SOLVE FOR X.

Warehouse Fire Sprinkler Codes and Impact on Storage Racks

Presented by:

Gary Smith

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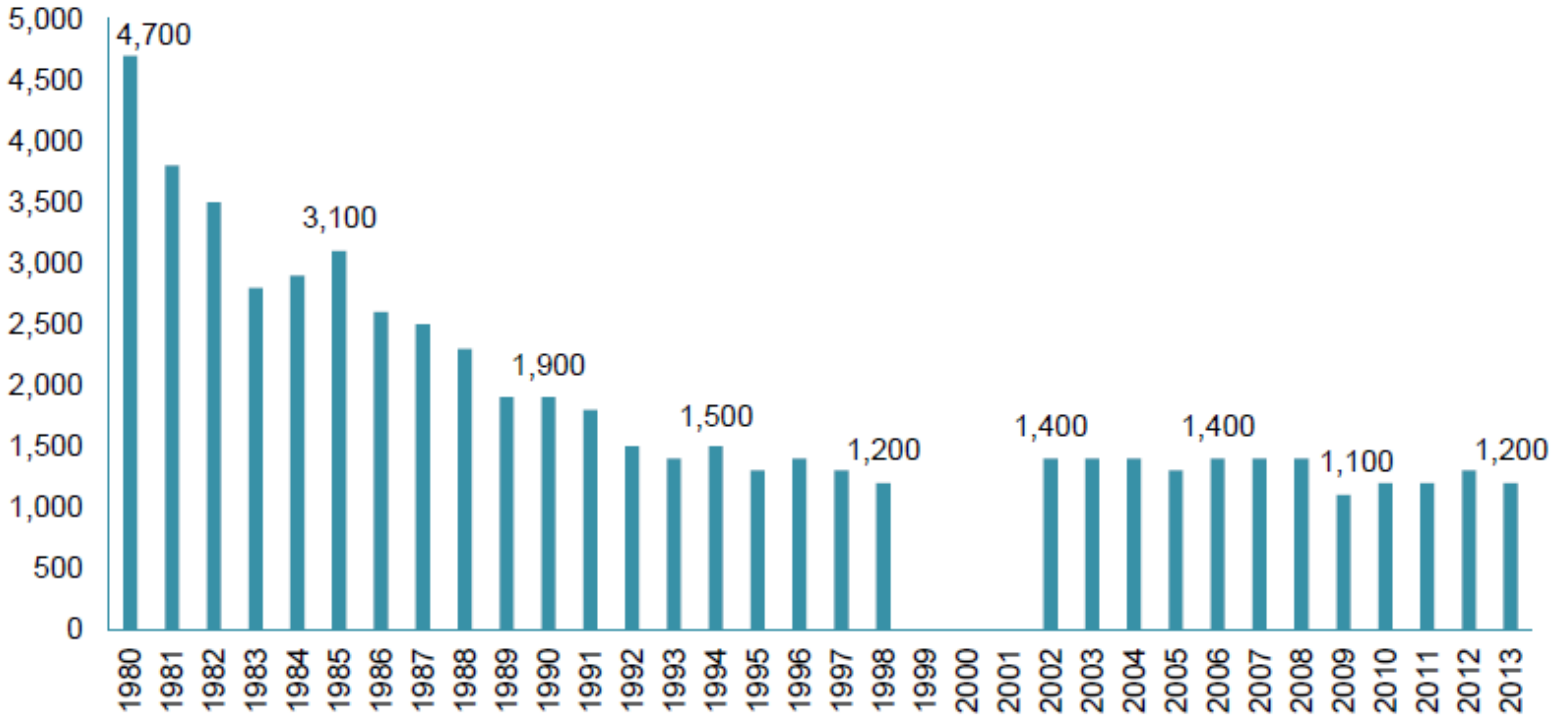
Today's Topics

- Warehouse fire statistics
- Recent significant warehouse fires
- Sprinkler system design basics
- Impact on racking layout
- Current code enforcement trends

Warehouse fire statistics

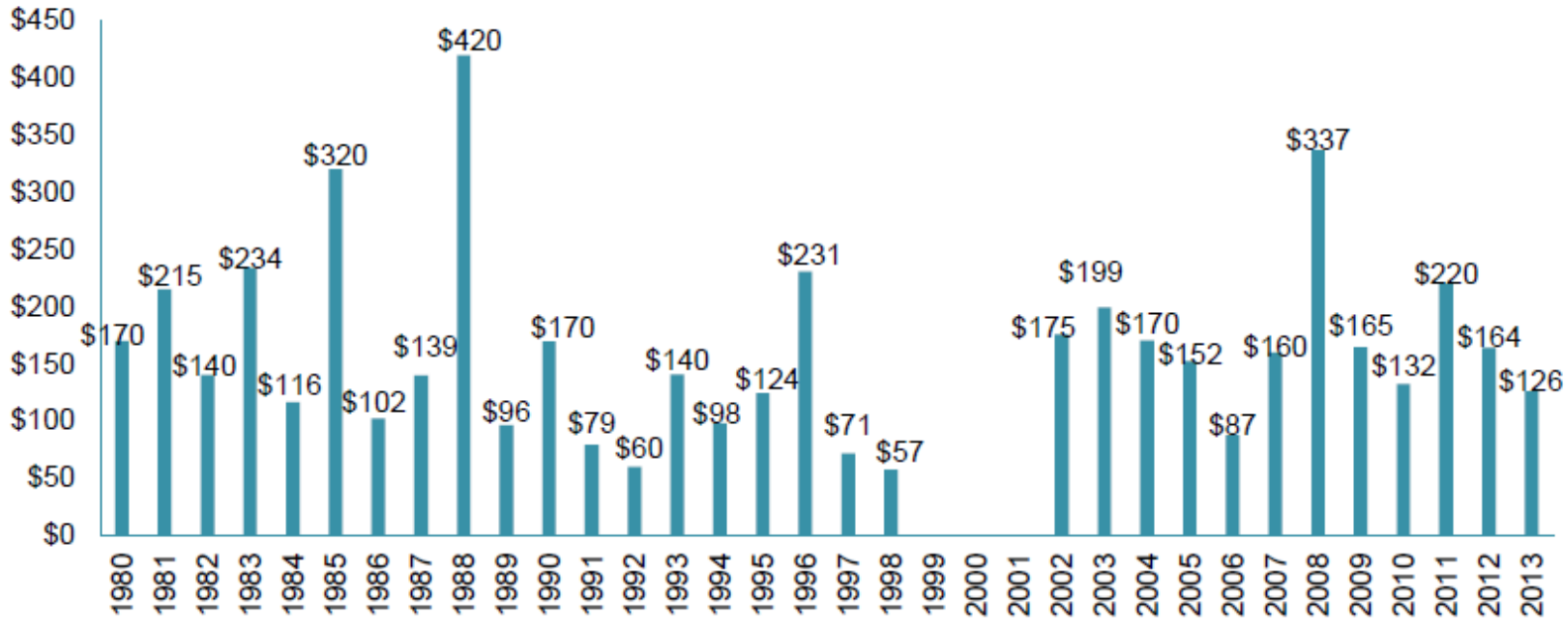
Figure 1. Reported Structure Fires in U.S. Warehouses, 1980-2013



Source: NFPA

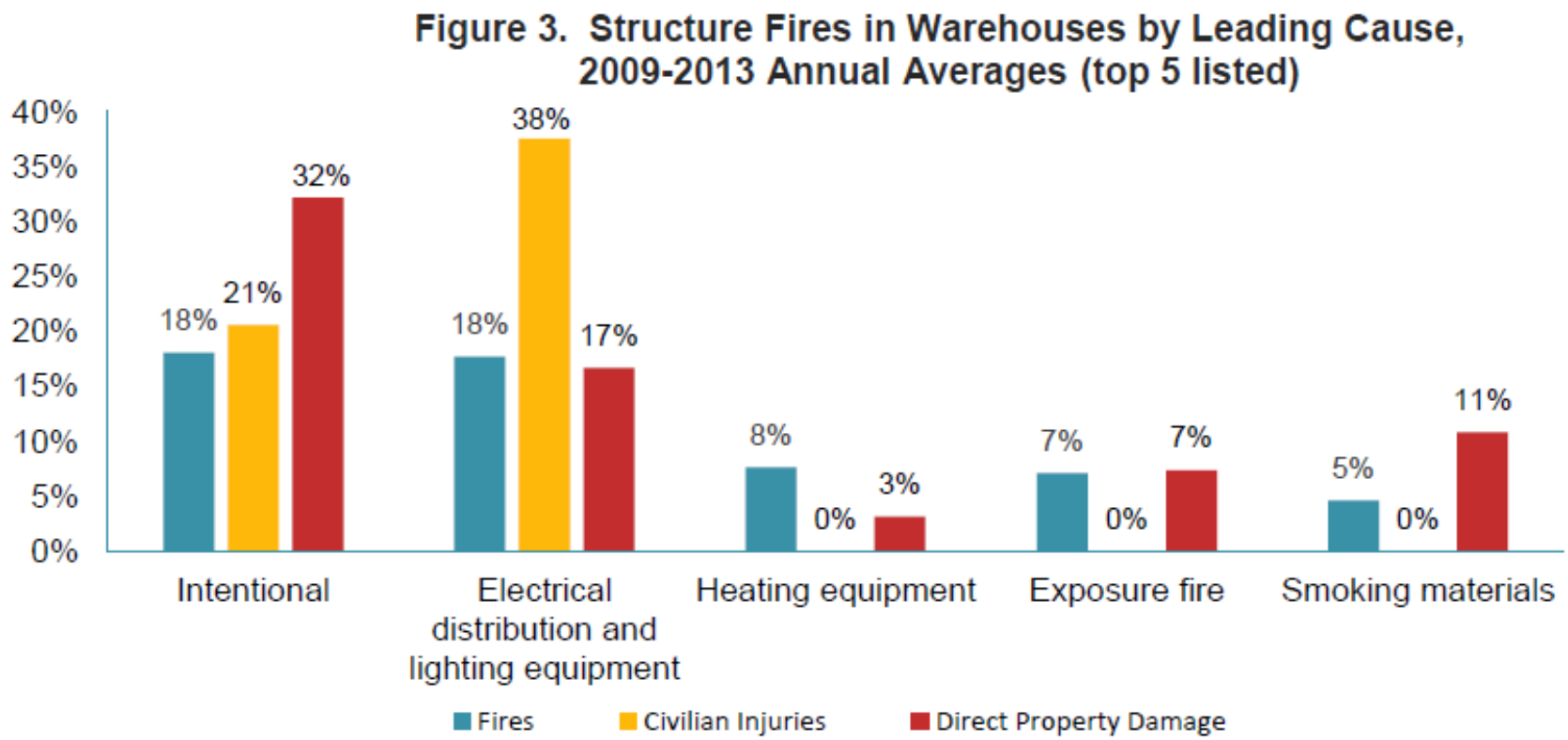
Warehouse fire statistics

Figure 2. Inflation-Adjusted Direct Property Damage, 1980-2013 in Warehouse Structure Fires



Source: NFPA

Warehouse fire statistics



Source: NFPA

Recent significant warehouse fires

Record storage – NJ

Recent significant warehouse fires

Plastics ASRS - SC

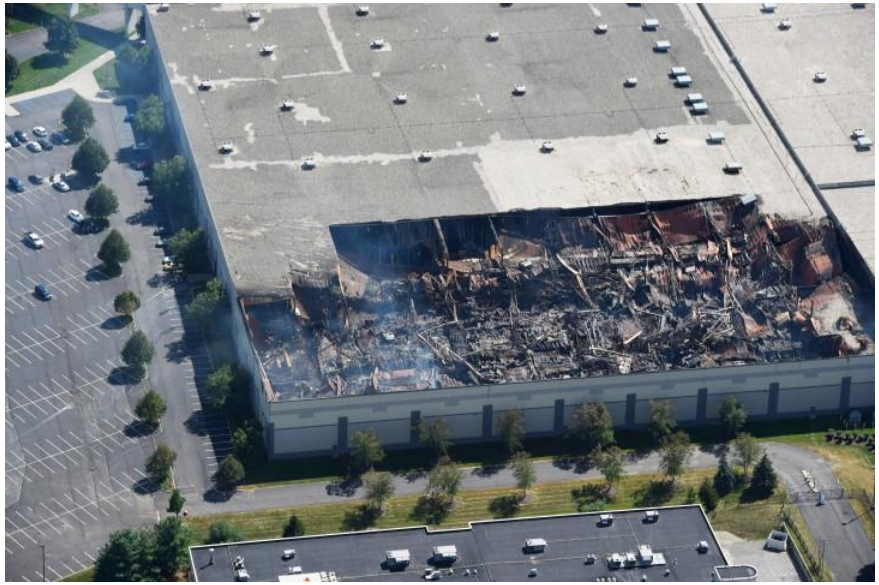
Recent significant warehouse fires

Refrigerated processed meat – NJ

Recent significant warehouse fires

Retail store with storage in rear - SC

Recent significant warehouse fires



Gap clothing - NY

Recent significant warehouse fires

Furniture storage - IL

Solutions: Sprinklers – effective

Sprinkler Systems in Warehouse Structure Fires
2007-2011 Annual Averages*

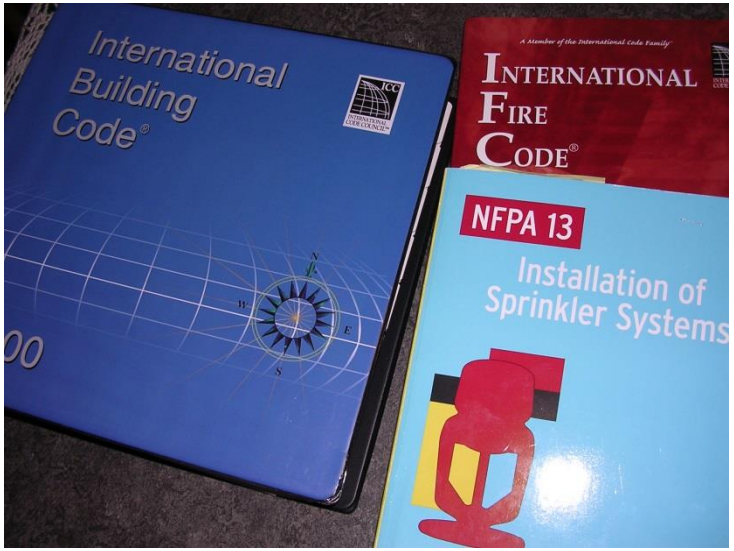
Percent of structure fires in warehouses reporting some type of sprinkler present	32%
Percent of fires with wet pipe sprinklers in which sprinklers operated	86%
Percent of fires with wet pipe sprinklers present in which sprinklers operated effectively	84%
Reduction in civilian deaths per thousand fires when wet pipe sprinklers were present	61%

* Excludes properties under construction and fires where sprinklers were not present in the fire area.

Source: NFIRS 5.0 and NFPA survey.

Pertinent design & building codes

- National Fire Protection Assn. (NFPA) 13
- International Fire Code
- Edition varies by jurisdiction
- Authority Having Jurisdiction (AHJ) role

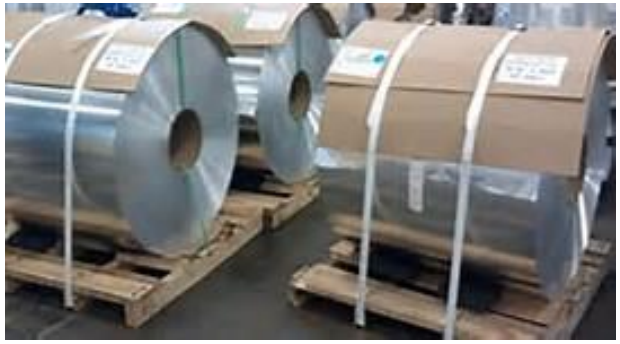


Design process: 3 Basic Questions

- *What* is stored?
- *How* is it stored?
- How *high* is it stored

What is stored?

- Class I: "..non-combustible on pallets, ..single-layered carton.."



What is stored?

- Class II: "…non-combustible in wooden crates, ..multiple-layered carton.."

What is stored?

- Class III: "…product fashioned from wood, paper, natural fibers ..or Group C plastics

What is stored?

Class IV: “ Group B plastics or partial (5-25%) Group A plastics..”

- Cellulosics
- Chlorophrene rubber
- Fluroplastics
- Natural rubber
- Nylon
- Silicone rubber

What is stored?

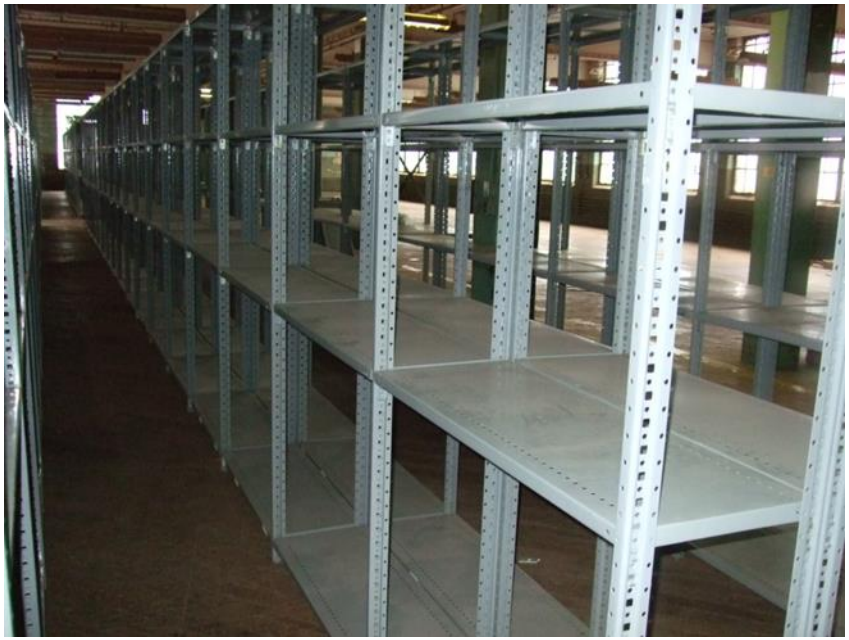
- Group A Plastics

What is stored?

- Mixed commodities

How is it stored?

- Solid shelving



How *high* is it stored?

- < 12 feet
- < = 25 feet
- > 25 feet

Special cases

- Tires

Special cases

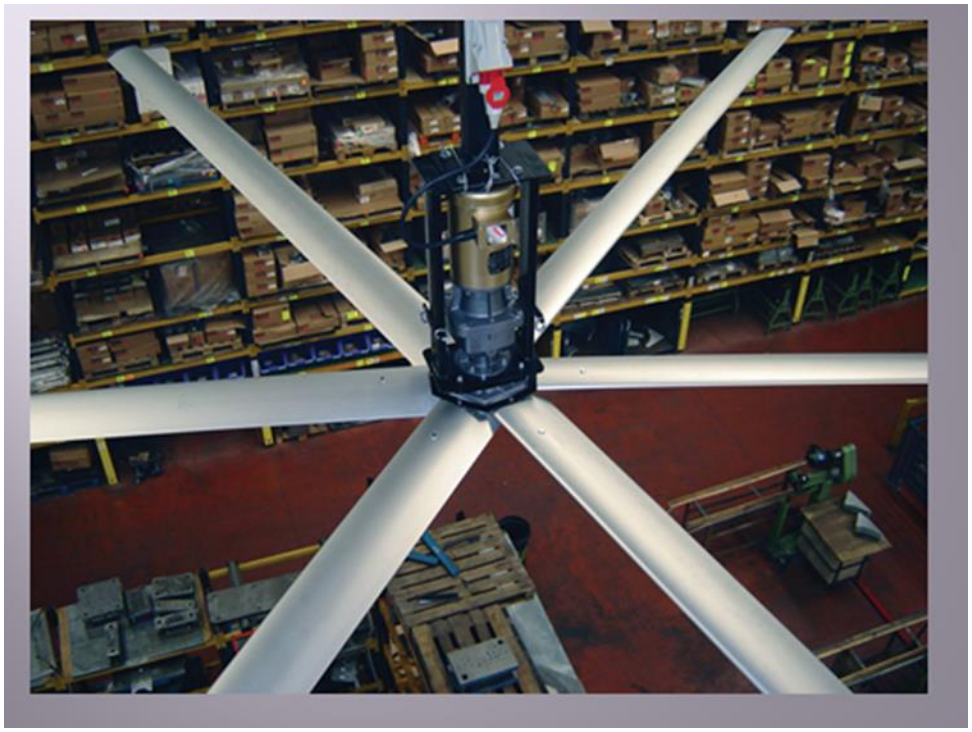
- Record storage

Special cases

- Movable shelving

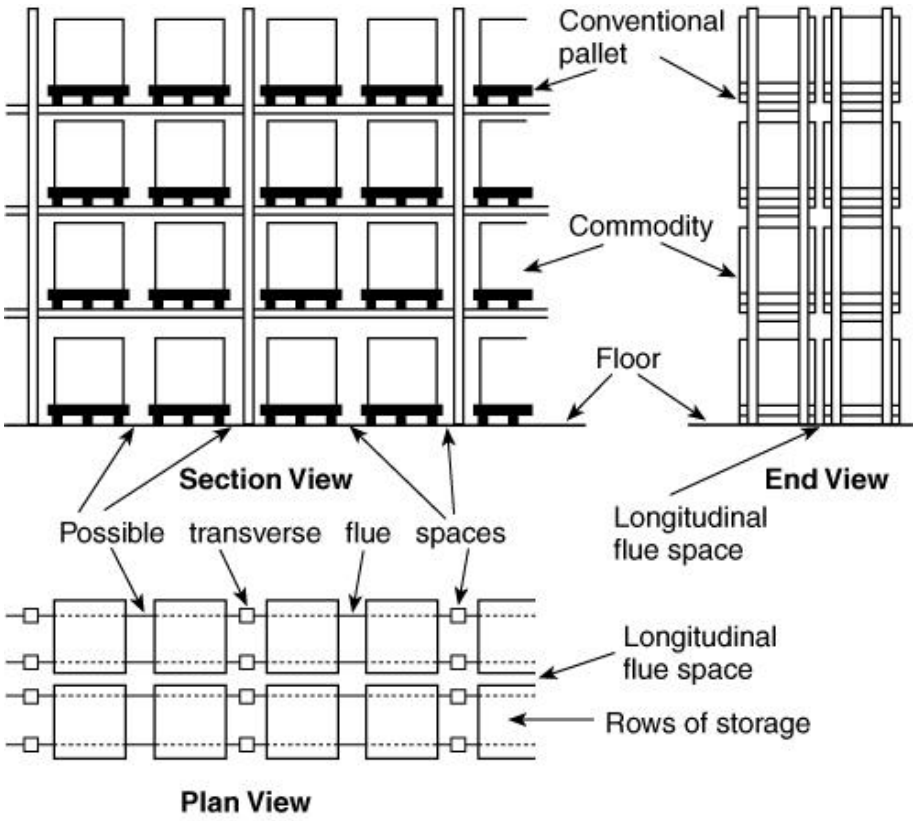
Special cases

- High volume, low velocity fans



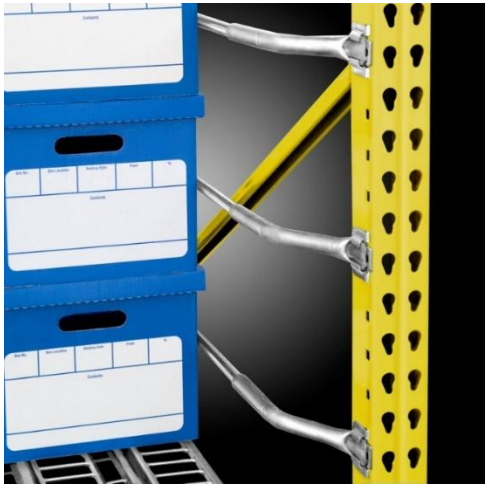
Impact of sprinklers on rack design

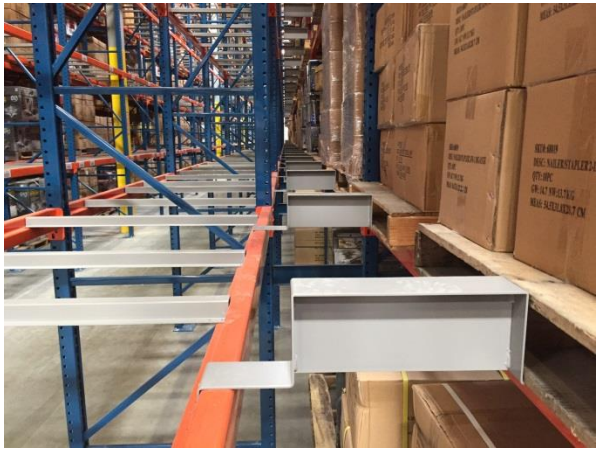
- Flue spaces
  - Transverse
  - Longitudinal
  - IFC 2012 code change – AHJ can demand “devices



Impact of sprinklers on rack design

Flue devices





Impact of sprinklers on rack design

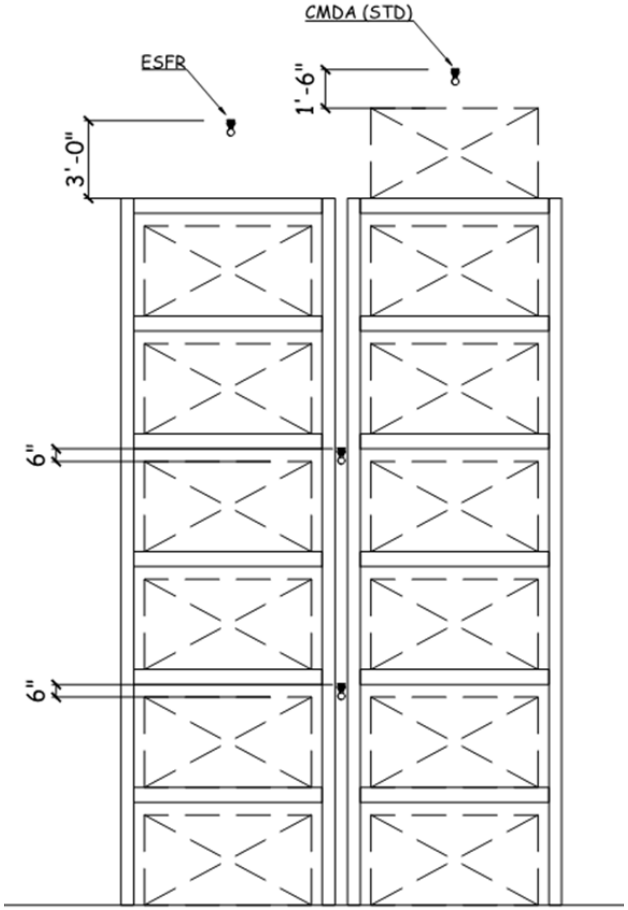
- “Open” shelves

Impact of sprinklers on rack design

- Solid shelving

Impact of sprinklers on rack design

- Clearances for water spray

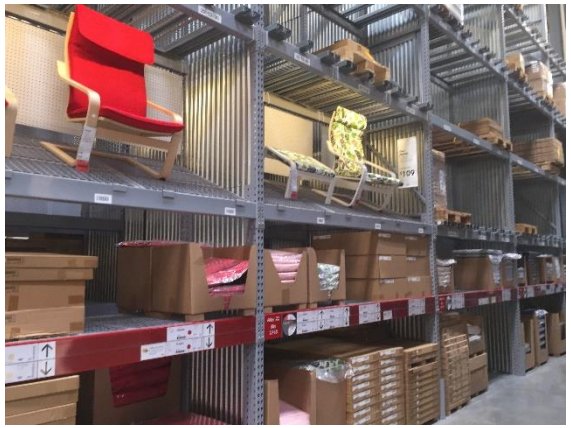


Impact of sprinklers on rack design

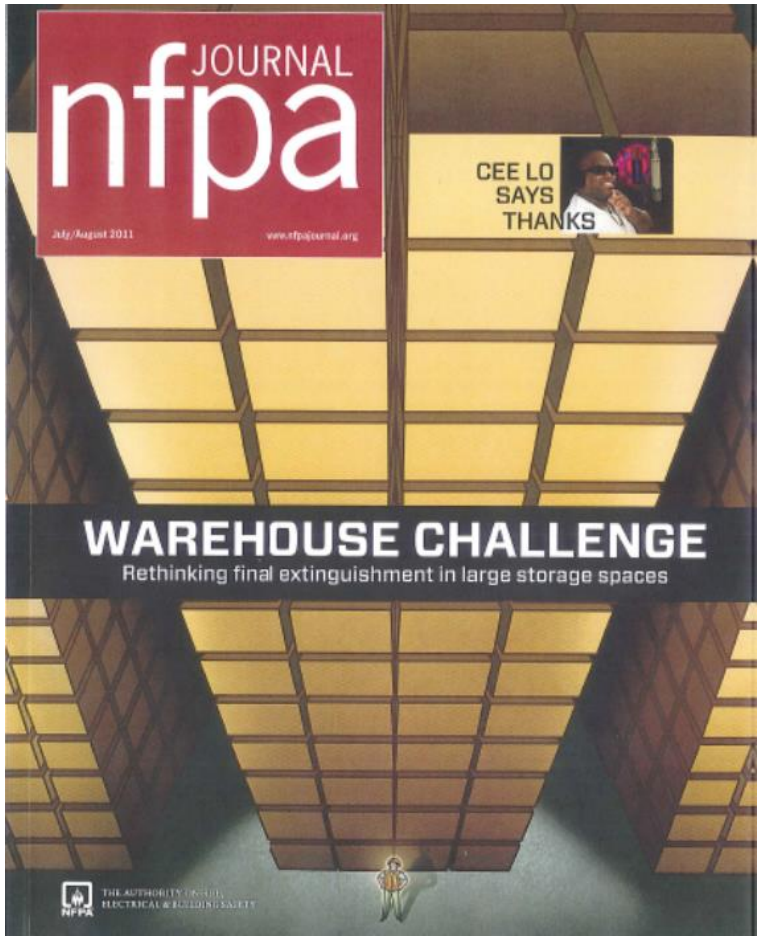
- Location to prevent head damage from lift equipment

Impact of sprinklers on rack design

- Weight of pipes with water
- Solid baffles (horizontal & vertical for aerosols, plastics)



Current code enforcement trends



Issues being heard

- Why all the recent concern about warehouse fire protection?
- I need longer row spacers
- I need longer beams
- I need a device to keep product out of “flue” spaces
- I need something called a “baffle” or “barrier”
- Do all these requirements *really* make a difference?
- Why is my rack permit being held up by the fire marshal?
- I need a “High Pile Permit”?

Reason # 1: Changes in commodities being stored

A Baby Boomer Christmas

Reason # 1: Changes in commodities being stored

A Millennial Christmas

Reason # 1: Changes in commodities being stored

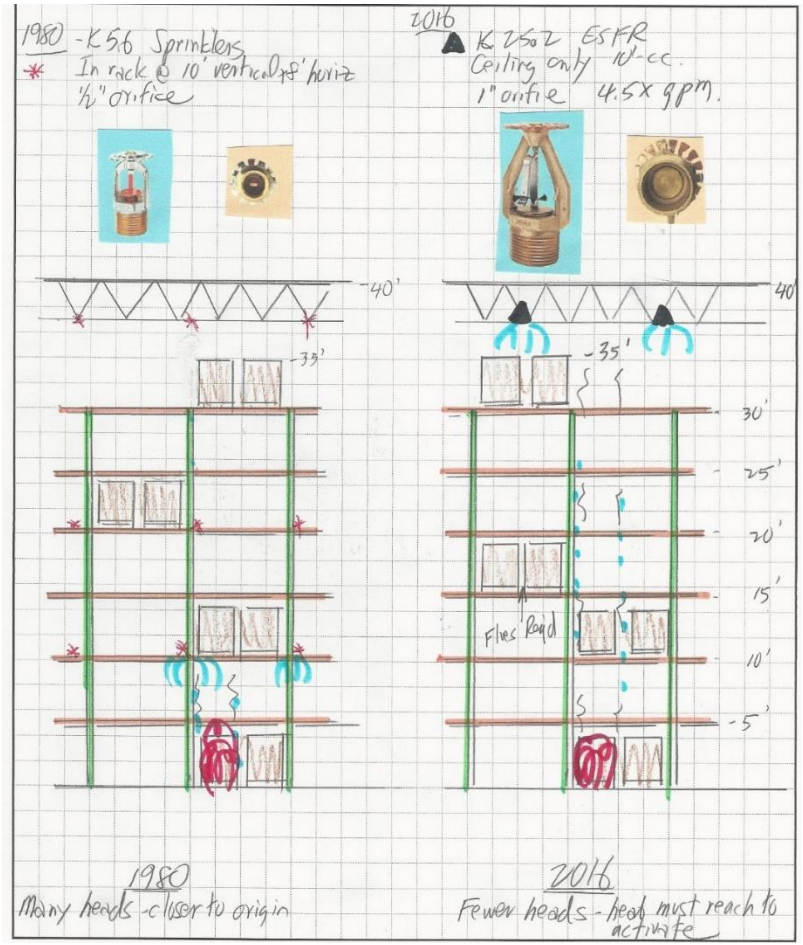
Reason # 2: Fire fighting philosophy

See video

Reason # 3: Larger financial loses

Reason # 4: Changes in protection schemes / equipment

Rack geometry, in conjunction with the customer's product size & placement, is an integral part of the overall fire suppression scheme.



For More Information:

Speaker email: gsmith@dacsinc.com

website: www.dacsinc.com

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