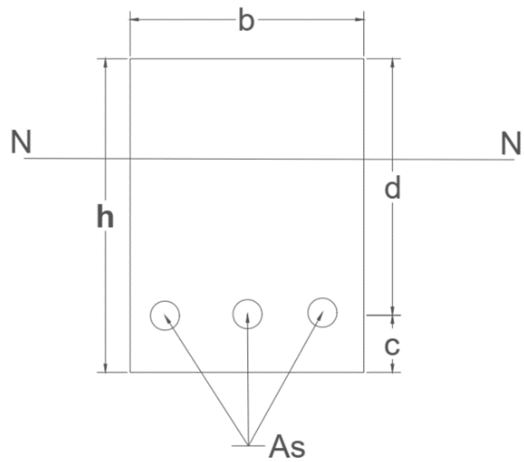
Learning Tool for Reinforced Concrete Design	Project				Job Ref.	
	Section				Sheet no./rev. 1	
	Calc.by	Date	Chk'd by	Date	App'd by	Date

DEFLECTION CALCULATION (EC2)

Reference	Calculations	Remarks
	 $f_{ck} =$ $f_{yk} =$ $E_s =$ $A_s =$ $b =$ $h =$ $c =$ $l =$ M=	
Note 1	**STEP 1** Calculate the curvature for uncracked section. $\left(\frac{\mathbf{1}}{\boldsymbol{r}}\right)_{\boldsymbol{uc}} = \frac{\boldsymbol{M}}{\boldsymbol{E_{c,eff} I_{uc}}}$	$\left(\frac{\mathbf{1}}{\boldsymbol{r}}\right)_{\boldsymbol{uc}} =$
	STEP 2 Calculate the neutral axis depth of the cracked section $\boldsymbol{x} = \frac{-\boldsymbol{\alpha_e A_s} \pm \sqrt{(\boldsymbol{\alpha_e A_s})^2 + 2\boldsymbol{b\alpha_e A_s d}}}{\boldsymbol{b}}$	$\boldsymbol{x} =$

Learning Tool for Reinforced Concrete Design	Project				Job Ref.	
	Section				Sheet no./rev. 2	
	Calc.by	Date	Chk'd by	Date	App'd by	Date

Reference	Calculations	Remarks
	Calculate curvature for cracked section $\left(\frac{1}{r}\right)_{cr} = \frac{M}{E_{c,eff} I_{cr}}$	$\left(\frac{1}{r}\right)_{uc} =$
Note 2	**STEP 3** $M_{cr} = f_{ctm} \times \left({b_w h^2}/{6}\right)$	$M_{cr} =$
Clauses 7.4.3(3) Eq. 7.19 Note 3	$\xi = 1 - \beta\left({M_{cr}}/{M}\right)^2$	$\xi =$
Clauses 7.4.3(3) Eq. 7.18	$\frac{1}{r} = \xi\left(\frac{1}{r}\right)_{cr} + (1-\xi)\left(\frac{1}{r}\right)_{uc}$	$\frac{1}{r} =$
Note 4	**STEP 4** Calculate the Deflection $a = Kl^2\frac{1}{r}$	$a =$

Notes of calculations

1. The contribution of the reinforcement to I_{uc} is here ignored, but can be accommodated using the modular ratio.
2. M_{cr} is the moment that causes the first cracking in the concrete section.
3. ${\sigma_{sr}}/{\sigma_s}$ can be replaced by ${M_{cr}}/{M}$ for flexure according to clauses 7.4.3(3).
4. Figure 6 of the concrete society publication (Deflection calculations) gives K values for different loading and support condition.