ENG 7704 Design of Steel Structures

Assignment 6

Note: You must indicate all the code clauses and Steel Handbook References at all the appropriate places. You must also use the proper units at all times. All the details must be included through neat sketches showing details of dimensions, spacing, failure paths (if any), etc.

Q1. The 7m long W250x49 beam carries a central concentrated load. What is the maximum load that it can carry? Assume that the lateral supports are at concentrated load and vertical supports only.

Q2. Design the beam by choosing an economical section with cross-sections not to exceed W410 size. Assume lateral support only at the vertical support points. For bending moment diagrams, etc., use the beam diagrams in the Handbook. Use a dead load factor of 1.25 and a live load factor of 1.5. The supports are made of 200 mm wide 35 MPa concrete wall. Use L=16m, Loads: \( q_1 = 8 \text{ kN/m dead load, 20 kN/m live load; } q_2 = 8 \text{ kN/m dead load, 30kN/m live load; } P_1 = 100 \text{ kN dead load, 225 kN live load; } P_2 = 100 \text{ kN dead load, 300 kN live load. } \) If lateral supports can be placed at any location, what is the length between lateral supports (for this beam) below which there is no gain in capacity?