Thesis Proposal

Executive Summary

The 8th Street Office Building project is a government office building designed for the state of Virginia. Unfortunately, construction of the building has not come to fruition as a result of a budget deficit. Therefore, design of the building has been on hold since 2008 at approximately 85-90% completion until funds are allocated for the remainder of the project.

It was discovered in Technical Report #3 and through discussions with the structural design engineers that the current lateral system for the 8th Street Office Building can be optimized through further analyses. Therefore, the main intent of the proposed thesis will be to investigate alternative lateral systems to the existing 12" thick reinforced concrete shear walls that are specified to surround the four transportation cores of the building. The alternative systems that will be considered are braced frames and steel plate shear walls. Initially, the alternative systems will be designed using the existing locations of the transportation cores as well as the loads that were calculated in Technical Report #1. This will provide a basis for comparison of the existing and alternative lateral system. The comparison of the systems will be based on a variety of factors including weight, cost, constructability, and serviceability. The computer program ETABS will be utilized in the design and comparison of the lateral systems. Finally, one optimal lateral system will be chosen from the existing system of reinforced concrete shear walls and the two proposed alternative systems.

The overall service core of the 8th Street Office Building will then be redesigned in an attempt to minimize its effect on useable space for the tenants. Movement and flow of the occupants through the building as well as the required means of egress will be considered. As a result, the transportation cores may be relocated and have an effect on the lateral system.

The 8th Street Office Building is also intended to achieve a Silver Certification under the U.S. Green Building Council's LEED for New Construction Version 2.2 Rating System. Many sustainable strategies have already been incorporated, but more points may be gained through the addition of a green roof that retains and distributes water for use throughout the building. Therefore, a green roof will be considered on the main roof level as well as in place of the existing planters on the terraces. The water drainage and retention will be designed, and water savings will be calculated.

Finally, the optimal lateral system will be redesigned according to the new transportation core locations and with the additional load from the green roof.