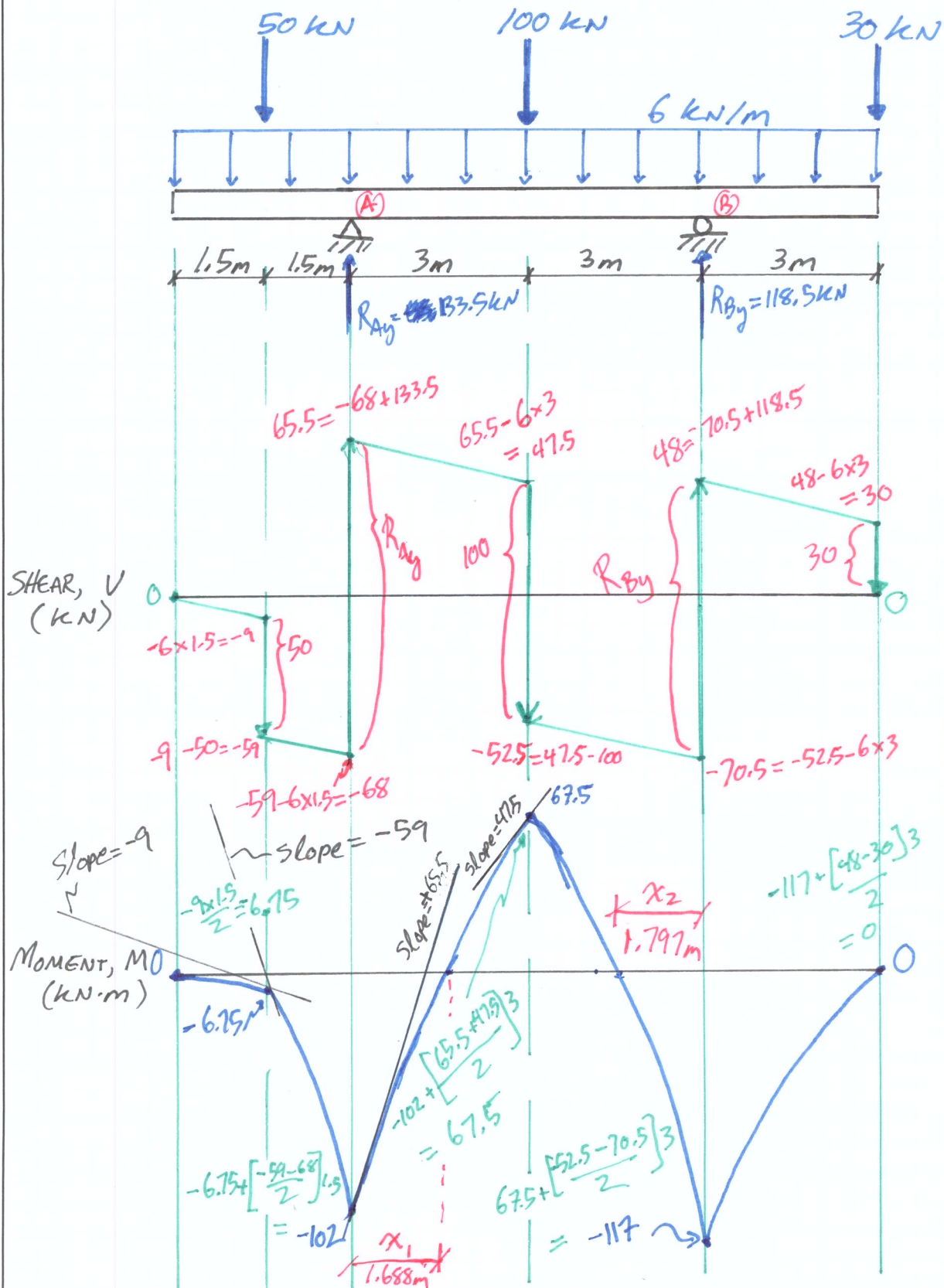


Use graphical techniques to draw the shear and moment diagrams.



Course No. **CE 1023**

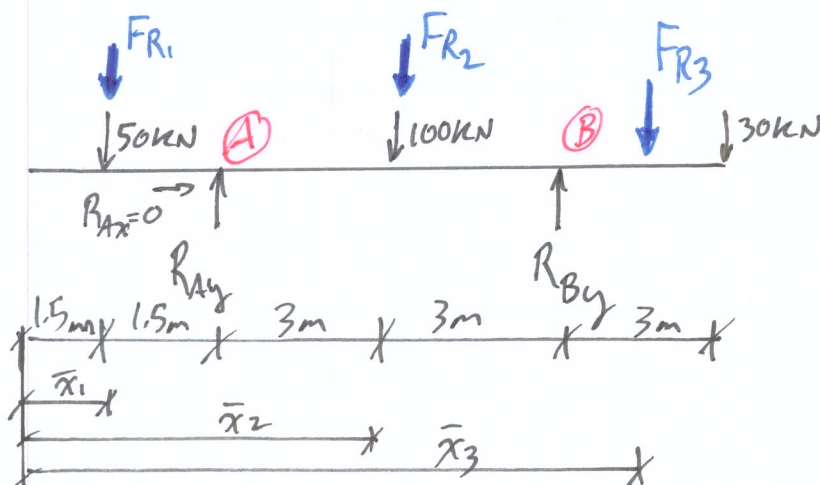
Assignment No.

Date **March 13, 2015**

Page

2

Problem No.

By **ALAN LLOYD**of
4Find Reactions

$$\sum F_x = 0$$

$$R_{Ax} = 0$$

$$F_{R_1} = (6 \text{ kN/m})(3 \text{ m}) = F_{R_1} = 18 \text{ kN}$$

$$\bar{x}_1 = 3 \text{ m} / 2 = 1.5 \text{ m}$$

$$F_{R_2} = (6 \text{ kN/m})(6 \text{ m}) = F_{R_2} = 36 \text{ kN}$$

$$\bar{x}_2 = 3 \text{ m} + 6 \text{ m} / 2 = \bar{x}_2 = 6 \text{ m}$$

$$F_{R_3} = (6 \text{ kN/m})(3) = F_{R_3} = 18 \text{ kN}$$

$$\bar{x}_3 = 9 + 3 / 2 = \bar{x}_3 = 10.5 \text{ m}$$

$$\sum M_A = 0 \quad \begin{matrix} \curvearrowleft + & \curvearrowleft + & \curvearrowright - & \curvearrowright - & \curvearrowleft + & \curvearrowright - & \curvearrowright - \end{matrix}$$

$$50(1.5) + 18(1.5) - 100(3) - 36(3) + R_{By}(6) - 30(9) - 18(7.5) = 0$$

$$R_{By} = +118.5 \text{ kN } \uparrow$$

$$\sum F_y = 0$$

$$R_{Ay} - 50 - 18 - 100 - 36 - 30 - 18 + 118.5 = 0$$

$$R_{Ay} = +133.5 \text{ kN } \uparrow$$

Course No. CE 1023

Assignment No.

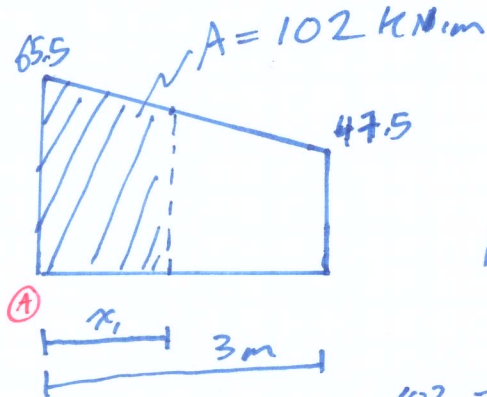
Date March 13, 2015

Page

3

Problem No.

By ALAN LLOYD

of
4 $x_1 =$ distance from (A) to zero moment.Shear

$$A = \left(\frac{h_1 + h_2}{2} \right) L$$

$$h_1 = 65.5$$

$$h_2 = 65.5 - 6 \text{ kN/m} \cdot x$$

$$L = x_1$$

$$102 = \left(\frac{65.5 + 65.5 - 6x_1}{2} \right) x_1$$

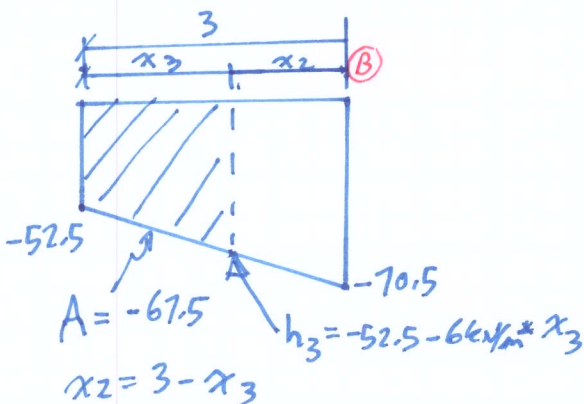
$$102 = 65.5x_1 - 3x_1^2 \rightarrow 3x_1^2 - 65.5x_1 + 102 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x_1 = \frac{-(-65.5) \pm \sqrt{(-65.5)^2 - 4(3)(102)}}{2(3)}$$

$$x_1 = 10.917 \pm 9.229$$

$$x_1 = 1.688 \text{ m} \quad \text{or} \quad 22.146 \text{ m}$$

 $x_2 =$ distance from (B) to zero moment

$$A = -67.5 = \left(\frac{h_1 + h_2}{2} \right) x_3$$

$$-67.5 = \left(\frac{-52.5 + (-52.5 - 6x_3)}{2} \right) x_3$$

$$3x_3^2 + 52.5x_3 - 67.5 = 0$$

$$x_3 = \frac{-52.5 \pm \sqrt{52.5^2 - 4(3)(-67.5)}}{2(3)}$$

$$x_3 = -8.75 \pm 9.953$$

$$x_3 = 1.203 \text{ m} \quad \text{or} \quad -18.703 \text{ m}$$

$$x_2 = 3 - 1.203 \text{ m}$$

$$x_2 = 1.797 \text{ m}$$

Course No. CE 1023

Assignment No.

Date March 13, 2015

Page

4

Problem No.

By ALAN LLOYD

of

4

Proper amount of information on shear + moment diagram

