School of Engineering

Department of Civil & Environmental Engineering

CEE 3222- Theory of Structures

Assignment No. 3 – Internal loading developed in structural members.

Due: Friday 11/08/2023

Question 1

(a) The floor system (with a = 2.5 m, b = 6 m) used in a school classroom consists of a 100 mm reinforced concrete slab with a density of 25 kN/m³. The dead load (contributed by floor tiles and weight of fixed partitions) on the floor is estimated to be 3.6 kN/m² excluding the self-weight of the slab.
 	
(I)   Sketch and determine the total loading (1.35DL +1.5 LL) that acts along the joist BF and side girder ABCDE.
 	
(II)   Determine the shear and moment functions of girder ABCDE using:
   (i)   Method of equilibrium (first principles)
   (ii)   Method of integration
   (iii)   Use the shear and moment functions above to sketch the shear force and bending moment diagrams.
 	
(III)   Draw the shear and bending moment diagrams girder ABCDE using the slope-area method.
 	
(b) Solve Part (a) with a = 3 m, b = 4.5 m.
(c) Model girder ABCDE in PROKON and plot the shear force and bending moment diagram.
 	
N.B. To make the calculations easier, ignore the self-weight if the girder. Do ignore self-weight of the girder in Prokon as well.

Fig1.1: Floor system of a cchool Classroom