



PROMAT

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Warehouse Fire Sprinkler Codes and Impact on Storage Racks

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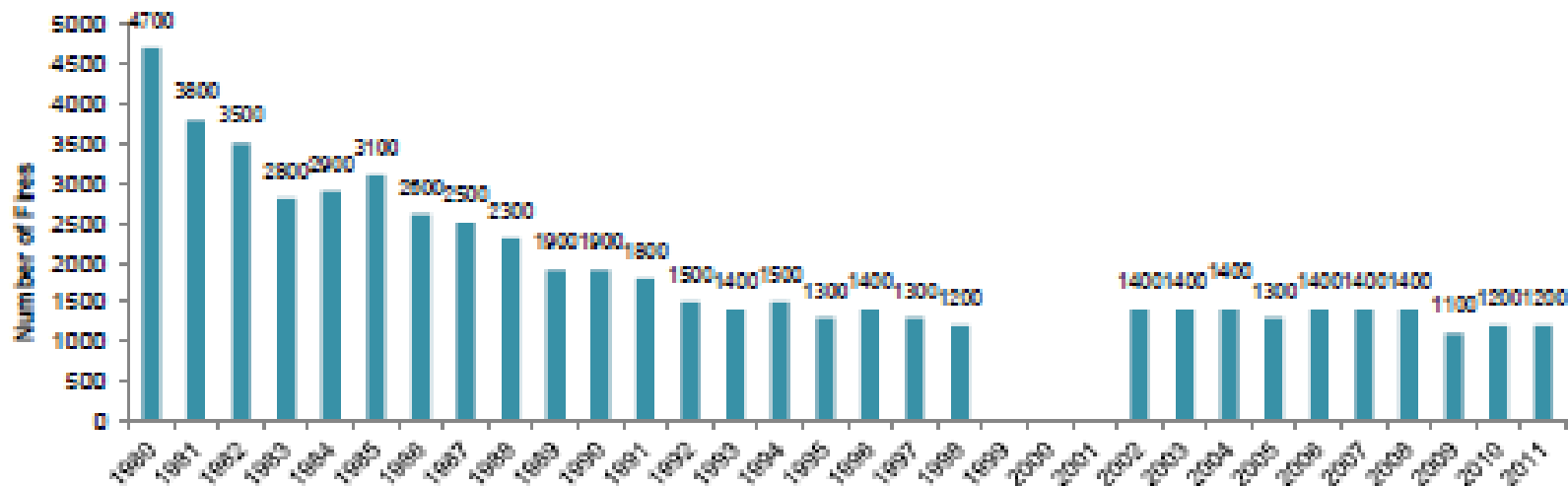


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Warehouse fire & statistics

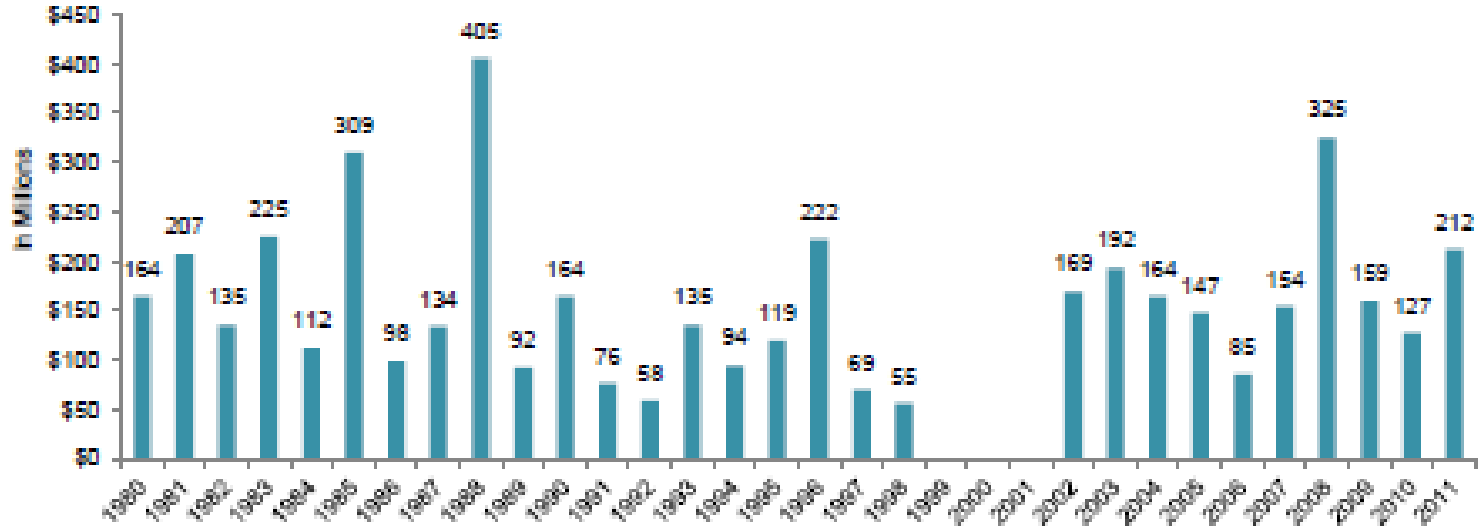
Figure 1A. Reported Structure Fires in U.S. Warehouses, by Year: 1980-2011



Source: NFPA

Warehouse fire & statistics

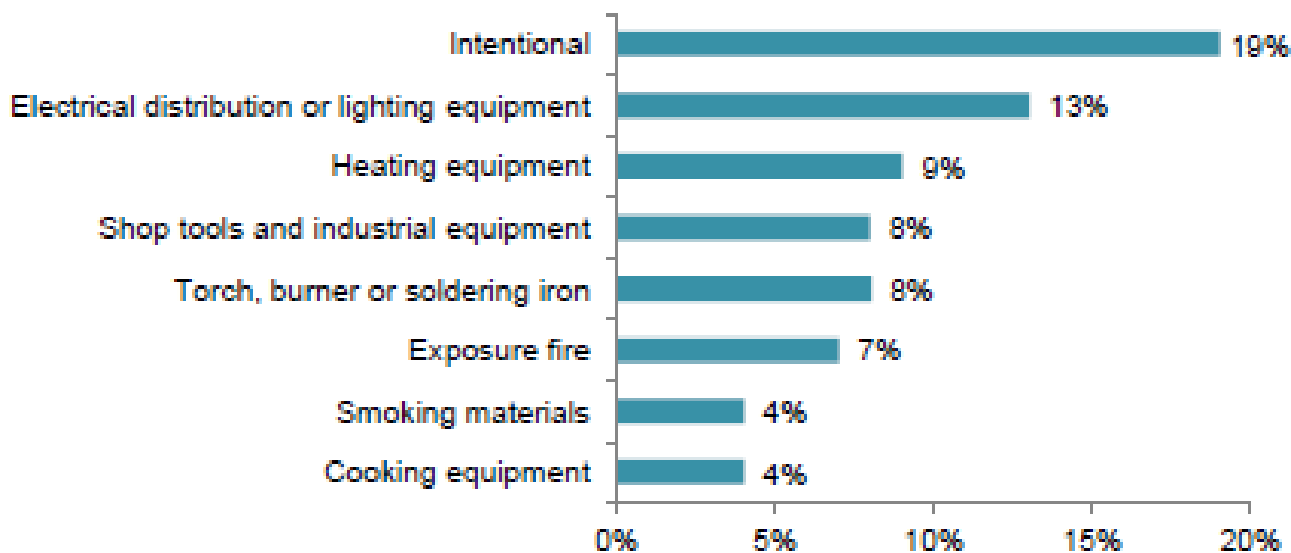
Figure 1B. Inflation-Adjusted Direct Property Damage in U.S. Warehouses, by Year: 1980-2011



Source: NFPA

Warehouse fire & statistics

Figure 2. Structure Fires in Warehouses by Leading Cause, 2007 -2011 Annual Averages



Source: NFPA

FIND WHAT'S NEXT.

Recent significant warehouse fires



Record storage – NJ

**FIND WHAT'S
NEXT.**

Recent significant warehouse fires



Plastics ASRS - SC

Recent significant warehouse fires



Refrigerated processed meat – NJ

FIND WHAT'S NEXT.

Recent significant warehouse fires



Retail store with storage in rear - SC

**FIND WHAT'S
NEXT.**

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%

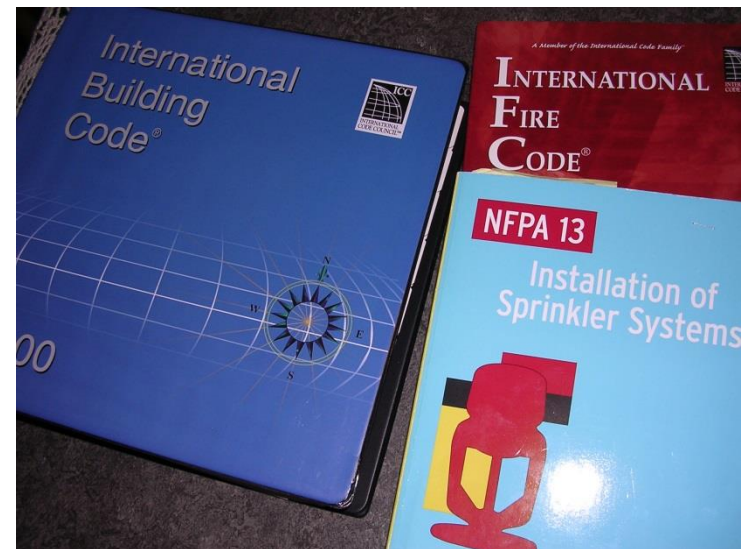
* Excludes properties under construction and fires where sprinklers were not present in the fire area.

Source: NFIRS 3.0 and NFPA survey.

FIND WHAT'S NEXT.

Pertinent design & building codes

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





3 Basic Questions:

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

FIND WHAT'S NEXT.

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..”



FIND WHAT'S NEXT.

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
 - Fluoroplastics
 - Natural rubber
 - Nylon
 - Silicone rubber

FIND WHAT'S NEXT.

What is stored?

- Group A Plastics



What is stored ?

- Mixed commodities



FIND WHAT'S NEXT.

What is stored?

- Pallet types



FIND WHAT'S NEXT.

What is stored?

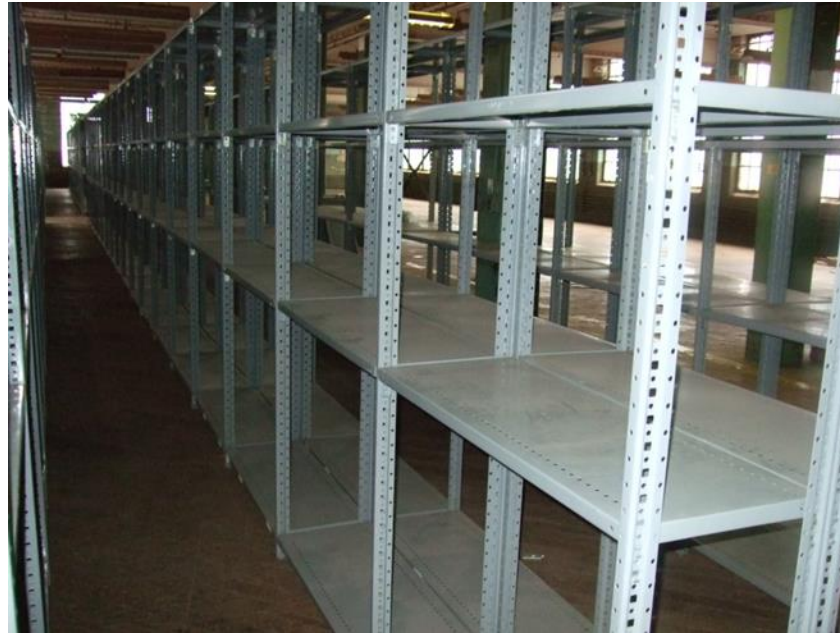
- Floor stacked



FIND WHAT'S NEXT.

How is it stored?

- Solid shelving



How is it stored?

- Back to back rows



How is it stored?

- High density (pallet flow, push back, drive-in, ASRS)





**FIND WHAT'S
NEXT.**

How high is it stored?

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

FIND WHAT'S NEXT.

Special cases

- Tires



**FIND WHAT'S
NEXT.**

Special cases

- Rolled paper



FIND WHAT'S NEXT.

Special cases

- Record storage



**FIND WHAT'S
NEXT.**

Special cases

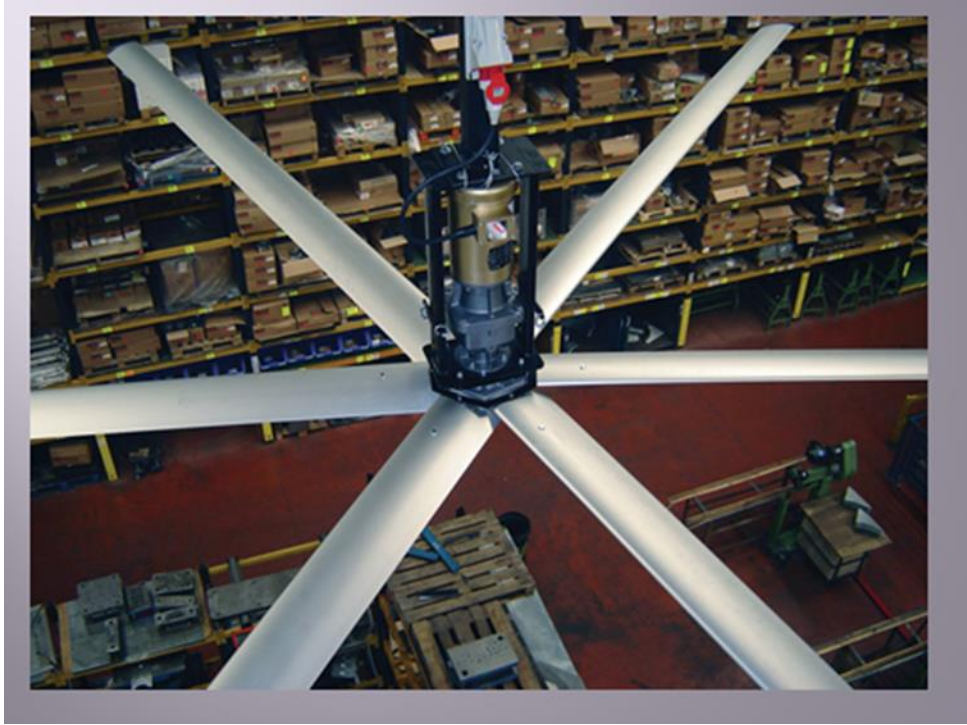
- Movable shelving



**FIND WHAT'S
NEXT.**

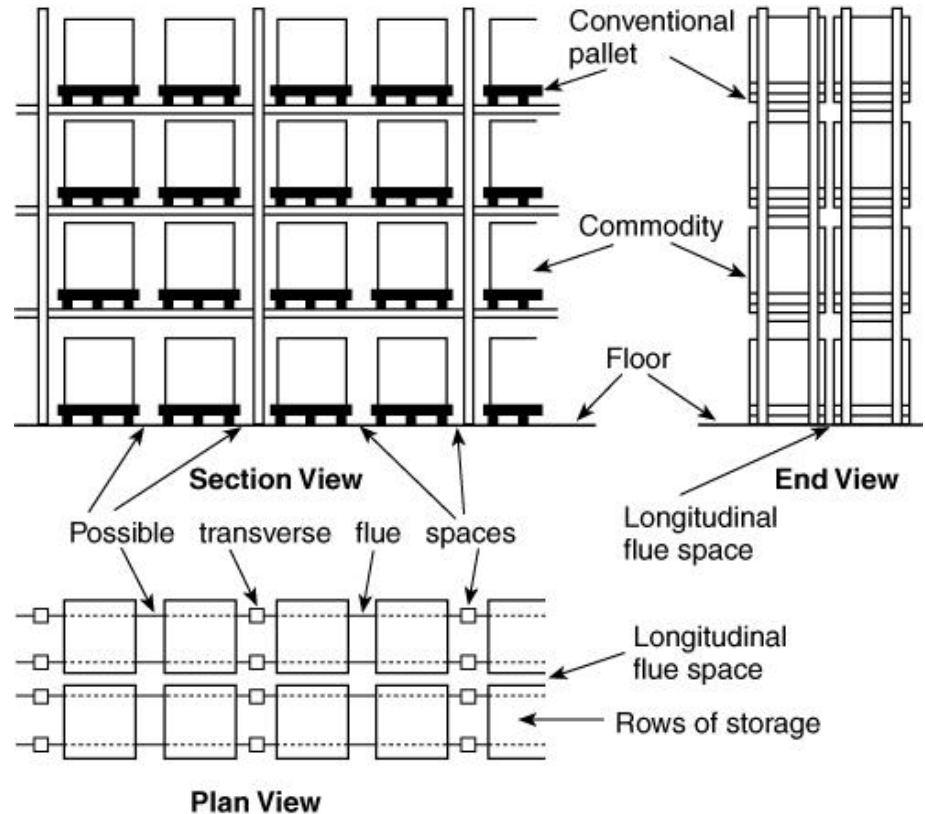
Special cases

- High volume, low velocity fans



Impact of sprinklers on rack design

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



FIND WHAT'S NEXT.

Impact of sprinklers on rack design

- “Open” shelves



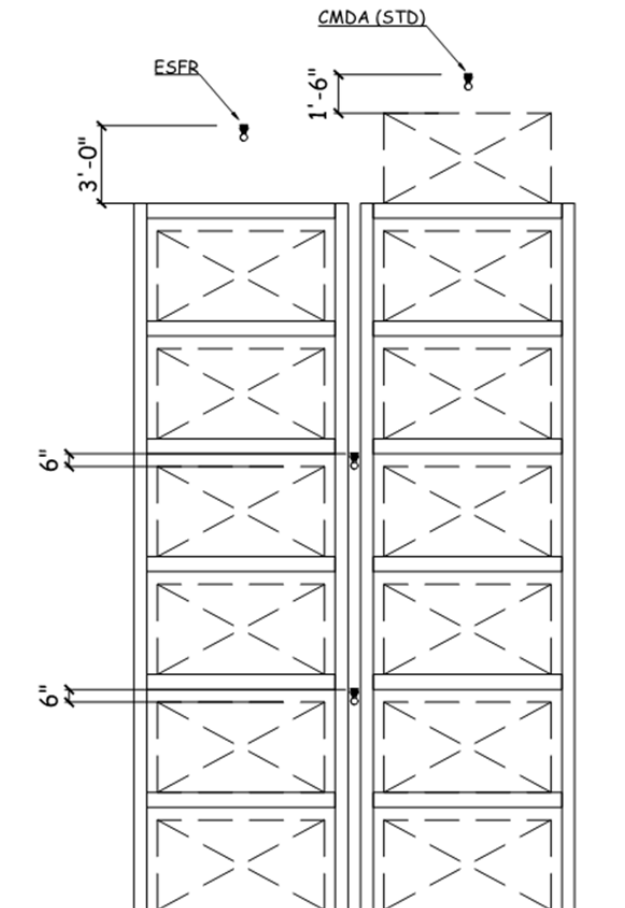
Impact of sprinklers on rack design

- Solid shelving



Impact of sprinklers on rack design

- Clearances for water spray



Impact of sprinklers of rack design

- Location to prevent head damage from lift equipment



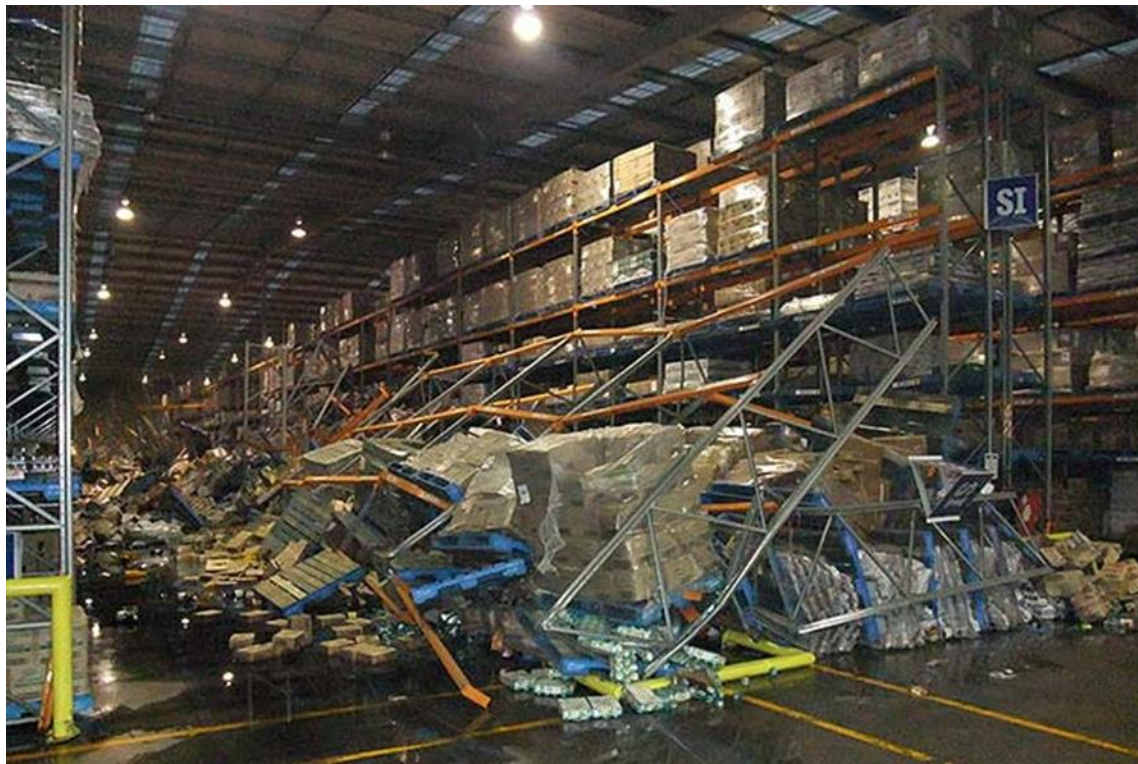
Impact of sprinklers on rack design

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



Impact of sprinklers on rack design

- Seismic bracing



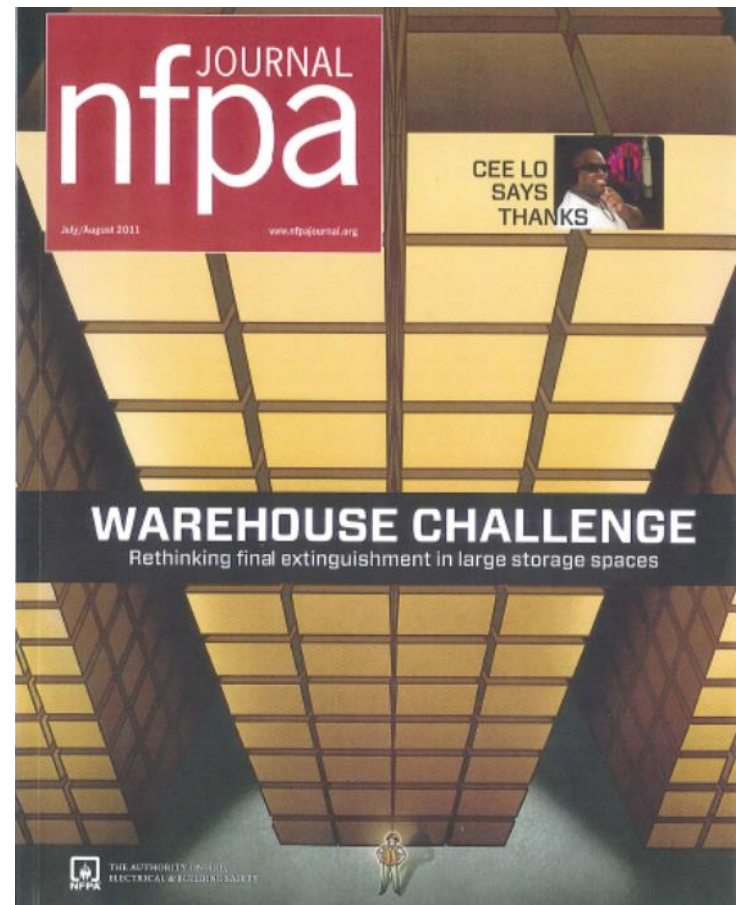
ESFR type sprinklers

- Definition
- Advantages
- Disadvantages
- Comparison to conventional



Trends in protection schemes

- Suppression vs. containment
- Firefighter action (or inaction)
- Recent NFPA Research Foundation for suppression ideas re: ASRS structures



Trends in protection schemes

- Expected changes to codes in the works



**FIND WHAT'S
NEXT.**

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