

EXECUTIVE SUMMARY

The Administration Building is an office building in Pennsylvania which is 87' tall, but only 67' are above grade. It has five floors with the first floor being 20' floor to floor height and the rest being 13.33' floor to floor height. It is a rather long building with 560' in the long direction and 203' in the short direction.

The building's primary structural system is comprised of a composite steel frame with composite floor slabs. The building resists lateral loads using braced frames between the floor slabs, which act as rigid diaphragms. The frames use stiffness in the plane of the lateral load and act similar to a truss to transfer the loads to the columns, which then transfer the loads to the foundation.

However, a composite steel building is not the most economical floor framing system. In technical assignment #2, four other systems were chosen as alternative floor framing methods and they all cost less than a composite steel building. A composite steel building is the industry standard for a steel structure and the design professional has more than sufficient experience in this type of design. With that in mind, the reason is clear why the design professional choose to use a composite steel building.

The proposed solution will involve changing the existing composite steel framing to a 1-way concrete slab. With the use of the existing column grid, the girders will frame in the 20' direction. The beams run perpendicular to the girders, spanning in the 40' direction. The lateral system will change from a braced frame system to moment frame system. The moment frames are achieved simply from the columns and beams. Since my building is only 4 stories above grade, moment frames should be sufficient. If moment frames are not sufficient, then the use of shear walls will be used.

By switching to 1-way slab system, multiple advantages are possible. The proposed solution requires no lead time which is a huge benefit when working on a tight schedule. With using concrete instead of steel, vibrations will not be an issue. Finally, the 1-way slab has a deflection of 1.77" which is deflection savings as compared to the composite system.

This system will be designed using ETABS or RAM Structural System, PCA Slab, PCA Column, ACI 318-05 as the model code, and the CRSI handbook. Trial sizes, as outlined above will be inputted into ETABS where multiple load combinations will be analyzed to determine what load combination controls. Also the sizes mentioned above are only trial sizes and most likely will change.

Changing from a composite system to 1-way slab system will impact the cost and schedule. An in-depth cost and schedule impacts of the 1-way slab will be analyzed for my construction management breadth. This includes a further analysis of just R.S. Means, but an assemblies estimate. Sub contractor input and vendor quotes will be analyzed.

For the electrical breadth study, a redesign of the transformers for the buildings electrical power distribution system. Currently there are an excessive amount of transformers used in the electrical power distribution. To reduce the number of transformers, the feeders must also be resized.