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Thesis Proposal – Breadth Topics Only (Revision #2)

Executive Summary

This proposal outlines the scope of research for the re-design of New York Law School's New Community Facility. Two depth and two breadth topics of study are proposed for Spring 2008. There are no obvious shortcomings of the existing building systems, but some systems will be re-designed and approached from a different direction. All of the topics are linked to some degree; the results of one design will impact other areas of study.

The first depth study focuses on the lighting systems in four spaces. These spaces were described in Technical Report 1, and schematic designs were created for Technical Report 3. The depth study will further develop the schematic design using comments from professional designers and further study of the spaces. Equipment will be selected to meet the design goals.

The electrical depth study addresses four issues. The branch circuits for the four spaces in which lighting will be re-designed must be changed to reflect the new loads. Secondly, a protective device coordination study will be conducted through a new pathway. A third study will re-design the lighting system to utilize 277V and determine whether this change is advantageous. Finally, the feasibility of installing photovoltaics for energy generation will be determined.

The first breadth study investigates the acoustical performance of the Level B4 library before and after the proposed lighting changes. Improvements will be proposed if necessary. The second breadth study analyzes the glass façade system of the Level 5 student dining area for insulation and solar heat gain. A new façade system will be researched if performance of the existing system is poor.

This document is available online at the following location:
<http://www.engr.psu.edu/ae/thesis/portfolios/2008/adk165/>

Breadth Topic 1: Acoustics

The library of level B4 contains reading areas and book stacks. Quiet conditions must be maintained to ensure comfort for occupants. Proper sound isolation and low reverberation times should characterize the space. The proposed lighting changes will drastically alter the acoustical performance of the space, since a luminous ceiling replaces acoustical ceiling tiles. For this breadth topic, appropriate acoustical characteristics for a library will be researched. The space will then be analyzed for acoustical performance both before and after the lighting changes. Specifically, the reverberation times will be calculated, and ray diagrams will predict sound propagation. The new design will be compared acoustically to the original, and possible improvements will be proposed if necessary.

Breadth Topic 2: Façade System and Solar Loads

NYLS's New Community Facility features large areas of glass façade. In addition to allowing light into the building, this glass also creates solar heat gains and possibly heat losses due to poor insulation. The façade system of the level 5 student dining area will be studied. This particular space has a significant amount of glass façade area. The solar gains and heat losses in this space will be calculated. If the results reveal poor performance, an improved façade system will be researched.