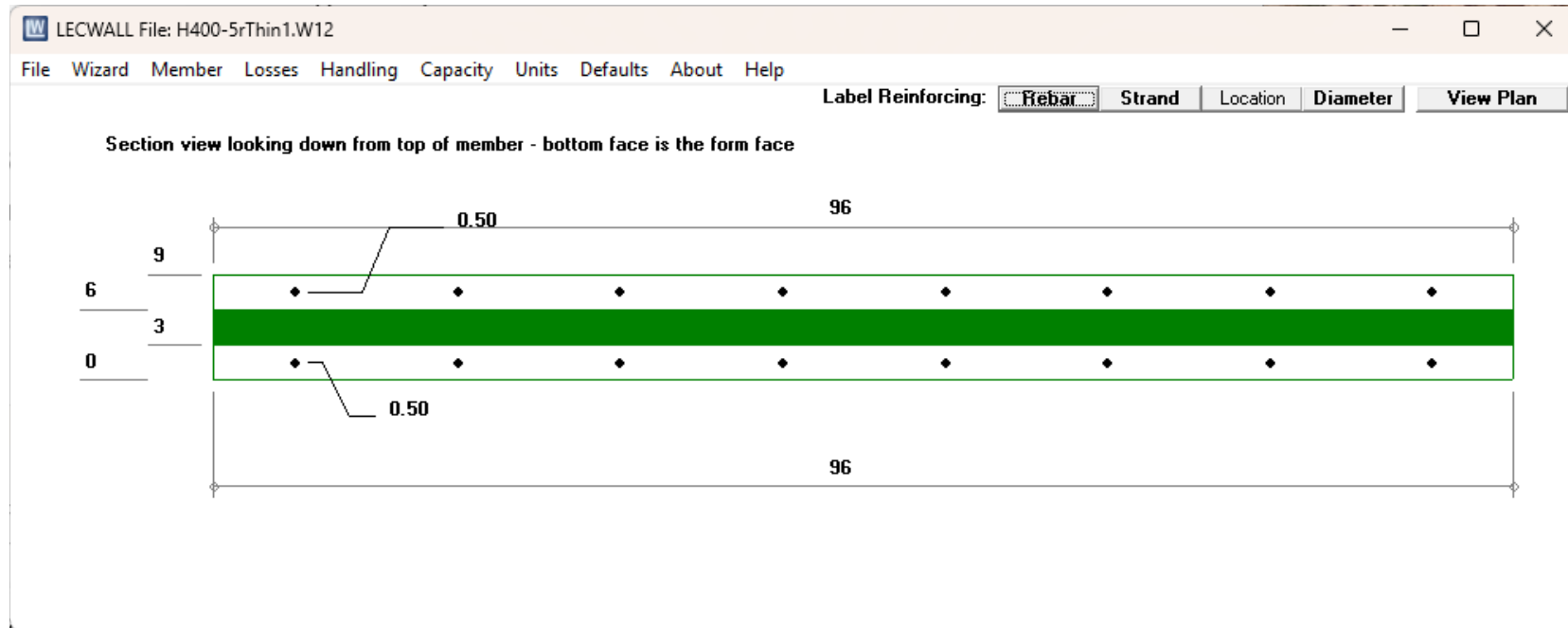


## LECWall Design Example Using Continuous Truss-Type Connectors:

2026-03-24

There are some special considerations when using LECWall to analyze continuous connectors, as opposed to discrete connectors. Layout can also be more complicated when the connectors have a fixed length. The Thin-Wall Nu-Tie, for example, is 45" long and is set at a 48" modular spacing. LECWall divides this connector into three 16" segments, for reasons which will be discussed.

For this example, a 3-3-3 panel 400" long and 96" wide with #4 bars at 12" O.C. in each wythe will use 3 rows of Thin-Wall trusses:



Since the trusses are more effective near the member ends, an additional truss will be provided at each end. Owing to the way connectors are input to LECWall, the first three rows each have an input for an additional connector ( $16" \times 3 = 48"$ ). If the connectors were spaced at 48" longitudinally (instead of 16") then the minimum panel length that could be analyzed would be 24' (288"). The program has to accommodate a wide variety of connector types, mostly discrete. For this reason, the truss is divided into three segments, even though each truss has 4 legs. Therefore, the displayed connector force and slip limits would apply to  $4/3$  of a truss leg. Newer versions of LECWall (12.6.1c onward) now display the total number of 48" trusses as confirmation, in this case there are 27:

**Partial Composite Wythe Connector Properties:**

Member height, in:

\*Number of connectors per lateral row:

\*Additional connectors in first row:

\*Additional connectors in second row:

\*Additional connectors in third row:

(\*Fractional number of connectors allowed)

Longitudinal connector row spacing, in:

**Manufacturer Plug-ins:**

Connector force at elastic limit, Fe, k:

Connector force at ultimate limit, Fu, k:

Connector elastic limit, DeltaE, in:

Connector inelastic limit, DeltaU, in:

Connector elastic stiffness, Ke, k/in:

Connector inelastic stiffness, Kie, k/in:

Connector Phi for ultimate limit:

**Connector/Insulation Type:**

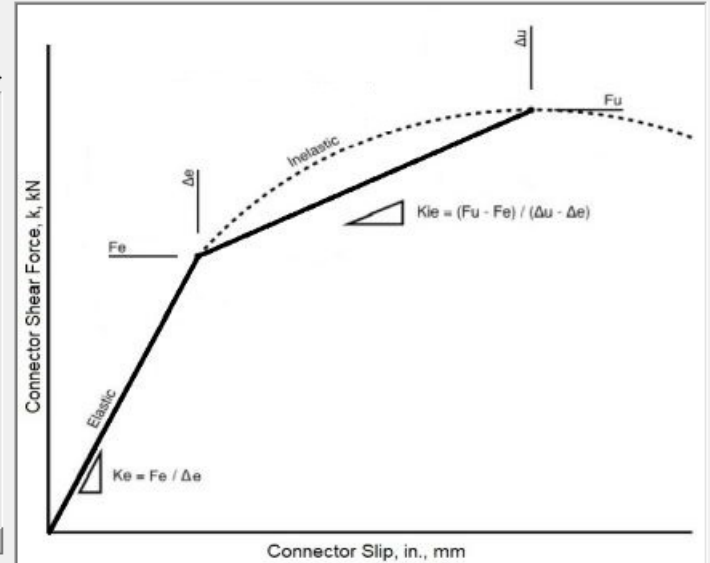
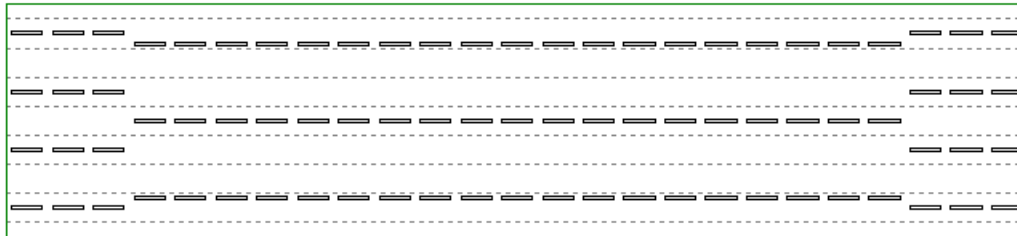
Primary:

**Notes:**

<--- Panel Top

Panel Bottom --->

Member Height =400.00 in. Width =96.00 in. (Select Advanced Layout to edit row-by-row.)



If checked, end solid zones are counted on where possible to provide composite action for ultimate strength.


Tension force from reinforcement, k:

Maximum % Composite Equivalent:

Ultimate:  Suction %  
Bottom  Pressure %

Advanced Layout

Total no. of trusses at 48 in. spacing:

**?** 

Connector force at elastic limit,  $F_e$ , k:

Connector force at ultimate limit,  $F_u$ , k:

Connector elastic limit,  $\Delta E$ , in:

Connector inelastic limit,  $\Delta U$ , in:

Connector elastic stiffness,  $K_e$ , k/in:

Connector inelastic stiffness,  $K_{ie}$ , k/in:

Connector Phi for ultimate limit:

**Connector/Insulation Type:**

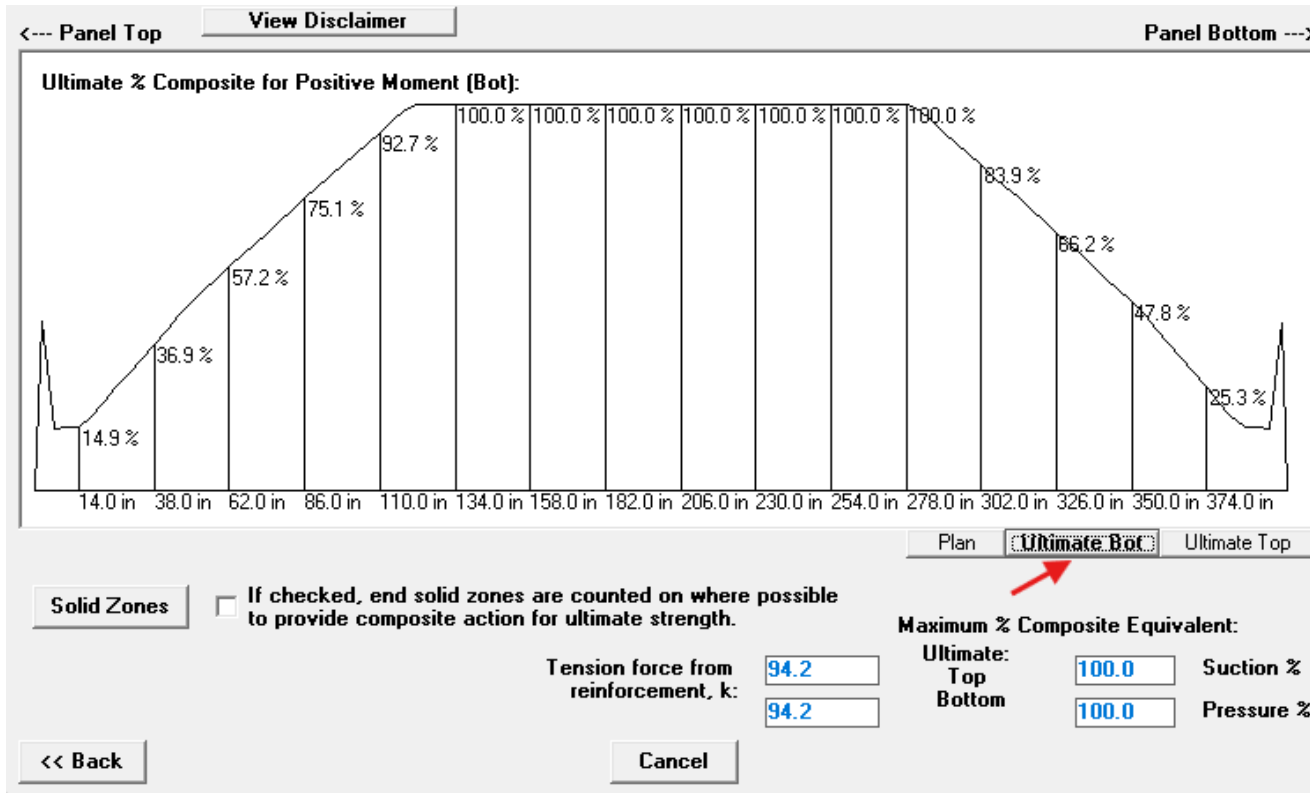
Primary:

H400-5rThin1.W12

Thin-Wall values are divided by 3 for a 16 in. spacing of a 48 in. truss.  
Press F1 and select 'Partial Composite Calculator' from the Table of Contents for help on this section.

OK

Clicking 'Ultimate Bot' (or Top), we find that most of the panel has 100% composite action for ultimate strength:



Note however that there are 25 rows across, which means we have an extra 16” segment of truss. To get rid of that, we can use “Advanced Layout”. This option is toward the lower-right of the Connectors window:

**Row-by-Row Connector Layout Control:**

Row # 1                      # of connectors in row = 4

Distance from panel top = 8.0                      Primary Secondary Solid

Connector type:

**Advanced Layout!**                     

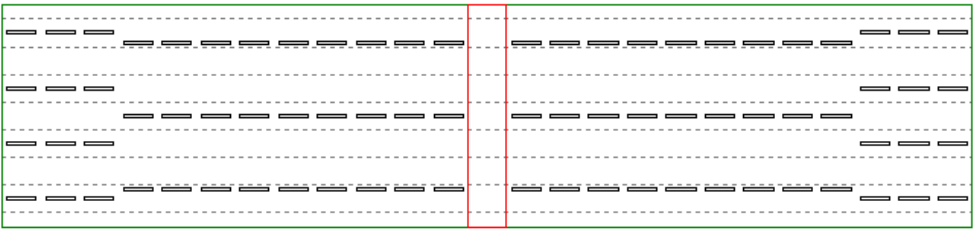
Total no. of trusses at 48 in. spacing: 27

Since the trusses are least effective near midspan, and for symmetry, the extra row will be taken from that region:

<--- Panel Top                                            Panel Bottom --->

Member Height =400.00 in. Width =96.00 in. Click on a connector row to edit (or use slider):



   If checked, end solid zones are counted on where possible to provide composite action for ultimate strength.

Tension force from reinforcement, k: 94.2                      Ultimate: Top 100.0                      Suction %

94.2                      Bottom 100.0                      Pressure %

**Row-by-Row Connector Layout Control:**

Row # 13                      # of connectors in row = 0

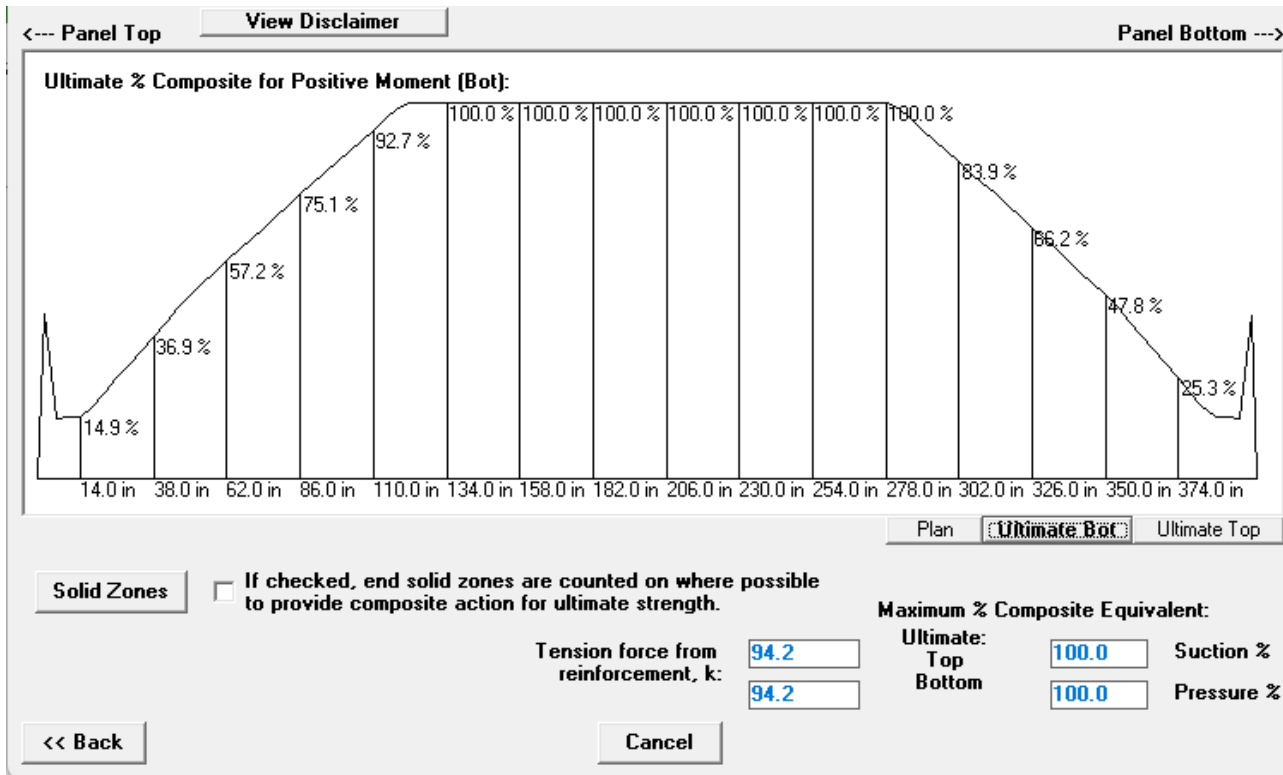
Distance from panel top = 200.0                      Primary Secondary Solid

Connector type:

**Advanced Layout**                     

Total no. of trusses at 48 in. spacing: 26

Rechecking the capacity finds that there's no impact from removing the extra row:



As noted above, the example is reinforced longitudinally with #4 bars at 12" O.C. in each wythe. Heavier reinforcing would reduce the percentage of composite action accordingly.

## Example with Window Opening:

Here is a variation with a 48" wide cutout for a window centered laterally in the panel:

**Partial Composite Wytke Connector Properties:** ?

Member height, in:	<input type="text" value="400.00"/>	Connector force at elastic limit, Fe, k:	<input type="text" value="3.14"/>
*Number of connectors per lateral row:	<input type="text" value="3"/>	Connector force at ultimate limit, Fu, k:	<input type="text" value="6.27"/>
*Additional connectors in first row:	<input type="text" value="1"/>	Connector elastic limit, DeltaE, in:	<input type="text" value="0.01300"/>
*Additional connectors in second row:	<input type="text" value="1"/>	Connector inelastic limit, DeltaU, in:	<input type="text" value="0.10100"/>
*Additional connectors in third row:	<input type="text" value="1"/>	Connector elastic stiffness, Ke, k/in:	<input type="text" value="241.28"/>
(*Fractional number of connectors allowed)		Connector inelastic stiffness, Kie, k/in:	<input type="text" value="35.57"/>
Longitudinal connector row spacing, in:	<input type="text" value="16.00"/>	Connector Phi for ultimate limit:	<input type="text" value="0.75"/>

**Manufacturer Plug-ins:**

Thin-Wall

**Connector/Insulation Type:**

Primary:

<--- Panel Top

The standard layout automatically shifts the trusses to the left and right of the opening. This can be improved using Advanced Layout. Since the opening is near midspan, two truss rows are probably sufficient alongside the opening:

**Partial Composite Wythe Connector Properties:**

Member height, in:

\*Number of connectors per lateral row:

\*Additional connectors in first row:

\*Additional connectors in second row:

\*Additional connectors in third row:

(\*Fractional number of connectors allowed)

Longitudinal connector row spacing, in:

Connector force at elastic limit, Fe, k:

Connector force at ultimate limit, Fu, k:

Connector elastic limit, DeltaE, in:

Connector inelastic limit, DeltaU, in:

Connector elastic stiffness, Ke, k/in:

Connector inelastic stiffness, Kie, k/in:

Connector Phi for ultimate limit:

**Manufacturer Plug-ins:**

**Connector/Insulation Type:**

Primary:

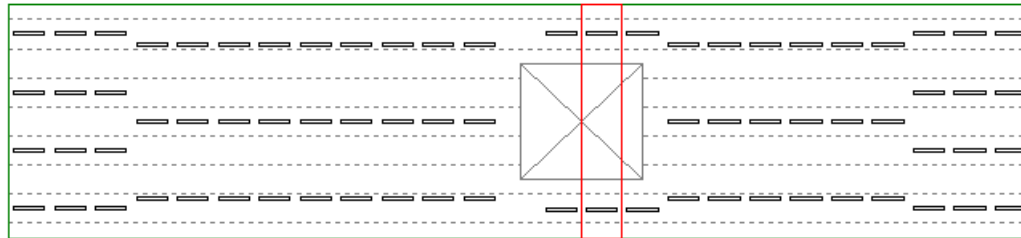
**Notes:**

Connectors are assumed to be relocated to the sides of openings.

<--- Panel Top

Panel Bottom --->

Member Height =400.00 in. Width =96.00 in. Click on a connector row to edit (or use slider):



**Row-by-Row Connector Layout Control:**

Row # 15  # of connectors in row

Distance from panel top = 232.0

Primary Secondary Solid

Connector type:

If checked, end solid zones are counted on where possible to provide composite action for ultimate strength.

**Maximum % Composite Equivalent:**

Tension force from reinforcement, k:

Ultimate:

Top

Bottom

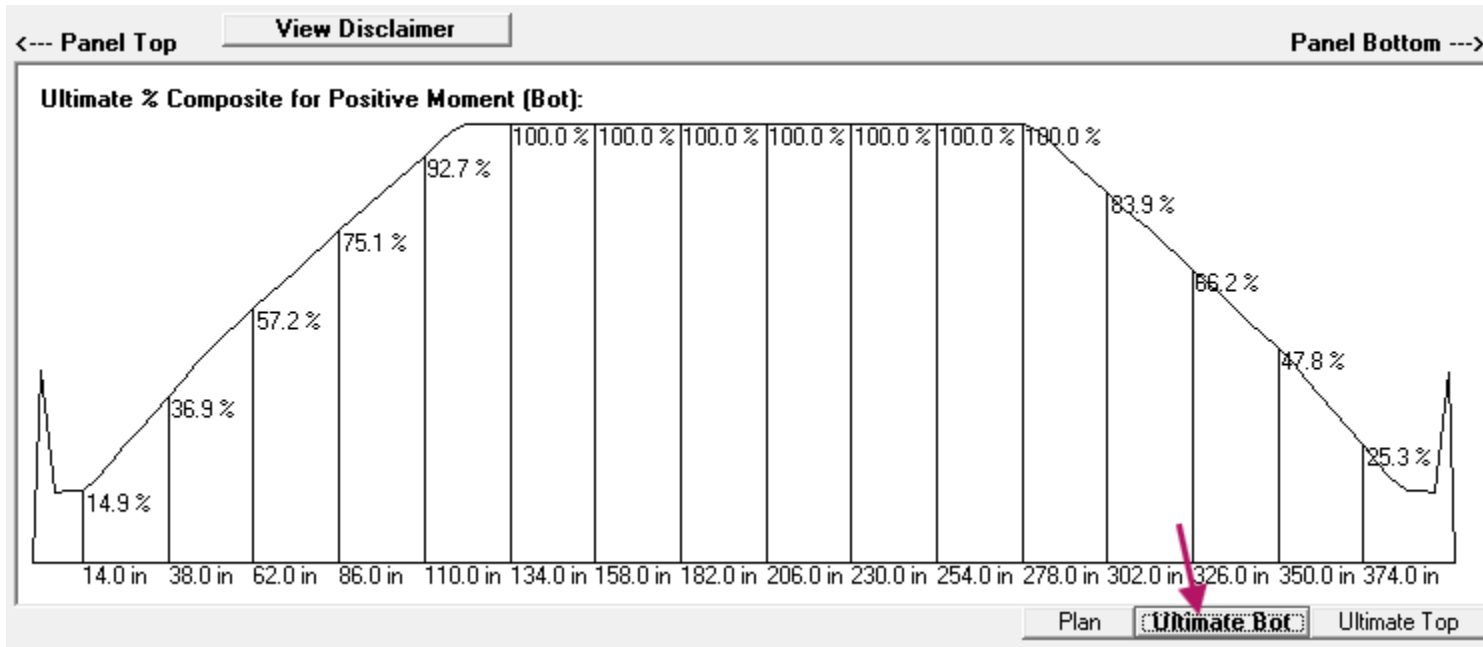
Suction %

Pressure %

Advanced Layout

Total no. of trusses at 48 in. spacing:

Again, removing the extra trusses has no effect on the midspan ultimate capacity because it was already past 100%:



This would be a different story if there was a mid-height panel connection. For that, the % composite check may not be applicable. The beam-spring analysis is relied on instead. Our [Beam-Spring Design Guide](#) covers this in more detail. Extra truss rows near the mid-height connection may be needed.