

Comparative Study on Performance of Air-Cooled Condenser (ACC) Steel Platform Structures using SCBF Frames, Spatial Structures and CFST Frames

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Abstract : Air-Cooled Condenser (ACC) platform structures are the most complicated and principal structures in power plants and other industrial parts which need to condense the low-pressure steam in the cycle. Providing large spans for this structure has great merit as there would be more space for other subordinate buildings and pertinent equipment. Moreover, applying methods to reduce the overall cost of construction while maintaining its strength against severe seismic loading is of high significance. Tabular spatial structures and composite frames have been widely used in recent years to satisfy the need for higher strength at a reasonable price. In this research program, three different structural systems have been regarded for ACC steel platform using Special Concentrate Braced Frames (SCBF), which is the most common system (first scheme), modular spatial frames (second scheme) and finally, a modified method applying Concrete Filled Steel Tabular (CFST) columns (third scheme). The finite element method using Sap2000 and Etabs software was conducted to investigate the behavior of the structures and make a precise comparison between the models. According to the results, the total weight of the steel structure in the second scheme decreases by 13% compared to the first scheme and applying CFST columns in the third scheme causes a 3% reduction in the total weight of the structure in comparison with the second scheme while all the lateral displacements and P-M interaction ratios are in the admissible limit.

Keywords : ACC, SCBF frames, spatial structures, CFST frames

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