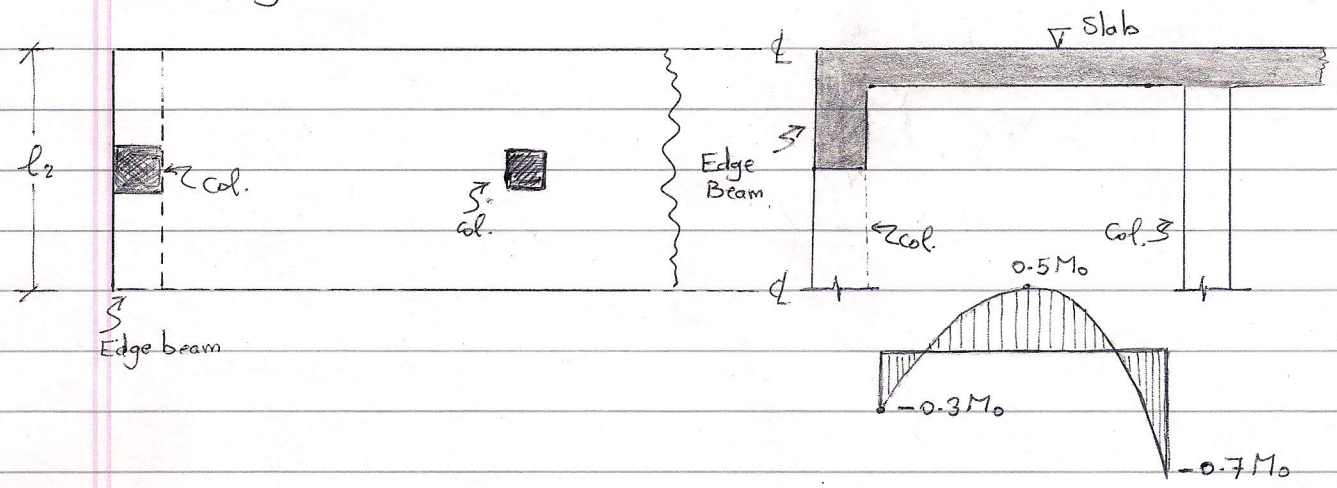
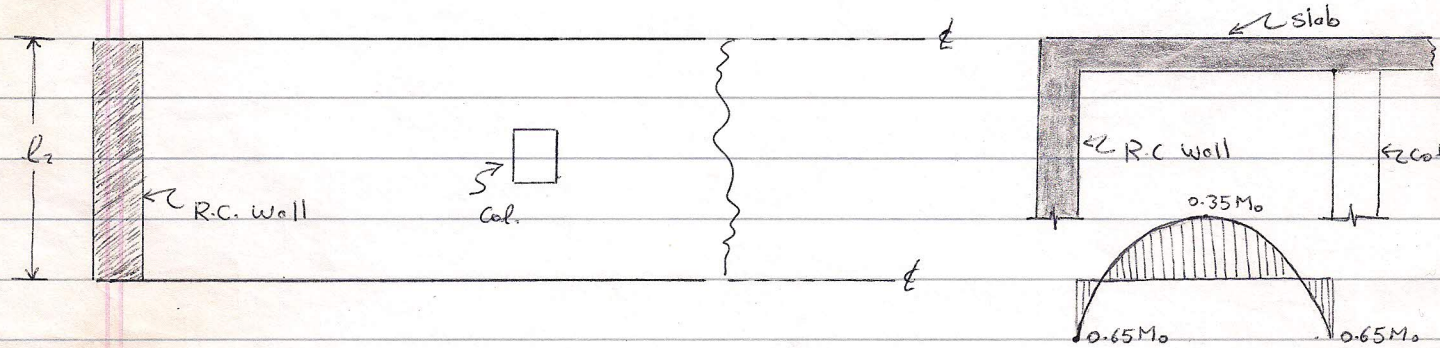
ii- With edge beam



4- In the case of slabs supported by fully restrained exterior edges. (R.C. walls)



ACI 13.6.3.4

Negative Moment Section shall be design to resist the larger of the two interior negative factored moment.

↑ For Interior Supports

Transvers Distribution of long. Moment

① Distribution to column strip (rest to middle strip) according to tables given by ACI 13.6.4

i- Find aspect ratio l_2/l_1

ii- Find $\alpha_1 \frac{l_2}{l_1}$ ratio

iii- Find $\beta_t = \frac{E_{cb} * C}{2 E_{cs} I_s}$

where $\frac{l_2}{l_1}$ = panel dimensions (measured c/c of spans)

β_t = ratio of torsional stiffness of edge beam section to flexural stiffness of a width of slab equal to the span length of the torsional edge beam c/c of supports.

α_1 = value of (α) in direction of $l_1 = \frac{E_{cb} I_b}{E_{cs} I_s}$

$I_s = \frac{l_2 t^3}{12}$ ↔ moment of inertia of slab

C = Cross-section Constant for Torsional member $= \sum (1 - 0.63 \frac{x}{y}) \frac{x^3 \cdot y}{3}$

x = shorter dimension of rectangular part.

y = Larger " " " "

Enter table → Find $\boxed{M_{c.s} = \text{Coeff.}\% * M}$ use interpolation where ever necessary.

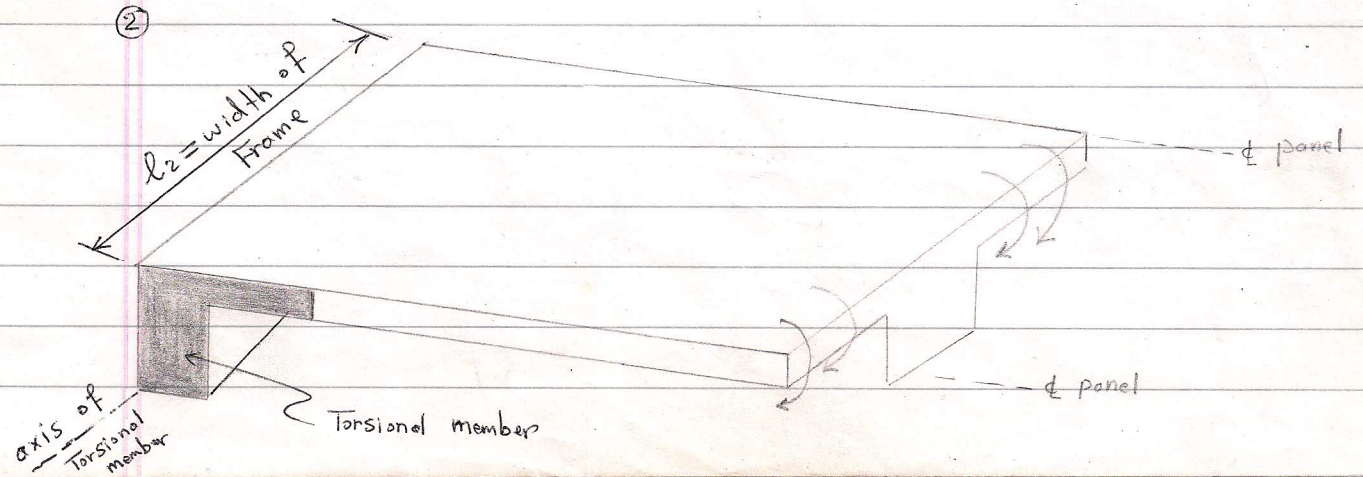
Notes/

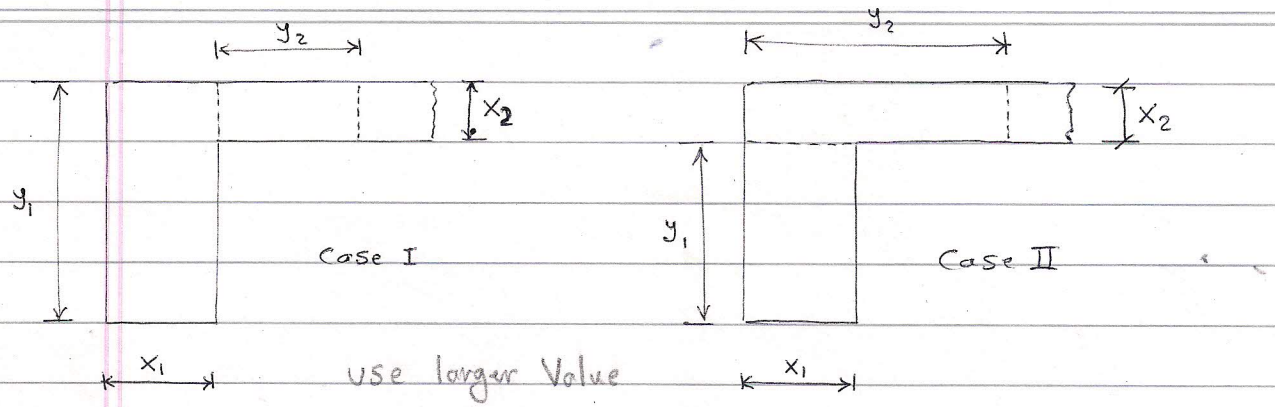
① When the exterior support is a wall perpendicular to the direction in which moment are being determined

* $\beta_t = 0$ for brick wall or Flat plate w/o edge beam

** $\beta t \geq 2.5$ for R.C wall.

②





* The c.s take the percentage of total moment at critical section according to Tables 13.6-4

Coefficients

Moment	$\alpha_1 \ell_2/\ell_1$	β_t	ℓ_2/ℓ_1 0.5	1.0	2.0
Interior −Ve	$=0$	—	75%	75	75
	≥ 1.0		90%	75	45
Exterior −Ve	$=0$	$=0$	100%	100	100
		≥ 2.5	75%	75	75
	≥ 1.0	$=0$	100%	100	100
		≥ 2.5	90%	75	45
+Ve	$=0$	—	60%	60	60
	≥ 1.0		90%	75	45

% of Interior M⁻ 13.6.4.1 to be Resisted by c.s

% of Ext. M⁻ 13.6.4.2 to be Resisted by c.s

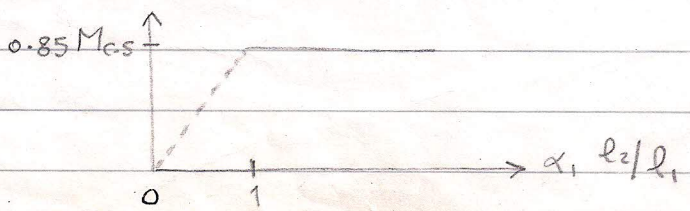
% of M⁺ to be 13.6.4.4 Resisted by c.s

(II) Distribution of $M_{c.s}$ to beam (rest to slab) ACI 13.6.5

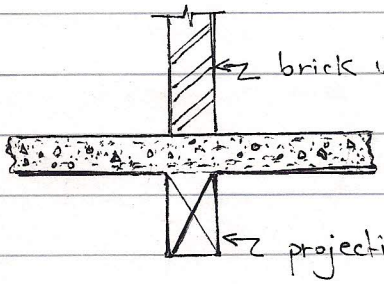
Beams resist 85% of $M_{c.s}$ if $\alpha_1 \ell_2/\ell_1 \geq 1.0$. For values between 0 & 1.0 linear interpolation can be used.

or

$$M_{beam} = 0.85 (\alpha_1 \ell_2/\ell_1) * M_{c.s} \leq 0.85 M_{c.s}$$

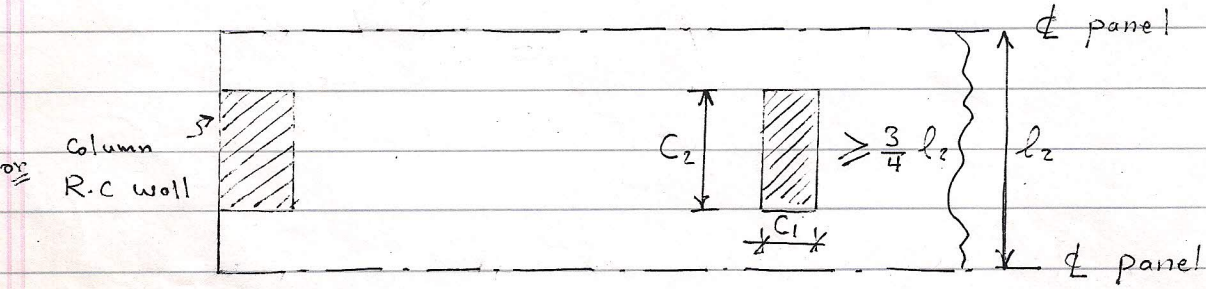


(I) In additions beams must be proportioned to resist moments Caused by loads applied directly to beams ACI 13.6.5.3



→ Load Transferred from slab to beam

(II) when size of column (support) $C_2 \geq \frac{3}{4} l_2$, M^- must be uniformly distribution across (l_2). ACI 13.6.4.3



(III) A middle strip adjacent to and parallel to a wall-supported edge shall be proportioned to resist twice the moment assigned to the half middle strip Corresponding to the first row of interior supports. ACI 13.6.6.3