



**Learning Tool for
Reinforced Concrete
Design**

Project

Job Ref.

Section

Sheet no./rev.
1

Calc.by

Date

Chk'd by

Date

App'd by

Date

FLEXURAL REINFORCEMENT CALCULATION (BS8110:PART1:1997)

(RECTANGULAR BEAM)

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

$$K' = 0.156$$

- ❖ If $K \leq K'$, compression reinforcement is not required;

$$Z = d \left\{ 0.5 + \sqrt{0.25 - \frac{K}{0.9}} \right\}$$

But not greater than $0.95d$

$$x = (d - z)/0.45$$

$$A_s = M/0.95f_yZ$$

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

$$Z = d \left\{ 0.5 + \sqrt{0.25 - \frac{K'}{0.9}} \right\}$$

$$x = (d - z)/0.45$$

$$A'_s = (K - K')f_{cu}bd^2/0.95f_y(d - d')$$

$$A_s = (K'f_{cu}bd^2/0.95f_yZ) + A'_s$$

$$f_{cu} = \text{Mpa}$$

$$f_y = \text{Mpa}$$

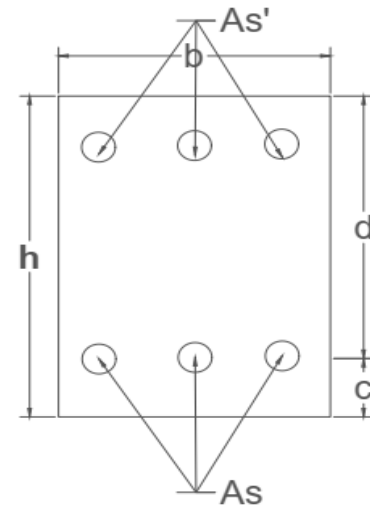
$$L = \text{m}$$

$$M = \text{kN/m}$$

$$d = \text{mm}$$

$$h = \text{mm}$$

$$b = \text{mm}$$



$K \leq K'$	$K > K'$
$Z = d \left\{ 0.5 + \sqrt{0.25 - \frac{K}{0.9}} \right\} =$	$Z = d \left\{ 0.5 + \sqrt{0.25 - \frac{K'}{0.9}} \right\} =$
$x = (d - z)/0.45 =$	$x = (d - z)/0.45 =$
$A_s = M/0.95f_yZ =$	$A'_s = (K - K')f_{cu}bd^2/0.95f_y(d - d') =$
	$A_s = (K'f_{cu}bd^2/0.95f_yZ) + A'_s =$