

Premier ICF No. 7003

Subject: Concrete - Wood Wall Strength Comparison

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Premier Building Systems has prepared a guide for strength comparison of concrete construction versus wood construction. Specific conditions for comparison of each wall type are presented in this bulletin. The variables are spelled out for each material and the results follow.

The wall comparisons are based on bending strengths only. The deflection limitations of the various materials are not considered. In designing a specific project, the serviceability of the wall (i.e., the deflection requirements) must also be considered.

**** NOTE:** Comparisons given here are not to be used for any project designs. They are strictly for information only. Premier Building Systems recommends that the applicable code requirements and the services of a registered professional structural engineer be used for the design of specific projects.

Situation: Exterior wall, 10' tall, wind loading only (i.e. no gravity load).

Wall Type - Stud Wall:	2 x 6 Stud Wall
2 x 4 Stud Wall	SPF #2 & better;
SPF #2 & better;	2 x 6 @ 16" o.c.;
2 x 4 @ 16" o.c.;	$F_b = 850$ psi;
$F_b = 850$ psi;	Capacity = 32 psf
Capacity = 13 psf	2 x 10 Stud Wall
2 x 8 Stud Wall	SPF #2 & better;
SPF #2 & better;	2 x 10 @ 16" o.c.;
2 x 8 @ 16" o.c.;	$F_b = 850$ psi;
$F_b = 850$ psi;	Capacity = 90 psf
Capacity = 56 psf	

Key:
 F_b - bending stress strength level of the wood (SPF #2 usually rates 850 psi)
 Capacity refers to the wind load wall strength in pounds per square foot (psf)
 f'_c - compressive strength of the concrete used (usually at 28 days cure time)
 A_s - size of rebar in the wall (#4 = 1/2 inch diameter) and the spacing (24 inch O/C)
 F_y - yield strength of the steel rebar - in this case 60,000 pounds per square inch

Wall Type - Reinforced Concrete:

4" Concrete Wall	6" Concrete Wall
$f'_c = 3000$ psi;	$f'_c = 3000$ psi;
$A_s = \#4$'s @ 24" o.c.;	$A_s = \#4$'s @ 24" o.c.;
$F_y = 60$ ksi;	$F_y = 60$ ksi;
Reinforcing centered in 4" wall.	Reinforcing centered in 6" wall.
Capacity = 59 psf	Capacity = 89 psf
8" Concrete Wall	10" Concrete Wall
$f'_c = 1350$ psi;	$f'_c = 1350$ psi;
$A_s = \#4$'s @ 24" o.c.;	$A_s = \#4$'s @ 24" o.c.;
$F_y = 60$ ksi;	$F_y = 60$ ksi;
Reinforcing centered in 8" wall.	Reinforcing centered in 10" wall.
Capacity = 120 psf	Capacity = 150 psf

Wall Type - Unreinforced Concrete:

4" Concrete Wall	6" Concrete Wall
$f'_c = 3000$ psi;	$f'_c = 3000$ psi;
$A_s = \text{None}$;	$A_s = \text{None}$;
Capacity = 29 psf	Capacity = 66 psf
8" Concrete Wall	10" Concrete Wall
$f'_c = 1350$ psi;	$f'_c = 1350$ psi;
$A_s = \text{None}$;	$A_s = \text{None}$;
Capacity = 117 psf	Capacity = 183 psf

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