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NORTH AMERICAN STEEL

SAFETY SCOOP

Disclaimer

The information presented in this publication is not a definitive guide to government regulations and **does not** relieve persons using this publication from their **responsibilities under applicable legislation**. The appropriate OHS legislation should be **consulted**.

Individual counselling and advice is available from the Manufacturers' Health & Safety Association.

Collaboration with NORTH AMERICAN STEEL

The Manufacturers' Health & Safety Association would like to thank North American Storage and Steel in Nisku, AB for their contribution and collaboration to this month's Safety Scoop on Pallet Racking Safety.

Pallet Racking Safety in Alberta

An Introduction to the Roles and Responsibilities for Employers

Information shared by: Jonathan Hirst - B.Eng

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North American Storage / Steel

Manufacturer of Shelving and Pallet Racking Systems for over 60 years.

Manufacturing facilities in:

- Whitby, Ontario (North American Steel)
- Nisku, Alberta (North American Storage)

manufacturer of steel storage equipment
SINCE 1952

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Why Discuss Racking Now?

- Racking has been around for 40+ years…but it is more prevalent than ever.

- More and more large-scale facilities are being constructed which incorporate racking systems.

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Why Focus on Racking Now?

- Loads being lifted, moved and stored are getting heavier.

- Buildings are getting taller:
  - 1970’s : 18’
  - 1980’s : 32’
  - 2010’s : 45’+

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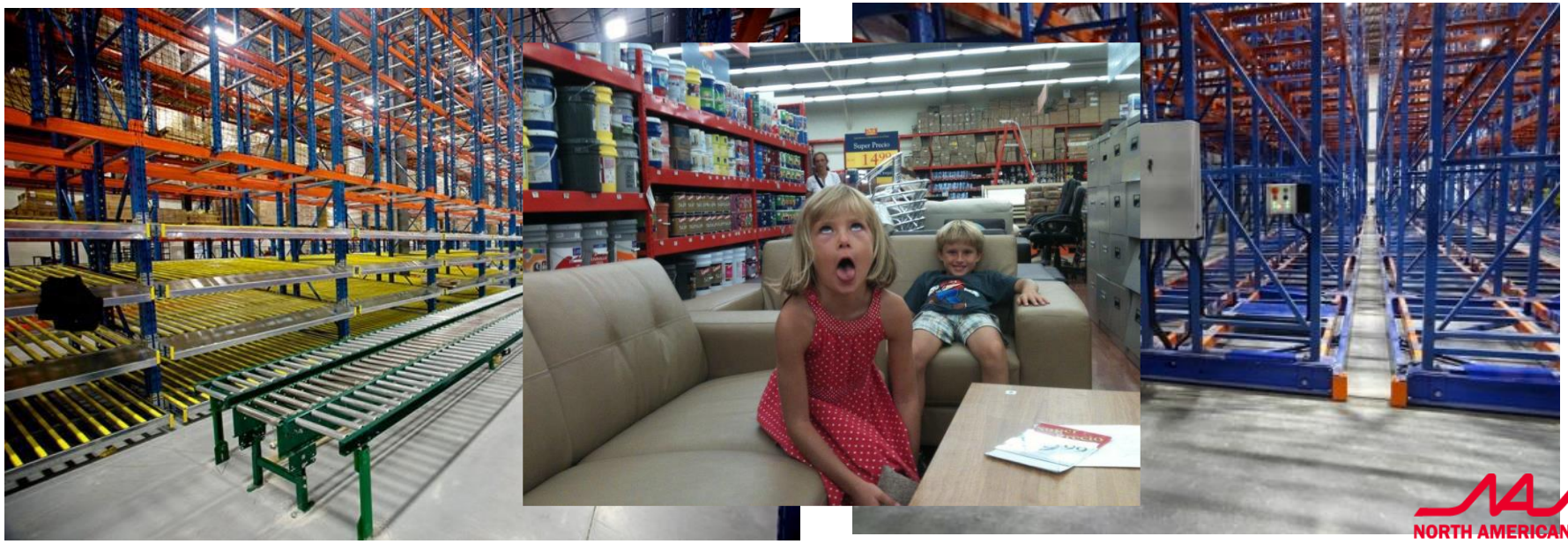
Why Focus on Racking Now?

- More integration and more complexity.
- No longer limited to industrial workplaces.

RACKING IS EVERYWHERE!



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Where to Start

Today we will review your responsibilities by:

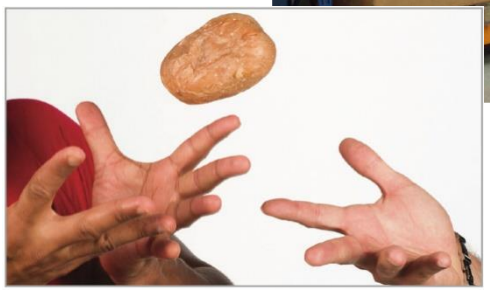
1. Legislation: Occupational Health and Safety.
2. Building/Fire Code: Life Safety & Insurance.
3. Canadian Design Standards: What we agree to follow.
4. Precedent: Good practices learned from others.

Federal Legislation

Source: Canadian Centre for Occupational Health and Safety

- No mention of pallet racking, except for a reference to forklift trucks – load handling.

What's Missing?



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Provincial Legislation (Alberta)

What does Alberta Occupational Health and Safety say:

Source: AB Occupational Health and Safety Code - Part 12 General Safety Precautions – Section 187

187(1) An employer must ensure that pallets used to transport or store materials or containers are loaded, moved, stacked, arranged and stored in a manner that does not create danger to workers.

187(2) An Employer must ensure the racks used to store materials or equipment

(a) are designed, constructed and maintained to support the load on them

(b) are placed on firm foundations that can support the load

187(3) A worker must report any damage to a storage rack to an employer as quickly as is practicable

187(4) The employer and the workers at a work site must take all reasonable steps to prevent storage racks from being damaged to the extent that their integrity as structures is compromised.

Provincial Legislation (Alberta)

Questions?

1. Racks, shelving, fixtures, etc. should be regularly inspected for damage and other defects?
   - How often is Regularly?
   - What are “Other Defects”?

2. It is expected that the employer will assess the damage.
   - What qualifications does one need to assess damage?

3. Has the damage been repaired, or the rack replaced?
   - How quickly? What is the liability in the interim?

4. Who enforces this?

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Potential Issues

Incidents involving pallets occur for five main reasons:

1. Poor pallet design;
2. Poor pallet construction;
3. Inappropriate use of a pallet for the load or storage method;
4. Continued use of damaged pallet(s); and
5. Poor handling.

- Racks, shelving, fixtures, etc. should be regularly inspected for damage and other defects that might cause loss of strength or result in injury or damage. Workers must report to their employer any damage to storage racks as soon as is practical. It is expected that the employer will assess the damage and based on that assessment, may have the damage repaired or rack replaced.

Potential Issues

The leading cause of storage rack system failures, acting alone or in combination, are:

1. Poor storage rack design – the rack is inherently unsafe;
2. Incorrect installation and assembly;
3. Using the wrong material handling equipment to load and unload the storage system;
4. Operator error when using material handling equipment, and
5. Structural problems with the floors or walls of the storage area – supporting structures may be overlooked, floors may not be sufficiently level.

Building Code & Fire Code (AB)

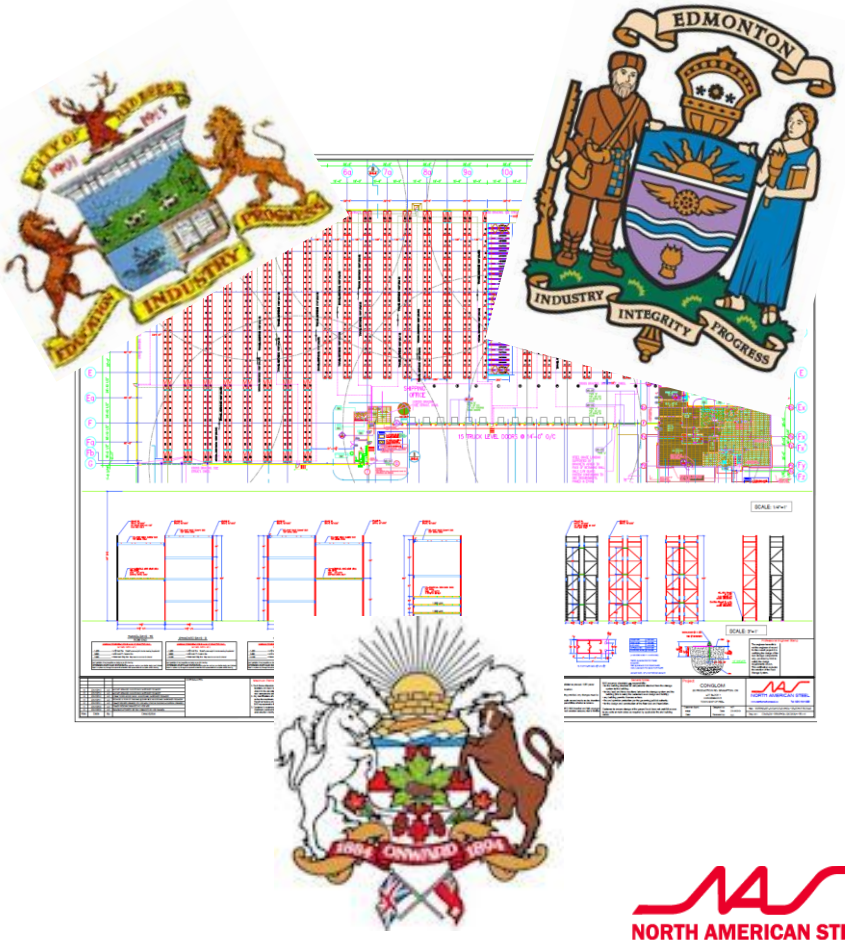
Do you need a permit to install racking?

- ✓ Yes, unless it's No, but even then, it's "Pretend you do".
- ✓ Varies by Municipality – you must ask!

- Design must adhere to National Building Code, Provincial Building Codes, and in some Provinces, Special Code Publications for Racking Supported Structures (Mezzanines and Rack Supported Storage Systems) Alberta STANDATA ABC 2009
- Min. Height – 8'0"+ typically requires a permit, below 8' is considered furniture. This "furniture" may still impede egress distances to fire exits.
- Must have Schedules completed.

Building Code & Fire Code (AB)

- Must submit Eng Stamped Drawings showing component and connection details, maximum allowable loads, Geo-Technical data, factored loads, site plan, legal site address, etc.
- Must submit a letter from Engineer confirming the slab can carry the forces from the loaded pallet rack.
- Must demonstrate the maximum egress distances from within the building are not exceeded by rack placement. May require an Architect's letter.
- Cost – can be a flat rate, or, $0/$1000 of project cost.



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Building Code & Fire Code (AB)

Do you need an in-rack sprinkler system for racking – see previous answer!

Source: Falls under National Fire Protection Association (NFPA)

30 yrs of development of the Early Suppression Fast Response (ESFR) are typically sufficient unless:

- If you are storing combustible type liquids, tires, exposed plastics, or aerosols, you will be limited to height and require in rack sprinklers.
- If your aisles are less than 6ft (1.8m) – many hand pick or narrow aisle applications.
- If the rack is higher than 25’0” (7.62m) under ceilings up to 30’0” (9.1m) in height.

Building Code & Fire Code (AB)

- If ESFR Building is higher than 35’0”, in-rack sprinklers may be required due to challenges of activating the system.
- If you utilize a mezzanine or a rack/shelving support storage platform.
- If you have a solid (wood or steel) shelves of larger than 20 sq. ft. (1.86 sq. m.) A typical 2x pallet wide bay is 28 sq. ft. (2.6 sq. m.).

Even if you don’t need a permit, your Insurance Underwriter may require a Fire Marshalls approval of your racking installation. The alternative could be a void policy!

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Design Standards

These are rules we design and manufacture by, they are not law or "Code"….yet.

- Canada – CSA A344:24 – User Guide for Steel Storage Racks
- Canada (new) – CSA S16-14 Annex M
- USA – Rack Manufacturers Institute, Inc. (ANSI – RMI MH 16.1-2008)
- USA – F.E.M.A. – specifically addresses racking in public areas
- Europe – FEA – the only current code that addresses allowable damage

Every legitimate domestic manufacturer follows these guidelines which determines how capacities are calculated, how calculators are to be confirmed through physical testing, welding standards, factors of safety, etc.

- Racking more than 10 years old may not have been built to these Standards.
- Offshore Racking, "Big Box" racking and shelving kits, do not meet these Standards.

Precedent to Develop a Program

Start Small:

Simply adding a “Rack Walk” to your monthly health and safety management system and look for missing pins, etc.

Make a Rack Plan Drawing:

Showing the layout of racking in your facility.

Call an Experienced Reviewer:

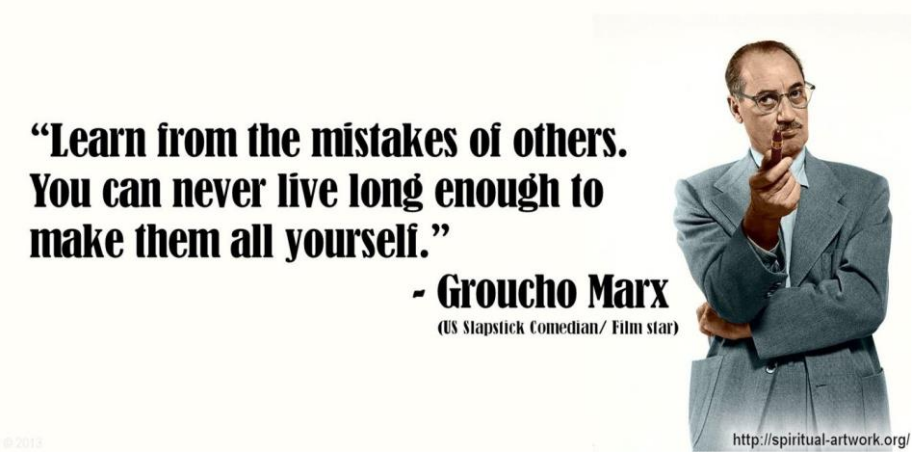
Don’t rush to become experts at assessing severity, call in an Engineer or other experienced individual; let them carry the liability for making the call.

Precedent to Develop a Program

Evaluate Experts:

There are many individuals and companies that will inspect your rack annually, ask for:

1. A sample report to review to ensure a thorough document that YOU can understand.
2. Capacity Calculations.
3. The report is stamped by a Registered Professional Engineer.
4. The engineer carries more than $5 million in professional liability insurance (not the $1 million standard P&O).



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Precedent to Develop a Program

Determine Allowable Rack Capacities:

If you purchase racking new, or used, it should always come with a document certifying the allowable loads for your application, sealed by an engineer. Component capacities are not sufficient.

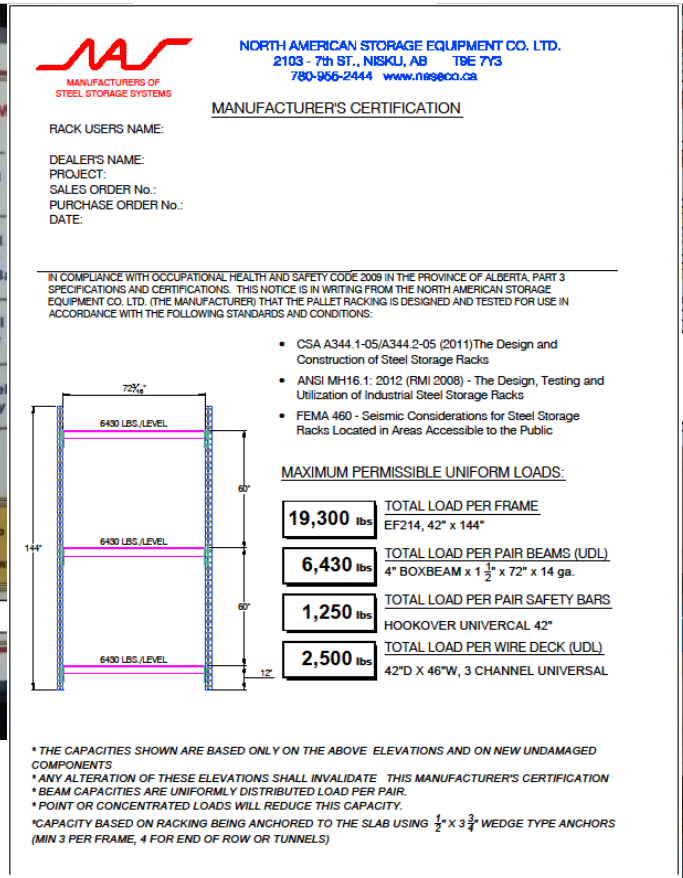
Post Allowable Rack Capacities where employees will see it:

Posters at end of rows, battery charging stations, H&S Info Boards
Label beams at your own risk!

Minimize # of Racking Elevations:

Every elevation could be a different rating, it quickly becomes a logistic nightmare.

Precedent to Develop a Program



MANUFACTURERS OF STEEL STORAGE SYSTEMS

NORTH AMERICAN STORAGE EQUIPMENT CO. LTD.
2103 - 7th ST., NISKU, AB T9E 7Y3
780-955-2444 www.naseco.ca

MANUFACTURER'S CERTIFICATION

RACK USERS NAME:

DEALER'S NAME:
PROJECT:
SALES ORDER No.:
PURCHASE ORDER No.:
DATE:

IN COMPLIANCE WITH OCCUPATIONAL HEALTH AND SAFETY CODE 2009 IN THE PROVINCE OF ALBERTA, PART 3 SPECIFICATIONS AND CERTIFICATIONS. THIS NOTICE IS IN WRITING FROM THE NORTH AMERICAN STORAGE EQUIPMENT CO. LTD. (THE MANUFACTURER) THAT THE PALLET RACKING IS DESIGNED AND TESTED FOR USE IN ACCORDANCE WITH THE FOLLOWING STANDARDS AND CONDITIONS:

- CSA A344.1-05/A344.2-05 (2011)The Design and Construction of Steel Storage Racks
- ANSI MH16.1: 2012 (RMI 2008) - The Design, Testing and Utilization of Industrial Steel Storage Racks
- FEMA 460 - Seismic Considerations for Steel Storage Racks Located in Areas Accessible to the Public

MAXIMUM PERMISSIBLE UNIFORM LOADS:

19,300 lbs	TOTAL LOAD PER FRAME EF214, 42" x 144"
6,430 lbs	TOTAL LOAD PER PAIR BEAMS (UDL) 4" BOXBEAM x 1 1/2" x 72" x 14 ga.
1,250 lbs	TOTAL LOAD PER PAIR SAFETY BARS HOOKOVER UNIVERCAL 42"
2,500 lbs	TOTAL LOAD PER WIRE DECK (UDL) 42"D X 46"W, 3 CHANNEL UNIVERSAL

** THE CAPACITIES SHOWN ARE BASED ONLY ON THE ABOVE ELEVATIONS AND ON NEW UNDAMAGED COMPONENTS*
** ANY ALTERATION OF THESE ELEVATIONS SHALL INVALIDATE THIS MANUFACTURER'S CERTIFICATION*
** BEAM CAPACITIES ARE UNIFORMLY DISTRIBUTED LOAD PER PAIR.*
** POINT OR CONCENTRATED LOADS WILL REDUCE THIS CAPACITY.*
**CAPACITY BASED ON RACKING BEING ANCHORED TO THE SLAB USING 1/2" X 3 3/4" WEDGE TYPE ANCHORS (MIN 3 PER FRAME, 4 FOR END OF ROW OR TUNNELS)*

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Precedent to Develop a Program

Leave Installations to the Professionals

- Erecting pallet racking, moving, or replacing damaged material is difficult to do safely.
- Installers should be licenced for operation of a lift truck, scissor-lift, fall arrest, elevated work platforms.
- Installers should be insured (WCB, WSIB, etc.)

If you must change beam elevations – call to confirm your new racking capacities FIRST

- The components used, and the height of the beams above the floor impact capacity calculations.
- A change of only 3” can result in a capacity reduction of up to 3000lbs.

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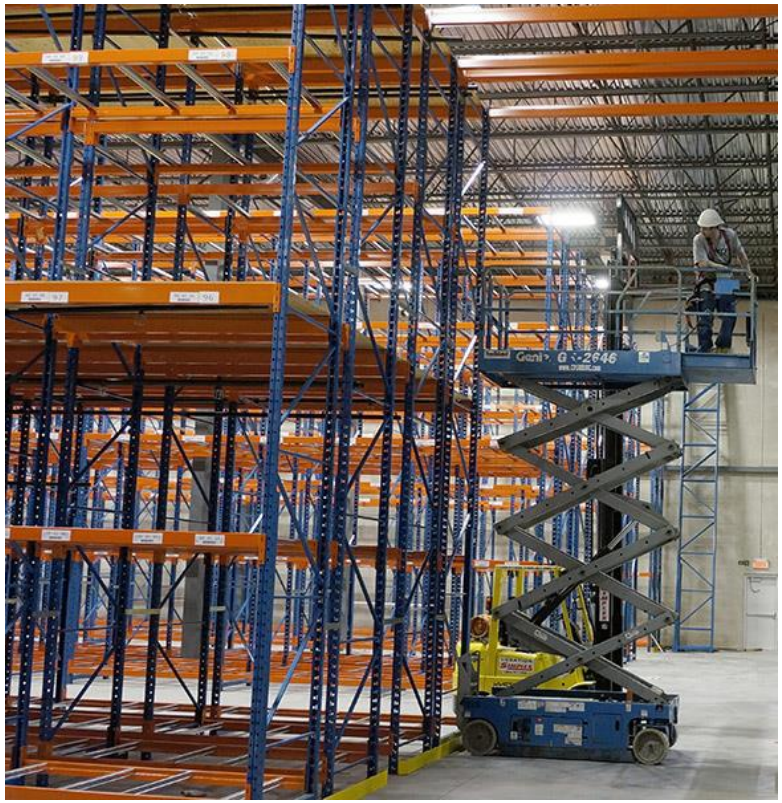
Precedent to Develop a Program

Create a Culture of Proactive Damage Reporting and Repair Tracking.

- If Lift Truck operators feel safe in reporting damage, then you will hear about it when it happens, not when it is “found”.
- Repeat damage in certain hi-risk areas may require additional frame protection.
- Ask an expert!



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Racking Repair or Replace?

Who is on the hook? "You", or "Not You"?

1. **New, or like new racking accompanied by a manufacturer's capacity rating or a sealed drawing.**
2. **If Racking is damaged, overloaded, or mis-used and still in service?**
   - If your racking is installed differently than what in on your drawing.
3. **If Racking damage is "accepted" by:**

a Racking Vendor/Inspector with no Professional Engineer:

- with an Engineer listed with APEGA.
- with an Engineer not listed with APEGA/out of Province.

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Racking Repair or Replace?

Who is on the hook? "You", or "Not You"?

4. If Racking damage is "repaired":

- By a 3rd party MHE company.
- By the original manufacturer.
- By a Professional (insured) 3rd party.
- A vendor of a 3rd party Repair Kits.

5. If you get visited by OHS Officer who notes damaged racking, and you:

- Appear surprised racking is now on their radar.
- You have a documented rack maintenance and repair program?

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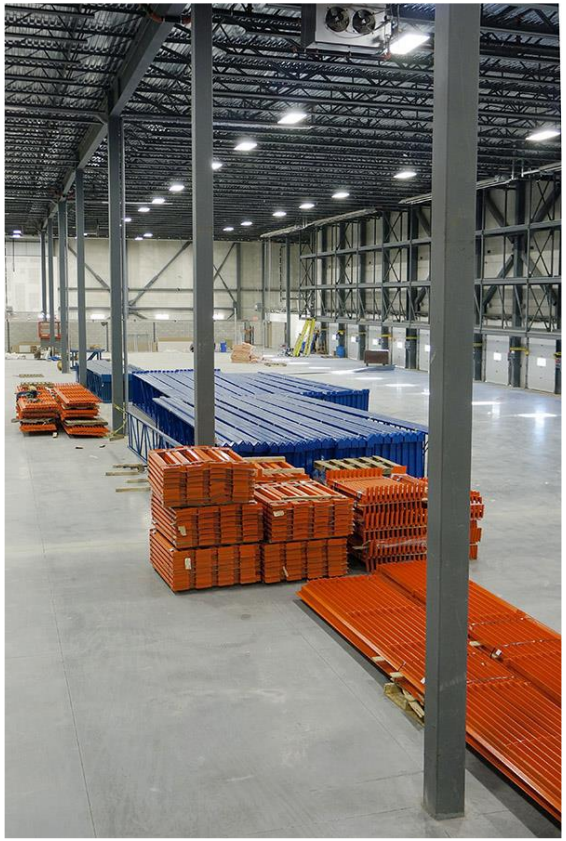
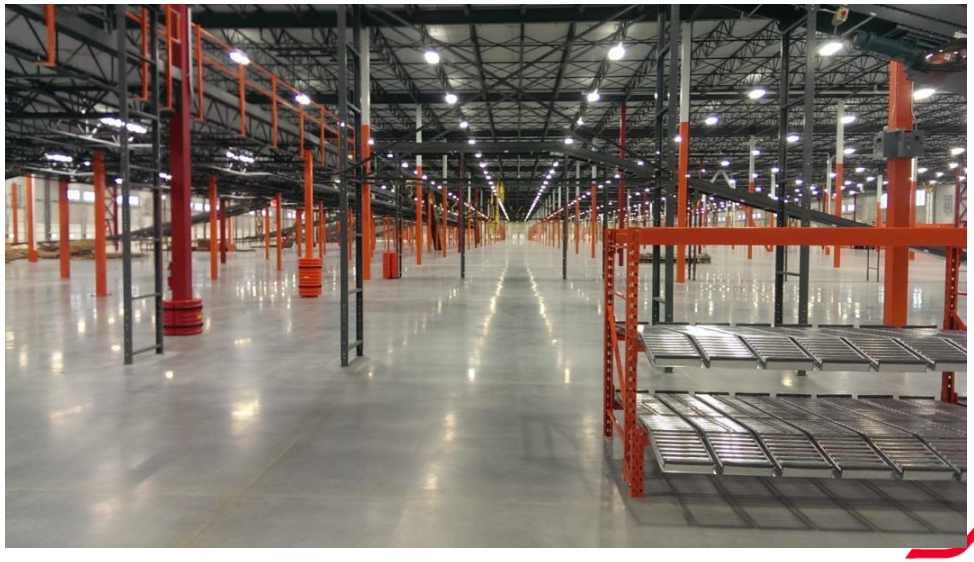
When should you implement a culture of racking safety awareness?



As soon as possible, but it's never too late!



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Conclusion

- Pallet Racking is very tolerant of misuse but there is always a limit.
- Don’t be the one that finds the limits!
- Ontario has taken the step of Legislating Rack Safety – Alberta may or may not go down that road.
- There is a currently a large gap between what is “required” and what a court may find as “due care”.
- Small changes now, will set you on a proactive path to ensuring the safety and awareness of your associates.

Remember: You don’t have to out-run the Bear!

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Questions

Thank you!

Any questions can be directed to Jonathon Hirst – at North American Storage 780-955-2444

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Have Questions? Contact us!

Rocky View	Red Deer	Edmonton
403-279-5555	403-343-0002	780-428-1006
rockyview@mhsa.ab.ca	reddeer@mhsa.ab.ca	edmonton@mhsa.ab.ca

To register for a course or access our other Safety Scoops visit https://www.mhsa.ab.ca/

Thank you!

Resources

https://search-ohs-laws.alberta.ca/legislation/occupational-health-and-safety-code/part-12-general-safety-precautions/

https://camindustrial.net/engineering-and-design/pallet-rack-regulations/

https://www.canadianlawyermag.com/news/general/alberta-court-of-kings-bench-upholds-tribunal-decision-on-calgary-warehouse-racking-system/383803