

# Mezzanine basics

## When workspace is tight, a mezzanine can raise your facility's capacity and productivity to a new level.

**By Lorie King Rogers, Associate Editor**

Are you squeezed for space? Is your distribution center cramped? A mezzanine might be a cost effective answer to increasing capacity and functionality by using the vertical space within your building.

In the theatre, a mezzanine is an intermediate level or floor. In the world of materials handling, a mezzanine is a pre-engineered or custom-designed structure that can be incorporated into a warehouse, distribution center or manufacturing facility to increase storage capacity or create additional production areas and workspaces. It can be made of structural steel, roll-formed steel, aluminum or fiberglass and built to fit exact specifications for the area, height and load requirements. The right mezzanine in the right place can have a significant impact on capacity, productivity and efficiency.

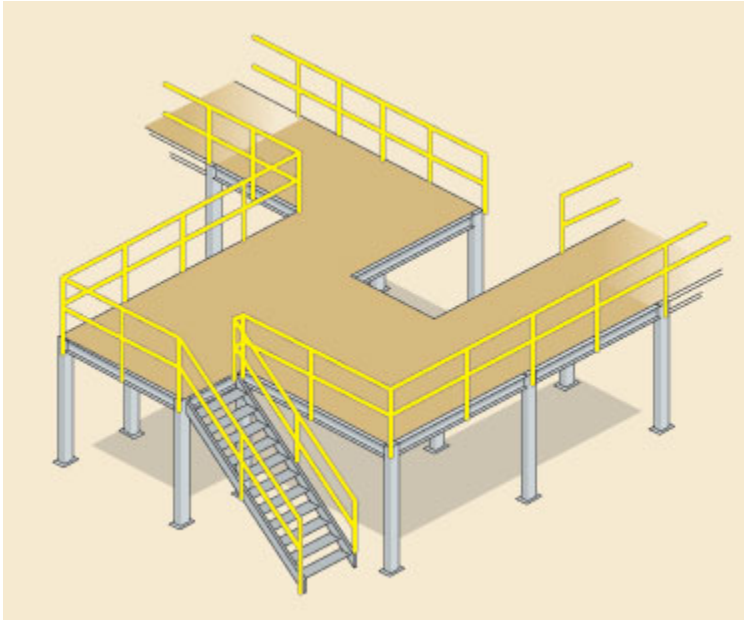
"Given the increase in the cost of construction, mezzanines are a less expensive way to add space," says Don Derewecki, assistant vice president at TranSystems. "They can also provide physical proximity for functions that need to be close together."

Mezzanines can offer a number of benefits and advantages, according to the Storage Equipment Manufacturers Association. For example, you can:

- Virtually double available floor space through efficient use of existing cube in the facility,
- Increase productivity,
- Avoid or minimize moving expenses,
- Minimize disruptions during installation,
- Avoid the need to rent, build or purchase additional space,
- Avoid or minimize additional property taxes,
- Make optimum use of existing heating, ventilating and cooling systems,
- Provide demounting and relocating options (in most cases),
- Provide expandability for future growth, and
- Provide possible tax advantages through accelerated depreciation.

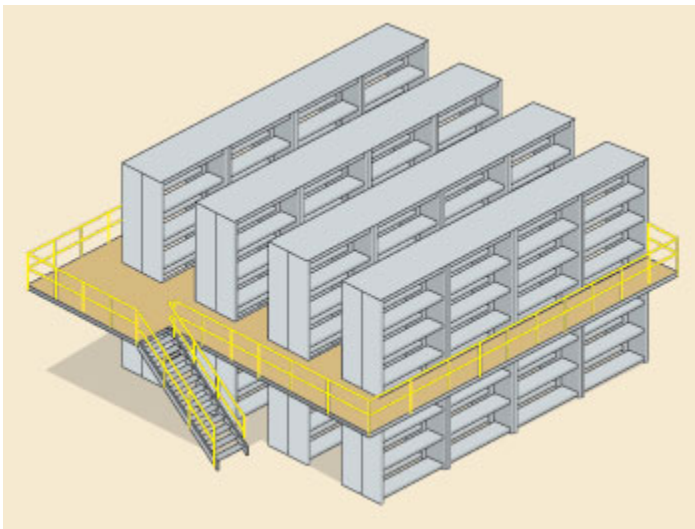
## MEZZANINE TYPES

### Freestanding



A freestanding mezzanine is considered a fixture in the building and can include a variety of customizable designs. These structures allow for the full use of the top mezzanine level and maximum use of the floor level below. Freestanding mezzanines are typically standardized, pre-fabricated modules that are available in a variety of sizes and can be assembled into many different configurations depending on the specific needs. Steel support beams are bolted to the floor and take up very little space. When there aren't any unusual configurations or loading requirements, modular freestanding mezzanines are often a good solution.

### Shelving and rack supported

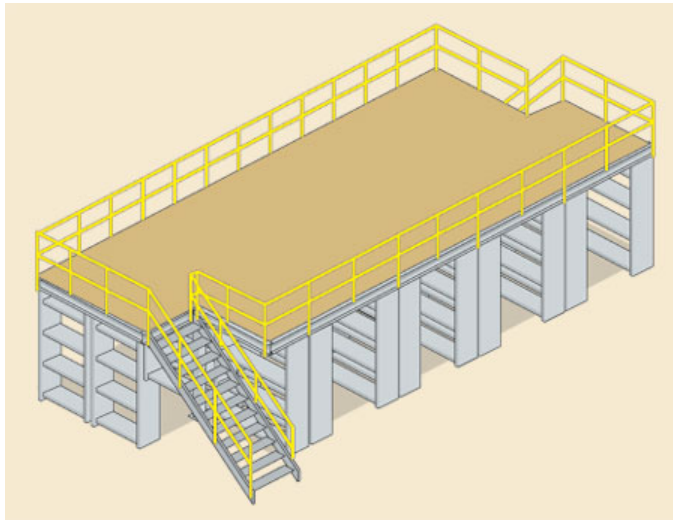


As the name suggests, shelf and rack supported mezzanines are supported by conventional pallet rack uprights or bin shelving systems and do not require structural columns (I-beams or box columns) to support the mezzanine. The advantage: They are generally more affordable. The disadvantage: Since the storage medium (rack uprights or shelving units) are supporting the upper floor, the reconfiguration capabilities are limited if not non-existent.

### **Catwalk**

A catwalk mezzanine typically refers to a maintenance mezzanine adjacent to elevated conveyor or similar materials handling or manufacturing equipment, which gives maintenance personnel access to otherwise not easily accessible equipment. The catwalk is usually 24 inches to 30 inches wide. Pallet drop zones, gates and stairways can be added to this system.

### **Full mat**



Combining features of both freestanding and catwalk styles, full mat mezzanines have an open second level and can be installed over existing shelving or rack uprights.

### **Integrated or structural**

These mezzanines are built into the building as part of the original design and considered part of the structure. They are usually installed by the builder. A permanent mezzanine, typically with a concrete floor, is often used when heavier loads need to be supported and when powered materials handling equipment is needed.

### **Customized**

True to the name, customized mezzanines can incorporate virtually any design, components, column spacing, unusual loading characteristics, and can be configured to the end user's exact specifications.

## TECHNICAL CONSIDERATIONS

Regardless of the type of mezzanine that works best for the purposes within your facility, it's important to consider a number of key technical issues. "The first question is whether or not your building floor has the capacity to bear the load of a mezzanine and what steps might need to be taken to make it compliant," says Bryan Jensen, vice president of business development at St. Onge.

Other technical considerations that go into the all-important planning and development stage are loading requirements, column spacing, flexibility of design, supporting sub-structure (footings or floor slab), and seismic requirements and considerations at the project's geographic location.

## MEZZANINE APPLICATIONS

"The installation of a mezzanine increases the utilization of available overhead space, which in turn increases processing, storage or office space," says Dave Becker, director at Tompkins Associates. "Mezzanines facilitate increases in overall square footage for the installation of storage and picking systems, conveyor and sortation systems, operation space and in-plant offices."

In production operations, mezzanines can position processing equipment above other processing equipment and they can house bulk materials that are gravity fed or "dropped" to floor-level processing equipment.

In distribution centers, mezzanines can be used in a variety of ways including: multi-level pick modules, multi-level value-added service (VAS) processing workstations, workstations above storage, returns processing, and detailed checking workstations for small items.

In any facility, mezzanines can increase storage space, create new spaces for employee services and offices, and provide flexibility and functionality.

## MEZZANINE IMPLEMENTATION

To determine whether or not a mezzanine is the right answer, do your homework.

"Start by determining the needs and flow of the operation and then look for underutilized areas within the cube," says Lou Cerny, vice president of Sedlak. "Mezzanines maximize space and allow growth within the four walls of the facility. They help an operation do more with less."

"A potential mezzanine user must also review existing building specifications and operational requirements to determine whether a mezzanine is a suitable investment," says Becker. He identifies three areas of concern:

- **Existing floor-to-ceiling clearance.** Clearances, and the location and elevations of any obstructions, must be calculated to determine whether there's sufficient headroom for a successful installation.

- **Floor load capacity.** Buildings with insufficient floor construction or soil density will be incapable of supporting a mezzanine system without structural modifications.
- **Clear span limitations.** Mezzanine designs that have relatively short clear spans typically create limited functional open floor space under the mezzanine. This significantly reduces flexibility and potential use of the area below.

When considering the installation of a mezzanine, Jensen reminds potential customers to consider lighting and sprinkler systems underneath the mezzanine, as those required components directly impact the cost. In many cases, mezzanines can use existing lighting, power, HVAC and fire protection systems. But if that's not the case in your facility, make sure to factor the costs of incorporating those systems into the overall price tag of your mezzanine structure.

### **One-third rule and compliance**

"A mezzanine structure should not cover more than one-third of the total footprint of the building, or it will likely be treated as a multiple-floor structure and require compliance with much more extensive and expensive code requirements," Cerny says.

Mezzanines are subject to their own set of standards. "Potential users should consult with a mezzanine design engineer for compliance with relevant IBC, OSHA, BOCA, egress, seismograph and local regulatory requirements prior to the installation of a mezzanine structure," says Becker. "ADA certification is not necessary for storage mezzanines. However, ADA compliance should be evaluated based on the type and amount of work personnel are performing on the mezzanine."

### **Accessories and features**

A number of customizable accessories are available to outfit your mezzanine, all of which are designed to ensure the safety and usability of the structure. Required accessories or special features include access staircases and ladders (they may have open or closed risers and treads); landings; two-rail, three-rail or welded mesh safety railings; swing gates, sliding gates or lift gates for pallet access; safety guarding to prevent materials from accidentally falling to the lower level; support columns and/or uprights to support the building floor loading restrictions; oversized base plates to accommodate the building floor loading restrictions and to prevent digging footers.

Decking is a key component. Since the use of pallet jacks and the installation of storage and processing equipment on a mezzanine deck can significantly reduce the life expectancy of the mezzanine deck surface, it's important to choose the right deck material. Decking options include b-decking (corrugated metal) and wood or composite overlayment, diamond plate, lightweight concrete, expanded steel and bar grating.

### **Business benefits**

"Because mezzanines can depreciate like equipment, unlike capital-intensive build-outs, the installation of a mezzanine can be the most economical way to increase the use of available

building cube. This is especially critical when operations occupy leased space and permanent alterations or expansion of the property is disallowed by the lease agreement," says Becker. "In rapidly expanding operations, mezzanines offer a potential short-term alternative to capital investment, especially for those who may be planning to relocate to a larger site within five years or less."

Mezzanines can be tailored for almost any end user, and that's exactly why the up front thinking and analysis of the design are so critical. "Always start with the fundamentals and strategy. Even though mezzanines are modular, like big erector sets, they're still tough to move, so be careful with design and placement," says Derewecki.