Concrete production facility has field strength test records for the specified class of within 1000 psi of the specified class of concrete.

- For ≥ 30 consecutive tests:
  - Calculate \( s_v \)
  - Required average strength using Table 5.3.2.1

- For Two groups of consecutive tests (total ≥ 30):
  - Calculate \( s_v \)
  - Calculate average \( s_v \)

- For 15 to 29 consecutive tests:
  - No (No data for \( s_v \))
  - Yes, \( s_v = 341.9 \) \( \text{modification} = 1.06 \)
  - \( f'c_r = 4000 + 1.34(1.06 \times 341.9) = 4486 \text{ psi} \)

- Field record of at least ten consecutive test results using similar materials and under similar conditions is available:
  - Yes
    - \( f'c < f'c_r \)
    - Results represent one mixture
    - \( \text{Avg} = 4454 \text{ psi} \)
    - Average ≥ required average
    - Plot average strength versus proportions and interpolate for required average strength
  - No
    - Results represent two or more mixtures
    - Determine mixture proportions according to 5.4 (requires special permission)

- Submit for approval

Fig. 5.3—Flow chart for selection and documentation of concrete proportions.
Tab #2 Solution (cont)

(2.) a.)

\[ \Sigma M_A = -2.0(20)(10) - 15(14) + V_B(20) \]
\[ V_B = 30.5 \text{k} \]
\[ V_A = 24.5 \text{k} \]

\[ \frac{x}{24.5} = \frac{20}{40} \rightarrow x = 12.3 \]
\[ \frac{24.5}{12.3} = \frac{x}{1.7} \rightarrow x = 3.4 \]

Max shear = 30.5 k

Max moment, \( M = 150.1 \text{k-ft} \)
b) \( \text{Max } \sigma = \frac{M_y}{I} = \frac{150k \cdot ft \cdot 15}{I} \)

Cross section is symmetric, \( y = \frac{h}{2} = 15 \text{ in} \)

\( \text{Max } \sigma = \frac{150k \cdot ft \cdot (12 \text{ in/ft}) \cdot (15 \text{ in})}{I} = \frac{27000 \text{ k.in}^2}{I} \)

Calculate \( I \):

\[
I = \left( \frac{bh^3}{12} + Ad^2 \right)^2 + \left( \frac{bh^3}{12} \right)
\]

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\[
I = \left[ \frac{12(2)^3}{12} + 12(2)(14) \right]^2 + \frac{1(26)^3}{12}
\]

\( I = 10,889 \text{ in}^4 \)

\[
\sigma_{\text{max}} = \frac{27000 \text{ k.in}^2}{10889 \text{ in}^4} = 2.48 \text{ ksi}
\]

\[
\sigma_{\text{max}} = 2.48
\]
c) Use transformed area method

\[ N = \frac{E_f}{E_w} = \frac{2E_w}{E_w} \quad n = 2 \]

Calculate new moment of inertia:

\[ I = \left[ \frac{bh^3}{12} + Ad^2 \right]_2 + \left[ \frac{bh^3}{12} \right] \]

\[ = \left[ \frac{24(2)^3}{12} + 48(14)^2 \right]_2 + \left[ \frac{1(20)^3}{12} \right] = 20,313 \text{ in}^4 \]

\[ \sigma_{\text{max}} = \frac{27000 \text{ ksi}}{20,313 \text{ in}^4} \quad \Rightarrow \quad \sigma_{\text{max}} = 1.33 \text{ ksi} \]

\[ At = 48 \text{ in}^2 \]

\[ At = 2.0(12 \text{ in})(2 \text{ in}) \]

\[ b \cdot h = 48 \text{ in}^2 \]

\[ b = 24 \text{ in} \]

\[ h = 2 \text{ in} \]