



Cogan<sup>®</sup>  
Since 1901

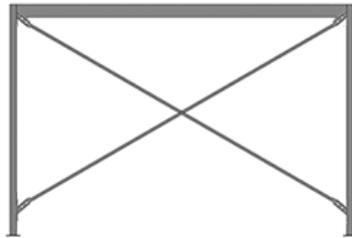


Mezzanines

Increase Floor Space

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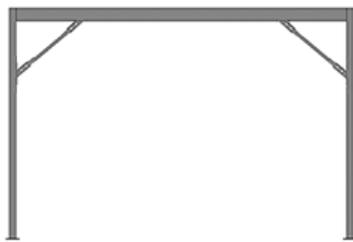
## BRACING



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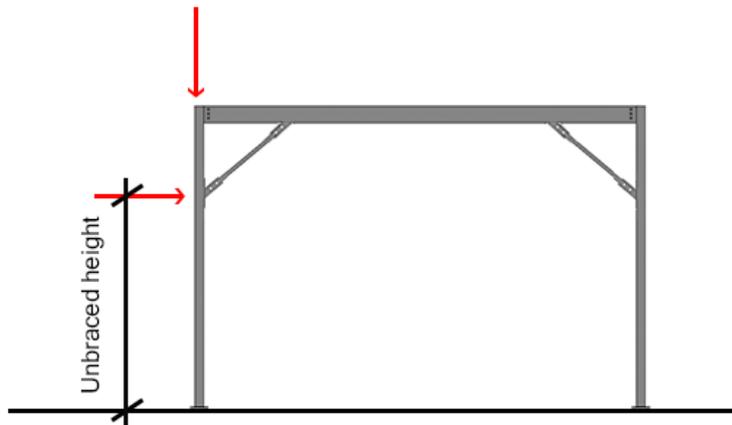
#### Description

Cogan structural steel mezzanines always include one of the following types of brace designs: knee-bracing, x-bracing, or structural knee-bracing. It is essential to consider the overall budget of your project in order to choose the proper brace design for your mezzanine.



## KNEE-BRACE

### KNEE - BRACE DESIGN



- Even though standard knee-bracing is usually the least expensive brace design for smaller mezzanine, this system creates large overturning loads at the base which usually require footings to be poured under each column baseplate. This is an additional expense that interrupts the flow of activity on or around the installation site and that directly affects your final project cost and timeline. Please note that each column is built using more steel, to counter balance part of the overturning loads, resulting on a more expensive overall structure in mid-size or bigger mezzanine.
- Each column connection must be reinforced with a knee-brace (i.e if 4 beams are connected to one column, then 4 knee-braces are required - one per beam connection).
- Cogan Standard knee-braces are not engineered to withstand overturning movement and seismic loads.



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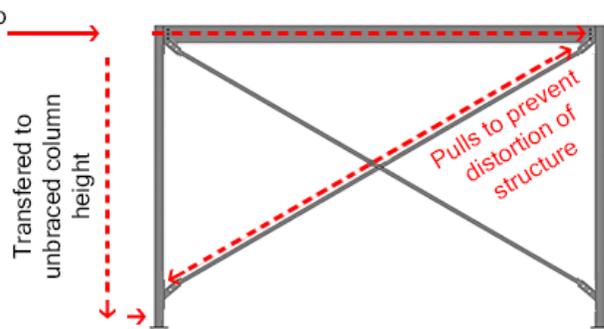
## TYPICAL LOAD TRANSFER

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- DECK → JOIST
- JOIST → BEAM
- BEAM → COLUMN
- COLUMN → ANCHORS
- ANCHORS → SLAB/FOOTING

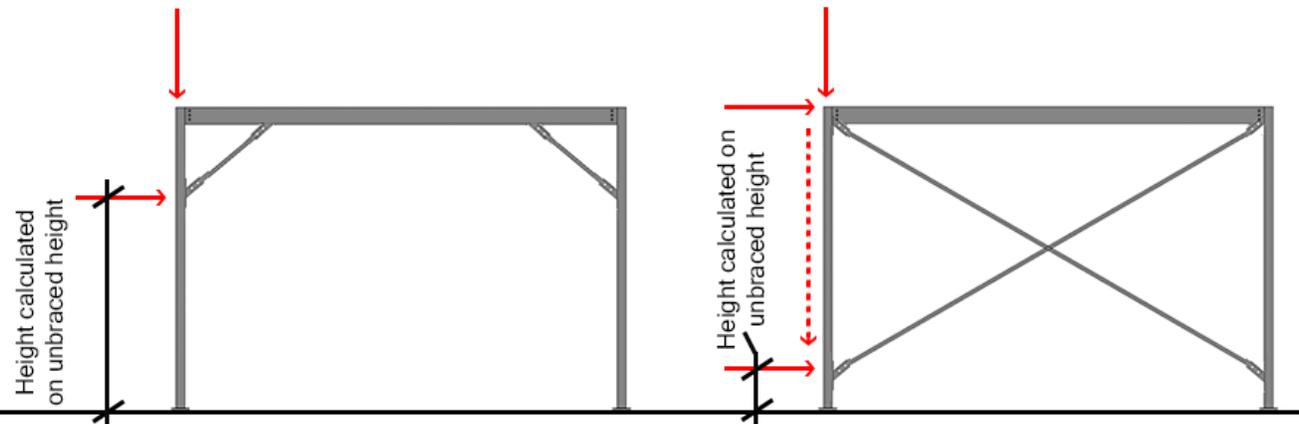
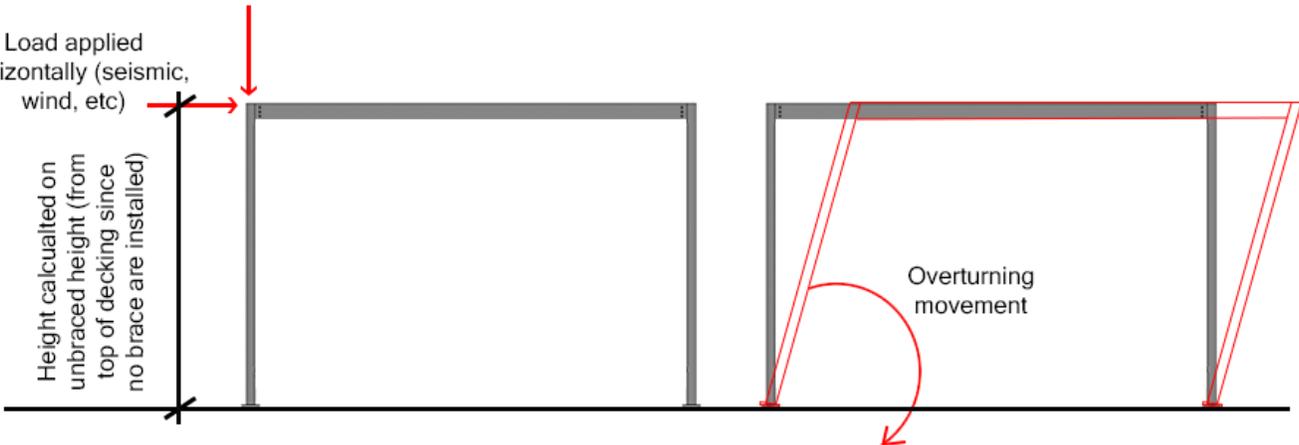
BRACES ARE DESIGNED TO TRANSFER THE HORIZONTAL LOADS TO THE BASE, THUS MINIMIZING THE MOVEMENT OF THE MEZZANINE AND LIMITING THE SWAY

Load applied to the structure



Load applied vertically  
(Dead Load + Live Load)

Load applied horizontally (seismic, wind, etc)

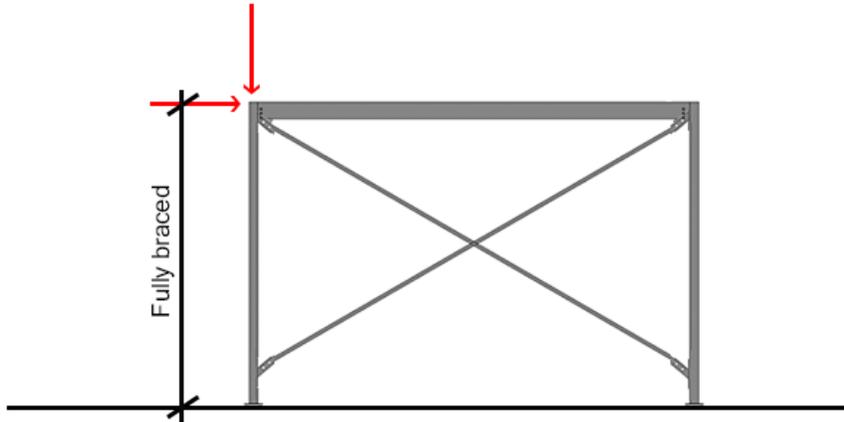


BOTH HORIZONTAL AND VERTICAL LOADS ARE TAKEN INTO CONSIDERATION WHEN DESIGNING A COGAN STRUCTURAL STEEL MEZZANINE. BRACES ARE ENGINEERED TO SUPPORT THE STRUCTURE AGAINST LATERAL (HORIZONTAL) LOADS. IN ADDITION TO SUPPORTING THE STRUCTURE THEY ALSO STABILIZE AND ENSURE COMFORT FOR PEOPLE ON TOP OF THE MEZZANINE AND TO ELIMINATE A CERTAIN SWING MOTION. NOT ALL BRACE DESIGN ARE THE SAME, AND ONLY X-BRACE OR STRUCTURAL KNEE-BRACE DESIGN ARE ACCEPTABLE IN CERTAIN SEISMIC ZONE.



## X-BRACE

### X-BRACE DESIGN

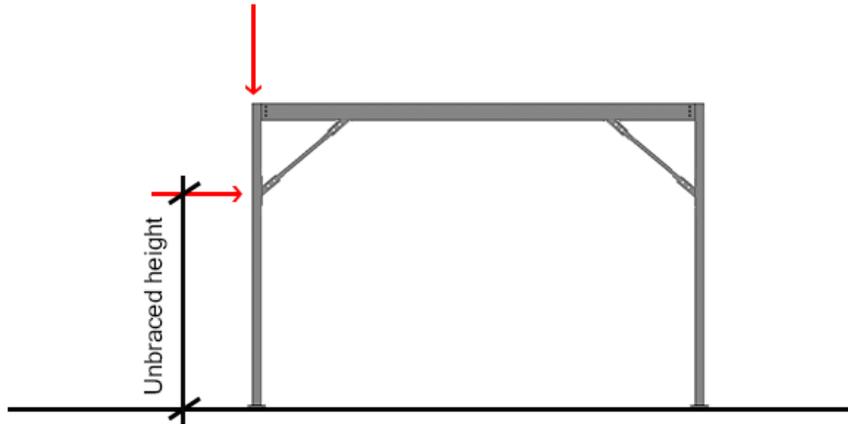


- An x-brace design is virtually the least expensive brace design for medium to big sized mezzanines. Since overturning loads are eliminated with this brace design, footings may not be required eliminating additional charges and interruptions to the flow of activity on or around the installation site.
- X-braces must be installed on minimum of 3 sides of the structure for complete strength and resistance.
- Cogan x-braces are engineered to virtually eliminate overturning moment and to withstand seismic loads in any seismic zone.



## STRUCTURAL KNEE-BRACE

### STRUCTURAL KNEE-BRACE DESIGN



- Cogan structural knee-brace design is usually the most expensive brace design for medium to large size mezzanine. With its full clear spans, it allows for fluid circulation underneath the mezzanine with no obstruction. Cogan structural knee-braces are engineered to eliminate overturning loads. As a result, footings are usually not required with this brace design, eliminating additional charges and interruptions to the flow of activity on or around the installation site.
- Cogan structural knee-brace design requires for each column connection to be reinforced with a structural knee-brace (i.e. if 4 beams are connected to one column, then 4 structural knee-braces are required - one per beam connection).
- Cogan structural knee-braces are engineered to eliminate overturning movement and to withstand seismic loads in any seismic zone.