



RESEARCH FOUNDATION

RESEARCH FOR THE NFPA MISSION

Impact of Elevated Walkways in Storage on Sprinkler Protection

Solid and open metal grate walkways are often installed in aisles as part of rack storage. Further, open metal grates are also used as mezzanine levels above storage. Little information exists on how these walkway and mezzanine installations impact current storage protection requirements. These installations have the potential to interfere with the sprinkler spray pattern or pattern development, delay activation of sprinklers due to the grate's interference with the plume, or impact pre-wetting of adjacent racks. Thus, there was a need to compile the available information and develop a research plan on this topic to address outstanding questions, such as:

- When are elevated walkways or mezzanines considered a problem from a sprinkler protection standpoint?
- At what point do walkways interfere with pre-wetting of adjacent arrays in storage?

Project Goal & Approach

The Fire Protection Research Foundation initiated this research program, with the goal of developing guidance on the protection of storage when solid or open metal grate walkways are present. The objective of this Phase I project was to document knowledge gaps related to elevated walkways in storage and develop a research plan to address these knowledge gaps.

The final report is available [here](#).

Summary Observations

Based on the literature review, the following knowledge gaps, regarding the interactions of sprinkler activations and spray patterns when elevated walkways of various porosity are present, were identified:

- 1) Fundamental understanding of sprinkler/walkway interactions:
 - a. Differences in spray patterns of sprinklers based on type, k-factor, and operating pressure.
 - b. Impact of walkway porosity and grate geometry on plume development, sprinkler activation, spray development, pre-wetting of adjacent combustibles, and water delivery.
 - c. Impact of sprinkler location and layout with respect to the mezzanine.
 - d. Impact of aisle width on propensity for fire to jump aisle
 - e. Impact of floor coverings
- 2) NFPA 13 guidance on sprinkler protection when walkways/mezzanines are present:
 - a. Actual conditions observed in warehouses.
 - b. Linkage between guidance and actual sprinkler performance
 - c. Consistent and expanded guidance on how to protect areas with solid/porous walkways/mezzanines in place

The research plan developed herein to address these knowledge gaps, will be pursued as a Phase II project.

Research by:



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