



DSF No. 7003

Subject: Concrete - Wood Wall Strength Comparison

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Diamond Snap-Form 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. DSF 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 4 Stud Wall

SPF #2 & better;
2 x 4 @ 16" o.c.;
 $F_b = 850$ psi;
Capacity = 13 psf

2 x 8 Stud Wall

SPF #2 & better;
2 x 8 @ 16" o.c.;
 $F_b = 850$ psi;
Capacity = 56 psf

2 x 6 Stud Wall

SPF #2 & better;
2 x 6 @ 16" o.c.;
 $F_b = 850$ psi;
Capacity = 32 psf

2 x 10 Stud Wall

SPF #2 & better;
2 x 10 @ 16" o.c.;
 $F_b = 850$ psi;
Capacity = 90 psf

Wall Type - Reinforced Concrete:

4" Concrete Wall

$f'_c = 3000$ psi;
 $A_s = \#4$'s @ 24" o.c.;
 $F_y = 60$ ksi;
Reinforcing centered in 4" wall.
Capacity = 59 psf

8" Concrete Wall

$f'_c = 1350$ psi;
 $A_s = \#4$'s @ 24" o.c.;
 $F_y = 60$ ksi;
Reinforcing centered in 8" wall.
Capacity = 120 psf

6" Concrete Wall

$f'_c = 3000$ psi;
 $A_s = \#4$'s @ 24" o.c.;
 $F_y = 60$ ksi;
Reinforcing centered in 6" wall.
Capacity = 89 psf

10" Concrete Wall

$f'_c = 1350$ psi;
 $A_s = \#4$'s @ 24" o.c.;
 $F_y = 60$ ksi;
Reinforcing centered in 10" wall.
Capacity = 150 psf

Wall Type - Unreinforced Concrete:

4" Concrete Wall

$f'_c = 3000$ psi;
 $A_s = \text{None}$;
Capacity = 29 psf

8" Concrete Wall

$f'_c = 1350$ psi;
 $A_s = \text{None}$;
Capacity = 117 psf

6" Concrete Wall

$f'_c = 3000$ psi;
 $A_s = \text{None}$;
Capacity = 66 psf

10" Concrete Wall

$f'_c = 1350$ psi;
 $A_s = \text{None}$;
Capacity = 183 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

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