EXECUTIVE SUMMARY

The Hyatt Regency Hotel and Conference Center is located adjacent to the Pittsburgh International Airport in Pittsburgh, PA. The 275,000 square foot Hyatt consists of a 12 story tower with guest rooms and a 1 story conference center. It is also the only hotel located on airport property.

The original design of the Hyatt Regency tower is a system of concrete moment frames and filigree floor slabs. The conference center is constructed of steel framing, typically employing wide flange shapes. The tower resists lateral loads through its concrete moment frames, while the conference center relies on steel braced frames.

The seismic loading on the existing tower control the lateral resisting frame design in the East-West direction over the wind loading that would typically control in the local area. The seismic loads are very large due to the weight of the concrete structure. Analysis has been carried out to compare more lightweight steel framing to the original concrete framing to determine if the steel framing is a more viable alternative. There are a number of design constraints on the project. Foremost is a height limitation due to its proximity to the airport. The new steel design will attempt to stay within all architectural constraints, while reducing the building weight and overall seismic loads.

Hand calculations were performed to generate initial member sizing and to iterate a floor layout. After a suitable initial design was reached, a computer model was created in RAM Structural Systems to assist in member design and load calculations. Chevron braced frames were added in locations that did not interfere with the architectural layout to resist the lateral loads on the structure. From the calculations, it was found that the building weight and seismic loadings were greatly reduced in the steel framing as compared to the concrete framing. However, even with small member sizes with minimal depth, the building height was still impacted slightly. Additional vibration, mechanical/fire protection, and construction management analyses were also performed to determine the viability of the new steel framed design.

The new steel framing was found to support the proposed reduction in weight and seismic loading. Based on other conditions such as the possible vibration problems, the increased cost, and the increased building height, the alternative framing does not seem to be the best choice. In other situations, where the height limit is not a major controlling factor, or where seismic loads need to be decreased, the steel framing seems to be the best selection.