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Structural Option
Building: Vickroy Hall
Location: Duquesne University
Pittsburgh, PA 15282
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Advisor: Dr. Boothby



EXECUTIVE SUMMARY

Finished in July 1997, this eight story 'Living/Learning Center' at Duquesne University provides living quarters and learning spaces for up to 280 upper class students. These living quarters include laundry facilities, double suites, and private restrooms. The 'eclectic' architecture is representative of other buildings on campus. Its impressive facade has won a masonry architecture award, which is displayed in the ground floor lobby.

Vickroy Hall is a structural steel building with moment frames used to resist lateral forces. The floor system is that of a composite metal deck with welded wire fabric reinforced light weight concrete. The exterior walls are composed of light gage steel framing with a curtain wall of brick.

The purpose of this report is to collaborate a years worth of research and design to determine if a different type of structural design would have been worthy for consideration. This report also examines two breadth topics that relate to the building.

The structural redesign of Vickroy Hall incorporated the removal of the structural steel frames and the incorporation of masonry load bearing walls and hollow core pre-cast concrete planks as a floor system. Two main design criterions were to be adhered to. Since the building had won an architectural award, the aesthetics were to be kept as close as possible to the original. Secondly, the living spaces had to be roughly maintained.

The breadth topics were to a) redesign the lighting in a ground floor lounge area and b) to analyze the schedule impact of redesigning the system.

The wall sizes, when determined using the Allowable Stress Design were basically the same as the original. Also, the scheduling of the main elements of the structural systems were very close, with only a week of difference in ending time. The redesigned system did bring about some changes. The loading on the foundations was higher, resulting in a redesign of some caissons and the addition of more grade beams. The exterior columns were also modified. However, the changes were not substantial enough to warrant the dismissal of the load bearing masonry wall system.

It was concluded that load bearing masonry walls with hollow core planking would indeed be a sensible alternative to the structural steel moment frame.