



BY SUZAN BUTYN

RACK OF AGES

A workplace mainstay is finally in the spotlight with a new CSA standard. Can your storage or pallet rack bear the scrutiny?

It's a good thing pallet racks can't talk. If they could, many would complain about being ignored, disrespected, overwhelmed by goods exceeding their capacity, and abused by lift trucks.

How old is your pallet storage rack? When was the last time you took a good look at it?

There's more to storage racks than a simple combination of upright frames and load support beams. While this combination is the basis for all pallet storage racks, there are 13 different kinds, static and dynamic, that can be subcategorized into 11 additional categories. Whatever system you have, properly installing, inspecting, maintaining and repairing it are integral and required parts of a health and safety program.

Storage racks are currently enjoying a stint in the spotlight with the release of the Canadian Standards Association (CSA)'s first rack standard. The new CSA A344.2-05 *Standard for the Design and Construction of Steel Storage Racks* and the accompanying *User Guide for Steel Storage Racks* (A344.1-05) clearly spell out what every company needs to know about specifications, installation, maintenance, inspection, and hazards, among other concerns.

One of the standard's chief architects, rack safety consultant Tony Mulholland, chaired the CSA's technical committee. He has more than 20 years of engineering experience, specializing in storage racks. Before the CSA standard, explains Mulholland, the only alternative was a US Rack Manufacturing Institute (RMI) standard. "But the problem is that it primarily deals with design, and you had to be a manufacturer of storage racks to be a member and have any input. You also had to actively market your product in the US, so Canadian companies haven't had any input into its content," says Mulholland. "The new CSA standard has more modern engineering thinking, is easier to understand, and integrates with Canadian building and structural codes."

Storage racks are very complex structures that are highly utilized but not well understood by most people. You can hold 25,000 lbs on a couple of 2" x 3" posts that are less than 1/8" thick. That's like having 10 compact cars standing on two little posts," explains Mulholland. There is no leeway for damage or transmitting unanticipated forces such as banging it with a fork lift truck.

Safety hazards can result from improper specifications, poor installation, no inspection or maintenance, improper repairs, and unknown capacity. An error in any of these areas can cause

a partial or total collapse of the storage rack and cause worker injuries and even fatalities.

The most publicized case was a fatality in 2003 at VersaCold Corporation's Walker facility in Brampton, Ontario. A worker was crushed under twisted metal shelving and frozen food when several racks suddenly collapsed. Shortly after, a roof caved in and a wall buckled outwards. The collapse and cave-in left a huge pile-up of twisted metal and tons of melting frozen food, so that recovering the worker's body took three days of concerted efforts by emergency officials. Heavy demolition equipment had to be brought in to remove the debris. The employer, a company with 24 facilities in North America that provide refrigeration storage space for food processors and distributors and retailers, was fined \$240,000.

"A lot of people think the VersaCold incident was the impetus for developing the CSA rack standard, but development of the standard began long before this incident," says Mulholland.

Prevention: conducting a needs assessment

From the outset a proper needs assessment is vital to determining what type of storage rack you should buy. The CSA standard outlines how to assess your needs. Questions include:

- what do you need it for
- how will it be used, and
- where will it be placed.

Additional considerations include durability, use over the year, and how much abuse the racks are likely to take.

Installing a new system?

If you install a new storage rack in compliance with current applicable standards, and have documentation proving compliance, the Ministry of Labour doesn't require a pre-start health and safety review. That's because the standard requires that rack structures be designed by professional engineers.

Normally a pre-start health and safety review (PSR) is required under Section 7 of Regulation 851 Industrial Establishments of the *Occupational Health and Safety Act* of Ontario. Storage racks are one of eight items stipulated in the regulation that require this type of review. However, explains Sandra Lawson, acting provincial coordinator of the Ministry of Labour's Industrial Health and Safety Program, "the Ministry of Labour recognizes current applicable CSA standards as one of the best practices listed in

Standard Operating Procedures for Rack Safety

No matter what the status of your storage rack, consultant Tony Mulholland recommends that companies create and implement a standard operating procedure that covers rack purchases, inspections and maintenance.

Such a document would serve three purposes:

1. protect employees from rack failure through documentation of structural adequacy, routine inspections and standardized maintenance procedures
2. maintain a capital asset (racks), and maximize its service life, thereby eliminating costly “re-racking”, and
3. ensure racking is maintained and inspected in accordance with the requirements of CSA A344.1.

More specifically, this standard operating procedure would

- dictate that rack inspections be conducted by the joint health and safety committee at least once a month (as required by section 9 (27) of Ontario’s *Occupational Health and Safety Act*)
- standardize the procedure for responding to rack damage
- allow for third party inspections to confirm internal inspection and maintenance procedures are working
- require that rack damage be recorded and communicated to the person responsible for overseeing safety and rack compliance issues
- document and communicate rack specifications to facility management people, and
- ensure proper training of people conducting rack inspections.

A good standard operation procedure would also clearly outline who is responsible for rack safety and his or her level of responsibility. Examples include the corporate loss manager, warehouse manager, and all employees who come in contact with racks.

Procedures and specific requirements would outline when and how racks are inspected, and who inspects them. For instance, monthly inspections could be conducted by a maintenance person or a material handler who also serves as a member of the joint health and safety committee. Weekly inspections could be conducted by the material handler assigned by the supervisor of the daytime shift.

A detailed standard operating procedure is a fundamental and vital tool to ensuring that your storage rack is safe and operational for all concerned. After all, the last thing you want is to realize your storage rack is unsafe when it’s too late.

10 Tips for Rack Safety

1. When buying storage racks, ensure durability and protection features are built into the design.
2. Ensure the structural integrity of the walls and floors before installing your storage rack.
3. Install storage racks according to the manufacturer’s specifications.
4. Make sure the aisles where the storage rack will be loaded are wide enough to easily accommodate the lift truck’s turning radius.
5. Conduct regular inspections, maintenance and repairs of storage racks.
6. Look for scratched paint, dents and bowed out components.
7. Ensure your storage rack is being used within the manufacturer’s specifications.
8. Train workers to properly load storage racks.
9. Conduct rack safety awareness training for all employees, and encourage them to report bangs and dents of racks.
10. Retrain lift truck drivers as required.

When to Perform a Pre-Start Health and Safety Review

Ontario’s Ministry of Labour recognizes current applicable standards as a best practice and exempts companies from conducting a Pre-Start Health and Safety Review (PSR) under certain conditions.

STORAGE RACK	FOLLOW CURRENT APPLICABLE STANDARDS	PSR REQUIRED
Installation of new storage rack	YES	NO
Repair or modification using a part from the original rack manufacturer	YES	NO
Modification or reconfiguration of the rack that is not recorded on the documentation provided by the original rack manufacturer	Not Applicable	YES

CSA Standard A344.2-05 has not yet been reviewed by the Ministry of Labour. The “current applicable standards” referred to above appear in the ministry’s guidelines for Pre-Start Health and Safety Reviews. To view the guidelines, visit www.labour.gov.on.ca/english/hs/guidelines/prestart/index.html.

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Relying on an existing system?

The waters muddy for companies with an existing storage rack. Says Mulholland, “There’s a lot of confusion out there. A large majority of companies don’t know who installed their existing storage rack and can’t come up with the paperwork that defines the capacity for the structure.” If there’s one message that Mulholland wants to get out, it’s that there is no such thing as “grandfathering” with storage racks. “Due diligence requires companies to know the capacity of their racks” in accordance with the ministry’s requirement for workplaces to be safe whether they have a new or old storage rack.

Not all users are aware that adjusting beam levels dramatically changes the capacity of the racks. Adjusting beam levels can trigger a PSR.

That’s why IAPA teamed up with CSA to create a one day racking course based on the standard. Consultant Chuck Leon, an IAPA subject matter expert found that people come to the event because they want to know what to look for. “The most common questions we get are, ‘Do we need to bolt the rack to the floor? Do we need row spacers? Do we need to use cross aisle ties? What about safety bars?’ One of the biggest surprises for participants is that installing the storage rack themselves can create a problem.”

Your rack needs repair?

There are two distinctions employers should be aware of regarding rack repairs. “If you are repairing a rack with a piece from the original rack manufacturer you don’t trigger a Pre-Start Health and Safety Review,” says Lawson. “But if you are using a component that does not come from the original rack manufacturer, then you need to conduct a safety review for the modification and repair.”

When inspecting a rack, the ministry can issue several types of orders, including an order to regularly maintain and inspect a rack. You can be sure one of the first questions they will ask is, “Who installed the system and where is the paperwork?”

What causes storage rack failures

Lawson identifies other contributing factors of storage rack failures, besides over-

loading and faulty installation or repairs. “Often overlooked are the structure of the floors and walls when installing racks at the beginning. Are there bumps in the floor? Is there floor damage from loads being dropped from the forklift trucks? Does the forklift truck have the proper turning radius for the aisle?”

Chuck Leon agrees that lift truck drivers often get the blame for rack damage, “but companies often install the racks without allowing for the proper turning radius of the forklift truck.” The biggest cause of failure is damage to the upright frame. Banging the rack can cause structural damage and cause loads to shift, leading to instability and falling loads.

Mulholland raises another safety consideration. “Fork lift trucks are engineered to protect the driver from falling loads because they have built-in overhead protection. But what about the worker on the popular power walkies that often bump into a rack? They’ll have no protection from falling loads because they have no overhead protection.”

Storage racks can also be compromised by materials handling people who leave

loads hanging over the edge of the pallet, so training workers is a fundamental component of rack safety. Businesses can also change and the racks may be holding different and heavier loads beyond their capacity. Says Lawson, “You can’t just eyeball a rack to determine whether it’s safe. There are a series of calculations on load capacity to make that call.”

Don’t forget about safety culture: it can underpin your safety efforts. One of the simplest measures is to encourage all employees to report bangs and dents of racks. “There should be an easy process to report collisions with racks,” says Lawson. Many employees might be afraid to report a collision, but Lawson says a safety culture that encourages reporting can go a long way in preventing a storage rack collapse in the future.

VersaCold Fatality Update

See “Inquest Jury Releases Racking Death Recommendations,” page 5, for an update on the August 2003 VersaCold fatality.

Suzan Butyn is a regular contributor to Accident Prevention. Her most recent article, “Saving Lives with Legislation,” appeared in the September/October 2006 issue.