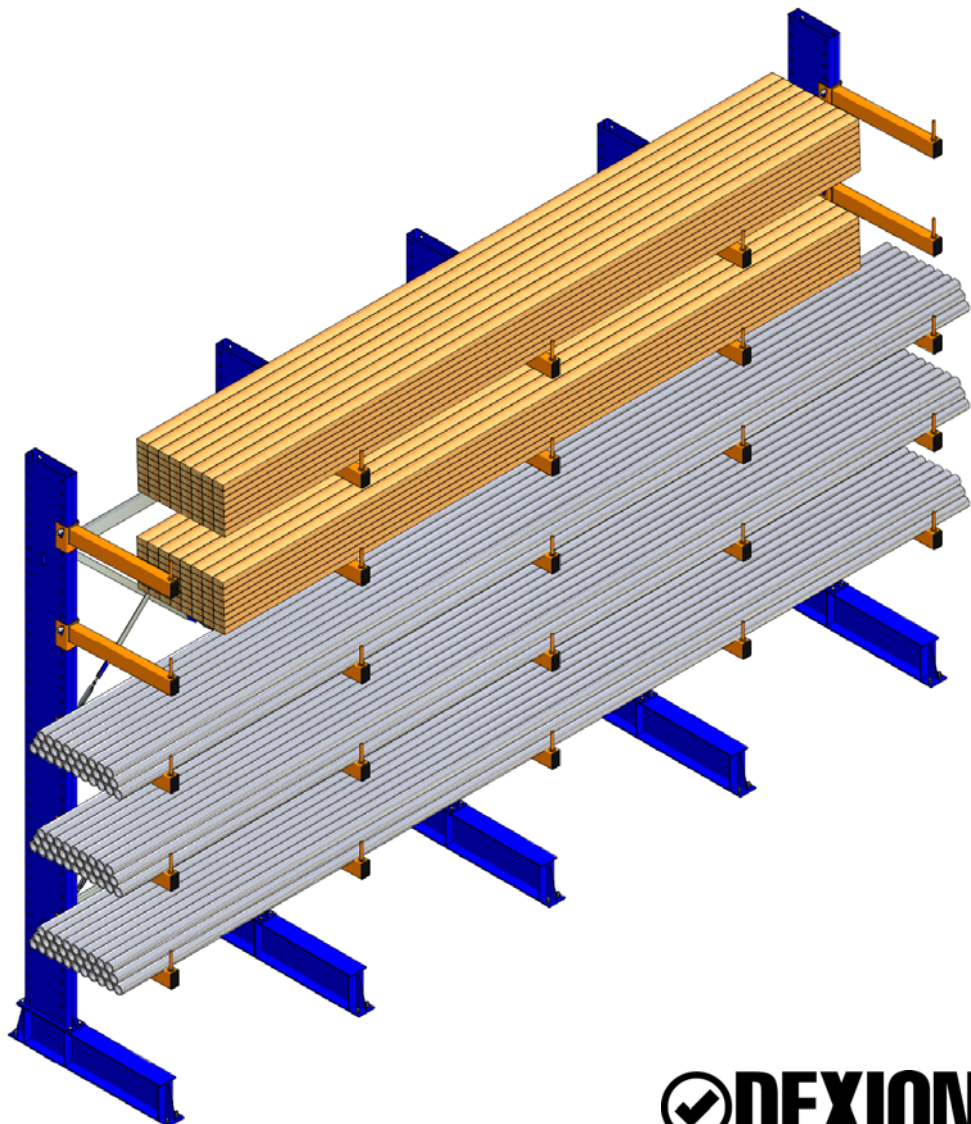


# Clearspan HD Heavy Duty Cantilever Racking

## User Manual



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# Clearspan HD Cantilever Racking

## User Manual



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# User Manual

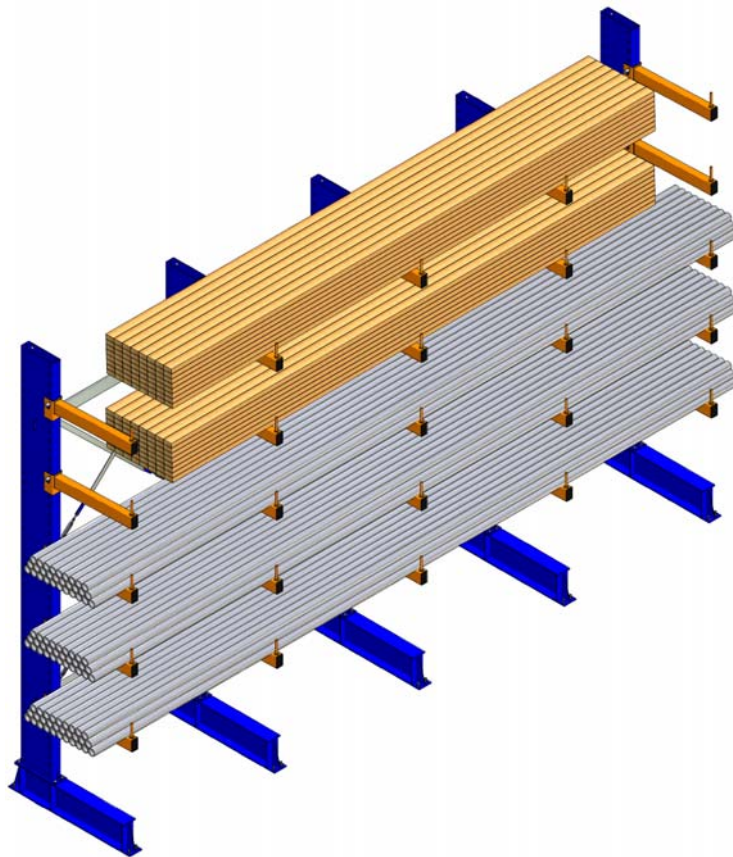
## Table of Contents

<b>SECTION 1 - INTRODUCTION</b> .....	<b>1.1</b>
PRODUCT OVERVIEW .....	1.1
SITE AND INSTALLATION .....	1.2
OPERATING ENVIRONMENT.....	1.2
FLOOR .....	1.2
LIGHTING.....	1.2
INSTALLATION.....	1.2
OPERATOR TRAINING .....	1.2
<b>SECTION 2 - LIFTING EQUIPMENT</b> .....	<b>2.1</b>
LIFT HEIGHT.....	2.1
CORRECT FORK LENGTH .....	2.1
TURNING CIRCLE .....	2.1
DRIVER TRAINING.....	2.1
DAMAGE TO STORAGE EQUIPMENT .....	2.2
<b>SECTION 3 - CORRECT USE OF SYSTEM</b> .....	<b>3.1</b>
PICKING UP THE LOAD.....	3.1
APPROACHING THE RACK.....	3.1
LOADING THE SYSTEM .....	3.2
UNLOADING THE SYSTEM .....	3.4
OPERATING CLEARANCES.....	3.4
<b>SECTION 4 - CHANGES TO SYSTEM</b> .....	<b>4.1</b>
<b>SECTION 5 - SAFE WORKING LOAD SIGN</b> .....	<b>5.1</b>
<b>SECTION 6 - ROUTINE INSPECTIONS AND MAINTENANCE</b> .....	<b>6.1</b>
RACK SAFETY OFFICER / REPORTING PROCEDURE .....	6.1
COLOUR CODING FOR RISK IDENTIFICATION .....	6.1
INSPECTION INTERVALS .....	6.2
CLEANING THE SYSTEM .....	6.2
<b>SECTION 7 - RACK DAMAGE AND RISK ASSESSMENT</b> .....	<b>7.1</b>
COMPONENT RECOGNITION.....	7.1
REPORT ALL DAMAGE .....	7.2
REPLACE DON'T REPAIR .....	7.2
DAMAGE INSPECTION – RACK OUT-OF-PLUMB .....	7.2
DAMAGE ACTION PROCEDURE FLOWCHART .....	7.3
TYPICAL CAUSES OF DAMAGE .....	7.4
PRECAUTIONS AGAINST DAMAGE .....	7.4



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## SECTION 1 INTRODUCTION



### PRODUCT OVERVIEW

Clearspan HD is a heavy duty cantilever racking system, used primarily for the storage of long product. This system utilises columns and bases, together with arms to create a complete column assembly that can then be positioned at varying centres using spacers and diagonal bracing sets to form a complete structure.

The system is able to be configured in three standard heights using 3000mm, 4500mm and 6000mm columns, with five standard column centre distances of 900mm, 1200mm, 1500mm, 1800mm and 2100mm. Arms are height adjustable and available in three standard lengths of 600mm, 900mm, and 1200mm.

## SITE AND INSTALLATION

### Operating Environment

Generally dry internal conditions. Outdoor racks require special design to accommodate wind loads and components need to be corrosion protected.

### Floor

The floor which is the racking foundation must be solid concrete floor capable of carrying the specified column loads and of receiving the base floor fixings. It must have a suitable degree of surface level tolerance and flatness.

### Lighting

The warehouse should be adequately lit to permit the safe use of machinery and equipment and the safe handling of goods.

### Installation

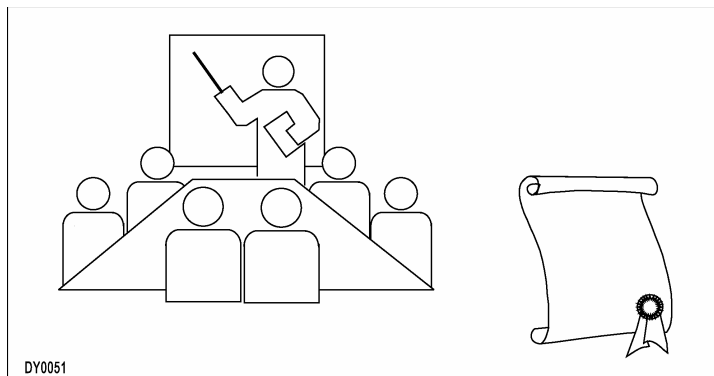
The storage equipment must be built in accordance with the specification, plans, and assembly instructions.

## OPERATOR TRAINING

Dexion recommends that ALL personnel operating within a warehouse environment are trained in safe working practises.

Part of the training given to forklift truck drivers or crane operators should cover correct use of the Clearspan HD Cantilever Racking installation, including the correct method of loading and unloading the racking and recognition of defects or damage that could adversely affect safety.

These guidelines describe how to use the system safely and should form part of your training. A copy of this document should be made available to all drivers.



To ensure safe use of the storage equipment the user must understand the following points:



## SECTION 2

# LIFTING EQUIPMENT

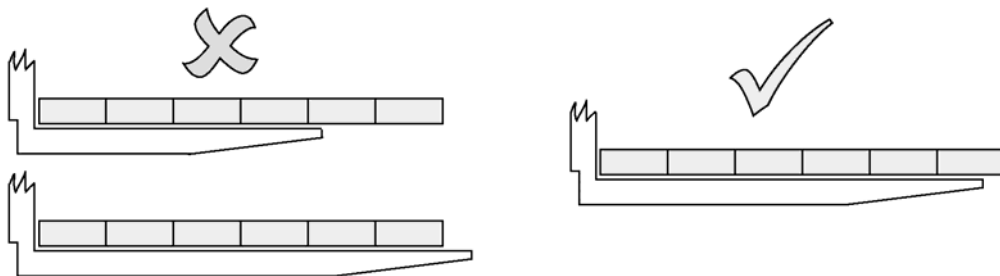
The fork lift truck, side loader or crane must be of a suitable design and capacity, capable of lifting the loads to the heights required. If there are any doubts regarding its capacity reference should be made to the relevant manufacturer or supplier.

### LIFT HEIGHT

The truck or crane must be capable of lifting the pack or bundle clear of the top storage level by at least 100mm.

### CORRECT FORK LENGTH

The forks should be of sufficient length, but not extend beyond the load (refer to the right-hand side figure for correct fork length).



### TURNING CIRCLE

The fork truck with combined load must be capable of operating within the aisle widths provided.

### DRIVER TRAINING

All fork truck drivers or crane operators should be suitably trained and licensed in the operation of the handling equipment. Secondly they should be trained in the use of this type of storage system and have a copy of these instructions available to them.



## **DAMAGE TO STORAGE EQUIPMENT**

The user is responsible for ensuring that the handling equipment is driven carefully at all times to avoid any collision with or damage to the rack structure. Harsh treatment or abuse will soon cause damage, reduction in system reliability and performance, and in extreme cases render the structure unsafe.

**Adopt and maintain safe working practices for the benefit of both the personnel and the system.**

## SECTION 3

# CORRECT USE OF SYSTEM

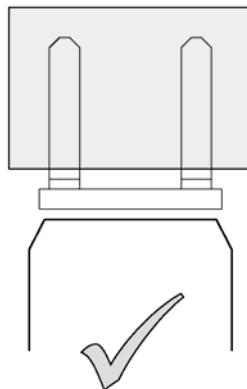
The following section covers the correct use of the system, and how to load and unload the racking.

The installation must be used in accordance with the specification and the criteria used for the design of the rack. The duty of the rack components will have been specifically selected to meet the individual load requirements of each rack. **It is important that the safe working loads are not exceeded and that the rack is not altered without consultation.**

### PICKING UP THE LOAD

Check that lift truck forks or crane slings are spaced to support the load with minimal deflection when lifted and will clear the cantilever arms when loading the system.

Where a fork lift truck or side loader is used, the load must be picked up square to forks. Misaligned loads cannot be corrected during the placement sequence and results in uneven loading on arms.



### APPROACHING THE RACK

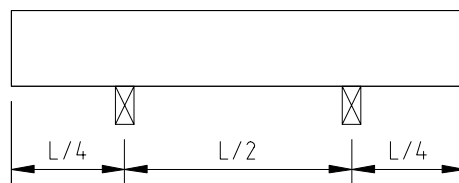
Slow down and stop the truck or crane in front of the desired location. Reduce any tilt on the fork lift mast and raise the load to the required storage level ensuring the load is still aligned centrally.

The pack or bundle must be presented to the rack squarely and not at an angle.

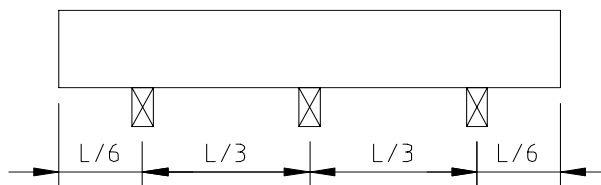
### LOADING THE SYSTEM

1. Correctly position the load above the cantilever arms within the depth of the rack in accordance with the following instructions. Ensure no contact is made with the arms or rack structure whilst manoeuvring load into position.

Goods must be stored evenly across the arms. The load should evenly overhang the end arms by half the distance between the arms and be supported by sufficient arms to keep load sag within the allowable limit. See diagrams below:

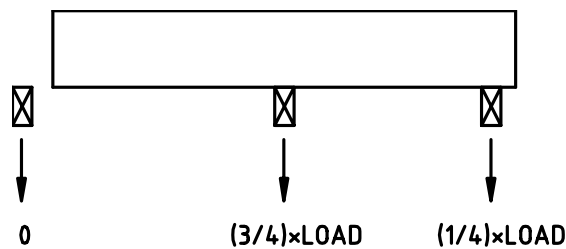


**Load position on 2 Arms**



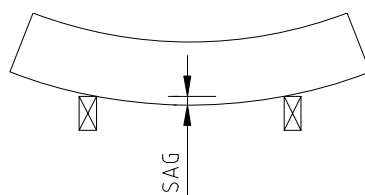
**Load position on 3 Arms**

Uneven storage can result in very high loads and must be avoided.



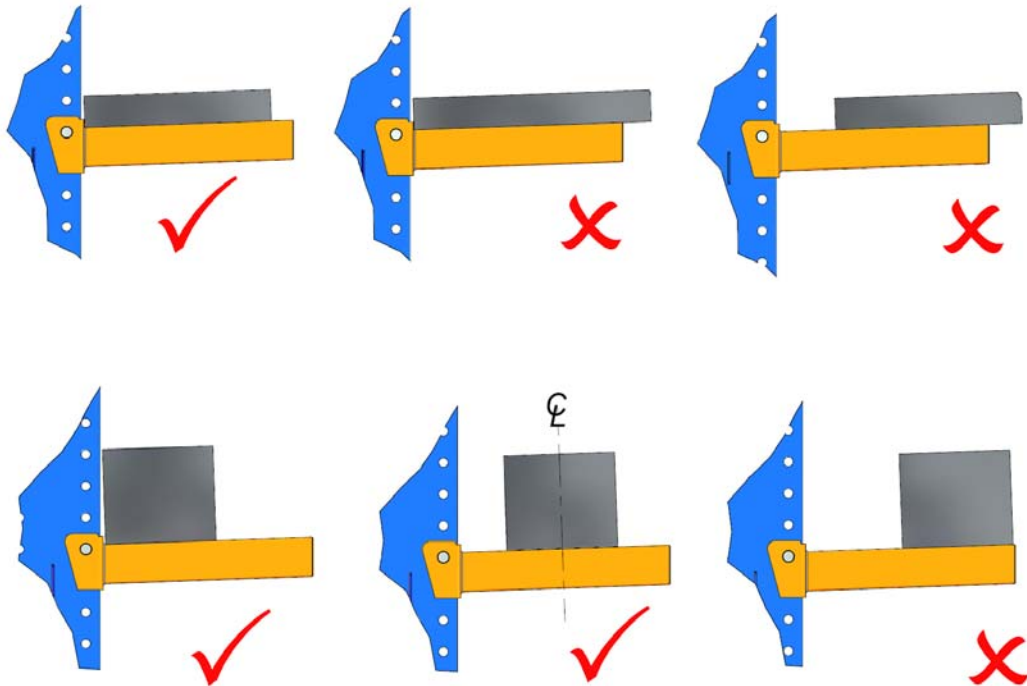
**Unevenly Supported Load**

Load deflection or sag should not exceed  $L/50$  ( $L$  = unsupported length)



**Load sag - maximum  $L/50$**

Goods must not exceed the length and load capacity of the cantilever arms. All arm capacities are based on uniformly distributed loads (UDL). Refer to load sign on relevant system.



2. Carefully lower the goods onto the support arms and release the load. Once the load is in contact with the support arms it must not be slid or dragged along or across the structure.
3. Then carefully remove the forks or slings from the load and exit the system.

**It is not acceptable practice to:**

- Nudge one bundle or pack with another, in an attempt to move or re-align loads.
- Drag or slide loads on the arms.

These are dangerous practices that impart additional loads in the rack structure, and could lead to damage and a reduction in safety.

## **UNLOADING THE SYSTEM**

1. Approach the rack squarely and align the truck or crane centrally in front of the required goods.
2. Insert the forks under load or slings around load.
3. Carefully lift the load just clear of the cantilever arms. Ensure the load is not raised too far, thus hitting the arm of the level above.
4. Remove the goods well clear of the rack before lowering the load to the floor or correct travelling position.

## **OPERATING CLEARANCES**

The rack dimensions will have been designed to provide operating clearances between the loads rack structure. The amount of recommended clearance varies slightly according to the rack height and the type of handling equipment in use. These recommendations have been judged to provide the operator with a fair margin in which to handle and position the goods.

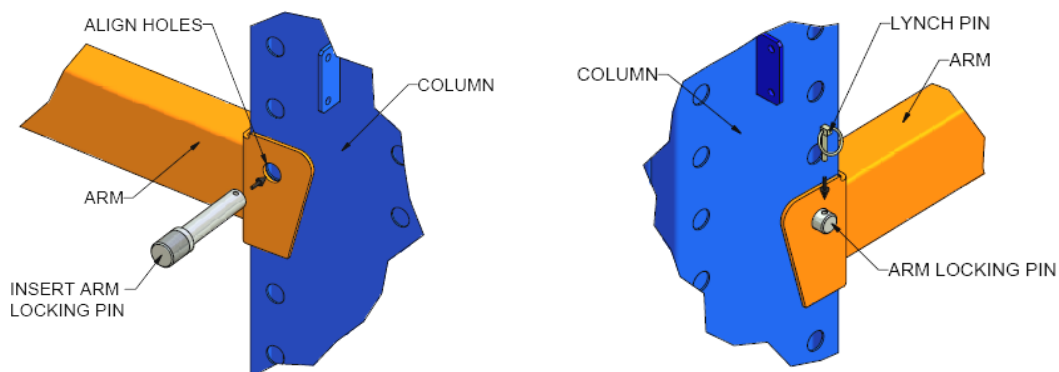
## SECTION 4

# CHANGES TO SYSTEM

A change in a rack configuration will cause a change in the load carrying capacity of a rack.

**The following points should be observed:**

1. In all cases of changes Dexion should be consulted before any alterations are made.
2. Additions or changes to the storage equipment by welding or bolting are not permitted unless specifically approved by Dexion.
3. The cantilever racking system is braced at specified locations. Any alterations of the bracing system, without consulting Dexion, may destabilise the racking and making it unsafe to use.
4. Changes in the safe load carrying capacity of the rack may occur if the racks are re-located and the floor conditions supporting the equipment change.
5. Safe load notices must be replaced as necessary after changes to the rack configuration.
6. During any alteration, for safety, the rack must be unloaded.
7. Changes should only be made in a professional manner and in accordance with the supplier's instructions.
8. Arms are to be fitted to columns as shown below.




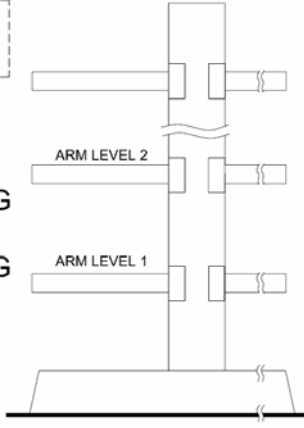




(1) Align the holes in the arm with those in the column and insert the arm lock pin all the way through.

(2) **ALWAYS** fit a Lynch Pin into the hole in the end of Locking Pin and ensure the ring of the Lynch Pin is locked over the Locking Pin so it cannot be accidentally removed.

## SECTION 5

# SAFE WORKING LOAD SIGN

Where required, a Dexion Cantilever Racking Safe Working Load sign is to be placed on one or both ends each system. The sign is fixed the end of the rack approximately 2 metres from the floor, and in a position so as not to be damaged by loading and unloading of goods within the rack.

		<b>SAFE WORKING LOADS</b> <small>CANTILEVER RACKING</small>	
<small>ALL LOADS TO BE UNIFORMLY DISTRIBUTED</small>			
NUMBER OF ARM LEVELS: <b>6</b>			
LOAD PER ARM: <small>ARM LEVELS</small> <b>4 TO 6 = 1,000 KG</b> <b>1 TO 3 = 1,200 KG</b>			
MAX LOAD PER COLUMN SIDE: <b>6,600 KG</b>			
	<small>Conduct regular INSPECTION to check for:</small> - Correct application & use - Loads within allowable safe limits. - Accidental damage to or dislodgement of structure components. - Ensure all components are correctly fitted and located.		<small>INSTRUCT operator on correct use of equipment.</small> Damage due to impact can impair safety. REPORT all damage to the Rack Safety Officer.
	<small>DO NOT climb on the structure.</small>		<small>DO NOT alter structure without checking manufacturers technical data</small> If in doubt ALWAYS contact your equipment supplier.
<small>SITE ADDRESS &amp; ZONE LOCATION:</small> <b>88/8888 XXXXXXXXXX          BUSINESS PARK          YYYYYYYYYYYYYYYY ROAD          ZZZZZZZZZZ ZZZZZZZZ          NSW 0000</b>		<small>INSTALLATION DATE:</small> <b>30 DECEMBER 2008</b>	
		<small>EQUIPMENT SUPPLIED BY:</small> <b>DEXION AUSTRALIA          23 TATTERSALL ROAD          KINGS PARK, NSW 2148</b>	

EQUIPMENT MANUFACTURED BY DEXION (AUSTRALIA) PTY LTD

Typical Load Sign



## SECTION 6

# ROUTINE INSPECTIONS AND MAINTENANCE

It is recommended that the end user refer to **Section 9 - “Operation and Maintenance of Adjustable Pallet Racking” of AS4084 (Steel Storage Racking)** for racking inspection and maintenance procedures. The following information has been compiled based on AS4084 and the FEM recommendation as a supplement to the code recommendations. FEM (Federation Europeene de la Manutention) is a European industrial body made up from various national organisations representing the storage equipment manufactures in their own country.

The system requires no maintenance other than cleaning and replacement of possible damage through incorrect operation. The system should be regularly inspected. *See Inspection Intervals.*

### RACK SAFETY OFFICER / REPORTING PROCEDURE

It is recommended that a ‘Rack Safety Officer’ be appointed and a procedure put in place so that any damage or unsafe occurrence can be reported, thus ensuring that any necessary actions can be taken to maintain a safe working environment.

The safety officer should undertake routine inspections, keeping maintenance and safety reports.

### COLOUR CODING FOR RISK IDENTIFICATION

The following colour coding - Green, Orange and Red are classifications of risk as defined by FEM ‘Guidelines for the Safe Use of Static Racking’

- Green Risk:** Damage requiring surveillance.
- Orange Risk:** Hazardous damage requiring action as soon as possible.
- Red Risk:** Very serious damage requiring immediate action.

*See section on Rack Damage and Risk Assessment.*

## INSPECTION INTERVALS

### Daily Inspections

This applies to operator care of the system.

Ensure the correct application and use of equipment.

- Ensure that the safe working load signs are adhered to.
- Damaged packs must not be entered into the system and should be removed as they occur.
- Any safety issues or damage to the structure should be reported to the Safety Officer who will carry out the risk assessment and identify the risk as necessary.

### Weekly Inspections

The Safety Officer will perform visual inspection carried out from ground level of all the racking. This should include all forms of accidental damage classed as **Red** or **Orange Risk**.

- All Inspections should include a check of all Arms to ensure the safety Lynch Pins are correctly installed with their retaining ring locked over the Locking Pin so that it cannot be accidentally removed.

### Monthly Inspections

This should be carried out in a similar manner to the weekly inspection, but include the physical emptying of random bays in order to carry out a more detailed inspection.

- It should also be used to check that items already identified as **Red Risk** have been isolated with the necessary actions taken to rectify the risk. Similarly **Orange Risk** items should be checked to ensure repairs are underway.
- Ensure that all safe working load signs, maintenance and other safety signs are in place.

### Six to Twelve Monthly Inspections

A major inspection by a technically competent person fully experienced in the identification and categorisation of rack damage. Such a person may be an external specialist capable of giving an independent assessment of the racking. This review should also examine the performance of the reporting procedures and that actual repairs are being carried out.

The inspection should be comprehensive and include checking for out-of-plumb and ensure that the rack installation has not been altered. A copy of the load application and configuration drawings shall be retained for this purpose.

## CLEANING THE SYSTEM

If the rack needs cleaning, either as part of a routine or as a result of a spillage, the following guidelines should be observed.

The clean should comprise of a wipe down with a damp cloth, using (if required) a mild detergent. Never use a hose to spray the racking or use abrasive or caustic cleaning agents.

## SECTION 7

# RACK DAMAGE AND RISK ASSESSMENT

The following pages detail the damage identification procedure and the risk assessment using colour-coding method as per FEM.

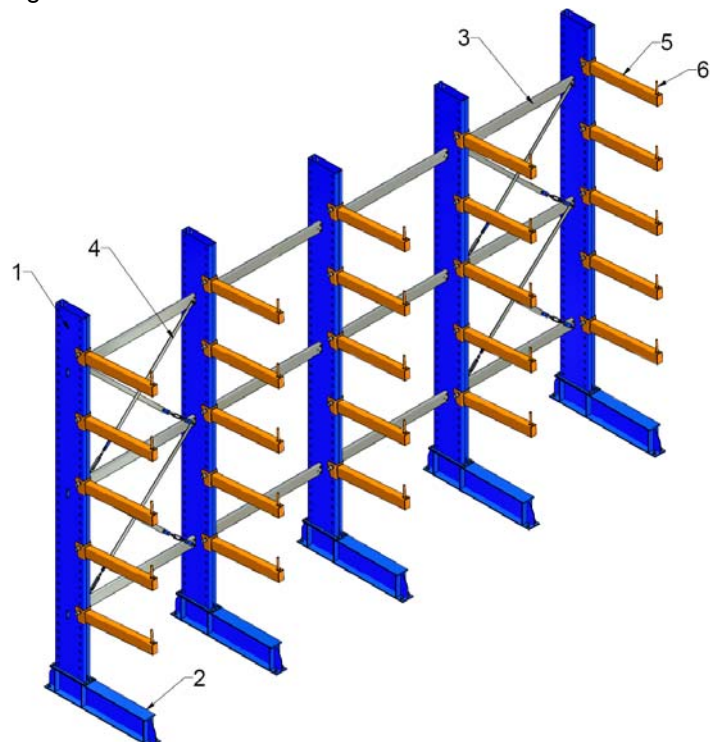
Almost all damage to racking systems occurs as a result of a collision impact on the structure by a fork lift truck or the load the truck or crane is transporting. Any damage will reduce the ultimate load carrying capacity of the rack to some degree, thereby eroding the design safety factors. The greater the damage the greater the reduction in safety factor, until ultimately a collapse could occur at normal working load.

It is important the user is aware of this situation and understands the need to monitor the racking carefully to ensure any damage is identified and dealt with.

### COMPONENT RECOGNITION

The racking installation comprises following main elements:

1. Column
2. Base – single entry or double entry (single entry shown)
3. Column Spacer
4. Diagonal Spine Bracing— comprising bracing strip and turnbuckle assembly
5. Arm Assembly – light, medium or heavy duty – comprising Arm, Locking Pin and safety Lynch Pin
6. Spigots



## REPORT ALL DAMAGE

If the racking is damaged it should be reported immediately to ensure the necessary precautionary actions are taken.

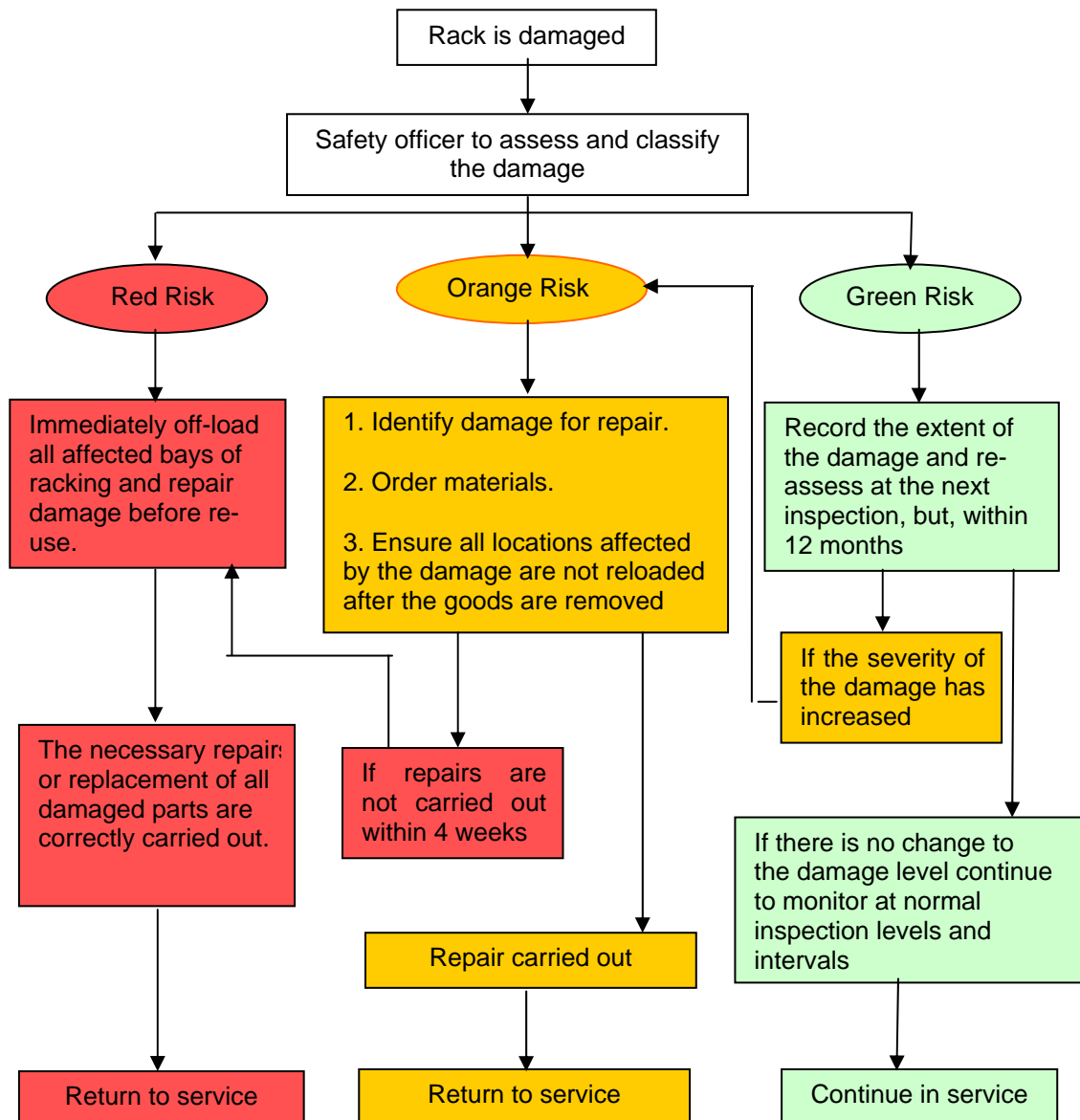
## REPLACE DON'T REPAIR

- It is not recommended to repair damaged rack components.
- Any component no longer fit for use should be replaced on a like for like basis.
- If the bottom portion of an upright is damaged, replace the whole upright up to the original splice level. Never cut and splice in a small piece of upright.
- Never apply heat in an attempt to straighten bent components.

## DAMAGE INSPECTION – RACK OUT-OF-PLUMB

Due to an impact (e.g. fork truck collision), a rack may be out-of-plumb by a certain amount. A recommended maximum amount of out-of-plumb for a rack in **an unloaded condition**, both along the aisle and across the aisle directions, is **Height / 500**

### DAMAGE ACTION PROCEDURE FLOWCHART



## TYPICAL CAUSES OF DAMAGE

The following are some typical contributing factors to why damage can occur.

- Handling equipment: Poor or ill maintained equipment, or a change in the type and size of handling equipment.
- Goods Stored: Change in the type or size of goods stored, overloading or incorrect loading of arms and system.
- Truck drivers: Contract or agency drivers, inexperienced or ill-trained, not familiar with the correct operating procedures, working to high throughput quotas.
- Poor housekeeping: Damaged packs, unstable loads, obstructions within the aisle.

## PRECAUTIONS AGAINST DAMAGE

The following are all factors that can contribute to minimising the risk of potential damage to the racking system.

- Installation layout design: The provision of adequate operating aisle and transfer aisle widths. Sufficient operating clearances around the stored goods.
- Good management: Operational procedures, material flow around the warehouse, avoidance of traffic bottlenecks, reporting procedures, training of warehouse staff.
- Good housekeeping: Inspection of and rejection of unsuitable packs, clearly defined aisles and stacking areas, maintenance of fork lift trucks, warehouse floor etc. and the provision of adequate lighting.
- Good driver/operator training: Instruction on the correct use of the racking, safety aspects, controlled use of speed within the racking area.
- Good aisle markings: Well defined aisles and transfer aisles, traffic routes, and stacking areas. Floor pallets are not to protrude into the operating aisle.
- Provision of guide rails: This may be a consideration depending on the type of racking system.
- Provision of rack protection: Guards for individual uprights or for the whole frame. Protection helps reduce the effects of accidental damage. They are intended as sacrificial protection that needs to be replaced once damaged and ineffective.



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