

Help protect workers from hazards associated with elevated storage areas.

Elevated platforms are a great way to add space, but must be designed safely.



Elevated storage platforms, often known as mezzanines, are used in many facilities to convert otherwise unused vertical space into usable area for storage, offices, break rooms, or other purposes. While mezzanines are a great way to add square footage to a building without increasing its overall footprint, their use creates several hazards that must be controlled to ensure the safety of the building, its contents, and its occupants. This brochure is based on OSHA standards and NFPA best practices and provides guidance on several key concerns for organizations using mezzanines and other elevated storage platforms in their facilities.

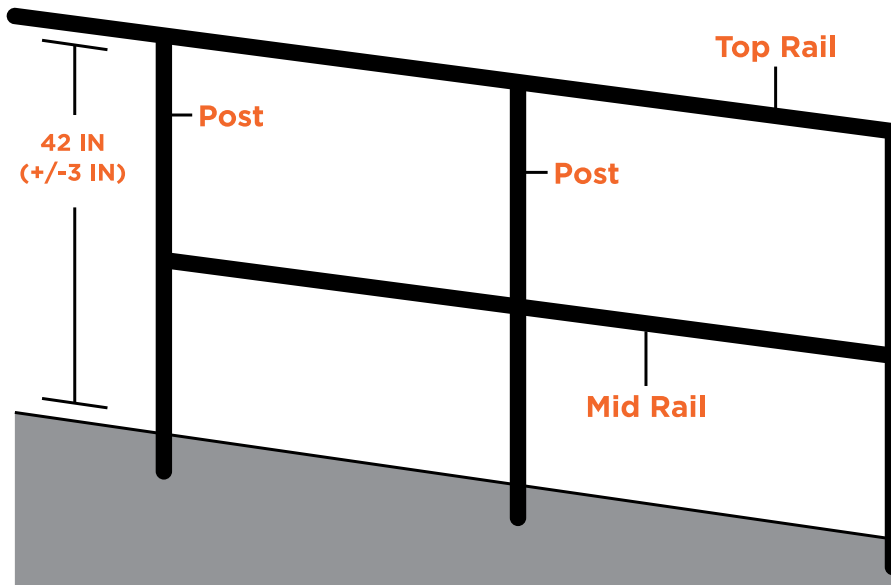
Elevated Storage Platforms

Guardrails.

A primary risk of mezzanines is falls from elevation. All elevated storage platforms more than four feet above ground level must be provided with guardrails designed to prevent workers and materials from falling to a lower level. A standard guardrail as defined by OSHA consists of the following components:

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- A **top rail** should be between 39-45 inches above the working surface. The top rail must be able to withstand 200 lbs. of force applied in every direction. The ability to withstand this force ensures that an employee leaning against the rail will not cause it to fail, which could lead to a potentially serious injury.
- A **midrail** should be approximately 21 inches above the working surface, or halfway between the floor and the top rail. The midrail must be able to withstand 150 lbs. of force.



- **Vertical posts** should be installed at regular intervals to support the top and midrails, ensuring they are able to support the required 200 lbs. of force.
- A **toeboard** should be installed when there is potential for people or machinery to be in the vicinity below the platform. A toeboard is designed to prevent material from being inadvertently pushed off the platform and striking people or machinery below the platform. Toeboards should be at least four inches high and able to withstand 50 lbs. of force.

In addition to the standard railing system, if material could fall through or over the railings, additional protection such as netting, fencing, or other systems should be installed. A few other design considerations for guardrails include:

- Rails should be smooth-surfaced to protect against cuts and clothing snags. Steel and plastic banding should not be used for any part of the guardrail system.
- The ends of top rails and midrails should not protrude into the walking/working area where workers may inadvertently make contact with them.

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- When guardrails are used in hoisting areas such as a pallet drop zone, a removable section, gate, or chain can be used to protect the opening. Ensuring that the opening is closed when employees are not performing hoisting operations is extremely critical. At no point should openings be left open, as this leaves the edge unprotected.
- Guardrail systems other than the standard guardrail are also acceptable if they meet the requirements of OSHA 1910.29 on *Fall protection systems and falling object protection*.

Load Rating.

Elevated storage platforms should be marked with their maximum load capacity, typically noted in pounds per square foot. Signs should be placed in multiple locations on the platform indicating the maximum design load and point loads. The design load represents the total amount of weight the work platform can handle spread over the entire surface. The point load is a heavy load in one specific area of the structure, such as the pallet drop zone. If the design load and/or point load capacity is not known, a licensed professional engineer should be consulted to determine the capacity of the platform.

All workers, but especially forklift operators, should be trained to determine the weight of loads being placed on the mezzanine and instructed to never exceed the design load or point load capacity. Doing so could cause the mezzanine to become damaged, or even collapse, if significantly overloaded.

Exit Route Requirements.

Exit routes should remain clear to allow employees to vacate quickly in the event of a fire or other workplace emergency, and must not be blocked by storage, machinery, or any other obstructions. Material should not be stored on or underneath stairs or be stacked in a way that could block an employee's view of the stairway. Two exit routes should be provided for elevated storage platforms, in case one of them is blocked by fire or other danger.

Elevated platforms are sometimes located close to structural ceiling supports, overhead pipes, or electrical runways. This can create a hazard in emergency situations. As such, all platforms should be designed so there is at least 7 feet of vertical clearance between the platform floor and each overhead obstruction. If this cannot be maintained—for whatever reason—the low clearance should be identified with colored markings and employees should be required to wear head protection.



Ensure storage load capacity information is part of your forklift operator training program.

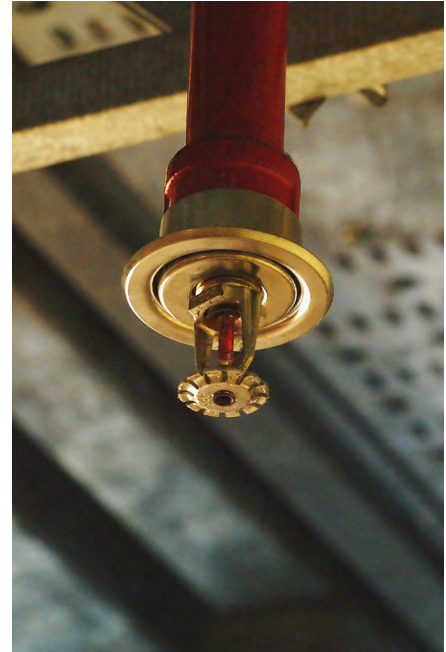
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Sprinkler Systems.

Elevated platforms can create sprinkler system coverage issues in a facility. At least 18 inches of vertical clearance should be maintained underneath all sprinkler heads, as sprinkler heads blocked by the mezzanine itself or storage on the mezzanine will likely result in an ineffective system and poor water coverage.

An elevated platform may prevent water from a sprinkler system from reaching the area directly below the platform. If a platform is installed in a previously sprinkled building, a sprinkler company should be contracted to extend the existing system underneath the elevated platform.



Consider sprinkler coverage when elevated platforms are present.

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