ERRATA for

Structural Engineering Sample Questions and Solutions

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Errata posted 4-3-2018

Revisions are shown in red.

Question 801, p. 180

Requirement (b) should read as follows:

(b) Determine the design wind pressure and seismic design force on the parapet. For wind, use the provisions of ASCE 7 Ch. 30 Part 6 and neglect corner zones. (Consider interior zones only.)

Solution 803, p. 230

The last five lines of Requirement (c) should read as follows:

Alternatively, the provisions of Sec. 25.4.2.3 may be used

$$\ell_d = \frac{3}{40}\frac{f_y\,\psi_t\psi_e\psi_s}{\lambda f_c'\left(\frac{c_b + K_{tr}}{d_b}\right)}d_b$$ ACI Eq. 25.4.2.3a

where $\frac{c_b + K_{tr}}{d} = \frac{3.313 + 0}{0.625} = 5.3 \le 2.5$ Use 2.5

$$\ell_d = \frac{3}{40}\frac{60(1.0)(1.0)(0.8)}{1.0(5)(2.5)}0.625 = 12.7 \text{ in.}$$

Class B splice $= (1.3)(12.7) = 16.5$ NG

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Solution 804, p. 232

Requirement (b) should read as follows:

(b) Nailing requirements of shear wall: NDS SDPWS Table 4.3A

15/32" wood structural panels-sheathing
w/ 8d nails @ 6" o.c. @ panel edges
and @ 12" o.c. @ intermediate supports, V_w = 730 plf
Footnote 3 specific adjustment factor:
= [1 – (0.5 – G)]
Hem-Fir G = 0.43 NDS Table 12.3.3A
= [1 – (0.5 – 0.43)] = 0.93

$$V_{Allow} = \frac{730\ \text{plf}}{2.0} \times 0.93 = 340\ \text{plf} > 270\ \text{plf} \quad \text{OK}$$

Bottom plate to blocking between trusses NDS Table 12N
For 16d nails and 2×4 bottom plate (t_s = 1 1/2")
Z = 122 lb
Penetration into main member (blocking):

$$p = 3\,1/2 - 1\,1/2 - 3/4 = 1\,1/4"$$

$$6\,D = 6\,(0.162) = 0.972"$$

$$10\,D = 10(0.162) = 1.62"$$

$$\therefore 6\,D < p < 10\,d \rightarrow \text{use adj. factor footnote 3}$$

$$z' = 122\ \text{lb} \times C_D \times p/10\,d$$

$$= 122 \times 1.6 \times 1.25/1.62 = 150\ \text{lb/nail}$$

$$\text{Required spacing} = \frac{150}{270} = 0.56' = 6.7"$$

$\therefore$ Attach bottom plate to blocking with 16d nails @ 6" o.c. (max.)

Add second-floor diaphragm loads

$$V_{DIA} = \frac{3{,}130\ \text{lb}}{7 \times 30\ \text{ft}} = 14.9\ \text{plf}$$

V = 270 plf + 15 plf

V = 285 plf

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804. (Continued)

Blocking between trusses to top plate (wall below)
Use 16d toe nails NDS Table 12N

z = 122 lb (from above)

Penetration of toe nail into main member (top plate):

$$p = \ell \cos 30° - \ell/3 = 31/2\,(\cos 30°) - \frac{31/2}{3} = 1.86"$$

$$\therefore p > 10\,d$$

$$z' = 122\text{ lb} \times C_D \times C_{tn}$$

$$= 122 \times 1.6 \times 0.83 = 162\text{ lb / nail}$$

$$\text{Required spacing} = \frac{162}{285\text{ plf}} = 0.57\text{ ft} = 6.82\text{ in.}$$

$\therefore$ Attach blocking to top plate with 16d toe nails @ 6 in. o.c. max.
Alternately, provide metal framing clips from blocking to top plate with correct combination of capacity and spacing for overall resistance of 285 plf

Net uplift holdown forces:

At location adjacent to balcony:

M_{gross} = 56,425 ft-lb (from Requirement (a))

$M_{0.6\,D}$ = 0.6(20 psf)(20 ft)(10 ft)(10 ft/2)

+ 0.6(15 psf)(20 ft)(10 ft)(10 ft/2) = 21,000 ft-lb

$$M_{net} = 56,425 - 21,000 = 35,425\text{ ft-lb}$$

Distance between holdown bolts $\approx 10\text{ ft} - 0.75\text{ ft} = 9.25\text{ ft}$

$$T_{@holdown} = \frac{M}{b} = \frac{35,425\text{ ft-lb}}{9.25\text{ ft}} = 3,830\text{ lb}$$

$$T_{@holdown} = T_{shear\ wall} + T_{header}$$

At location adjacent to 10-ft opening:

$$T_{header} = 440\text{ plf}\ (10\text{ ft}/2) - 0.6(20\text{ psf} + 15\text{ psf})(20\text{ ft})\,(10\text{ ft}/2) = 100\text{ lb}$$

$$\therefore\ T_{@holdown} = 3,830 + 100 = 3,930\text{ lb}$$

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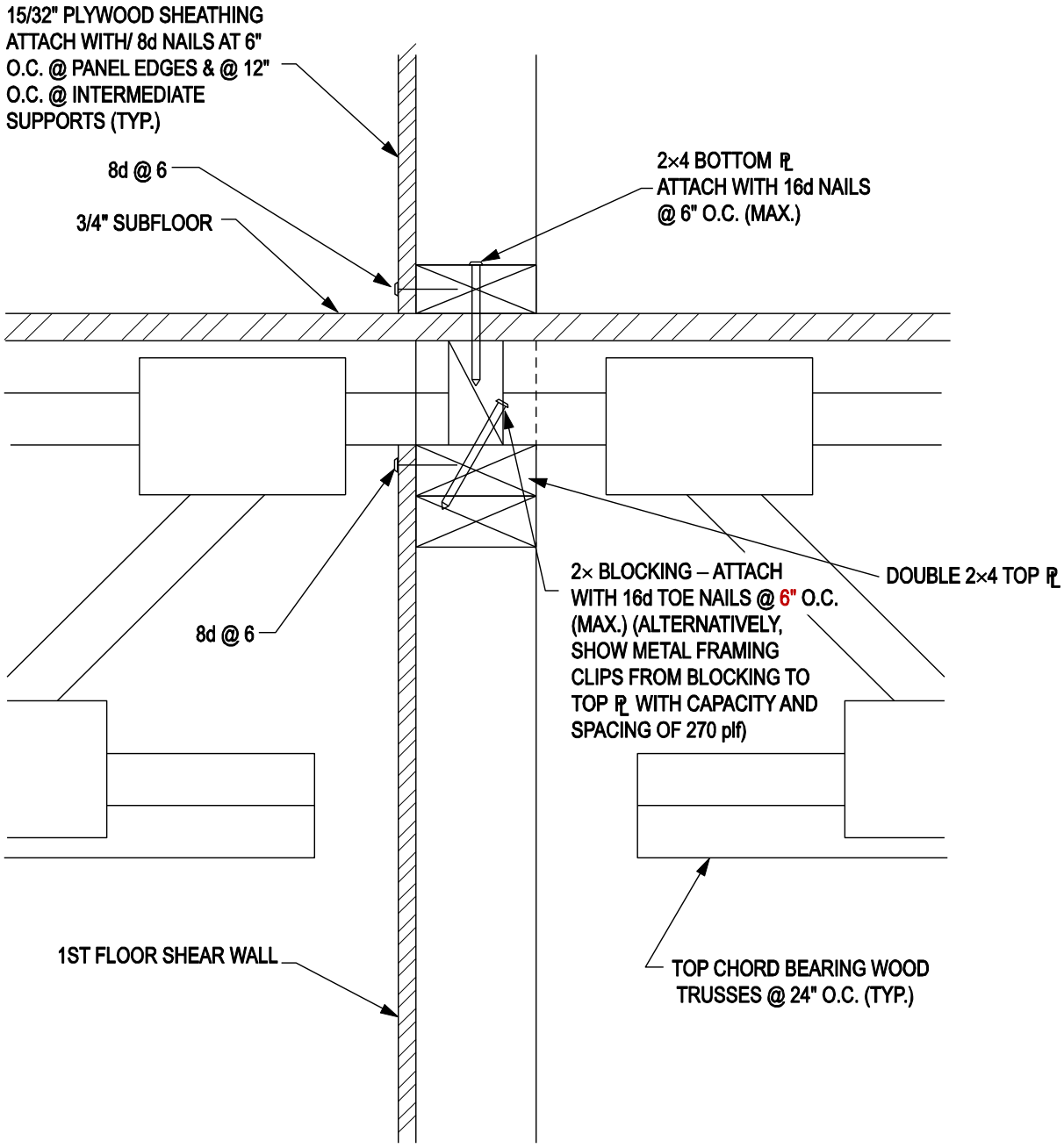
Solution 804, p. 235

Requirement (d) should read as follows:



Note: This detail outlines one of numerous possible configurations. The key components for the load path include:

1. Plywood wall sheathing
2. Boundary nailing
3. Bottom plate
4. Nailing of plate to plywood floor sheathing and blocking
5. Nailing of blocking to double top plate
6. Boundary nailing
7. Plywood wall sheathing