Introduction to Building Redesign

Problem Statement:

Due to the surroundings and purpose of Spring Run Assisted Living; it is difficult to choose another method of support for this building. The architect had designed the building to be a masonry load bearing wall system. During the fall 2005 semester, I analyzed multiple options for an alternate design at Spring Run Assisted Living. After an investigation into altering the building's floor system to 3 other options, I concluded that the original design seemed to be the most efficient. The other options were steel structure, pre-cast pre-stressed double tees, and a one-way concrete joist system. Following the analysis of different floor systems, I took an extensive look into the current building lateral resistance system. As a conclusion to my analysis I concluded that the current lateral system was not only sufficient but possibly the most viable solution based on the building use and architecture.

At the conclusion of fall semester, I proposed to completely abandon the current structural design and redesign it with structural steel and cast-in-place concrete slabs on metal deck. A mechanical study was performed to consider how change the exterior walls would affect the heat transfer through the walls. A cost and schedule comparison was completed to study the affects the new design would have on the building.

Solution Overview:

To start the new design, it was necessary to analyze the current wall layouts as well as any areas considered to be dead space. This then allowed me to create a column grid without affecting the interior layout of the building. Once the new grids were laid out I was able to begin utilizing software programs to model the structure. The structural modeling program I chose was RAM Structural System. With the new structural system,

it was necessary to reanalyze the lateral resistance and this was also done with RAM Structural System. Once the design was complete, I needed to check to verify that my new design maintained the resistance to heat transfer set forth by ASHRAE. Finally and most importantly, I studied how the new design would affect the owner through cost and time. I completed my cost analysis by using a program named Cost Works 2005. Cost Works is essentially R.S. Means through a computer program. To complete a schedule comparison I was able to contact Bill Koch, the project manager representing Paul Risk & Ass., in which he gave me standard times for construction in and around Lancaster, Pennsylvania.