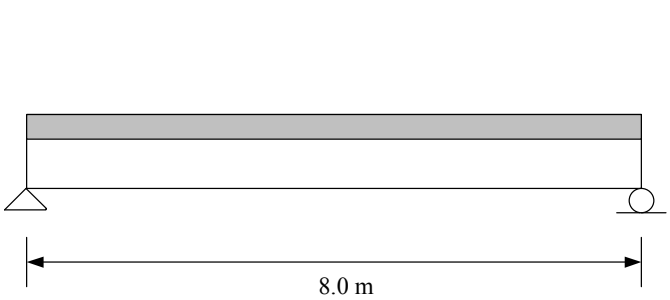
UNIVERSITY OF OTTAWA
Department of Civil Engineering

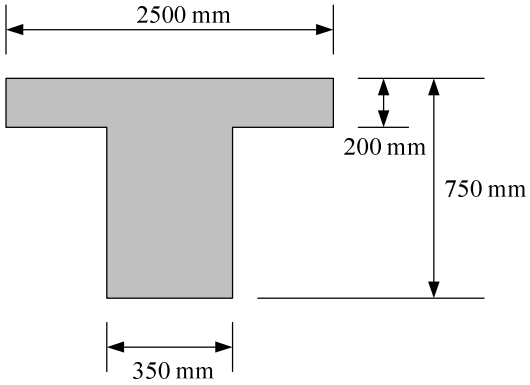
CVG3148 Reinforced Concrete Design I
Assignment 2

Solutions are due at the beginning of Monday's lecture (January 21)

1. The reinforced concrete T-beam below is required to support a roofing system. The loads include a superimposed dead load of 20.0 kN/m, a live load of 25.0 kN/m, and a snow load of 10.0 kN/m. Determine:
   a) The maximum factored distributed load the beam must support according to Table 4.1.3.2 of the NBC 2010;
   b) The end reactions forces; and
   c) The maximum shear force and maximum bending moment. Plot the shear and bending moment diagrams.

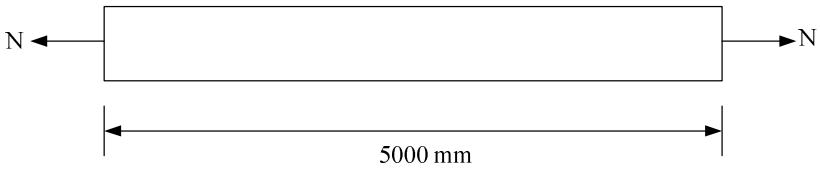


Elevation View

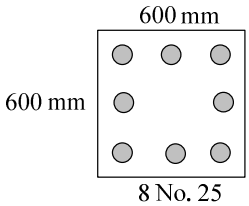


Cross Section

2. Calculate and plot the relationship between the applied load, N, and the axial deformation, Δ, for the reinforced concrete member shown. The effects due to temperature, creep, and shrinkage can be ignored. Indicate on your plot concrete cracking, steel yielding, and concrete crushing. Provide at least two sample calculations for each of the tension and compression regions for spreadsheet solutions. $f_c' = 40MPa$ $f_y = 400MPa$ $f_{cr} = 2.5MPa$. NOTE: Use the initial tangent stiffness formulation for your calculations.



Elevation View



Cross Section