Barrette Structural Distribution is proud to announce its new version of TRIFORCE® Analyzer plugin.
This update contains small bug fixes and improvements:

1. New Building Codes
2. How to change regular joist to special grade
3. New reinforcement method for hanger fixed to the side of a joist girder
   3.1 Point Load With Less Reinforcement using Top Mount Hangers
   3.2 Point Load With Reinforcement using Face Mount Hangers
4. Cantilevers and perpendicular line load without reinforcement
   4.1 Cantilevers without reinforcement
   4.2 Line loads or Top Point load without reinforcement
5. Usage of strongback in TRIFORCE® floor system
   5.1 Usage of Strongback in iStruct®
   5.2 Strongbacks bug fix
6. Technical advice for drawing TRIFORCE® joists in isPlan®

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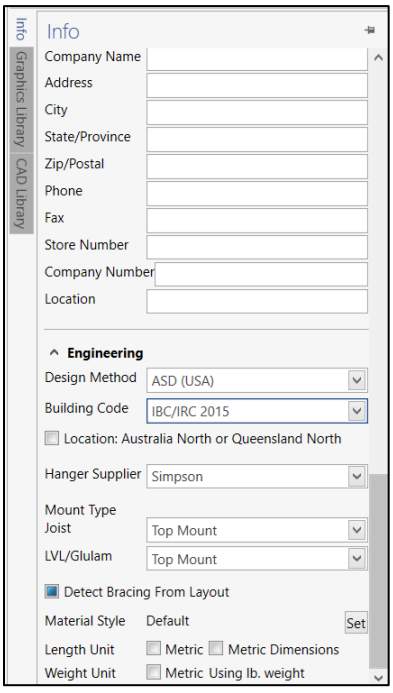
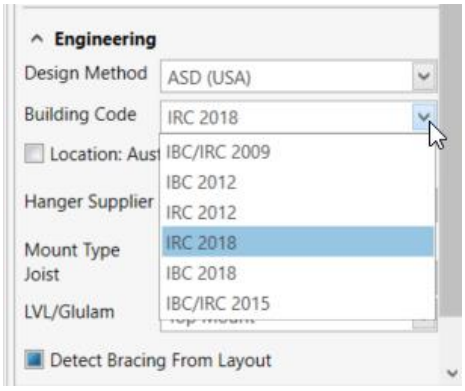
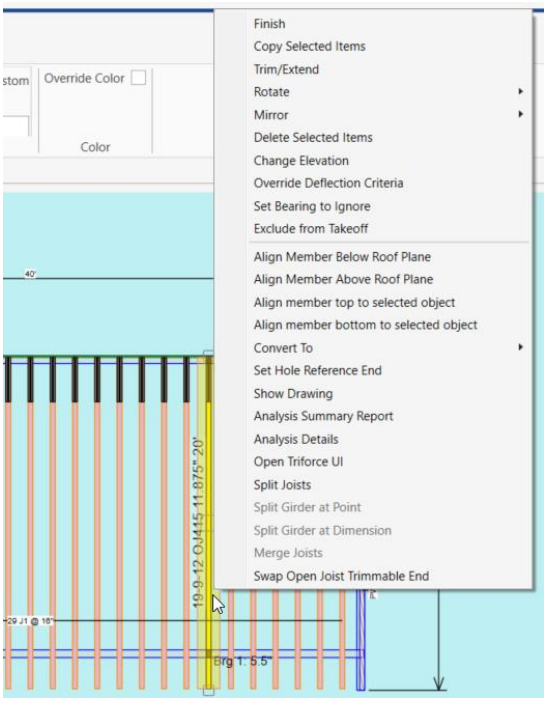
1. New Building Codes:

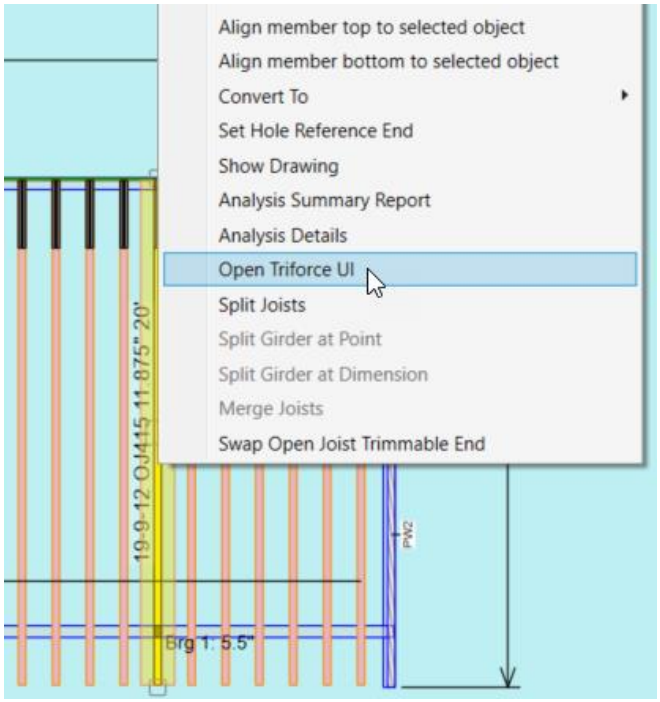
For iStruct® users designing TRIFORCE® in isPlan®, you will have to select your **Building Code** in the ***Info*** tab:



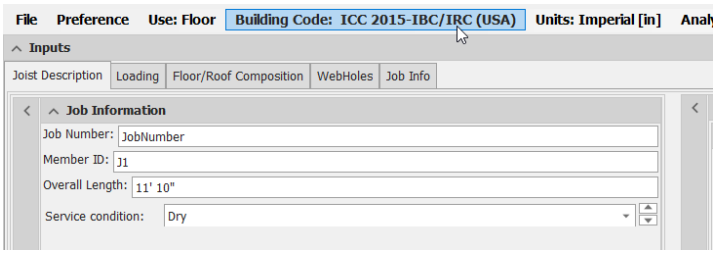


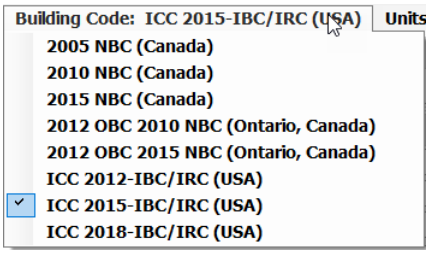
If you need to analyze **one joist in particular** in another Building Code once your layout has been analyzed in isPlan®, you can select a joist and right click on it in order to select "Open Triforce UI". You will then have access to a Standalone version of Analyzer.





You can now change the code or other values:





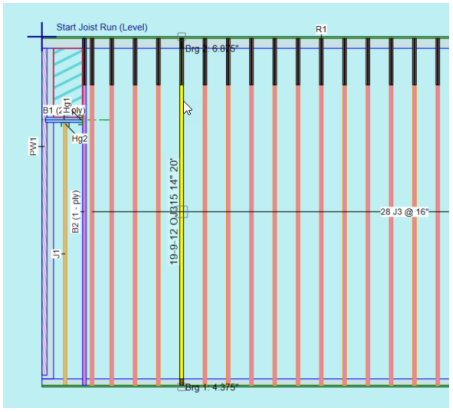
New Building codes available in Analyzer are:

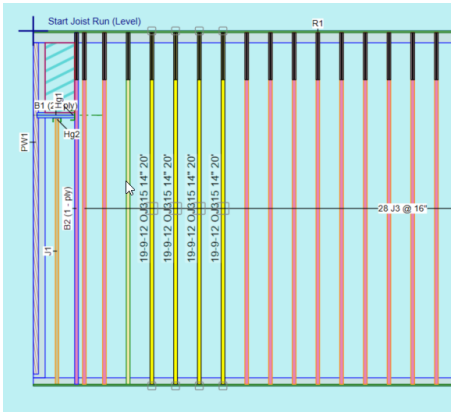
For Canada: 2012 OBC 2010 NBC and 2012 OBC 2015 NBC
For USA: ICC 2018 IBC/IRC code

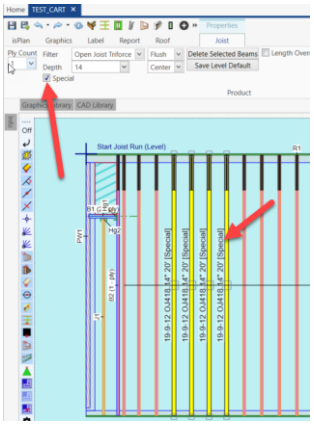
NOTE: Everything you change must be saved in a separate file or in a PDF file as the new values won't be transferred into isPlan®.

2. How to change regular joist to special grade

Once your layout is analyzed, you can select one or multiple joists (with a cross window) and just check the "Special" box:







You can refer to our standard Joist Sizes chart:

Depth	Series	Weight lbs/ft	Stock Lengths (feet)												
			6	8	10	12	14	16	18	20	22	24	26	28	30
11 ⅞"	OJ314	2.80	✔	✔	✔	✔	✔	✔							
	OJ315	2.80							✔						
	OJ415	3.35								✔					
	OJ418	3.35							S	S	✔				
14"	OJ314	2.85	✔	✔	✔	✔	✔	✔							
	OJ315	2.85							✔	✔					
	OJ415	3.45									✔				
	OJ418	3.45								S		✔	✔		
16"	OJ314	2.95	✔	✔	✔	✔	✔	✔							
	OJ315	2.95							✔	✔					
	OJ418	3.55								S	✔	✔	✔		
	OJ420	3.55												✔	✔

✔ = In stock

S = Limited inventory. Please contact your representative to determine quantities.

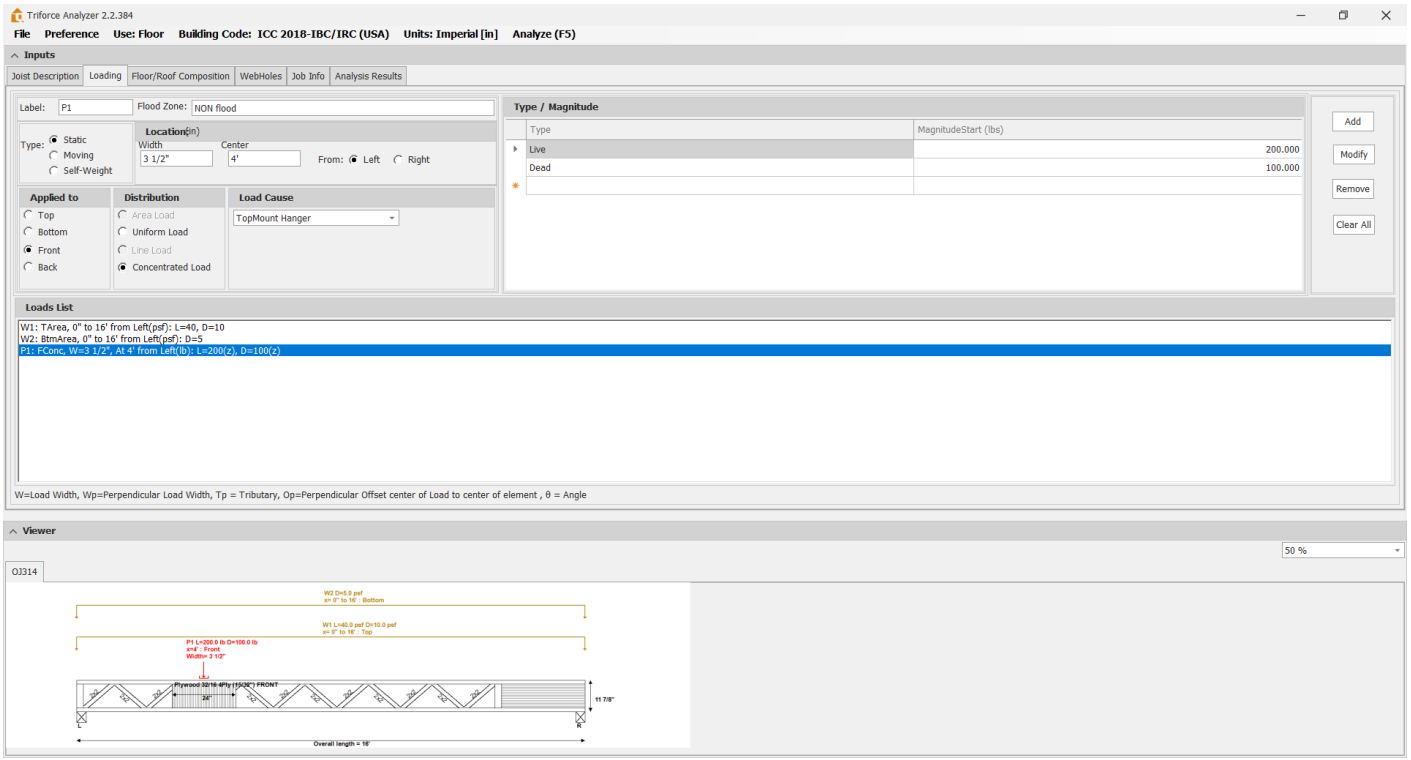
3. New reinforcement method for hanger fixed to the side of a joist girder:

3.1) Point Load with less reinforcement using Top Mount Hanger

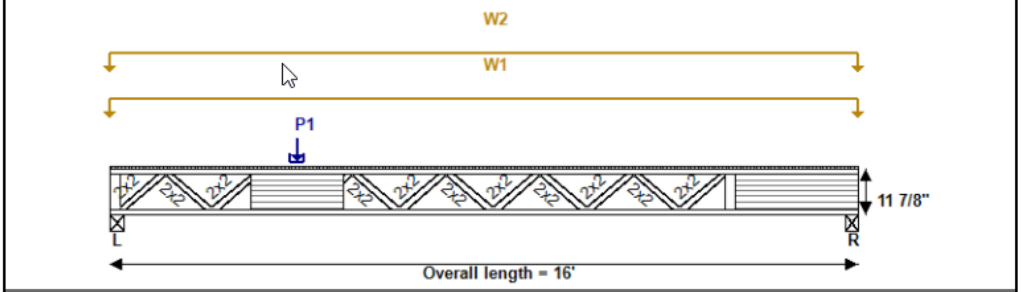
Part of the plugin updates is an important improvement in the reinforcement required for a Top Mount hanger on a TRIFORCE® girder. This new feature will save up to 2 plies of reinforcement. TRIFORCE® Analyzer will specify the reinforcement required according to the intensity of the load applied in the Top Mount hanger, and so, without systematically adding the 3 thicknesses of reinforcement [**which are required for the nailing of a Face Mount hanger**].

EXAMPLE WITH A **TOP MOUNT HANGER**

In this example, a single ply girder 2x3 OJ314 11 7/8" with a point load of 300 lbs **(using Top Mount Hanger)** at 4'-0'' from the left only needs 1 ply of reinforcement installed ***between*** the top and the bottom chord:



Manufactured length: 16 Trim Left: 0", Right: 0"	Perimeter Materials Left: None, Right: None	Characteristics(Use, Depth, Top-Bottom, Plies, Spacing) Triforce OJ314 (Floor - Joist, 11 7/8", 3 X 2, 1 ply, girder)



LOADING

Top Roll(Φ)=0° Pitch(Θ)=0°

Lbl	Nb	@ c/c	Type	X1	X2	Y	Z	Θ	L	Lp	Loads
W1	1	-	Area	0"	16'	-	-	-	16'	1' 4"	(psf): L=40, D=10

Front Roll(Φ)=90° Pitch(Θ)=0°

Lbl	Nb	@ c/c	Type	X1	X2	Y	Z	Θ	L	Lp	Loads
P1	1	-	Conc	4'	-	-	-	-	3 1/2"	11 7/8"	(lb): L=200(z), D=100(z)

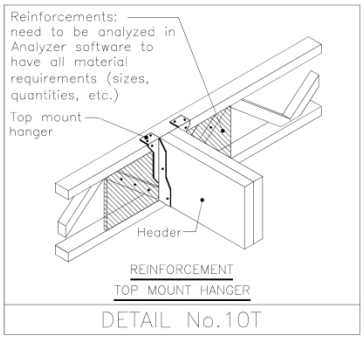
Bottom Roll(Φ)=180° Pitch(Θ)=0°

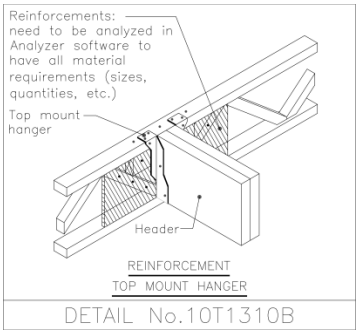
Lbl	Nb	@ c/c	Type	X1	X2	Y	Z	Θ	L	Lp	Loads
W2	1	-	Area	0"	16'	-	-	-	16'	1' 4"	(psf): D=5

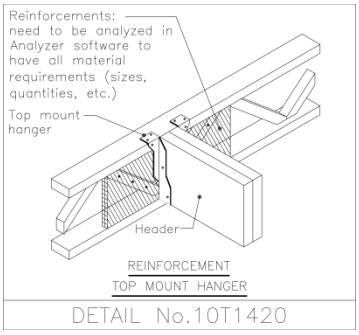
STRENGTH LOAD CASES

REINFORCEMENTS
- Add WOOD FILLER: 0.5" of thickness Plywood or OSB x 8 7/8" of height x 24" of length, STARTING at 36" from LEFT end, fixed on FRONT side to webs with PL PREMIUM glue and nails.
ENGINEERING NOTES
Left Bearing Unspecified material (not verified)
Right Bearing Unspecified material (not verified)
The indicated reinforcements are only valid if the following load/source combinations are valid: P1/TopMount Hanger on the Front When a concentrated load comes from a hanger, the capacity of this hanger must be verified.
Lateral Supports : For Joists, lateral support at a minimum of 16" o.c is always required on top chord, as well as on bottom if there are more than two bearings or a cantilever condition.
Subfloor : OSB 20oc (19/32") Glued and Nailed/Screwed
Quotation -The Span of calculation is center to center of the real bearings. -The position of Shear and Bending in the analysis is from the left end of the Span of calculation.

New reinforcement details are available to go along with your placement guides. Here are some examples:





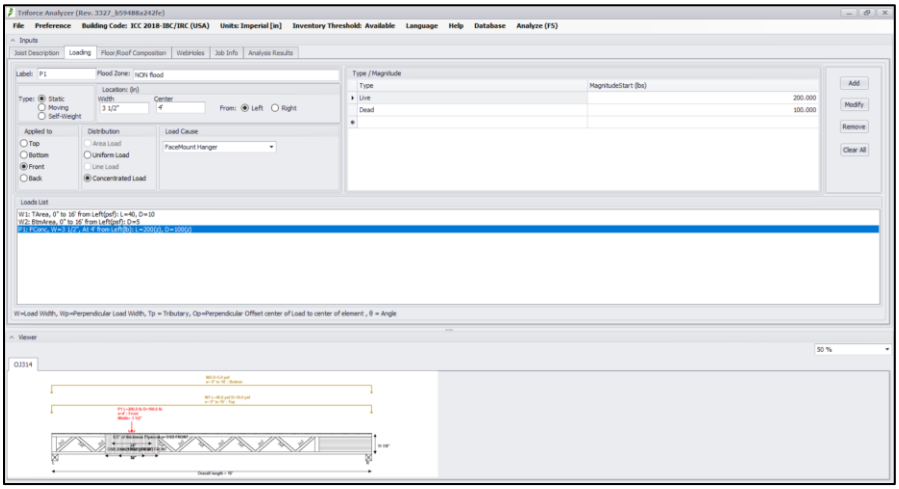


NOTE: Using a top mount hanger for a header is not considered as a load applied to the top. It should be applied to the front or back.

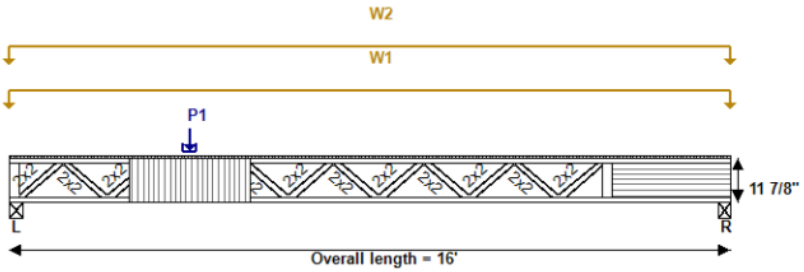
3.2) Point Load with reinforcement using Face Mount Hanger

SAME EXAMPLE, BUT WITH A **FACE MOUNT HANGER** THIS TIME

If you select **Face Mount Hanger**, using the same example as above (a single ply girder 2x3 OJ314 11 7/8" with a point load of 300 lbs. at 4'-0'' from the left), it will need 1 ply of reinforcement installed ***between*** the top and the bottom chords and 2 plies to be installed ***over***, meaning covering both the top and bottom chords for a total of 3 plies:



Manufactured length: 16 **Trim Left: 0", Right: 0"**	Perimeter Materials **Left: None, Right None**	Characteristics(Use, Depth, Top-Bottom, Plies, Spacing) **Triforce OJ314 (Floor - Joist, 11 7/8", 3 X 2, 1 ply, girder)**



LOADING

Top **Roll(Φ)=0°** **Pitch(Θ)=0°**

Lbl	Nb	@ c/c	Type	X1	X2	Y	Z	Θ	L	Lp	Loads
W1	1	-	Area	0"	16'	-	-	-	16'	1' 4"	(psf): L=40, D=10

Front **Roll(Φ)=90°** **Pitch(Θ)=0°**

Lbl	Nb	@ c/c	Type	X1	X2	Y	Z	Θ	L	Lp	Loads
P1	1	-	Conc	4'	-	-	-	-	3 1/2"	11 7/8"	(lb): L=200(z), D=100(z)

Bottom **Roll(Φ)=180°** **Pitch(Θ)=0°**

Lbl	Nb	@ c/c	Type	X1	X2	Y	Z	Θ	L	Lp	Loads
W2	1	-	Area	0"	16'	-	-	-	16'	1' 4"	(psf): D=5

REINFORCEMENTS

- Add WOOD FILLER: 0.5" of thickness Plywood or OSB x 8 7/8" of height x 24" of length, STARTING at 36" from LEFT end, fixed on FRONT side to webs with PL PREMIUM glue and nails.
- Add REINFORCEMENT: OSB 20oc (19/32") x 11 7/8" of height x 32" of length, starting at 32" from left end, fixed on FRONT side in VERTICAL position to top and bottom chord with PL PREMIUM glue and 3" nails at 5" o.c.
- Add WOOD FILLER: OSB 20oc (19/32") x 11 7/8" of height x 16" of length, STARTING at 40" from LEFT end, fixed on FRONT side over previously installed reinforcement parts, fixed with PL PREMIUM glue and 3" nails at 5" o.c. to joist top and bottom chord.

ENGINEERING NOTES

Left Bearing Unspecified material (not verified)

Right Bearing Unspecified material (not verified)

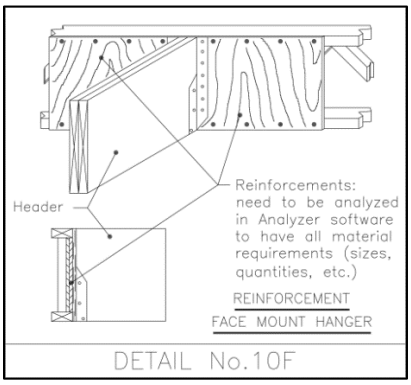
The reinforcements indicated are only valid if: P1 from Front FaceMount Hanger
When a concentrated load comes from a hanger, the capacity of this hanger must be verified.

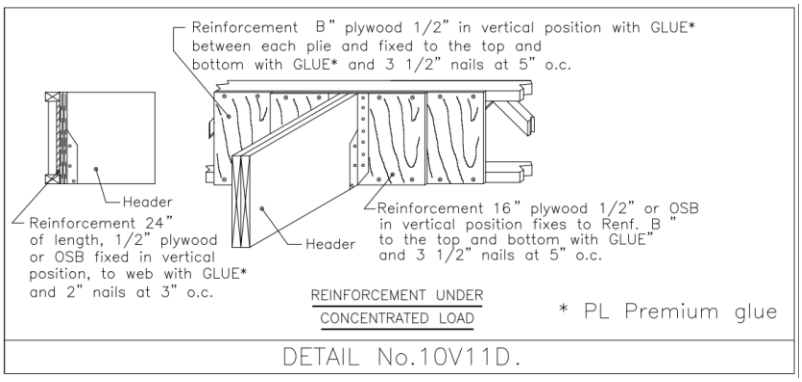
Lateral Supports : For Joists, lateral support at a minimum of 16" o.c is always required on top chord, as well as on bottom if there are more than two bearings or a cantilever condition.

Subfloor : OSB 20oc (19/32") Glued and Nailed/Screwed

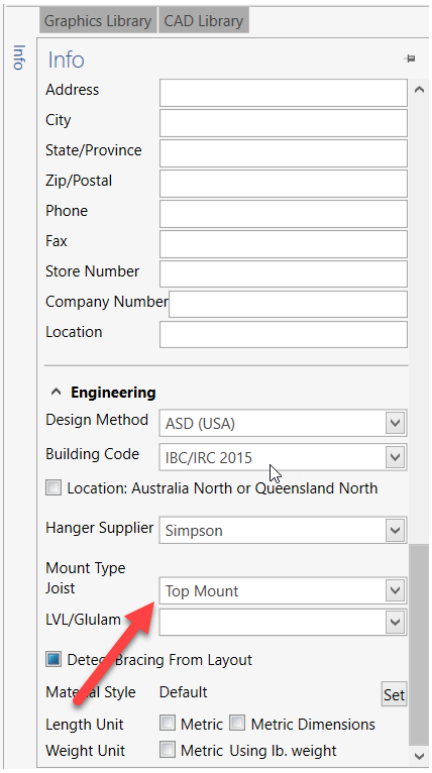
Quotation
-The Span of calculation is center to center of the real bearings.
-The position of Shear and Bending in the analysis is from the left end of the Span of calculation.

Reinforcement details are available to go along with your placement guides. Here are some examples:

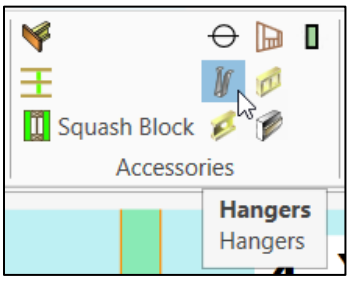




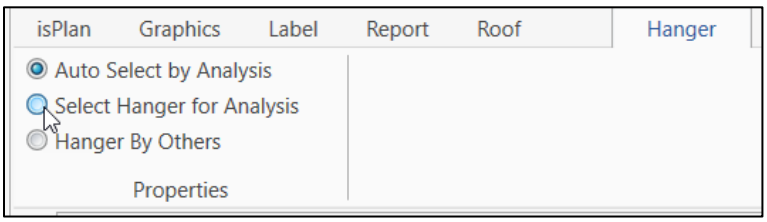
You can select your default hangers **Mount Type** in the info tab:



To select only one hanger in particular, you click on the hanger icon:

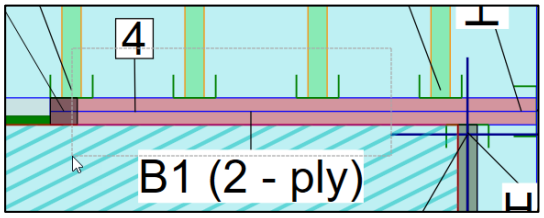


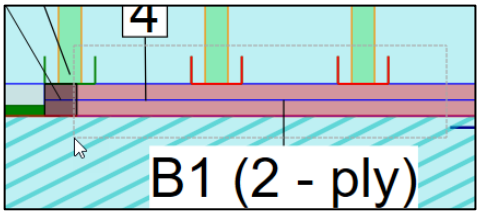
Then, to select the desired hanger, click on *Select Hanger for Analysis*.



You will have access to select the Supplier (manufacturer), Mount Type and then the model:

After selecting the model, you can select the hanger you would like to change. Simply drag from left to right (or right to left) to **select** all **hangers** that are entirely enclosed in the **selection** rectangle or lasso (window **selection**):

Drag: 

Enclosed: 

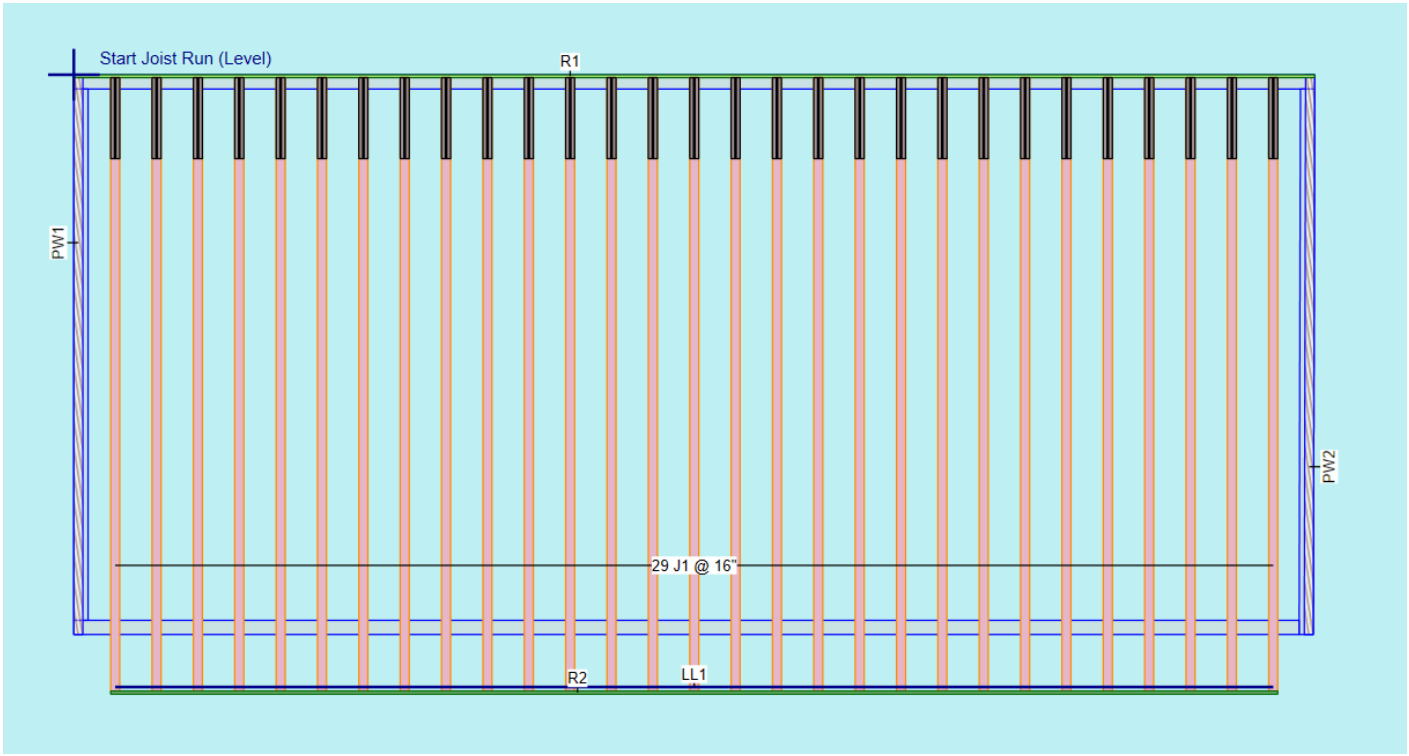
It will apply the new model that you have previously selected.

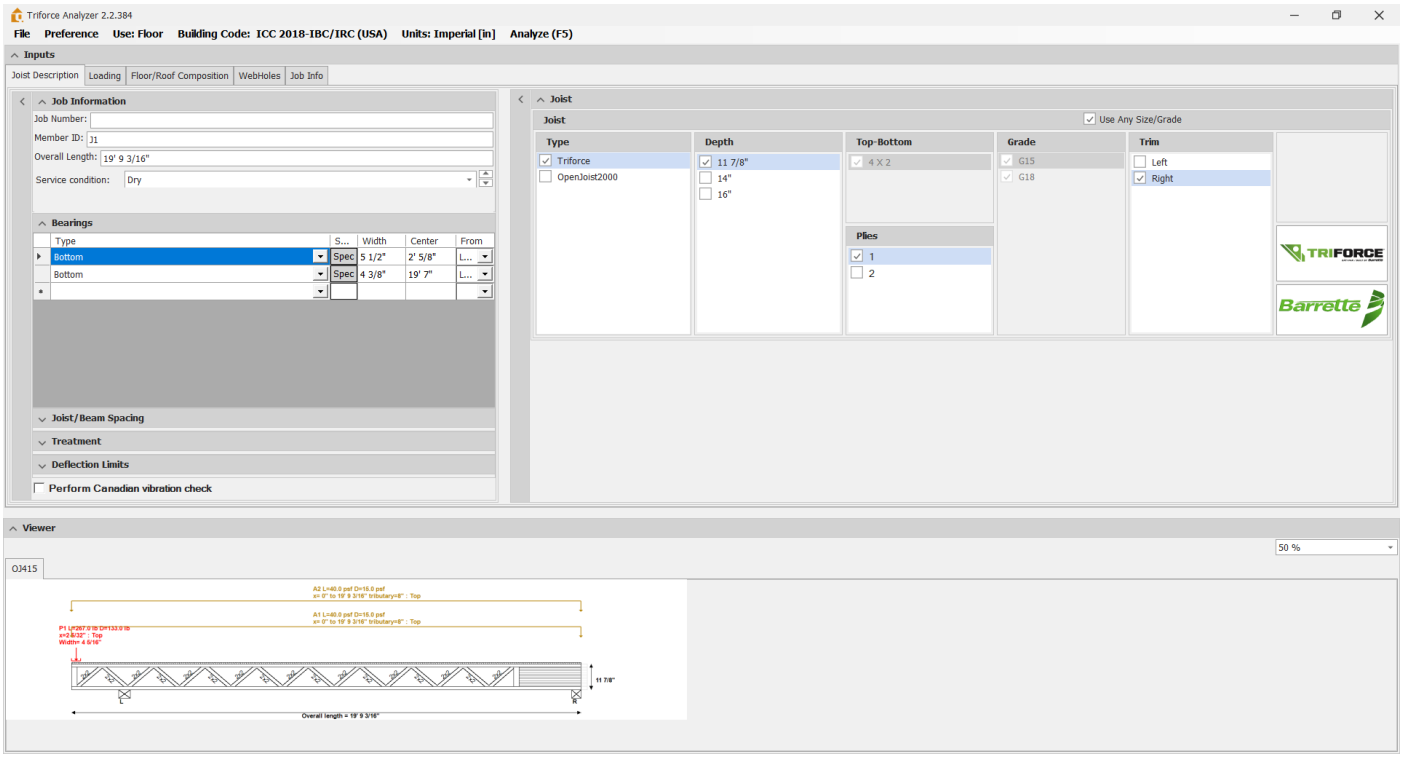
4. Cantilevers and perpendicular line load without reinforcement

4.1) Cantilevers without reinforcement

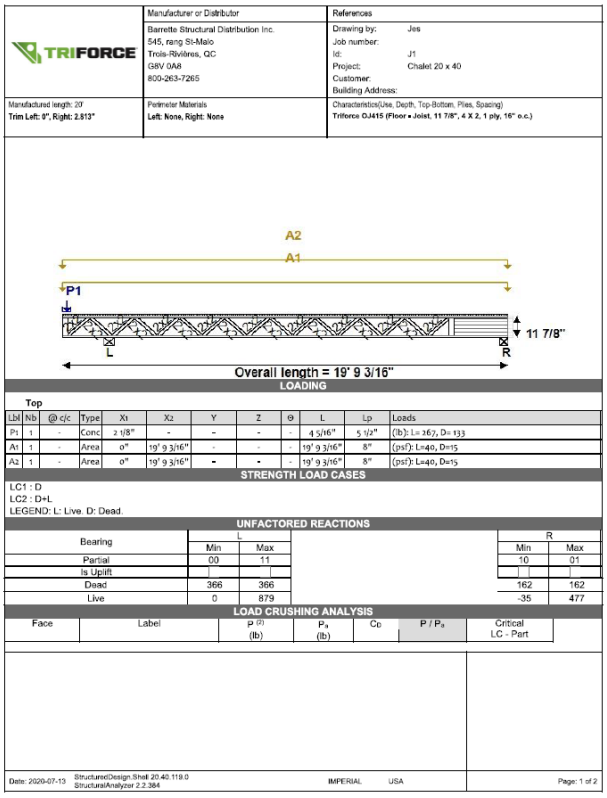
Another update: reinforcement is ***not*** required on certain conditions for cantilevered joists. When bearing the joist on the junctions of diagonals and the bottom chord, depending on the size of the loads (width), reinforcement may not be required.

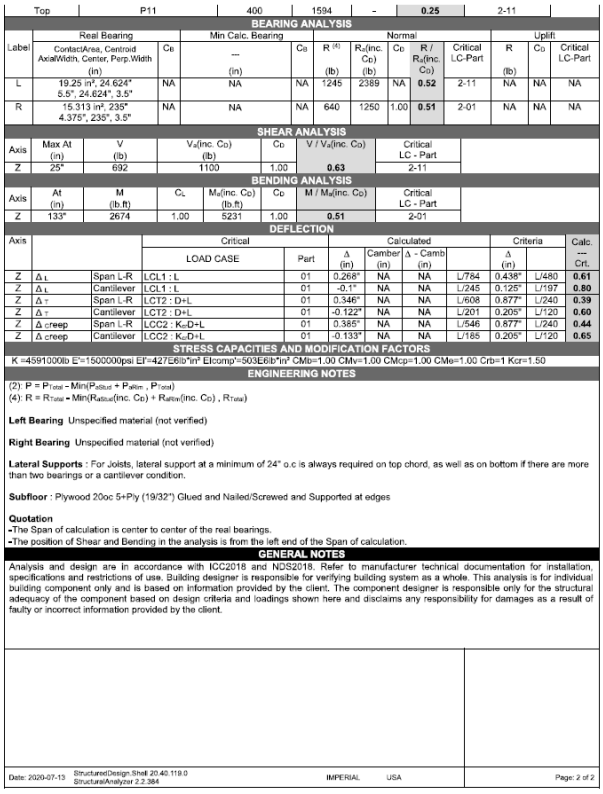
<u>EXAMPLE WITH A BEARING AT JUNCTION:</u>
In this example, a single ply joist 2x3 OJ315 14" space at 16" o.c. with a line load of 300 plf from the left with a 2 feet cantilever:





In this example reinforcement won't be needed:





Since no reinforcement is required, simply send the joist design report without any particular framing detail.

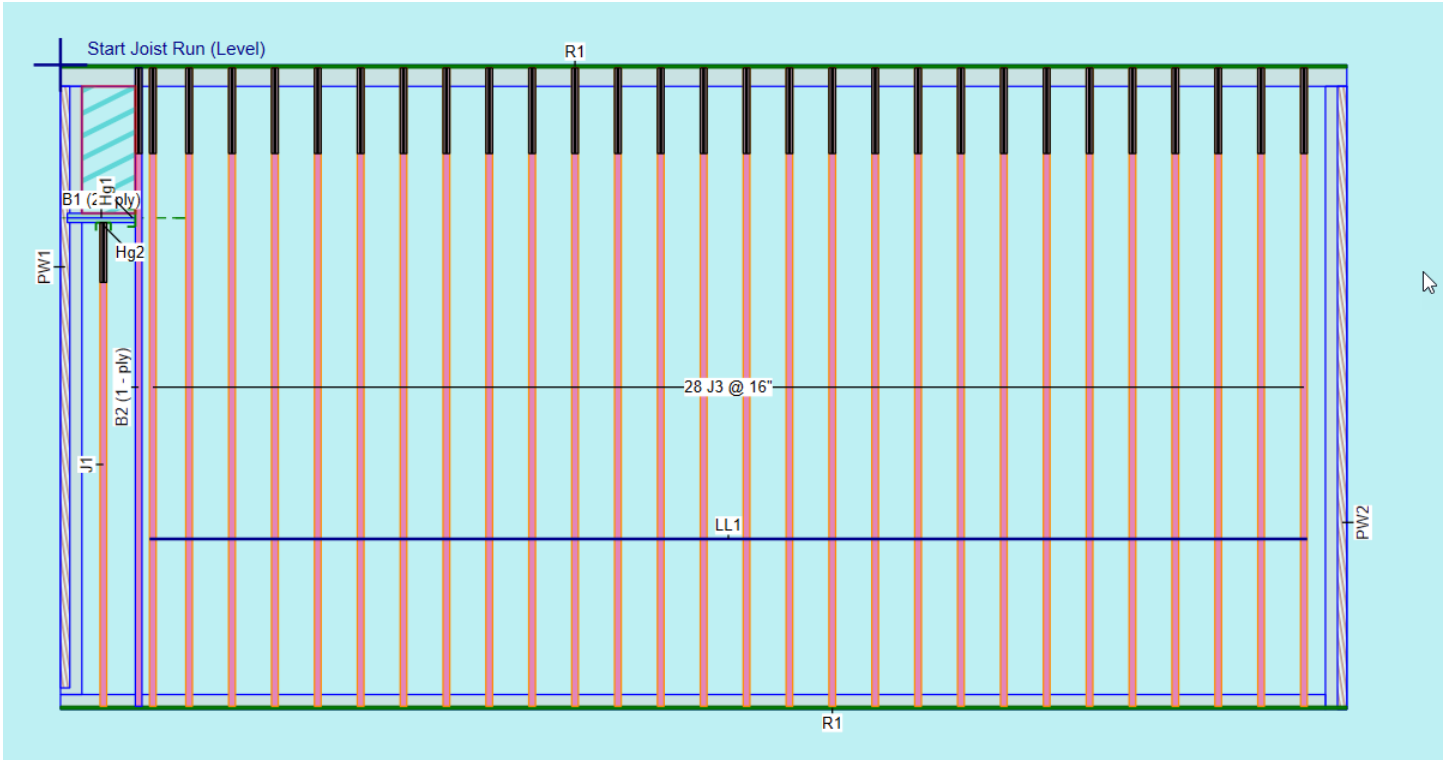
Please take note that all line loads in isPlan® are transfer in point loads to Analyzer

4.2) Line Load or Top Point Load without reinforcement

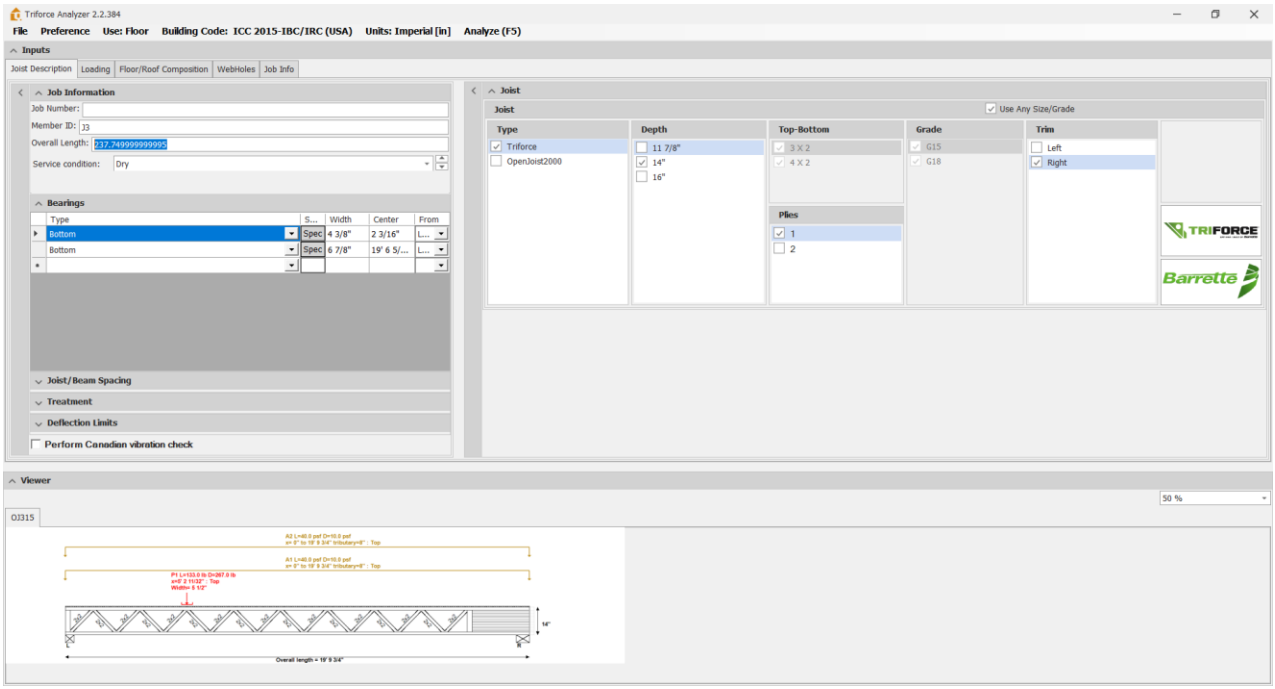
Another update is that reinforcement is ***not*** required on certain conditions for Top applied Line Loads. When applying line loads to the top of the joist (ex: perpendicular bearing wall setting on top of the floor like in attic rooms or column on top), depending on the size of the load (width) and on its location, you may no longer need reinforcement if the line load sits on the junction of the diagonals and the top chord.

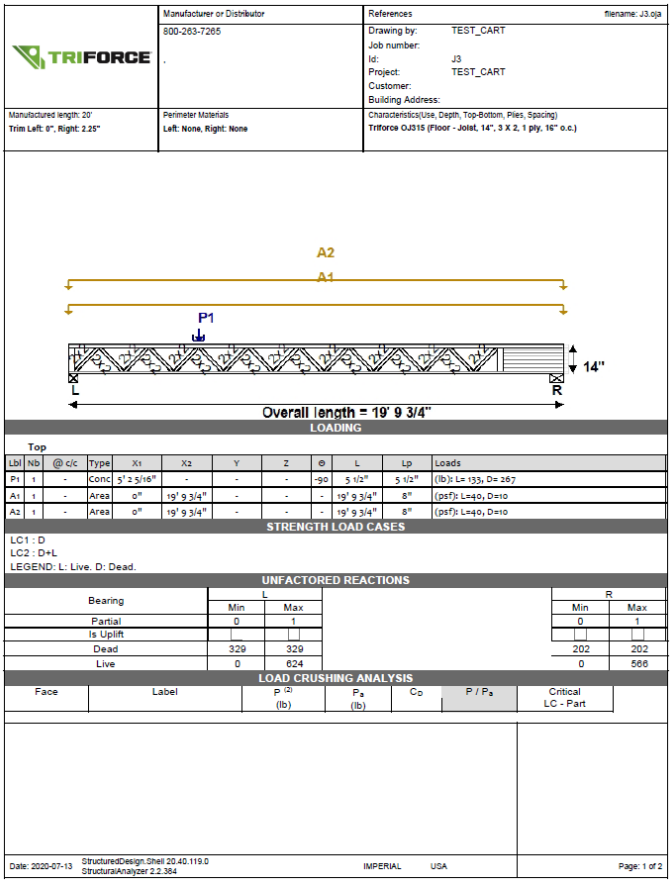
EXAMPLE WITH A TOP LINE LOAD

In this example, a single ply joist 2x3 OJ314 14" space at 16" o.c. with a line load of 300 plf. add to the top at 5'-2'' from the left:



With this update, TRIFORCE® Analyzer optimizes the load transfer trough the webs going downward to the bottom chord more efficiently than ever. Take note that iStruct® will convert your line loads to a point loads applied to the top.





TRIFORCE

Manufacturer or Distributor	References	filename: J3.oja
800-263-7265	Drawing by: TEST_CART Job number: Id: J3 Project: TEST_CART Customer: Building Address:	
Manufactured length: 20' **Trim Left: 0", Right: 2.25"**	Perimeter Materials **Left: None, Right: None**	Characteristics(Use, Depth, Top-Bottom, Plies, Spacing) **Triforce OJ315 (Floor - Joist, 14", 3 X 2, 1 ply, 16" o.c.)**

LOADING

Top

Lbl	Nb	@ c/c	Type	X1	X2	Y	Z	Θ	L	Lp	Loads
P1	1	-	Conc	5' 2 5/16"	-	-	-	-90	5 1/2"	5 1/2"	(lb): L= 133, D= 267
A1	1	-	Area	0"	19' 9 3/4"	-	-	-	19' 9 3/4"	8"	(psf): L=40, D=10
A2	1	-	Area	0"	19' 9 3/4"	-	-	-	19' 9 3/4"	8"	(psf): L=40, D=10

STRENGTH LOAD CASES

LC1 : D
LC2 : D+L
LEGEND: L: Live. D: Dead.

UNFACTORED REACTIONS

Bearing	L		R	
	Min	Max	Min	Max
Partial	0	1	0	1
Is Uplift				
Dead	329	329	202	202
Live	0	624	0	566

LOAD CRUSHING ANALYSIS

Face	Label	P (2) (lb)	Pa (lb)	Cb	P / Pa	Critical LC - Part

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Top	P11	400	2122	-	0.19	2-1

BEARING ANALYSIS

Label	Real Bearing: ContactArea, Centroid AxialWidth, Center, Perp.Width (in)	Cb	Min Calc. Bearing (in)	Cb	Normal: R (4) (lb)	Ra(inc. Cb) (lb)	Cb	R / Ra(inc. Cb)	Critical LC-Part	Uplift: R (lb)	Cb	Critical LC-Part
L	10.938 in², 2.188" 4.375", 2.188", 2.5"	NA	NA	NA	953	2456	NA	0.39	2-1	NA	NA	NA
R	17.188 in², 234.313" 6.875", 234.312", 2.5"	NA	NA	NA	768	1420	1.00	0.54	2-1	NA	NA	NA

SHEAR ANALYSIS

Axis	Max At (in)	V (lb)	Va(inc. Cb) (lb)	Cb	V / Va(inc. Cb)	Critical LC - Part
Z	14.188"	874	1240	1.00	0.71	2-1

BENDING ANALYSIS

Axis	At (in)	M (lb.ft)	CL	Ma(inc. Cb) (lb.ft)	Cb	M / Ma(inc. Cb)	Critical LC - Part
Z	99.188"	4201	1.00	4420	1.00	0.95	2-1

DEFLECTION

Axis			Critical: LOAD CASE	Part	Calculated: Δ (in)	Camber (in)	Δ - Camb (in)		Criteria: Δ (in)		Calc. --- Crt.
Z	Δ L	Span L-R	LCL1 : L	1	0.437"	NA	NA	L/532	0.484"	L/480	0.90
Z	Δ T	Span L-R	LCT2 : D+L	1	0.644"	NA	NA	L/360	0.967"	L/240	0.67
Z	Δ creep	Span L-R	LCC2 : K_{cr}D+L	1	0.748"	NA	NA	L/310	0.967"	L/240	0.77

STRESS CAPACITIES AND MODIFICATION FACTORS

K =4616000lb E'=1500000psi El'=442E6lb*in² Elcomp'=511E6lb*in² CMb=1.00 CMv=1.00 CMcp=1.00 CMe=1.00 Crb=1 Kcr=1.50

ENGINEERING NOTES

(2): P = P_{Total} - Min(P_{aStud} + P_{aRim} , P_{Total})
(4): R = R_{Total} - Min(R_{aStud}(inc. Cb) + R_{aRim}(inc. Cb) , R_{Total})

Left Bearing Unspecified material (not verified)

Right Bearing Unspecified material (not verified)

Lateral Supports : For Joists, lateral support at a minimum of 16" o.c is always required on top chord, as well as on bottom if there are more than two bearings or a cantilever condition.

Subfloor : OSB 20oc (19/32") Glued and Nailed/Screwed and Supported at edges

Quotation
-The Span of calculation is center to center of the real bearings.
-The position of Shear and Bending in the analysis is from the left end of the Span of calculation.

GENERAL NOTES

Analysis and design are in accordance with ICC2015 and NDS2015. Refer to manufacturer technical documentation for installation, specifications and restrictions of use. Building designer is responsible for verifying building system as a whole. This analysis is for individual building component only and is based on information provided by the client. The component designer is responsible only for the structural adequacy of the component based on design criteria and loadings shown here and disclaims any responsibility for damages as a result of faulty or incorrect information provided by the client.

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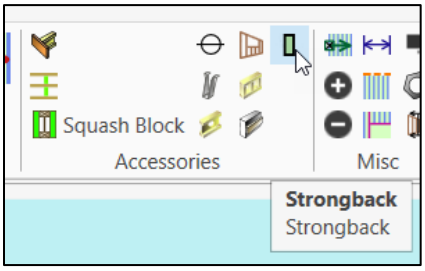
No specific detail is needed, simply send the joist design report to costumers.
Please take note that all line load in isPlan® is transfer in point load to Analyzer

NOTE: Using top mount hanger for a header fixed to the side of the joist must not be applied as Top Concentrated load but front or back as per example 5.1 or 5.2

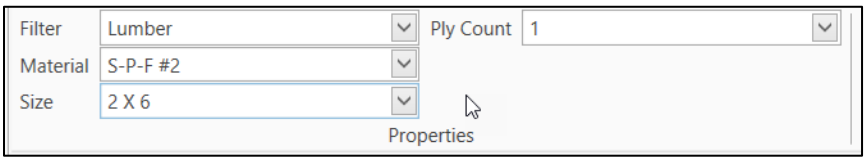
5. Usage of Stongbacks in TRIFORCE® floor system:

5.1) You can add strongbacks in your placement guide using these simple steps:

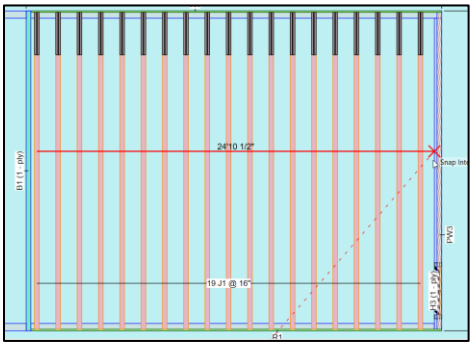
First, you need to click on the Stongback icon:



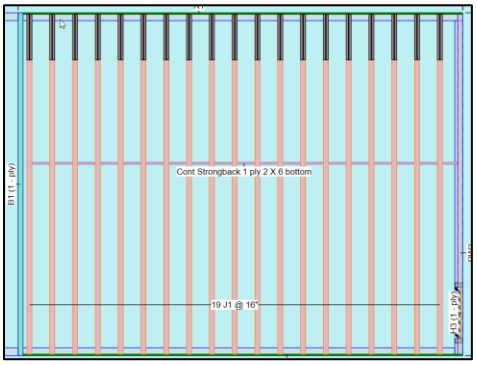
Select your strongback properties:



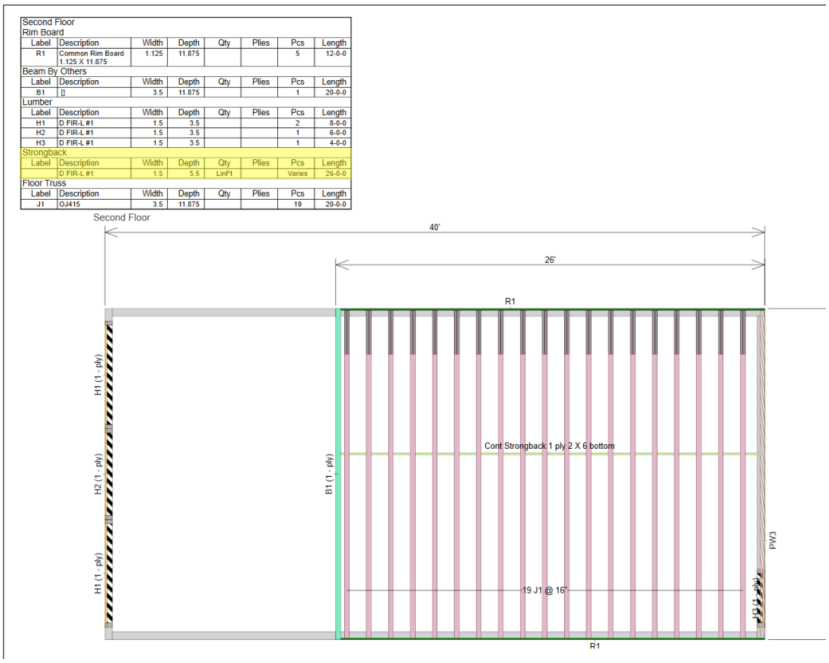
Click on your placement guide and drag up to where you want your strongback:



They will be identified after running an analysis.



These strongbacks can be added in your material list in total linear footage:



Second Floor

Rim Board

Label	Description	Width	Depth	Qty	Plies	Pcs	Length
R1	Common Rim Board 1.125 X 11.875	1.125	11.875			5	12-0-0

Beam By Others

Label	Description	Width	Depth	Qty	Plies	Pcs	Length
B1	[]	3.5	11.875			1	20-0-0

Lumber

Label	Description	Width	Depth	Qty	Plies	Pcs	Length
H1	D FIR-L #1	1.5	3.5			2	8-0-0
H2	D FIR-L #1	1.5	3.5			1	6-0-0
H3	D FIR-L #1	1.5	3.5			1	4-0-0

Strongback

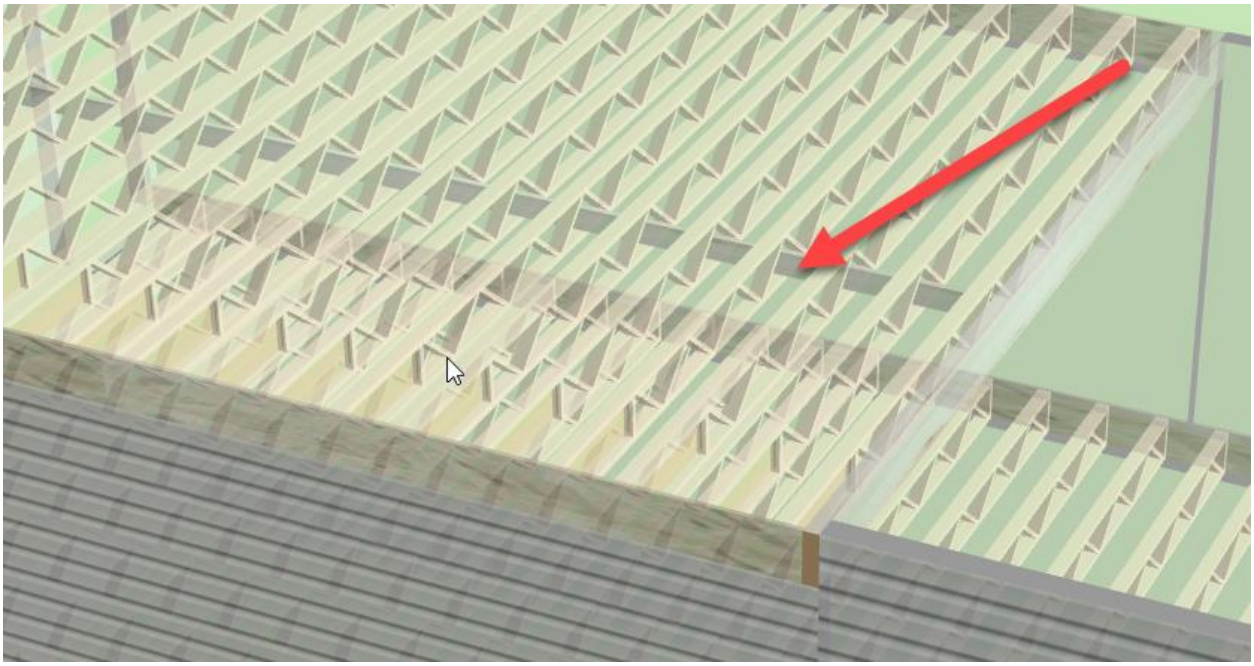
Label	Description	Width	Depth	Qty	Plies	Pcs	Length
	D FIR-L #1	1.5	5.5	LinFt		Varies	26-0-0

Floor Truss

Label	Description	Width	Depth	Qty	Plies	Pcs	Length
J1	OJ415	3.5	11.875			19	20-0-0

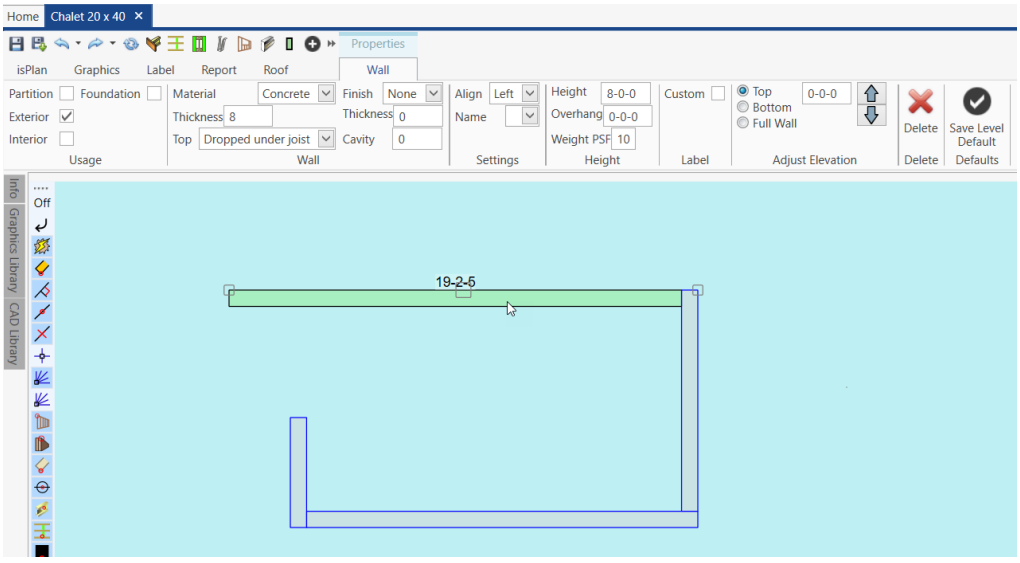
5.2) Strongbacks bug fix:

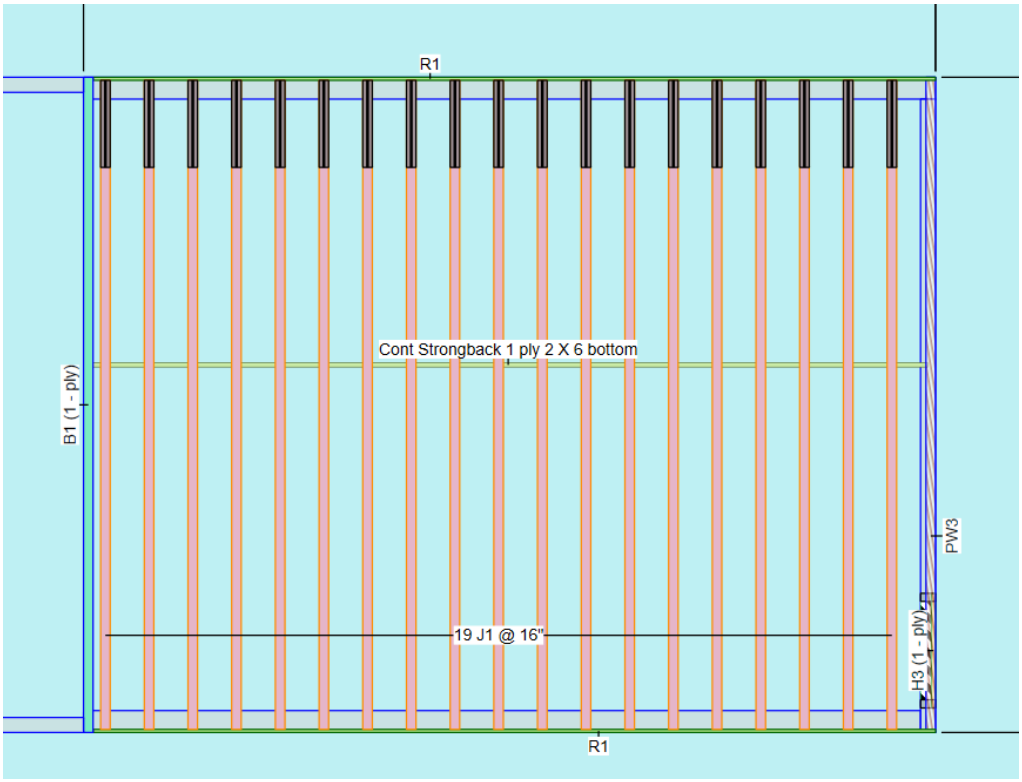
On last floor, strongbacks were appearing outside the floor in the previous version, but now appear correctly inside the floor:



6. Technical advice for drawing TRIFORCE® joists in isPlan®

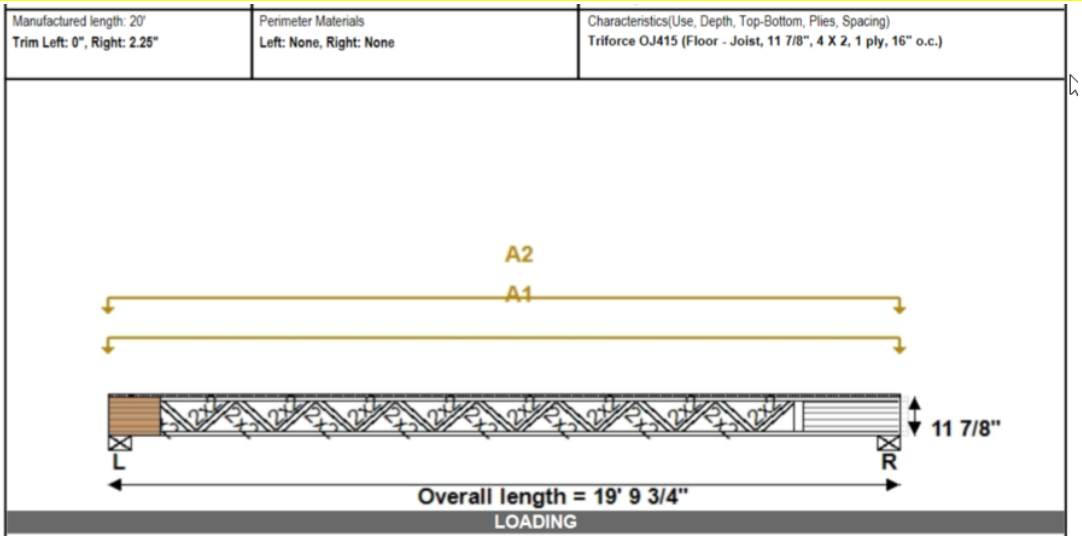
When designing the foundation, be careful with the assumption of the bearing.
Using an 8" concrete wall could send the wrong information to Analyzer:





isPlan® will send the information to Analyzer that there is 8" of bearing minus the rimboard, so 8" – 1 1/8" = 6 7/8" of bearing for the joist. This will add you some reinforcement on the side of the vertical 2x3.

In the case of a 2x6 sill plate, you would need to draw a 5 ½" wood wall to send the right information for the bearing size.

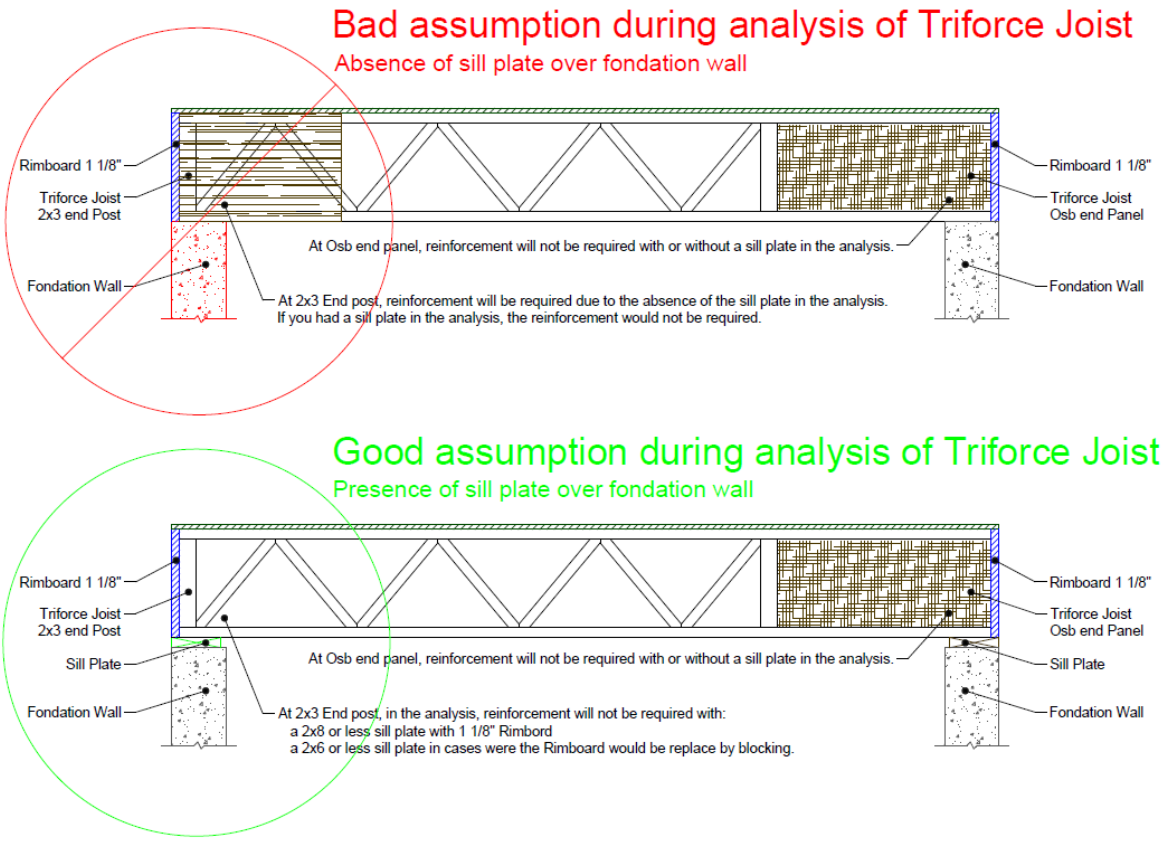


BEARING ANALYSIS

Label	Real Bearing Center, Width, Perp Width (in)	C_B	Min Calc. Bearing Center, Width (in)	C_B	Normal R (lb)	Normal R_a (lb)	Normal C_D	Normal R / ($R_a C_D$)	Normal Critical LC-Part	Uplift R (lb)	Uplift C_D	Uplift Critical LC-Part
L	3.438", 6.875", 3.5"	1.00	NA, NA	NA	726	2490	NA	**0.29**	2-1	NA	NA	NA
R	234.312", 6.875", 3.5"	1.00	NA, NA	NA	726	1250	1.00	**0.58**	2-1	NA	NA	NA

SHEAR ANALYSIS

Here's a quick graphic explanation:


Bad assumption during analysis of Triforce Joist
Absence of sill plate over fondation wall
Rimboard 1 1/8"
Triforce Joist
2x3 end Post
Fondation Wall
At Osb end panel, reinforcement will not be required with or without a sill plate in the analysis.
At 2x3 End post, reinforcement will be required due to the absence of the sill plate in the analysis.
If you had a sill plate in the analysis, the reinforcement would not be required.
Rimboard 1 1/8"
Triforce Joist
Osb end Panel
Fondation Wall
Good assumption during analysis of Triforce Joist
Presence of sill plate over fondation wall
Rimboard 1 1/8"
Triforce Joist
2x3 end Post
Sill Plate
Fondation Wall
At Osb end panel, reinforcement will not be required with or without a sill plate in the analysis.
At 2x3 End post, in the analysis, reinforcement will not be required with:
a 2x8 or less sill plate with 1 1/8" Rimbord
a 2x6 or less sill plate in cases were the Rimboard would be replace by blocking.
Rimboard 1 1/8"
Triforce Joist
Osb end Panel
Sill Plate
Fondation Wall