

WHITE PAPER

Mezzanine Methods:

**BOLTED DESIGN
VS. AEC APPROACH**

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MEZZANINE METHODS: Bolted Design vs. AEC Approach

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John Moore,
vice president of
Cubic Designs

THE RESURGENT ECONOMY and the steady march of e-commerce growth is keeping warehouse and distribution center (DC) operations busy picking, packing, and fulfilling orders, usually with more item handling and value added services thrown into the mix.

The consequence of this welcomed growth is the need for more space. And when DCs, plants, or any industrial facility needs more space, there are two basic options: going “out” by acquiring or building additional facilities, or “going up” by maximizing the cubic volume of existing facilities.

A few years back when the economy was deep in recession, industrial space could be had relatively cheaply, but that is no longer the case. In fact, according to the CBRE Group, in the second quarter of 2015, the availability rate for industrial space dropped to a low not seen since Q4 of 2007, and the need for new space is now greater than it has been in a decade.¹

Going up, on the other hand, can be accomplished by using mezzanines and platforms to take full advantage of a building’s vertical space. After all, if you have a 30-foot clear height warehouse, but are only using 10 or so feet of that height, you are wasting space.

In buildings with sufficient clear height, a mezzanine can be added to create additional space for value added services like kitting, packing, or returns processing. Platforms can also be added to bring equipment, bulk storage or offices up a level, thereby freeing space on the ground level.

“The need today is to effectively maximize the use of your vertical space, because it is much less costly to go up than out,” says John Moore, vice president of Cubic Designs, a manufacturer of professionally engineered, bolted design mezzanines and platforms.



At minimum, 15 feet of vertical space is needed to add a level; code requires 7 feet of clear height below the mezzanine and 7 feet from the deck to the lowest obstruction. Many warehouses have well over 20 feet of vertical space, which is more than enough for a mezzanine system.

Assuming your company sees the advantage of “going up” rather than out, the question then becomes which method do you want to use to acquire a mezzanine.

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Benefits	Bolted Design Mezzanines/Platforms	AEC Stick Built Mezzanines/Platforms
Custom Design	✓	✓
Proven Delivery Process	✓	✓
Conventional Delivery Process		✓
Single Point of Responsibility for Delivery Process	✓	
Accommodating to last minute changes		✓
Ability to Support Large / Complex Loads	✓	✓
Meets Seismic Requirements	✓	✓
Design Certified by Licensed Professional Engineer	✓	✓
Code Compliant	✓	✓
Powder Coat Paint / Manufactured Finish	✓	
Minimal Disruption to Jobsite	✓	
Cost Efficient Steel Design	✓	
Efficient use of Materials	✓	
Predictable / Consistent Lead Times	✓	
Easily Dissassembled / Moved	✓	

Do you want it completely fabricated and constructed in place for you by companies who use a traditional architecture, engineering, and construction (AEC) market approach, or do you want a pre-manufactured, bolted design system installed after it has been custom configured, professionally engineered, manufactured, and finished prior to arriving at your facility?

This white paper will explore the characteristics of each approach, and examine some similarities between the approaches in terms of materials and quality assurance. This comparison should shed light on which method is preferred for the pressing need many companies have for more space in their warehouses or manufacturing facilities.

AEC characteristics

Having a mezzanine custom engineered, fabricated, and constructed is a proven approach that has worked time and time again in facilities around the world. The method’s biggest strength may be the familiarity that

facility owners and design/build firms have with the approach.

If your warehouse was built by a construction firm you know and trust, you probably have a high degree of confidence that firm can build you a solid mezzanine from scratch.

“There is a comfort level with the AEC approach,” says Moore. “People have experience with this method, and conversely, they might not even know that there is such a thing as a bolted-design approach to mezzanines and platforms.”

Another strength of an AEC approach is flexibility to accommodate last minute changes while the project is under construction. If the facility owner changes direction on the features of a mezzanine before it is completed, the designer can make changes, have them reviewed, come up with the impact on cost, and present those changes to the client.

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Arco Murray

While a bolted design approach can also accommodate changes, it tends to be disruptive to the internal processes of the mezzanine provider, leading to revising the design and rereleasing some materials.

Of course, after a custom-constructed, welded mezzanine is finished, it's not flexible because it can't be disassembled and moved. Flexibility to move or rearrange a mezzanine or platform over its service life can be an important factor for some user companies.

Bolted Design Process

Companies that create bolted-design mezzanines have the process down pat; from field measurements to ensure all variances are accounted for, to PE stamped drawings, to a manufacturing facility that does nothing but produce mezzanines, they're able to deliver with predictable lead times and costs.

The pre-engineered, manufactured nature of the components leads to an inherent cost efficiency. “We're engineering and manufacturing components in our facility, and these standard components are then bolted together in the field,” says Moore. “It's all finished product when it gets to the site, so it assembles very quickly.”

Bolted design system providers have deep experience in efficient component and system configurations that ensure more than ample strength for an application, without overkill in materials or costs. “We will meet any strength or capacity requirements needed, but we are going to ‘design out’ any unnecessary metal, because we are selling engineered products time and time again, and we are looking to maximize the efficiencies in manufacturing and installation,” says Moore. “Because bolted-design is an integrated approach, we keep the total solution very cost efficient,



while exceeding the strength or other design requirements of the customer.”

Similarities and differences

The bolted design approach is similar to the AEC approach in that the user does not have to compromise on factors like design complexity or weight capacity.

“In our experiences, we haven't met a challenge we could not overcome with a bolted-design approach,” says Brett Garrett, a project manager with Arco Murray, a Downers Grove, Ill.-based design/build firm that handles both bolted design and traditional AEC mezzanine projects. “We have been able to keep the structural integrity of the mezzanine while designing around equipment, existing building obstructions, and complex loads.”

This ability to be flexible and have strength and durability is largely because providers of bolted design mezzanines, such as Cubic Designs, use many of the same materials as a construction firm would. The company also has a staff of PEs to work on designs, just as an AEC firm typically does.

Bolting together structural components, rather than welding them, also creates some advantages. For some users, avoiding on-site fabrication is a significant consideration,

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according to Garrett. “Most facility managers and businesses are not crazy about welding steel members in their buildings while they are trying to continue with day-to-day business activities,” says Garrett. “The bolted-design approach allows us to install these systems as least invasively as possible.”

Additionally, a bolted-design mezzanine can later be disassembled and moved to a different facility, or to another side of the same facility, should the company need to change locations or make major changes to its layout. A welded structure, on the other hand, cannot be easily cut apart and moved.

Another important difference is that bolted-design mezzanine may qualify as facility equipment, rather than as real property. This makes it possible, for tax purposes, to depreciate the mezzanine on a quicker schedule than if it were a welded structure that which is categorized as real property.

The bolted-design approach also holds down costs because the engineering, manufacturing, and installation are one integrated process that keeps an eye on both costs and strength concerns. With an AEC approach, a building designer might focus on capacity and strength concerns, with less regard for the materials or installation costs, and then turn the project over for bidding to a construction firm who is going followed the specified plans.

By contrast, the bolted design approach integrates all concerns: the strength and capacity requirements of the design with the manufacturing and installation cost impacts of the design.

Conclusion

As discussed, there are strengths, differences, and similarities in AEC versus bolted design approaches to mezzanines and platforms. Both will deliver a strong, durable platform.

The AEC approach carries a comfort level in the market, but is generally more expensive and typically involves a longer construction phase, rather than a shorter installation phase. The bolted design approach is perhaps not as well known to user companies or AEC firms, but it’s a mistake to think that because it involves standard components, it compromises on design flexibility.

The fact is that professionally engineered, bolted design mezzanines can fit nearly any strength or design configuration need, subject to constraints any mezzanine system—

AEC or bolted design—would face when it comes to factors like support column spacing and the need for footings when desiring widely spaced support.

With these factors in mind, the bolted design method may well be worth further consideration. For certain, companies needing more space should start by “looking up” at unused clear height in existing facilities, rather than looking out to acquire or lease increasingly pricey industrial real estate.

Footnotes

1. CBRE Group, press release, July 13, 2015, U.S. Commercial Real Estate Maintains Strong Momentum in Q2 2015. <http://www.cbre.com/EN/aboutus/MediaCentre/2015/Pages/Q2-2015-Vacancy.aspx>