STRUCTURAL TECHNICAL REPORT 3

LATERAL SYSTEM ANALYSIS AND CONFIRMATION DESIGN

EXECUTIVE SUMMARY

This third technical assignment is an analysis that confirms the design of the existing lateral load resisting system of the new tallest building in Philadelphia, the Comcast Center. Currently under construction, the Comcast Center will be 57 stories tall reaching a height of 1,002 feet. The glass-clad skyscraper will primarily function as office space with a few retail and restaurant spaces. This LEED-certified structure promotes public transportation with a new grand entrance to the Suburban Station providing access to the commuter rail and two subway lines.

The gravity load system of the Comcast Center is composed of a composite metal deck floor supported by steel beams. The steel beams frame into steel columns along the perimeter of the building and a massive concrete core at the center of the building.

Lateral loads from wind and seismic activity are resisted by the massive concrete core walls which range from 1'-6" thick to 4'-6" thick and act as shear walls. The glass façade is supported at every floor with a steel tube which resists the local lateral forces caused by wind.

The total drift of the structure is 17.5 inches. A drift limit of L/600 allows for 20 inches of lateral drift. Due to the cantilevered condition of the building the story drifts experienced at the top of the structure are greater than the story drifts at the base.

Member checks such as shear strength were performed to confirm the design of the shear walls. The total shear strength of the core walls is 22,000 kips. This is much greater than the 6,300 kips the structure experiences. With a shear strength 3 times greater than structurally necessary it poses the question of whether or not all the shear walls are needed. This theory will be explored in my thesis this Spring.