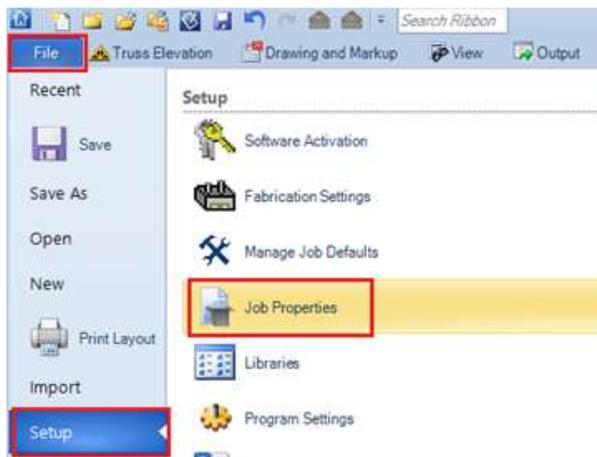


This article summarizes the significant changes made between ASCE 7-10 and ASCE 7-16 that affect truss designs.

While both the 2012 and 2015 IBC referenced the 2010 edition of ASCE 7, the 2018 IBC refers to the 2016 edition of ASCE 7, “Minimum Design Loads and Associated Criteria for Buildings and Other Structures”, which is put out by the American Society of Civil Engineers, and which establishes design loads for buildings.

To update job settings, go to File – Setup – Job Properties:



In Job Properties go to Job Settings – Design – Building Code Settings and choose IBC 2018:



## WIND

ASCE 7-10 wind maps and wind speeds are updated in ASCE 7-16. Wind speeds for large parts of the country have been reduced for each Risk Category.

While Category III and IV buildings were addressed on a combined map in ASCE 7-10, ASCE 7-16 has a separate wind speed map for Risk Category IV. There are four maps in ASCE 7-16: one for each Risk Category.

External pressure coefficients for component and cladding have increased. Hip and gable roofs are separated. Due to these changes our edit roof zone feature has been modified to specify new zone designations for C-C Roofs. In most cases, the factors are going up. Wind loads will generally increase. We generally recommend the user leaving this setting on “Automatic.” If you have a roof with just hip ends on it, you can set this to “Hip”, or if it just has gable ends on it, you can set it to “Gable”.

C-C Roof	Automatic
Wind Velocity	Interior
Directionality Factor	Exterior
Opening Conditions	Corner
Height Above Ground	Automatic

CC Wind Zones ASCE 7-10

C-C Roof	Automatic
Wind Velocity	Automatic
Directionality Factor	Gable
Opening Conditions	Hip
Height Above Ground	

CC Wind Zones ASCE 7-16

Enclosure Classification in ASCE 7-16, **Opening conditions**, has four inputs with factors for each. Just like in ASCE 7-10, the options available for all the procedures, are “Enclosed Bldg (Cond I)” and “Partially Enclosed (Cond II)”. But under the CC and Directional procedures in addition to “Open Bldg (Cond III)” you will also find “Partially Open (Cond IV)”. The building enclosure classification should be provided by the building designer. A basic explanation of a Partially Enclosed Building is where one side of the building is open, similar to an airplane hangar. Open Buildings have no walls on any side; a picnic pavilion is an example of an Open Building. Enclosed Buildings are those that only have small opening(s) on each wall (less than 4 sq. ft. or 1% of the wall area.) Partially Open Buildings are those that do not classify as enclosed, partially enclosed, or open. A carport with one solid wall and the others all open would fit in this category. Partially Open has the same internal pressure as Enclosed and basically is treated as enclosed with regards to the directional and envelope methods for MWFRS.

Opening Conditions	Partially Enclosed (Cond.II)
Height Above Ground	Partially Enclosed (Cond.II)
Number of CC load cases	Enclosed Bldg.(Cond.I)
Max Top Chord Dead Load	Open Bldg.(Cond.III)
Max Bottom Chord Dead Load	Partially Open (Cond.IV)

A Ground Elevation Factor is added in ASCE 7-16 to account for variations in air density at different altitudes. Entering the correct Ground Elevation above Sea Level can result, as an example, in 17% reduction in design wind loads in Denver.

<b>Loading - Wind</b>	
Wind Load	Yes
Wind Design Method	Components/Cladding ASCE 7-16
Directions	Four
Topographic Factor, Kzt	1.00
Ground Elevation	5000-00-00
Ground Elevation Factor, Kz	1.00

The *Occupancy categories* described in the drop-down menu of the MiTek Engineering software are *Risk Categories*. Definitions are pretty much the same, just a change of nomenclature. For a more complete description, refer to MiTek Engineering Technical Article [“ASCE 7 Occupancy Categories”](#).

Building Rigidity	Rigid
Occupancy/Risk Category	II> All buildings except those listed below...
C-C Roof	Automatic
Wind Velocity	115 mph

## SNOW

Snow load maps in ASCE 7-16 incorporate regional snow data for site specific case study zones. Seven states specify snow load by county instead of using the map.

There are some changes in the unbalanced snow load requirements that will mostly affect small trusses.

If you design trusses for the Arctic Circle or mountain tops, you will need to check on Windswept Area in the Loading - Snow section of Building Code Settings.

<b>Loading - Snow</b>	
Consider Snow Load	Yes
Design Method	ASCE 7-16
Snow Load Location	Ground (Pg)
Snow Load	50.0 lb./ft <sup>2</sup>
Roof Exposure Category	Partially Exposed
Windswept	Yes

## IBC/IRC BOTTOM CHORD LIVE LOADS

<b>Loading Advanced - Limited Access Loads</b>	
Limited Access Load	IBC/IRC 42"x24" BC Load
Follow Building Code	Yes
Limited Access Load	0.0 lb./ft <sup>2</sup>
Minimum Height	0-00
Minimum Width	0-00
Apply to Entire Panel	No
<b>Loading Advanced - Stabilizer(tm) Installation Load Case</b>	
<b>Additional Bottom Chord Live Load Considerations</b>	
Bottom Chord Live Load	IBC
Follow Building Code	Yes
Load	10.0 lb./ft <sup>2</sup>

Both the IRC and IBC require a non-concurrent 10 psf bottom chord live load for attic areas without storage (IBC BC Live Load). Non-concurrent means that the bottom chord live load is applied in a separate load case without the top chord or any other live loads. Both codes also have a 20 psf live load for attic areas with limited storage, defined as any area in which a 42" high by 24" wide box would fit within the open spaces of a truss. This load is applied concurrently with the top chord or any other live loads. Both codes, IBC2018 and IRC2018, require that you have a minimum 10 psf bottom chord live load in the remaining portions of the bottom chord where the 20 psf live load is not applied. This is taken care of by the MiTek program when this load is applied. Please note, for the IRC, there are exceptions where the 20 psf live load is not required: for bottom chord slopes of 2:12 and greater, and when the required insulation depth is greater than the bottom chord member depth. The insulation exception may make it rare that the 42"x24" load is required on IRC designs. Given that energy codes require the use of insulation over livable spaces, it is likely that the 42-inch limited access live load will only be applicable to trusses over a non-insulated garage. Please also note that there is no "insulation exemption" in IBC. Of course, it is important to remember to check with local codes as many jurisdictions modify the requirements of this load.

For additional information, or if you have questions, please contact the MiTek Engineering department.