

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 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 proposal includes changing the structural system from a composite system to an open web joist system. By switching to an open web joist system, multiple advantages are possible. The proposed solution is almost the same weight as the composite system, so the foundation will not have to change. The floor to floor height will be maximized by 3" as the depth of the open web joists is shallower than the composite system. Finally, open web joists has a deflection of almost 1" which is 1" savings as compared to the composite system.

This system will be designed using RAM Structural System, AISC LRFD 3rd edition as the model steel code, the SJI 42nd edition Standard Specification, and AISC steel design guide 11. A detailed vibration analysis will be performed to the open web joists. Trial sizes will be inputted into RAM Structural System. Multiple load combinations will be analyzed to determine what load combination controls.

Changing from a composite system to an open web joist system will impact the cost and schedule. An in-depth cost and schedule impacts of open web joists 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 calculation of the design loads for the administration building electrical distribution system. Those calculated design loads will also be compared to the installed system. An investigation of potential modifications to the electrical system will be addressed.