

Executive Summary

The purpose of this report is to analyze the lateral system implemented to resist seismic and wind activity of Pearl Condominiums which is located in Philadelphia, Pennsylvania. This was accomplished through the combination of computer analysis software (ETABS) and hand calculations.

The gravity system of this building is comprised of load bearing walls and precast concrete planks. The main component in the lateral system is the use of concrete masonry units as shear walls in the stair towers and the elevator core. The ground floor contains moment frame to transfer lateral loads from the stair tower shear walls which end on the second floor. Finally, the use of metal stud walls with metal strapping is used to help resist lateral load in the east to west direction of the building.

This report discussed the influence of the lateral load path of the building, overall building drift, and story drift. The effect of overturning and it's the impact on foundations are analyzed because of the affect on the soil that supports the foundation system. There is a brief of discussion of torsion which does not control in the design, this results from the symmetric shape of the building. Finally the center of rigidity and center of mass are analyzed and their effects on the loading.

From the process of writing the report, the findings showed that the wind controlled in the north to south direction (short direction) and the seismic loading controlled in the east to west direction (long direction). Using the loads and story deflections figured through the ETABS model prepared, the shear wall were analyzed to see if they could resist the loading and the story drifts were tested against allowable drifts by code.

The concrete masonry shear walls through hand calculations showed that theses lateral elements were able to resist the loading depicted by the two types of forces. The overall drift was acceptable by code, but some of the story drifts differed from the code requirements. The story drift will need to be addressed in the proposal, resulting in the decision of choosing a system that will be able to meet the code requirements for story drift.