Content of Post 18 C.

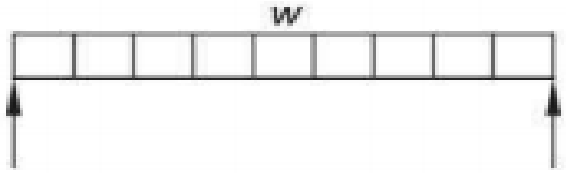
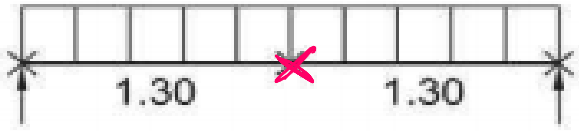
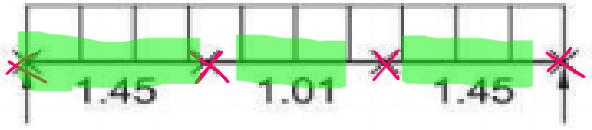
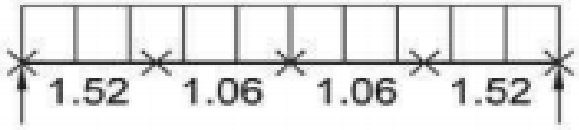
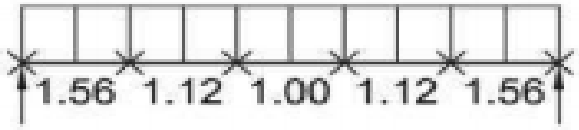
① Find Cb Values for simple beam under uniform Load with Four braces.

$$CB = (1.45, 1.01, 1.45)$$

Two braces at edges

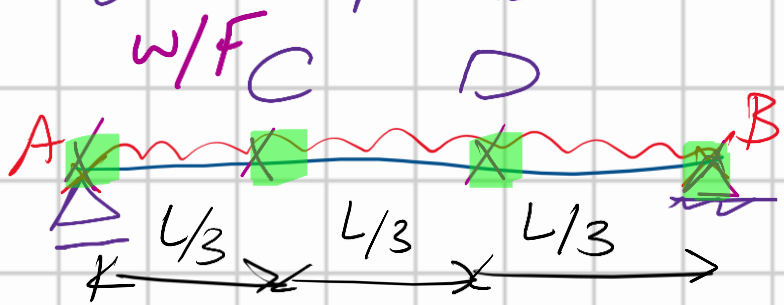
Two braces at third points $\Rightarrow \left(\frac{L}{3}, \frac{2L}{3}\right)$

Table 3-1
Values of C_b for Simply Supported Beams

Load	Lateral Bracing Along Span	C_b
	None	
	At midpoint	
	At third points	
	At quarter points	
	At fifth points	

included in → Post 17
post → 18b
post → 18c

CB For a Simple beam Under U. Load → 4 braces



Two braces at A & B
Two braces at C & D

$R_A = wL/2$ ← L → CB For Part AC/dB

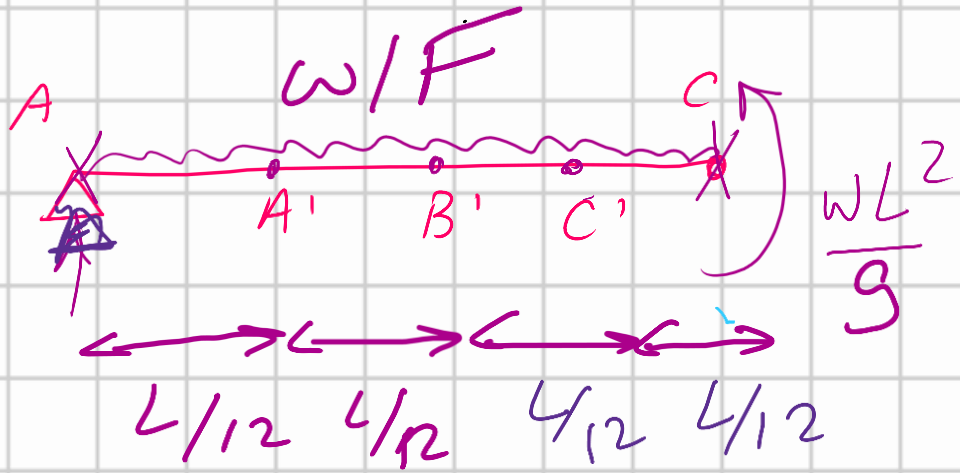
$M_C = R_A\left(\frac{L}{3}\right) - w\left(\frac{L}{3}\right)\left(\frac{L}{6}\right) = \frac{wL}{2}\frac{L}{3} - \frac{wL^2}{18} = \left(\frac{18-6}{6(18)}\right)wL^2$

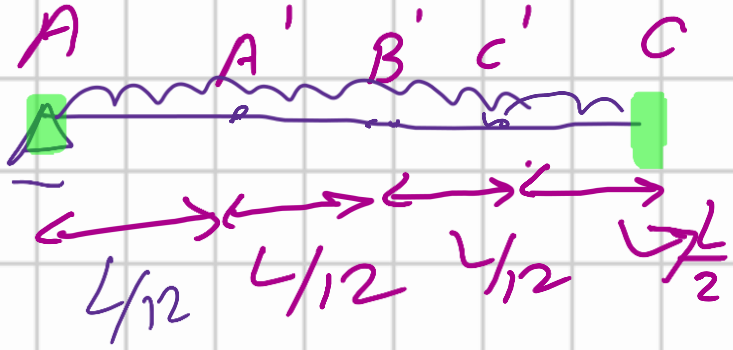
M_d $M_C = M_d = \frac{1}{9}wL^2$

Divide Part AC to Four quarters

Each length $= \frac{L}{3}\left(\frac{1}{4}\right)$

$= L/12$





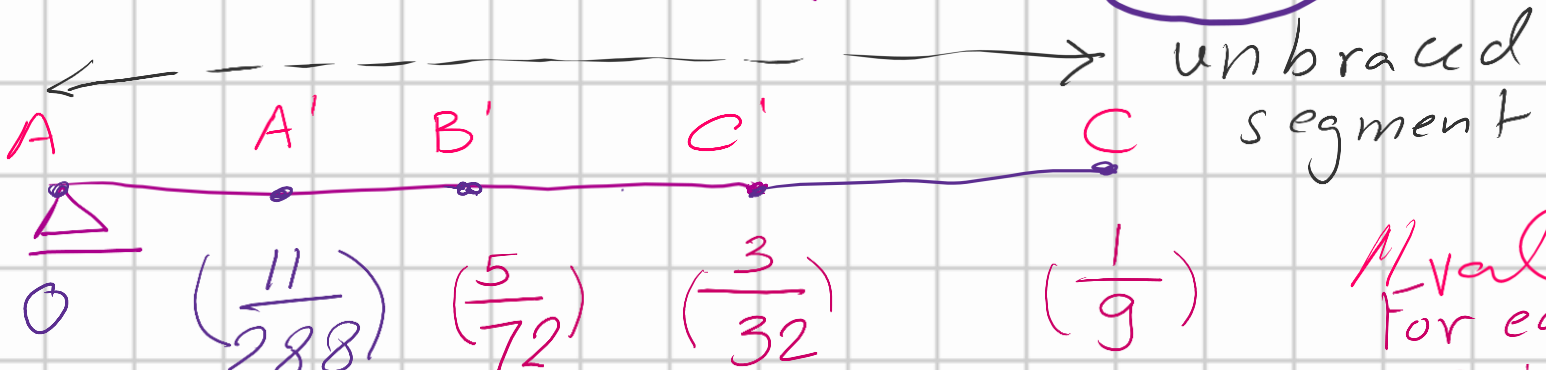
$$M_{A'} = \frac{wL}{2}\left(\frac{L}{12}\right) - w\left(\frac{L}{12}\right)\left(\frac{L}{24}\right)$$

$M_{A'}, B', C', C$

$$M_{A'} = \frac{wL^2}{24}\left[1 - \frac{1}{12}\right] = \frac{11}{12}\,\frac{wL^2}{24}$$

$$M_{B'} = \frac{wL}{2}\left(\frac{L}{6}\right) - w\left(\frac{L}{6}\right)\left(\frac{L}{12}\right) = \frac{wL^2}{12(6)}(6-1) = \frac{5wL^2}{12(6)}$$

$$M_{C'} = \frac{wL}{2}\left(\frac{L}{4}\right) - w\left(\frac{L}{4}\right)\left(\frac{L}{8}\right) = \frac{wL^2}{32}(4-1) = \frac{3}{32}wL^2$$

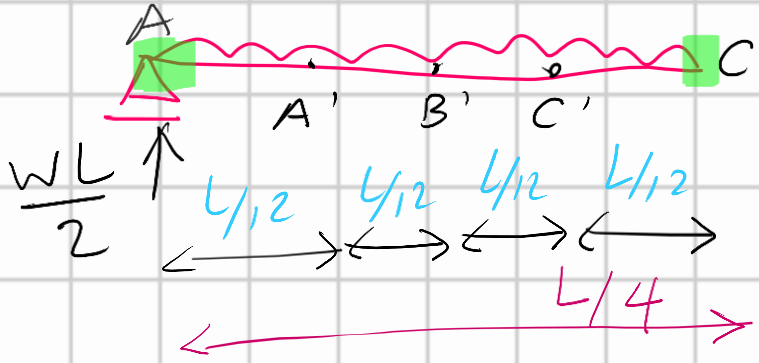


wL^2 Multipliers

M value for each Point

$$M_{max} = \frac{wL^2}{9}$$

→ at point C



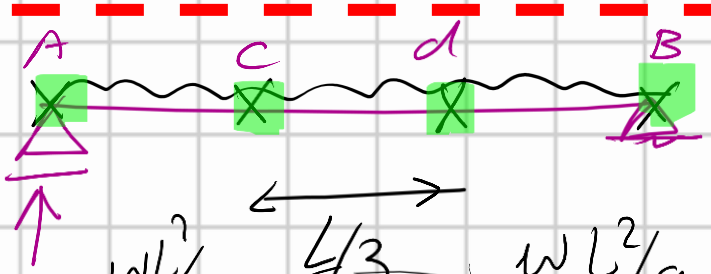
Find C_b value For part AC

$$C_b = \frac{(12.50\ M_{max})}{(2.50\ M_{max} + 3M_{A'} + 4M_{B'} + 3M_{C'})}$$

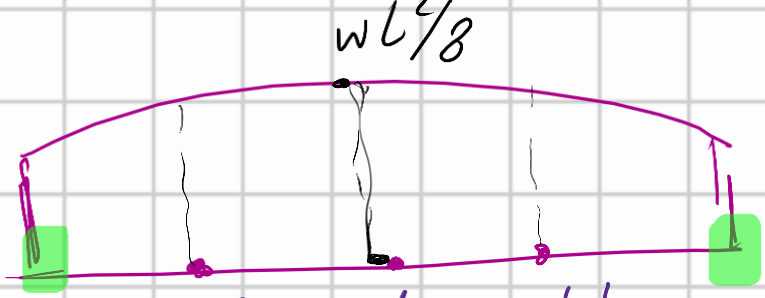
First quar — 2nd quar — 3rd quarter

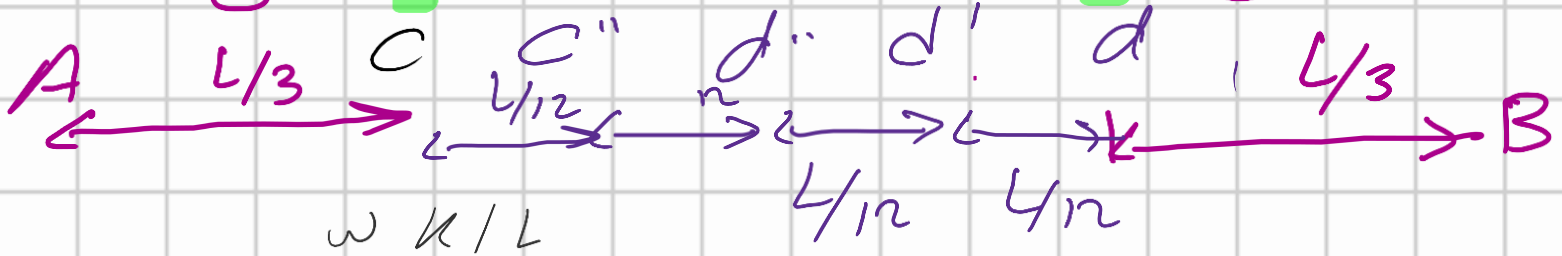
$$C_b = \frac{12.50\ (wL^2/9)}{wL^2\left[2.5\left(\frac{1}{9}\right) + 3\left(\frac{11}{288}\right) + 4\left(\frac{5}{72}\right) + 3\left(\frac{3}{32}\right)\right]}$$

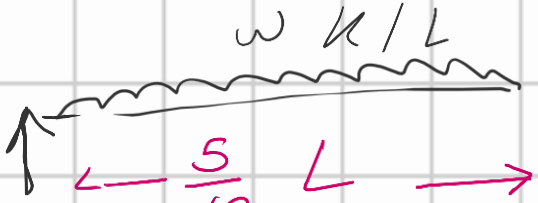
$$C_b = \frac{12.50/9}{\frac{80+33+80+81}{288}} = \frac{12.5}{9}\left(\frac{288}{274}\right) = 1.4599$$



For the middle part Cd

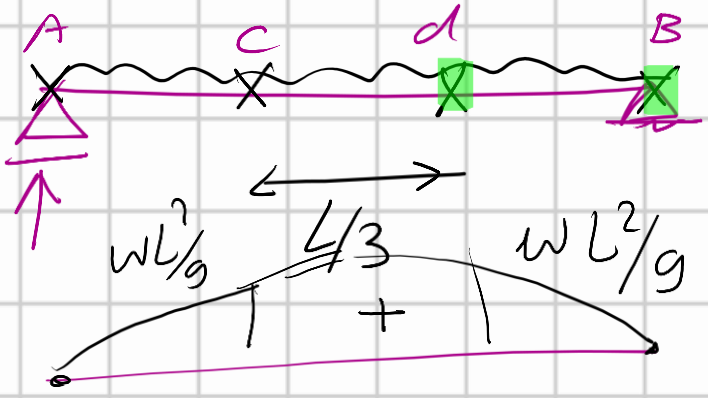




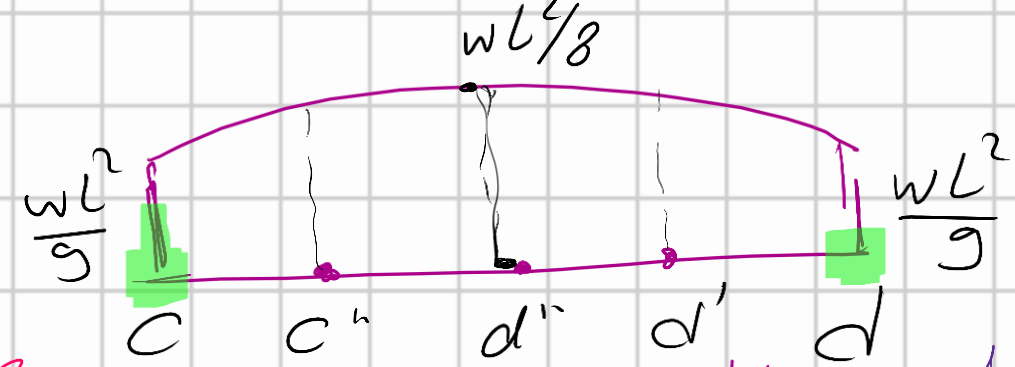


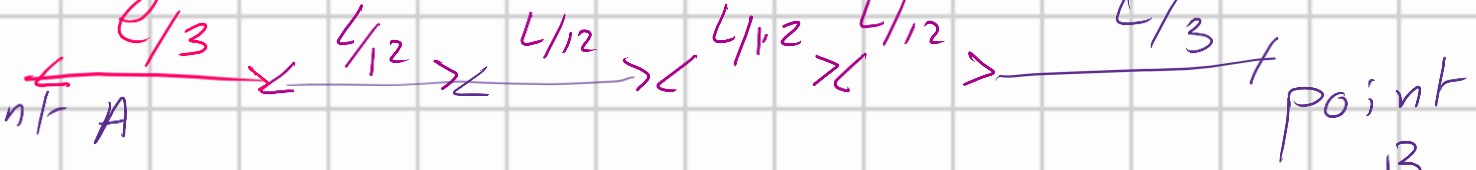
$$M_{C''} = \frac{wL^2}{2}\left(\frac{5}{12}\right) - w\left(\frac{5}{12}\right)L\left(\frac{5}{24}\right)L = (wL^2)\left[\frac{5}{24} - \frac{25}{288}\right]$$

$$M_{C''} = wL^2\left[\frac{60-25}{288}\right] = wL^2\left[\frac{35}{288}\right]$$



For the middle part Cd



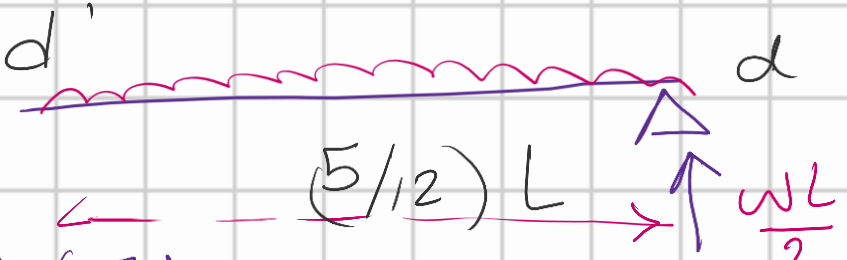


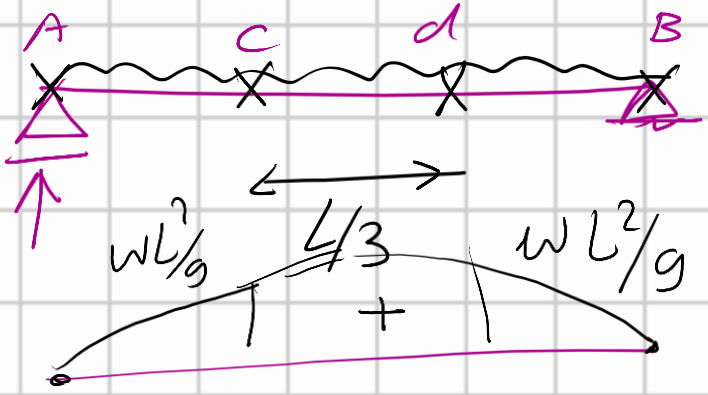
$$M_{d''} = \frac{wL^2}{8}$$

$$M_{d'} = \frac{wL}{2}\left(\frac{5}{12}\right)L - w\left(\frac{5}{12}\right)\left(\frac{5}{24}\right)L^2$$

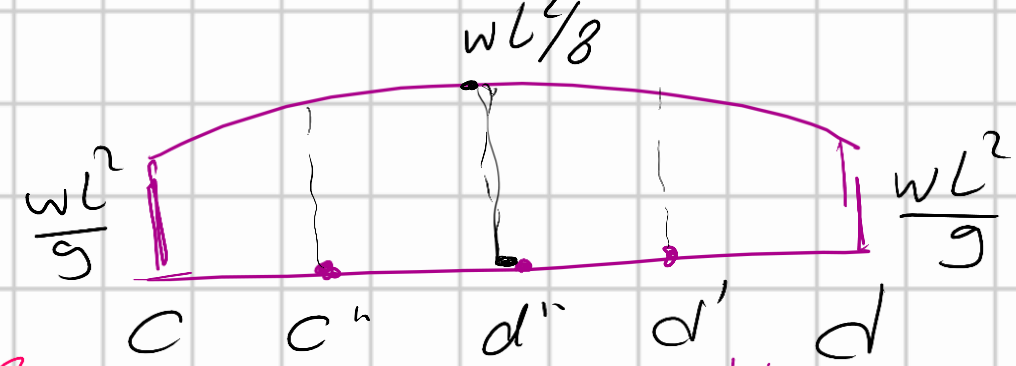
$$M_{d'} = wL^2\left[\frac{5}{24}\right]\left[1 - \frac{5}{12}\right] = wL^2\left(\frac{5}{24}\right)\left(\frac{7}{12}\right)$$

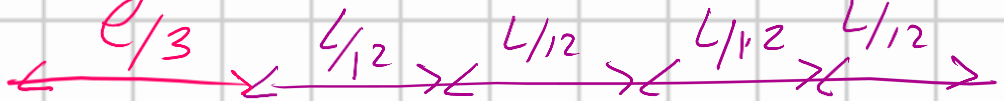
$$M_{d'} = \frac{35}{288}wL^2 = M_{C''}$$





For middle part- cd





For M_{max}

wL^2 Multiplier $\left(\frac{1}{9}\right)$ $\left(\frac{35}{288}\right)$ $\left(\frac{1}{8}\right)$ $\left(\frac{35}{288}\right)$ $\left(\frac{1}{9}\right)$

$M_{max} = \frac{wL^2}{8}$

$\downarrow$ 2-50

$\frac{2\text{-}5}{8}$

(3) $= \frac{35}{96}$

(4) $\frac{1}{2}$

(3) $\frac{35}{96}$

$$C_b = \frac{12.5\ M_{max}}{2.5\ M_{max} + 3M_{C'} + 4M_{d'''} + 3M_{d'}}$$

$$C_b = 12.5\left[\frac{wL^2}{8}\right] \Big/ wL^2\left[\frac{2.5}{8} + \frac{3.5}{96} + \frac{1}{2} + \frac{3.5}{96}\right]$$

$$C_b = \frac{12.5}{8}\left[\frac{1}{\frac{30 + 3.5 + 48 + 3.5}{96}}\right] = \frac{12.5}{8}\left[\frac{96}{148}\right]$$

$$= 1.0135 \Rightarrow 1.01$$

C_b for part Cd $= (1.01) \Rightarrow$ Same as in Table 3.1