

Executive Summary

The Seneca Allegany Casino Hotel Addition is a 153 foot tall, 11 story hotel located within the Seneca Nation of Indians reserve in Salamanca, New York. This addition ties into an existing hotel tower and casino complex, adding a new floor of office space and 200 additional hotel rooms. Floors are comprised of normal weight concrete on composite metal deck supported by a steel framing system. To resist lateral loads, braced frames are used in the N-S direction and perimeter moment frames are used in the E-W direction. The whole addition rests on steel piles driven to bedrock.

Since the hotel addition makes use of a repetitive floor plan, a staggered truss system was deemed a possible design choice. The ultimate goal of this thesis was to properly implement a staggered truss system working as both the gravity system and lateral system in the N-S direction. Precast concrete planks were also implemented as the floor system, replacing the existing composite metal deck. Hand calculations were performed following *AISC Design Guide 14– Staggered Truss Framing Systems* to determine preliminary member sizes and stresses. Once member sizes were found, a RAM Elements model was created to check loads and deflections.

With the trusses spanning the entire width of the building, interior spaces were affected. The area most affected was the master bedroom in the VIP Suite at one end of the addition. This required that the addition's geometry be adjusted to fit the truss within the wall of the master bedroom. The master bedroom was shifted to "square-off" the end of the addition, thus creating more interior floor space. Options for this extra floor space included a new, separate hotel room, an additional guest room for the VIP Suite, and an elevator shaft.

The use of prefabricated members for the framing and floor system would allow for a faster erection process during construction. A new tower crane was selected in order to carry the heaviest member. This required an evaluation of the site plan during construction. Since the prefabricated members would be quite large, it was found that there would not be enough space on the existing site to store materials. Thus, members would have to be trucked in and lifted directly from the truck. A proper layout was created to show how the delivery trucks would reach the site and the tower crane.

A staggered truss system was found to be adequate for the SAC Hotel Addition, but required changes to the building's existing geometry to make the best use of the system. By "squaring-off" the NE corner of the addition, the existing retaining wall and two large drainage pipes behind the wall would have to be moved and redesigned. This would have been costly and time consuming. Had the SAC Hotel Addition been constructed with the staggered truss system in mind, and prior to the construction of the retaining wall, this would not have been an issue.