



FLEXURAL REINFORCEMENT CALCULATION (BS8110:PART1:1997)

(RECTANGULAR BEAM)

$$K = \frac{M}{bd^2f_{cu}}$$

$$K' = 0.167$$

- ❖ If $K \leq K'$, compression reinforcement is not required; hence singly reinforced.

$$Z = d \left\{ 0.5 + \sqrt{0.25 - \frac{K}{1.134}} \right\}$$

$$A_s = M / 0.87f_y Z$$

- ❖ If $K > K'$, compression reinforcement is required;

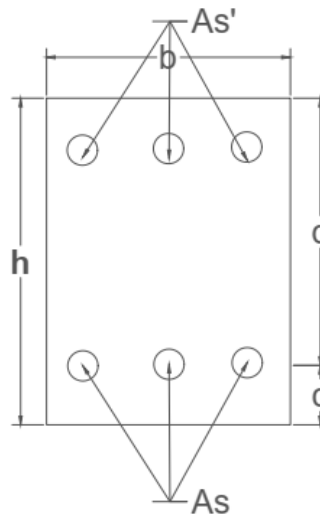
$$Z = d \left\{ 0.5 + \sqrt{0.25 - \frac{K}{1.134}} \right\}$$

But not greater than $0.95d$

$$A'_s = (K - K')f_{ck}bd^2 / 0.87f_{yk}(d - d')$$

$$100A'_s / A_c > 0.2$$

$$A_s = \left(K_{bal}f_{ck}bd^2 / 0.87f_{yk}Z_{bal} \right) + A'_s$$





**Learning Tool for
Reinforced Concrete
Design**

Project

Job Ref.

Section

Sheet no./rev.
2

Calc.by

Date

Chk'd by

Date

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Date

$$K \leq K'$$

$$Z = d \left\{ 0.5 + \sqrt{0.25 - \frac{K}{1.134}} \right\} =$$

$$A_s = M / 0.87 f_y Z =$$

Check for the minimum reinforcement

$A_{s,prov}$ has to be greater than $0.26 \frac{f_{ctm}}{f_{yk}} b_t d$ but not less than $0.0013 b_t d$.

$$0.26 \frac{f_{ctm}}{f_{yk}} b_t d =$$

$$0.0013 b_t d =$$

Check for maximum reinforcement

$$100 A_s / A_c < 4 ; \text{hence ok.}$$

$$K > K'$$

$$Z = d \left\{ 0.5 + \sqrt{0.25 - \frac{K}{1.134}} \right\} =$$

$$A'_s = (K - K') f_{ck} b d^2 / 0.87 f_{yk} (d - d') =$$

$$100 A'_s / A_c > 0.2$$

$$A_s = \left(K_{bal} f_{ck} b d^2 / 0.87 f_{yk} Z_{bal} \right) + A'_s =$$

Check for the minimum reinforcement

$A_{s,prov}$ has to be greater than $0.26 \frac{f_{ctm}}{f_{yk}} b_t d$ but not less than $0.0013 b_t d$.

$$0.26 \frac{f_{ctm}}{f_{yk}} b_t d =$$

$$0.0013 b_t d =$$

Check for maximum reinforcement

$$100 A_s / A_c < 4 ; \text{hence ok.}$$