SOLVE FOR X.

Warehouse Fire Sprinkler Codes and Impact on Storage Racks

Presented by:
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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

Figure 3. Structure Fires in Warehouses by Leading Cause, 2009-2013 Annual Averages (top 5 listed)

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Percent of structure fires in warehouses reporting some type of sprinkler present</td>
<td>32%</td>
</tr>
<tr>
<td>Percent of fires with wet pipe sprinklers in which sprinklers operated</td>
<td>86%</td>
</tr>
<tr>
<td>Percent of fires with wet pipe sprinklers present in which sprinklers operated effectively</td>
<td>84%</td>
</tr>
<tr>
<td>Reduction in civilian deaths per thousand fires when wet pipe sprinklers were present</td>
<td>61%</td>
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* 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
Reason #1: Changes in commodities being stored

A Millennial Christmas
Reason # 1: Changes in commodities being stored

I just want to say one word to you. Just one word. Plastics.
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.
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