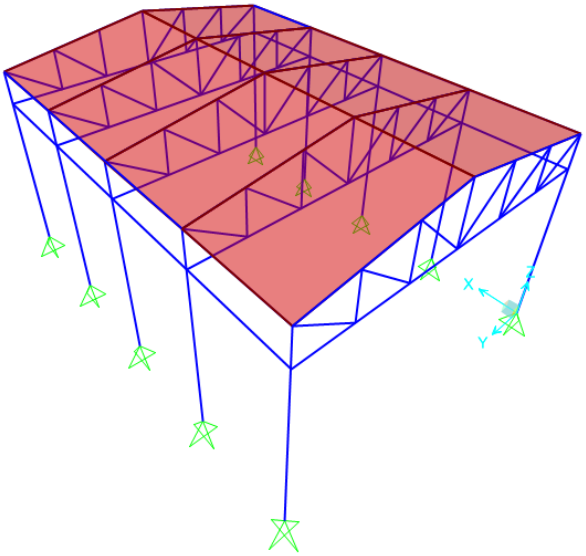
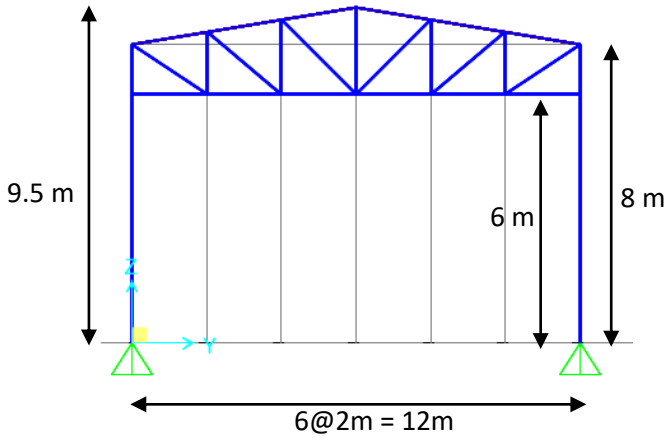
MIDDLE EAST TECHNICAL UNIVERSITY
DEPARTMENT OF CIVIL ENGINEERING

CE482-DESIGN OF STEEL STRUCTURES
2019 – 2020 Fall Semester

Assignment # 3 – Date Due: 22.11.2019





An industrial building is composed of a single bay in y-direction and 4 bays in x-direction as shown on the 3D view. The four bays in the longitudinal direction are each 3 m wide and the bay in the transverse direction is 12 m wide. The 5 mm thick steel roof is supported by trusses in the transverse direction, which frame into tube columns pinned at the base. The trusses are to be constructed of back to back channel sections. The top and bottom chords are composed of UPN200 sections while the vertical and diagonal members are composed of UPN100 sections. The columns are TUBO200x200x12.5 sections. Grade of steel is S275. The building will be analyzed for static loads only, and the trusses will be loaded at their panel points with a Dead Load = 90 kN at the seven joints of the top chord, while the roof will be loaded with a Live Load = 1.5 kPa and a Wind Load = 0.7 kPa (pressure) on the windward side and 0.3 kPa (suction) on the leeward side. In addition, each column will be loaded with a distributed Wind Load = 2.7 kN/m (pressure) and 1.2 kN/m (suction) on the windward side and on the leeward side, respectively. Load combination is 1.2DL + 1.0LL + 1.6WL. Use SAP2000 for your analysis and section properties can be imported from Euro.pro file that is stored with the program files for SAP2000.

Prepare a report including the following topics:

- Give a sketch of your computer model, e.g. 3-D view, loading, member sections etc.
- Show the axial forces developed in the roof truss for an intermediate frame.
- Report the lateral displacement at the top of a column in an intermediate frame.
- Report the reactions at the column base in all three directions for all columns.
- Submit your SAP2000 file and report by sending an e-mail to kkocamaz@metu.edu.tr. Furthermore, submit a hard copy of your report during the lecture hour to your instructor.