EDENWALD NEW TOWER

Thesis Proposal
Executive Summary & Breadth Studies

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EXECUTIVE SUMMARY

The Edenwald New Tower is a 12-story building located in Baltimore, Maryland. Designed as an addition to an existing 15-story tower, its 253,000 square feet were designed to meet the demands of a continuous care retirement community for total project cost of $52 million. The project scope includes 60 apartments and 32 assisted living units, 4 levels of parking, as well as amenities such as an indoor pool, an enclosed walking track, a fitness center, a pub & lounge, a chapel, a great room and more.

The Edenwald addition's structural frame is comprised of flat-plate, post-tensioned concrete slabs supported by concrete columns and shear walls. The building is enclosed with a combination of brick veneer, precast concrete panels, and glass windows and curtain walls.

The area of interest for the proposed thesis design revolves around the building's main lateral force resisting system: 15 ordinary reinforced concrete shear walls, eight of which form 2 separate cores. It was determined that when the building was in its initial stages of design, the code being adopted was IBC 2000. Accordingly, seismic analysis was performed according to this code. However, in the years since then ASCE-7 05 has become the most recently released code governing seismic design, as IBC currently directly references ASCE-7. In the latest code, changes have been made in the seismic chapters governing the S_1 and S_s values with which the seismic response coefficient, C_s, is calculated. The older code has much more stringent requirements, meaning that if the building was designed under the current code, the base shear would have been reduced, possibly allowing for the removal of some of the walls. The goal of this thesis proposal is to redesign the main lateral force resisting system according to loads determined from ASCE-7. At the same time, alternative wall locations will be investigated to reduce the significant amount of torsion that the current design must handle due to the high eccentricities on each floor.

As a result of the wall reductions, which are discuessed below, it was subsequently determined to include coupling beams at shear wall openings to improve the behavior of the cores, and as such their design was included in the depth study. Columns were designed to carry gravity loads were walls were taken out. Lastly, a foundation check was performed for one location, where the wall redesign would likely have significant impact on

The proposed breadth studies include acoustical and lighting redesigns of spaces likely to be critical for the elderly occupants, whose vision and hearing abilities are likely to be impaired. More information on these designs can be found below.

BREADTH TOPICS

Lighting:

Spaces used for the elderly are subject to more stringent lighting requirements due to the fact that the occupants are likely to have decreased or limited vision. The fifth and six floors were designed as assisted living, and so the corridor and adjacent reading/gathering area for these floors would need to have appropriate lighting, as dictated by IESNA. For this breadth, an analysis of the public spaces of these floors was conducted, using the program AGI to determine illuminance levels. For the redesign, in addition to illumination considerations, the solution was also considered in regards to ADA compliance, general aesthetics and power density.

Acoustical:

One of the amenities provided in the Edenwald New Tower is a chapel located on the first floor. This spaced will be analyzed and redesigned accordingly for two criteria: reverberation time and sound transmission class (for the partition separating the chapel from the corridor). Those who use hearing aids are more susceptible to reverberation interference, and so it is critical that the acoustics of the space to not inhibit the occupants from understanding the words being spoken. While churches and worship places often rate higher reverberation times to allow the sound of the music to properly develop, the fact that the elderly will probably exclusively use the chapel means that speech clarity supersedes sound quality.

Additionally, spaces such as theaters and music rooms (which are similar in function to a chapel) are desired to have the partitions separating them from corridors achieve a sound transmission class (STC) rating of 60. The STC rating is an average value given to a partition to rate its sound attenuation according to the partition's transmission loss values across 16 frequencies. The wall separating the chapel from the corridor will be analyzed to determine if its rating is adequate, and then shall be redesigned in the case it is not.