

Hiro McNulty – Structural Option
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Hyatt Regency – Hotel and Conference Center
Pittsburgh International Airport, PA
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Technical Assignment 3



EXECUTIVE SUMMARY

The Hyatt Regency – Hotel and Conference Center at the Pittsburgh International Airport, PA, is a 275,000 square foot multi-use building located directly adjacent to the airport's landside terminal. The building consists of an 11-story tower and 1-story conference center with an additional partial level below grade.

The tower is a concrete structure with typical 22"x28" or 22x32" columns and an 8" filigree floor and roof system. The lateral resisting system in the tower consists of concrete moment frames. The conference center is a steel framed structure, with typical W10x33 columns, and different beam sizes, ranging from W12x19 to W21x44 beams. The conference center has composite steel decking with a concrete slab and steel roof decking. The lateral resisting system in the conference center are four braced frames (2 in each direction), each consisting of two K-braces.

The tower and the conference center are independent structures, and are quite different structurally. Lateral loads have been calculated based on the ASCE 7-02. The original design for the buildings did not incorporate seismic loadings, so part of this analysis is to determine the impact of the new loading case.

Through computer modeling and hand calculations, the structures have been analyzed for the design loading combinations. The controlling load combination was determined to be: $1.2 D + 0.2 S + E + L$. Under this loading, the deflection at the top of the tower was determined to be 20.7 inches, which is within this case's seismic drift limit of 26.4 inches. The seismic loading does not meet the 1/400 standard for drift; however, under the controlling wind loading of: $1.2 D + 0.5 S + 1.6 W + L$, the drift at the roof is limited to 3.2 inches, which is less than the 1/400 value of 3.67 inches. The drift in the conference center is only 0.07 inches, so it is negligible.

The analysis has shown that although almost all of the members are the adequate size for the loads they are required to take, many of the concrete columns in the tower require additional reinforcing steel to carry the critical load case. The only columns that were not satisfactory under the critical loading are the slender columns around the stair towers, although they are satisfactory under the critical wind loading. Overall, with a new controlling seismic load case that is much larger than the controlling wind case, the building still performs as it was designed. Most of the members simply need additional reinforcement, and do not even require re-sizing.