Terrillone Residence

Given: maximum Span between piles 13'-9"

Consider whether 2ea 2x12's can be used to support Roof, wall & Floor loads. (Consider Flinch beam)

Estimated Loads

Roof loads: Snow

Roof surface Area = 9 s.f./LF x 5psf = 45#/LF

Roof Live Loads: 9 s.f./LF x 20 psf = 180 #/LF

Floor Live Load : 6.875 s.f./LF x 40 psf = 275 #/LF

Dead Loads

Roof: 2x8 rafters @16"oc, shingles, felt, Sheathing
9 s.f./LF x 8 psf = 72 #/LF

Ceiling: 2x8 framing @ 16"oc, w/insul & Sheetrock
6.875 s.f./LF x 12 psf = 82.5 #/LF

Ceiling/Floor MEP & Storage
6.875 S.f./LF x 20 psf = 137.5#/LF

Walls 2x4 @16" O.C., gypsum & hardi board
10 s.f./LF x 10psf = 100 #/LF

Floor Framing 2x12 @16" O.C.
6.875 s.f./LF x 3.5 psf = 24.1 #/LF

Floor Plywood 3/4"
6.875 s.f./LF x 2.5 psf = 17.2 #/LF

Floor Wood Finish
6.875 s.f./LF x 4 psf = 27.5#/LF

Roof Snow : 45#/LF
Roof Live Load : 180 #/LF
Floor Live Load : 275 #/LF
Dead Loads : 460.8 #LF

LRFD Load Comb.

1.2(460.8) + 1.6(275) + ½(180)

= 1082.96 #/LF.
90.2 #/Linch

$E_{steel} = 29{,}000{,}000$ psi #2 Southern pine 1,600,000 psi

Cross Section I =

1/4" = 31.68 in^3 1/2 Load Δ = 0.568"

3/8" = 47.53 in^3 1/2 Load Δ = 0.379" @ 1/6 Load Δ = 0.421"

1/2" = 63.37 in^3 Δ = 0.284"

sawn 2x12 = 178.0 in^3 1/6 Load Δ = 0.508"

real 2x12 = 288 in^3 1/6 Load Δ = 0.314

real 2x14 = 457.3 in^3 @ 1/2 Load Δ = 0.601"

" @ 1/3 Load Δ = 0.404"

@ 1/4 load Δ = 0.305

Use (2) 2x12 + (1) (3/8") steel Plate

or

3 real 2x14 or

(2) real & (1) 1/4" x 12" Flitch Beam

L/360 = 0.458"

L/480 = 0.347"