

ARCH 207, 507, 2006 HW #6
Concrete Frame, Problem 6a

Live Load: Roof 30 lbs/ft²
 Floor: 150
 Concrete F_c 4000 lbs/in²
 Steel F_s 60,000 lbs/in²
 Load Factors: Dead Loads x1.4
 Live Loads x1.7

Roof

1. Estimate Slab Depth (ASC) _____
2. Compute Slab Dead Load (lb/ft²) _____
3. Compute uniform dead load "w" created by slab in int. girder _____
4. M_{max} , roof girder (Kft)
 $M_{max} = wL^2/8, 12, \text{ or } 16$ _____
5. Est. effectivebeam depth, $d_{eff}: L/18(\text{in})$ _____
6. Det. Actual Beam Height ($d_{eff} + 2.5\text{in}$) _____
7. Determine Beam Width, b_w
 $b_{wmax} = 20M_{max}/d_{eff}^2$ (Kft/in²) _____
 $b_{wmin} = 13M_{max}/d_{eff}^2$ (Kft/in²) _____
8. Determine Required Reinf (A_s)
 $A_s = M_{max}/4d_{eff}$ _____
9. Check A_s
 $A_s \text{ min} = 3f_c^{-2} b_w d_{eff}/f_s$ _____
 $A_s \text{ max} = .0214 b_w d_{eff}$ _____

Floor

1. Estimate Slab Depth (ASC) _____
2. Compute Slab Dead Load (lb/ft²) _____
3. Compute uniform dead load "w" created by slab in int. girder _____
4. M_{max} , roof girder (Kft)
 $M_{max} = wL^2/8, 12, \text{ or } 16$ _____
5. Est. effectivebeam depth, $d_{eff}: L/18(\text{in})$ _____
6. Det. Actual Beam Height ($d_{eff} + 2.5\text{in}$) _____
7. Determine Beam Width
 $b_{wmax} = 20M_{max}/d_{eff}^2$ (Kft/in²) _____
 $b_{wmin} = 13M_{max}/d_{eff}^2$ (Kft/in²) _____
8. Determine Required Reinf (A_s)
 $A_s = M_{max}/4d_{eff}$ _____
9. Check A_s
 $A_s \text{ min} = 3f_c^{-2} b_w d_{eff}/f_s$ _____
 $A_s \text{ max} = .0214 b_w d_{eff}$ _____

Concrete Frame (Problem 5b)

Live Load (Roof) 30 lbs/ft²
 See 5a for other values

Roof

1. Estimate Slab Depth (ASC) _____
2. Compute Slab Dead Load (lb/ft²) _____
3. Compute uniform dead load "w" created by slab in int. girder _____
4. M_{max} , roof girder (Kft)
 $M_{max} = wL^2/8, 12, \text{ or } 16$ _____
5. Est. effectivebeam depth, $d_{eff}: L/18(\text{in})$ _____
6. Det. Actual Beam Height ($d_{eff} + 2.5\text{in}$) _____
7. Determine Beam Width
 $b_{wmax} = 20M_{max}/d_{eff}^2$ (Kft/in²) _____
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8. Determine Required Reinf (A_s)
 $A_s = M_{max}/4d_{eff}$ _____
9. Check A_s
 $A_s \text{ min} = 3f_c^{-2} b_w d_{eff}/f_s$ _____
 $A_s \text{ max} = .0214 b_w d_{eff}$ _____

