Large Concentrated Loads on Rim Board (12,000+ lb)

Load development within a structure often results in large, concentrated loads on floor framing from columns or built-up studs. Sufficient support (e.g. rim board or squash blocks) is required for the bottom wall plate and floor sheathing to facilitate transfer of the concentrated loads around the floor framing. Inadequate support may induce crushing of the floor framing.

When design loads exceed the rim board capacity, the designer has several options for transferring the load to prevent failure of the floor framing members, including:

- Specify higher capacity rim board (i.e., vary material type, thickness, and/or quantity).
- Extend post through floor framing cavity.
- Add squash blocks.

This document provides solutions utilizing Weyerhaeuser engineered wood products (EWP) when large, concentrated loads exceed the capacity of typical floor framing support details. When utilizing Weyerhaeuser Javelin® software, squash blocks will be called out if rim board concentrated load capacities are exceeded. The squash blocks (CS Detail) are good for up to a 12,000 lb load. For loads exceeding the 12,000 lb limit, Javelin® will place a hex detail at the location indicating a special design is required. The tables in this document provide supplemental reinforcement solutions for this limitation.

Conditions That May Need Supplemental Reinforcement

Figures 1 through 3 represent typical conditions that may require supplemental reinforcement.

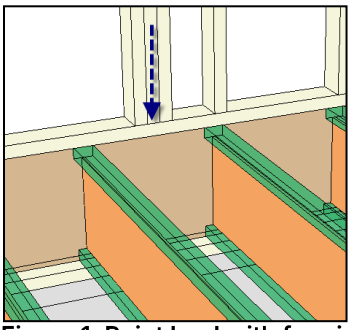


Figure 1: Point load with framing perpendicular to rim board.

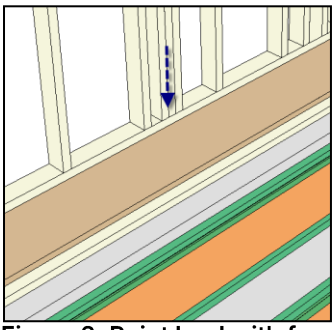


Figure 2: Point load with framing parallel to rim board.

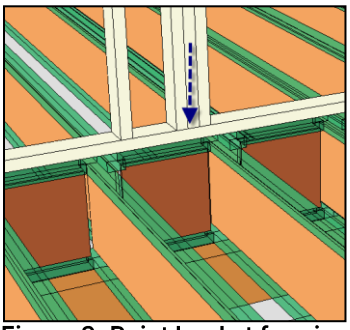


Figure 3: Point load at framing interior support.

Supplemental Reinforcement

The simplest procedure to support large point loads over 12,000 lb is to build up the specified rim board with similar material as shown in Figure 4 and Figure 5. Various built-up rim board assembly options, and capacities, are given in Tables 1 through 3. Supplemental reinforcement must have a minimum length of 12″ and should be placed along the length of the rim board, centered below the concentrated load.

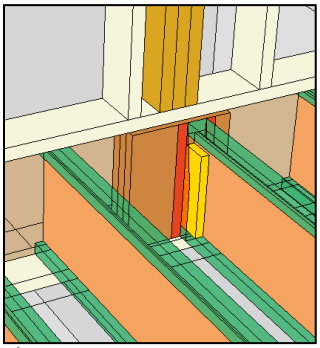


Figure 4: Supplemental reinforcement.

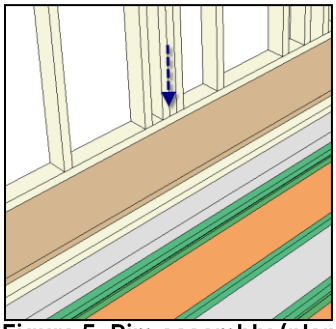


Figure 5: Rim assembly (plan view).

TABLE 1: MAXIMUM COMBINED CONCENTRATED AND UNIFORM LOAD (lb) – 2X6 WALL

9½″ to 11⅞″ Floor Depth

Rim Assembly (Rim + Reinforcement)	Plies	2x6 Wall Plate Species (Supporting Column)							
		HF/SPF				SP/DF/TimberStrand® LSL			
		Column Width				Column Width			
		4.5″	5.25″	7″	9″	4.5″	5.25″	7″	9″
1⅛″ TJ® Rim Board	3	-	-	12,395	12,395	-	-	12,395	12,395
	4	-	-	14,885	16,525	13,165	14,380	16,525	16,525
1¼″ TimberStrand® LSL	3	-	-	13,770	13,770	-	-	13,770	13,770
	4	-	-	14,885	18,360	14,625	15,975	18,360	18,360
1½″ TimberStrand® LSL	3	-	-	14,885	16,525	13,165	14,380	16,525	16,525
3½″ TimberStrand® LSL	1	-	-	12,850	12,850	-	-	12,850	12,850

14″ to 16″ Floor Depth

Rim Assembly (Rim + Reinforcement)	Plies	2x6 Wall Plate Species (Supporting Column)							
		HF/SPF				SP/DF/TimberStrand® LSL			
		Column Width				Column Width			
		4.5″	5.25″	7″	9″	4.5″	5.25″	7″	9″
1⅛″ TJ® Rim Board	4	-	-	13,600	13,600	13,165	13,600	13,600	13,600
1¼″ TimberStrand® LSL	3	-	-	12,750	12,750	-	-	12,750	12,750
	4	-	-	14,885	17,000	14,625	15,975	17,000	17,000
1½″ TimberStrand® LSL	3	-	-	14,885	16,525	13,165	14,380	16,525	16,525
3½″ TimberStrand® LSL	1	-	-	12,850	12,850	-	-	12,850	12,850

18″ Floor Depth

Rim Assembly (Rim + Reinforcement)	Plies	2x6 Wall Plate Species (Supporting Column)							
		HF/SPF				SP/DF/TimberStrand® LSL			
		Column Width				Column Width			
		4.5″	5.25″	7″	9″	4.5″	5.25″	7″	9″
1¼″ TimberStrand® LSL	4	-	-	14,755	14,755	14,625	14,755	14,755	14,755
1½″ TimberStrand® LSL	3	-	-	14,885	16,270	13,165	14,380	16,270	16,270
3½″ TimberStrand® LSL	1	-	-	12,850	12,850	-	-	12,850	12,850

How to use this chart:

1. Add the concentrated load to the total uniform load over the 12″ long reinforcement to determine a combined load.
2. Find the table that matches the thickness of the wall above and the depth of the floor system.
3. Identify the table section that matches the species of the wall plate.
4. Find the appropriate table column that is equal to or less than the column width above the rim assembly.
5. Scan down until the value is equal to or greater than the value determined in (1), and then scan horizontally to determine the rim assembly type.
6. 3½″ thick sections of TimberStrand® LSL reinforcement may be used adjacent to the rim provided the combined width does not exceed the support material. Otherwise, cut rim to accommodate material.

General Notes:

- Bottom plate is a continuous 2x member.
- Assumed plate compression perpendicular to grain values: HF/SPF = 405 psi, SP = 565 psi, DF = 625 psi, 1.3E TimberStrand® LSL = 670 psi, 1.5E TimberStrand® LSL = 750 psi, 1.6E TimberStrand® LSL = 900 psi.
- "-" indicates capacity is less than 12,000 lb.
- The wall framing below the supplemental reinforcement must be an equivalent species and equal to or wider than the wall above.
- Concentrated loads must be tracked to ensure a continuous vertical load path through the entire structure.
- Duration of load increases are not permitted.

TABLE 2: MAXIMUM COMBINED CONCENTRATED AND UNIFORM LOAD (lb) – 2X8 WALL

9½" to 11⅞" Floor Depth

Rim Assembly (Rim + Reinforcement)	Plies	2x8 Wall Plate Species (Supporting Column)							
		HF/SPF				SP/DF/TimberStrand® LSL			
		Column Width				Column Width			
		4.5"	5.25"	7"	9"	4.5"	5.25"	7"	9"
1⅛" TJ® Rim Board	3	-	-	12,395	12,395	-	-	12,395	12,395
	4	13,165	14,380	16,525	16,525	13,165	14,380	16,525	16,525
	5	14,315	15,945	19,845	20,655	16,455	17,970	20,655	20,655
1¼" TimberStrand® LSL	3	-	-	13,770	13,770	-	-	13,770	13,770
	4	14,315	15,945	18,360	18,360	14,625	15,975	18,360	18,360
	5	14,315	15,945	19,845	22,950	18,280	19,970	22,950	22,950
1½" TimberStrand® LSL	3	13,165	14,380	16,525	16,525	13,165	14,380	16,525	16,525
	4	14,315	15,945	19,845	22,030	17,550	19,170	22,030	22,030
3½" TimberStrand® LSL	1	-	-	12,850	12,850	-	-	12,850	12,850
	2	14,315	15,945	19,845	25,705	19,970	22,245	25,705	25,705

14" to 16" Floor Depth

Rim Assembly (Rim + Reinforcement)	Plies	2x8 Wall Plate Species (Supporting Column)							
		HF/SPF				SP/DF/TimberStrand® LSL			
		Column Width				Column Width			
		4.5"	5.25"	7"	9"	4.5"	5.25"	7"	9"
1⅛" TJ® Rim Board	4	13,165	13,600	13,600	13,600	13,165	13,600	13,600	13,600
	5	14,315	15,945	17,000	17,000	16,455	17,000	17,000	17,000
1¼" TimberStrand® LSL	3	-	-	12,750	12,750	-	-	12,750	12,750
	4	14,315	15,945	17,000	17,000	14,625	15,975	17,000	17,000
	5	14,315	15,945	19,845	21,250	18,280	19,970	21,250	21,250
1½" TimberStrand® LSL	3	13,165	14,380	16,525	16,525	13,165	14,380	16,525	16,525
	4	14,315	15,945	19,845	22,030	17,550	19,170	22,030	22,030
3½" TimberStrand® LSL	1	-	-	12,850	12,850	-	-	12,850	12,850
	2	14,315	15,945	19,845	25,705	19,970	22,245	25,705	25,705

How to use this chart:

1. Add the concentrated load to the total uniform load over the 12" long reinforcement to determine a combined load.
2. Find the table that matches the thickness of the wall above and the depth of the floor system.
3. Identify the table section that matches the species of the wall plate.
4. Find the appropriate table column that is equal to or less than the column width above the rim assembly.
5. Scan down until the value is equal to or greater than the value determined in (1), and then scan horizontally to determine the rim assembly type.
6. 3½" thick sections of TimberStrand® LSL reinforcement may be used adjacent to the rim provided the combined width does not exceed the support material. Otherwise, cut rim to accommodate material.

General Notes:

- Bottom plate is a continuous 2x member.
- Assumed plate compression perpendicular to grain values: HF/SPF = 405 psi, SP = 565 psi, DF = 625 psi, 1.3E TimberStrand® LSL = 670 psi, 1.5E TimberStrand® LSL = 750 psi, 1.6E TimberStrand® LSL = 900 psi.
- "-" indicates capacity is less than 12,000 lb.
- The wall framing below the supplemental reinforcement must be an equivalent species and equal to or wider than the wall above.
- Concentrated loads must be tracked to ensure a continuous vertical load path through the entire structure.
- Duration of load increases are not permitted.

TABLE 2 (CONTINUED): MAXIMUM COMBINED CONCENTRATED AND UNIFORM LOAD (lb) – 2X8 WALL

18″ Floor Depth

Rim Assembly (Rim + Reinforcement)	Plies	2x8 Wall Plate Species (Supporting Column)							
		HF/SPF				SP/DF/TimberStrand® LSL			
		Column Width				Column Width			
		4.5″	5.25″	7″	9″	4.5″	5.25″	7″	9″
1¼″ TimberStrand® LSL	4	14,315	15,945	18,360	18,360	14,625	15,975	18,360	18,360
	5	14,315	15,945	19,845	22,950	18,280	19,970	22,950	22,950
1½″ TimberStrand® LSL	3	13,165	14,380	16,525	16,525	13,165	14,380	16,525	16,525
	4	14,315	15,945	19,845	22,030	17,550	19,170	22,030	22,030
3½″ TimberStrand® LSL	1	-	-	12,850	12,850	-	-	12,850	12,850
	2	14,315	15,945	19,845	25,705	19,970	22,245	25,705	25,705

How to use this chart:

1. Add the concentrated load to the total uniform load over the 12″ long reinforcement to determine a combined load.
2. Find the table that matches the thickness of the wall above and the depth of the floor system.
3. Identify the table section that matches the species of the wall plate.
4. Find the appropriate table column that is equal to or less than the column width above the rim assembly.
5. Scan down until the value is equal to or greater than the value determined in (1), and then scan horizontally to determine the rim assembly type.
6. 3½″ thick sections of TimberStrand® LSL reinforcement may be used adjacent to the rim provided the combined width does not exceed the support material. Otherwise, cut rim to accommodate material.

General Notes:

- Bottom plate is a continuous 2x member.
- Assumed plate compression perpendicular to grain values: HF/SPF = 405 psi, SP = 565 psi, DF = 625 psi, 1.3E TimberStrand® LSL = 670 psi, 1.5E TimberStrand® LSL = 750 psi, 1.6E TimberStrand® LSL = 900 psi.
- "-" indicates capacity is less than 12,000 lb.
- The wall framing below the supplemental reinforcement must be an equivalent species and equal to or wider than the wall above.
- Concentrated loads must be tracked to ensure a continuous vertical load path through the entire structure.
- Duration of load increases are not permitted.

Perpendicular Floor Framing at Supplemental Reinforcement

If perpendicular floor framing is present at the location of supplemental reinforcement, additional checks are required:

- Verify the floor framing member will have sufficient bearing after installation of supplemental reinforcement.
- If the member does not have sufficient bearing, a hanger will be required.
  - **Note:** The reaction of the floor framing member must also be included in the combined axial load plus 12″ of uniform load when selecting the rim assembly.

Connections

Connect each ply of reinforcement to the other as follows:

- **1⅛″ TJ® Rim Board, 1¼″ TimberStrand® LSL:** Six (6) 6d (0.113″ x 2″) nails.
- **1½″ and 1¾″ TimberStrand® LSL:** Six (6) (0.131″ x 3″) nails.
- **3½″ TimberStrand® LSL:** Six (6) (0.131″ x 3″) nails; connect through specified rim (≤ 1¾″) into larger section.
- **(2-ply) 3½″ TimberStrand® LSL:** Four (4) Simpson Strong-Tie® SDS, SDW22 or MiTek® WS, WSWH, proprietary wood screws (min. 5″ length).

If you have any questions, please contact your Weyerhaeuser representative.

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