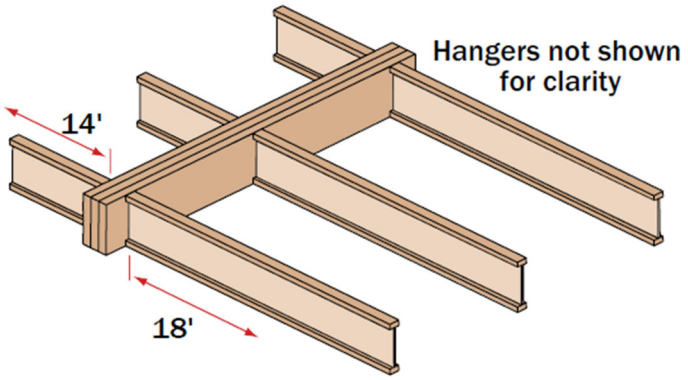
Connecting Multiple-Ply Versa-Lam® LVL Beams

When using multiple ply Versa-Lam® LVL beams to create a wider member, the connection of the plies is as critical as determining the beam size. When side loaded beams are not connected properly, the inside plies do not support their share of the load and thus the load carrying capacity of the full member decreases significantly. The following is an example of how to size and connect a multiple ply Versa-Lam® LVL floor beam.

Given: Beam shown below is supporting residential floor load (40 psf live load, 10 psf dead load) and is spanning 16'-0". Beam depth is limited to 14".



Find: A beam of multiple 1¾" plies of Versa-Lam® LVL that can support the design loads, plus the beam's proper connection schedule.

1. Calculate tributary width and load the beam is supporting:
   14'/2 + 18'/2 = 16 ft tributary width
   Live Load: 40 psf * 16 ft = 640 PLF
   Dead Load: 10 psf x 16 ft = 160 PLF
   Total Load: 640 PLF + 160 PLF = 800 PLF
2. Use PLF table on page 28 of Boise Cascade *Engineered Wood Products Specifier Guide* or BC Calc® software to size the beam:
   A 3-ply Versa-Lam® LVL 2.1E 1¾" x 14" beam will adequately support the calculated design load.
3. Calculate the maximum PLF load from longest side (18' in this case).
   Max. Side Load = (18'/2) x (40 + 10 psf) = 450 PLF
4. See the Side-Loaded Applications table page 27 of Boise Cascade *Engineered Wood Products Specifier Guide* for 1¾" Versa-Lam® LVL, 3 plies.
5. The proper connection schedule must have a capacity greater than the maximum side load:
   Nailed: 3 rows 16d sinkers at 12" o.c:
   525 PLF is greater than 450 PLF OK
   Bolts: ½" diameter 2 rows at 12" staggered:
   755 PLF is greater than 450 PLF OK

Side-Loaded Applications

Number of Members	Maximum Uniform Side Load [plf]							
	Nailed [3]		½" Dia. Through Bolt [1]			⅝" Dia. Through Bolt [1]		
	2 rows 16d Sinkers @ 12" o.c.	3 rows 16d Sinkers @ 12" o.c.	2 rows @ 24" o.c. staggered	2 rows @ 12" o.c. staggered	2 rows @ 6" o.c. staggered	2 rows @ 24" o.c. staggered	2 rows @ 12" o.c. staggered	2 rows @ 6" o.c. staggered
1¾" Versa-Lam® LVL (Depths of 18" and less)								
2	470	705	505	1010	2020	560	1120	2245
3 [2]	350	525	375	755	1515	420	840	1685

Notes:

- Fastener connection analysis for multiple ply Versa-Lam® LVL is also available in BC Calc® software.
- See Boise Cascade technical notes LVL-08, LVL-09, and LVL-16 for information on proprietary self-driving screws.