CE 3310: Advanced Structural Analysis

Tutorial - 1 : Force Methods

Take P = 100 + last two digits of your Roll No.

1. Consider the system of two identical parabolic two-hinged archs (span 20m, rise 8m), subjected to a concentrated load of P kN on one of the arches, as shown in the Fig.1. Analyse the loaded arch and sketch the bending moment diagram also find the maximum values of bending moment, shear force and axial thrust for this arch.

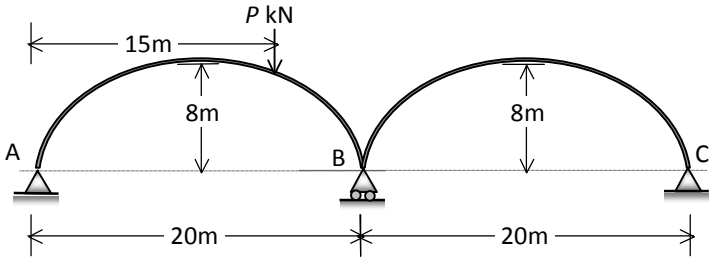

Fig.1

2. Find the bar forces and cable tension in the cable-suspended truss system shown in Fig. 2. Assume constant EA for all truss members, and that the cable has an axial rigidity equal to 2EA. If the vertical deflection at D is 12mm, find the value of EA (in kN).

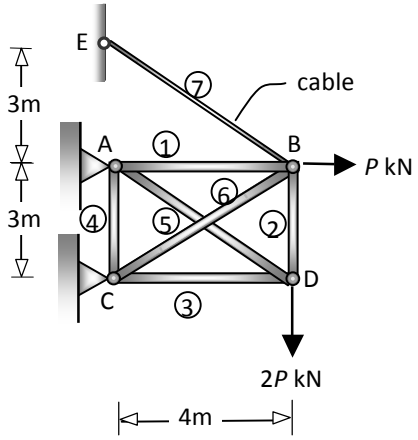

Fig. 2

3. Consider a two-storeyed framed building, 18m × 18m in plan, subjected to an effective wind pressure loading of 0.1P kN/m^2 on one of its fully clad faces. Columns are located on a 6m × 6m square grid. The storey height is 3m. Assume the level of fixity at the base to be 1.5m below the ground floor level. Analyse a typical intermediate frame (2- storeyed, 3 bay) using (a) Portal Method and (b) Cantilever Method, and compare the bending moment diagrams for the two cases.