

ERRATA: February 2013

Prestressed Concrete Analysis and Design: Fundamentals
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ERRATA:

1. Page XXViii, 4th line from the bottom: change "topci" to "topic"
2. Page 57, Figure 2.6b: change "28000 ksi (183 GPA ..." to "28000 ksi (193 GPA ..."
3. Page 82: one paragraph and equation 2.11 are twice in the book - delete one
4. Page 99: Problem 2.3: read: "... coefficient $C_{CU} = 3$ for the material, compute...."
5. Page 269, 8th line from top, read "strictly" instead of "sticktly"
6. Page 313, second to last line of example: read "...still, for all practical purposes,...." instead of "sill"
7. **Example 5.11.3:** error in computing c ; see reworked example below.

Error in Example of section 5.11.3. Replace as follows:

5.11.3 Unbonded Tendons

The span is given as 40 ft.. Following the flow chart Fig. 5.25.

$$\rho_p = \frac{A_{ps}}{bd_p} = \frac{0.918}{24 \times 20.75} = 0.00185$$

$$\frac{L}{d_p} = \frac{40 \times 12}{20.75} = 23.13 \leq 35$$

$$f_{ps} = f_{pe} + 10 + \frac{f'_c}{100 \times \rho_p}$$

$$= 148.5 + 10 + \frac{5}{100 \times 0.00185} = 185.53 \text{ ksi}$$

$$f_{ps} = 185.53 \text{ ksi} \begin{cases} \leq f_{pe} + 60 = 148.5 + 60 = 208.5 \text{ ksi O.K.} \\ \leq f_{py} = 229.5 \text{ ksi O.K.} \end{cases}$$

Compute c assuming R-section behavior first:

$$c = \frac{A_{ps}f_{ps} + A_s f_y}{0.85 f'_c b \beta_1} = \frac{0.918 \times 185.53 + 1.58 \times 60}{0.85 \times 5 \times 24 \times 0.8} = 3.25 \text{ in}$$

$$a = \beta_1 c = 0.80 \times 3.25 = 2.60 \text{ in} < h_f = 3 \text{ in}$$

Rectangular section behavior is confirmed as per ACI.

$$d_e = \frac{A_{ps}f_{ps}d_p + A_s f_y d_s}{A_{ps}f_{ps} + A_s f_y} = \frac{0.918 \times 185.53 \times 20.75 + 1.58 \times 60 \times 21.5}{0.918 \times 185.53 + 1.58 \times 60} = 21.02 \text{ in}$$

And from Eq. 5.16 for rectangular section behavior:

$$M_n = A_{ps}f_{ps} \left(d_p - \frac{a}{2} \right) + A_s f_y \left(d_s - \frac{a}{2} \right)$$

$$M_n = 0.918 \times 185.53 \left(20.75 - \frac{2.60}{2} \right) + 1.58 \times 60 \left(21.5 - \frac{2.60}{2} \right)$$

$$= 5227.62 \text{ kips-in} = 435.63 \text{ kips-ft}$$

Compute: $c / d_e = 3.25 / 21.02 = 0.154 < 0.375 \Rightarrow \phi = 0.9$

The section is tension-controlled and the factor $\phi = 0.90$, leading to: $\phi M_n = 392.07 \text{ k-ft}$

Note that, because the stress in the unbonded prestressing tendons is much smaller than that in the bonded tendons, the nominal bending resistance is also significantly smaller.

5.11.4 Odd Case

Examples 5.11.1 and 5.11.2 above did not present any difficulty or noticeable inconsistency; unlike Example 5.11.3, they had values of a and c either both larger than h_f , or both smaller than h_f . However, when using the ACI condition for T-section behavior, an inconsistency occurs when a is smaller than h_f and c is larger than h_f . Let us consider again the example of Section 5.11.1