

Racking Blitz Presentation for WSN – October 19, 2011

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Safe At Work Ontario
Enforcement > Compliance > Partnership >

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What is considered Racking?

- For this Blitz racking is industrial pallet racking
- They are made of:
 - Cold-formed steel
 - Hot-rolled steel
 - Wood
 - Aluminum
 - concrete

Pallet Rack

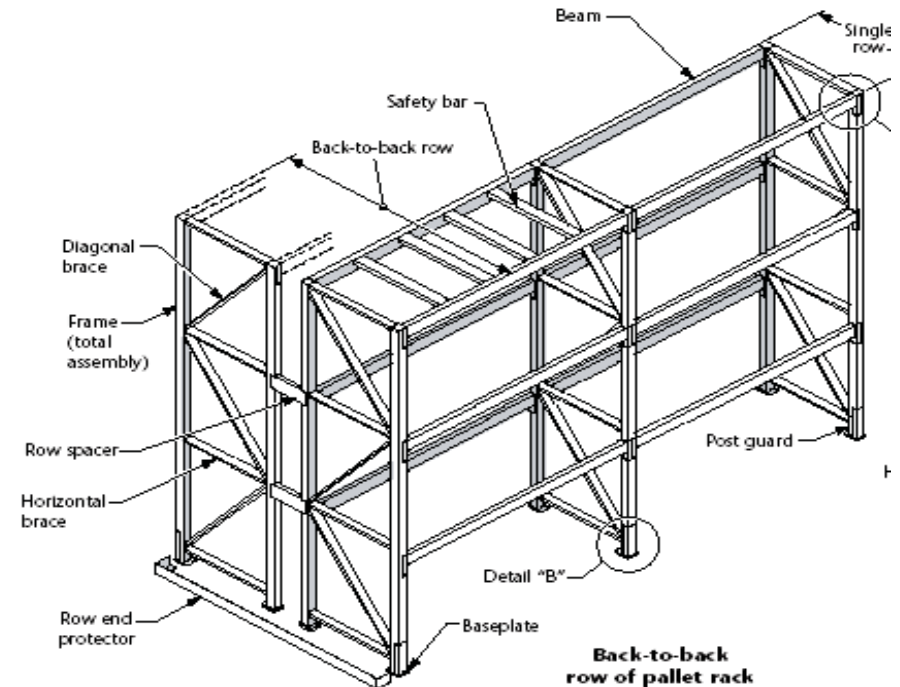


Workplace Selection

Inspectors will be visiting workplaces (in any sector) where racking is commonly used (such as warehouses, distribution centres, retail operations and manufacturing plants) based on various risk factors.

Terms, Definitions & How Racks Work

- **Racking (pallet rack, storage rack, racks):** a combination of frames beams and accessories used after assembly into a structure to support unit loads whether or not loads are palletized.



Why the Concern?

Pallet racks often support heavy loads which may collapse and there is potential to severely injure or kill a worker

Shelving

- This Blitz will not focus on shelving where items are hand placed.
- The rationale is the weight of loads and risk of collapse is much less than for pallet racks.

Example: Rack Collapse



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Commons Racking Incidents

- Examples of racking incidents:
 - Partial or total failure/collapse of racking systems
 - Forklifts colliding with racks causing material to be displaced or causing potential damage to the racking itself
 - Material falling through the back of the racks
 - High floor vibration at forge shops causing loads to crawl and falloff the rack if not properly secured

Racking Prosecution

- Company fined \$240,000 for violations of OHSA that resulted in death of an employee at a Brampton warehouse
- Steel rack collapsed followed by a cave-in of a roof and buckling outwards of a wall
- Collapse and cave-in caused a huge pile-up of twisted metal and tons of frozen food
- Took 3 days to recover worker's body
- Investigation found a lift truck banged into the rack prior to collapse and cave-in

Racking Prosecution ... cont'd.

Company pleaded guilty, as an employer, to:

1. Failing to prevent tipping or falling of material that may endanger a worker, as required by Section 46 of the Regulations for Industrial Establishments, by failing to ensure that racks with a height-to-depth ratio in excess of 8 to 1 were supported with cross aisle ties or building ties. This was contrary to Section 25(1)(c) of the act; and
2. Failing to provide appropriate supervision to the lift truck driver on the safe operation of the lifting device. This was contrary to Section 25(2)(a) of the act.

Why Problems Occur

- Examples of causes of storage rack system failure, alone or in combination, include:
 - poor storage rack design
 - incorrect installation and assembly
 - uneven floors
 - inadequately designed or constructed floors
 - inadequately connected to wall members
 - poor/inadequate storage rack repair
 - shelf beams and/or uprights damaged
 - incorrect use or overloading
 - lack of regular inspection and maintenance program
 - product pushed through the back of the rack

Why Problems Occur ... cont'd.

- Examples of factors that may contribute to rack system failure include:
 - operator error when using material handling equipment (lift truck, reach trucks etc.)
 - aisle width is too narrow for lift truck and as a result it doesn't "fit" system causing damage to racks
 - operator of material handling equipment drives carelessly or is not properly trained, therefore causing damage to racks
 - workers failing to notify supervisor of lift truck collisions with racks and supervisor in turn failing to assess damage and ensure the necessary maintenance measures
 - workplaces evolve and use racks to store goods/products they were not originally designed for
 - workers unaware of rack capacity
 - required anchor bolts not installed
 - incompatible rack components

Pre-Start Review (PSR)

Intent

- 1) To ensure that a timely professional review identifies specific hazards
- 2) To ensure that such hazards are removed or controlled before the apparatus or process is started up.
- 3) To ensure worker protection as required under the applicable provisions of the Regulation for Industrial Establishments

For more information see MOL Guideline at:

http://www.labour.gov.on.ca/english/hs/pdf/gl_psr.pdf

PSR for Racking

When is it Required

- A PSR would be required, in a factory, when an employer:
 - Installs a new racking system
 - Modifies an existing racking system

Documents for PSR Exemption

- The following documents on acceptable to established an exemption:
 - A document from the manufacturer stating that the racking has been “pre-engineered” (by an Ontario P. Eng.) and the configurations that the approval applies to (limitations, installation instructions, etc.)
- OR
- A document from the manufacturer declaring that the rack structure is designed and tested in accordance with a design Standard like FEM, RMI 1997 (or later) or CSA A344.2-05

PSR Legislation

- 7(2) Subject to subsections (5), (7), (8) and (9), a pre-start health and safety review is required if, in a factory other than a logging operation, a provision of this Regulation listed in the Table applies and the circumstances described in the Table will exist,
- (a) because a new apparatus, structure or protective element is to be constructed, added or installed or a new process is to be used; or
 - (b) because an existing apparatus, structure, protective element or process is to be modified and one of the following steps must be taken to obtain compliance with the applicable provision:
 1. New or modified engineering controls are used.
 2. Other new or modified measures are used.
 3. A combination of new, existing or modified engineering controls and other new or modified measures is used. O. Reg. 528/00, s. 2.

PSR Legislation ...cont'd

- 7(3) When a pre-start health and safety review is required, the owner, lessee or employer shall ensure that the apparatus, structure or protective element is not operated or used or that the process is not used, as the case may be, unless the review has been conducted, and,
- (a) all measures identified in the review as being required for compliance with the relevant provisions of this Regulation that are listed in the Table have been taken; or
 - (b) if some or all of the measures specified in clause (a) are not taken, the owner, lessee or employer has provided written notice to the joint health and safety committee or the health and safety representative, if any, of what measures have been taken to comply with the relevant provisions of this Regulation that are listed in the Table..

PSR Legislation...cont'd

7(10) If no pre-start health and safety review is required because subsection (5), (7), (8) or (9) applies, the owner, lessee or employer shall keep documents establishing the exemption readily accessible in the workplace for as long as the protective element, rack or stacking structure or lifting device, travelling crane or automobile hoist remains in the workplace or the process is used in the workplace, as the case may be.

PSR Legislation...cont,d

- 7(14) Reports of pre-start health and safety reviews conducted under this section shall,
- (a) be kept readily accessible in the workplace together with any supporting documents; and
 - (b) be provided to the joint health and safety committee or the health and safety representative, if any, before the apparatus, structure or protective element is operated or used or the process is used.
- 7(15) Documents kept under subsection (10) may be reviewed, on request, by,
- (a) the joint health and safety committee or the health and safety representative, if any; or
 - (b) an inspector.

Occupational Health and Safety Act

54 (1) An inspector may, for the purposes of carrying out his or her duties and powers under this Act and the regulations

- (m) require in writing an owner, constructor or employer to provide, at the expense of the owner, constructor or employer, a report bearing the seal and signature of a professional engineer stating,**
- (i) the load limits of a building, structure, or any part thereof, or any other part of a workplace, whether temporary or permanent,**

Occupational Health and Safety Act...cont'd

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(m) require in writing an owner, constructor or employer to provide, at the expense of the owner, constructor or employer, a report bearing the seal and signature of a professional engineer stating,

(iii) that a building, structure, or any part thereof, or any other part of a workplace, whether temporary or permanent, is capable of supporting any loads that may be applied to it,

(A) as determined by the applicable design requirements established under the version of the Building Code that was in force at the time of its construction,

Occupational Health and Safety Act...cont'd

25. (1) An employer shall ensure that,

(b) the equipment, materials and protective devices provided by the employer are maintained in good condition;

25(2) Without limiting the strict duty imposed by subsection (1), an employer shall,

(a) provide information, instruction and supervision to a worker to protect the health or safety of the worker;

(d) acquaint a worker or a person in authority over a worker with any hazard in the work and in the handling, storage, use, disposal and transport of any article, device, equipment or a biological, chemical or physical agent;

Regulation 851

11. A floor or other surface used by any worker shall,
(a) be kept free of,
(i) obstructions,
(ii) hazards

21. Where natural lighting is inadequate to ensure the safety of any worker, artificial lighting shall be provided and shadows and glare shall be reduced to a minimum.

45. Material, articles or things,
(b) shall be transported, placed or stored so that the material, articles or things,
(i) will not tip, collapse or fall, and
(ii) can be removed or withdrawn without endangering the safety of any worker

46. Machinery, equipment or material that may tip or fall and endanger any worker shall be secured against tipping or falling. R.R.O. 1990, Reg. 851, s. 46.

Load Limits

The load rating of a pallet rack should contain the following information:

- maximum beam capacity
- maximum bay capacity
- design standards used
- maximum capacity is the load that can be placed on two beams.
- maximum bay capacity is the load that can be placed in each bay, excluding the loads placed on the ground.

Load Limits... cont'd

MAXIMUM PERMISSIBLE LOADS

2000 lbs. Maximum Pallet Load
1440 lbs. Average Pallet Load
16,000 lbs. Maximum Bay Load

WARNING: The above capacities are based on new, undamaged components. Damage reduces rack capacity. Repair or replace damaged components.

Customer Name and Address

This rack installation is designed and constructed in conformance with the ANSI MH16.1 -2008.

Supplier Name
and Address

Anchoring and Bolting

- An anchor is a mechanical fastener used to secure a pallet rack structure to a building structure e.g. floor.
- All racking must be bolted unless employer has documentation (from P. Eng. or manufacturer) to confirm it is not required

Beam Damage



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Welded Racks



The capacity and/or safety of frames, and beams can be adversely affected if they are structurally modified e.g. cut down, spliced or welded

Rack Damage



Post Guard



Damaged Diagonals



Damaged Rack



Damaged Rack

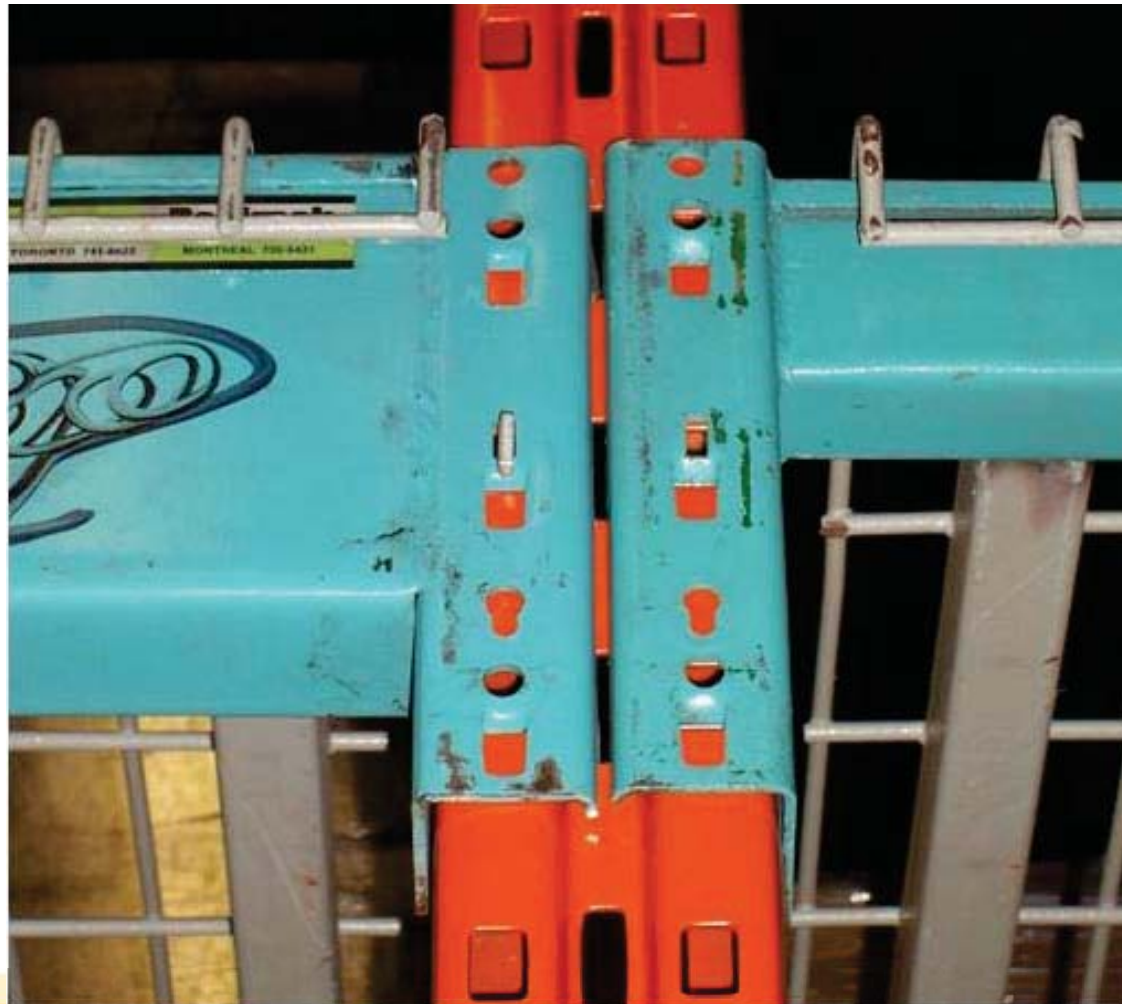


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Mismatches

- Different coloured components should raise concern that components are not properly matched
- Mismatched components may appear compatible, however their use may adversely affect the safety of racking system
- Inspector may ask employer for documentation to confirm all components came from original manufacturer or supplier

Different Capacities



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Proper Placement of Pallets on Rack

- The following is a list of practices that workers should be made aware of to ensure proper and safe placement of pallet on racks:
 - The rated load should be adhered to, since a localized overload may cause a permanent deformation of the load beams or beam brackets, among other things
 - Any load that is likely to break up should be properly secured on the pallet by strong packaging
 - The loads should be evenly distributed and securely fastened on the pallets
 - The loads should not overhang over the pallet by more than 50 mm (2 in.)

Uniformly Distributed Load



Back Stops

- Function of back stops:
 - To ensure a pallet is not pushed out by the pallet going in front of it
 - To prevent loads from falling into aisles and injuring a worker in the aisle



Safety Netting

- Purpose of safety netting:
 - Another precaution to prevent pallet from falling off back of rack
 - This is important where pedestrians pathways are behind rack



Pallets

- Damaged pallets should be removed from service
- Common defects include:
 - Missing, deficient, split or broken boards
 - Protruding nails

Damaged Pallet



Thank You