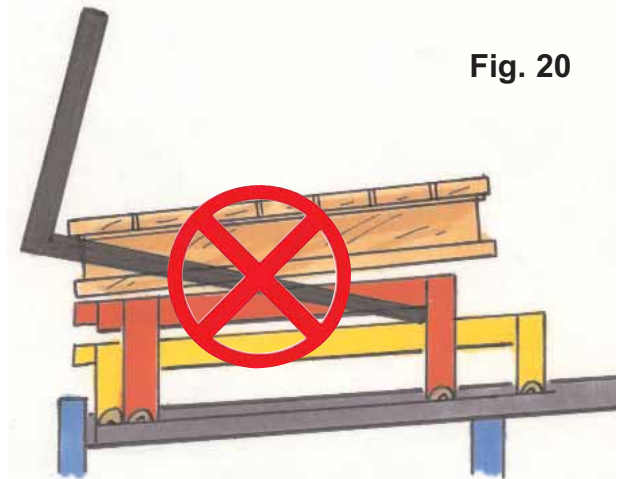
1. Fork truck operators need to tilt their forks slightly upward when unloading a pallet from a push back lane. See Fig. 19



**Fig. 19**

*Diagram shows the proper angle of forks for unloading a push back system.*

*Diagram shows the improper angle of forks for unloading a push back system.*



**Fig. 20**



## CAUTION

Entering the lane with the forks tilted downward, may cause the forks to catch the underside of the center tube or rear tube of the cart. This could cause the carts to be accidentally dislodged from the system or damaged.

2. Pick up the pallet and **slowly** pull back out of the system, controlling the speed of the remaining pallet loads in the lane. **Do NOT pull the front pallet out faster than the rear pallets will flow.**

***It is critical to control the speed of the pallets with the fork truck.***



## WARNING

If rear pallets are allowed to flow uncontrolled towards the front of the system, the impact of hitting the front beam can cause product to fall from the pallet potentially resulting in serious injury or death.

3. Remove remaining pallets from the carts using the same procedures as described above.

# Fixing Jammed Systems:

If during the unloading of a pallet load from a push back lane, should the pallet behind it not immediately flow forward, the fork truck operator should lightly bump the hung up pallet with the pallet being removed. This should free the pallet and allow it to flow forward.

If the rear pallet does not move forward after bumping it, return the pallet that was removed back into the system to hold the stuck pallet in place.



## WARNING

Do NOT allow a jammed pallet to remain in the system. Should it break free, it could travel rapidly to the exit end and product may spill in to the aisle causing severe injury or death.

There are four typical reasons why push back carts become jammed:

- Rear pallet misalignment
- Load overhang from pallet (slip sheets, shrink wrap, carton flaps, etc.)
- Debris on push back rails (wood splinters, granular product, etc.)
- Adjacent pallet misalignment

If at anytime your Steel King SK3600 Push Back system becomes jammed follow these safety steps:

1. ***Steel King always recommends, and Federal, State and local safety codes require the use of fall protection equipment when working at elevated heights. Please follow the instructions provided with your fall protection equipment. Also use all other appropriate safety equipment such as hard hats, etc..***
2. Never enter the actual push back lane to free up a jammed pallet.



**DANGER**

**Do not climb into the lane in front of a jammed pallet. Pallet loads can release at any time and may result in serious injury or death.**

3. Return pallets to the system in front of the jammed load. Leave the fork truck as a brace in front of the first load. Make sure the truck's parking brake is engaged.
4. If possible, look underneath the system to see if something fell in to the push back rail blocking the wheel of the cart.
5. If you can remove the obstruction from the system very carefully do so.
6. If the obstruction can not easily be removed or is caused by a broken pallet, remove all pallet loads from an adjacent push back lane using normal unloading procedures.

7. Remove push back carts from the adjacent lane.
8. Create a solid, secure platform in the lane just cleared. The platform must not be subject to tipping or movement.
9. Place an empty pallet on a fork truck and park in a location easily and safely accessible from the just cleared lane.
10. Following all safety procedures and using all necessary protection and safety equipment, enter the just cleared lane
11. Transfer the load from the jammed pallet on to the pallet on the fork truck. Do not step on pallet.
12. Carefully remove the jammed pallet out of the system and the remaining carts should roll forward.
13. Remove platform and reinstall carts in adjacent lane.

## **Summary:**

It is imperative that the guidelines detailed in this user handbook are followed to ensure a safe and effective push back system.

Failure to operate your push back system as indicated may result in serious injury, damage to the push back system or damage to products stored within the system.

If, after reviewing the handbook, you still have questions regarding the safe operation of your push back system, contact the material handling distributor you purchased the push back system through or contact Steel King Industries, Inc. directly.

**For more safety information visit [www.steelking.com](http://www.steelking.com)**

Get pallet rack safety information from Steel King's Pallet Rack User Manual. Call or write for your free copy.

A Pallet Rack User Manual may also be downloaded at [www.steelking.com](http://www.steelking.com).



**© Copyright 2007**

**Steel King Industries, Inc  
2700 Chamber St  
Stevens Point, WI 54481  
(800) 826-0203  
(715) 341-3120 Fax  
[info@steelking.com](mailto:info@steelking.com)  
[www.steelking.com](http://www.steelking.com)**

**PBHBK0306**