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Executive Summary – Breadth Work

When changing from a steel building to a concrete building, the mechanical, architectural, plumbing, and many other system designs could be changed for better efficiency. Construction management issues such as construction schedule, construction cost, and duration of the project will also change. This being said, the two areas of breadth work will be the greatest impacted areas; mechanical systems and construction management issues.

Construction Management

With a switch from a steel building to a concrete building, impacts will be made on the construction schedule and methods used. Therefore, an analysis of each change in the depth work will be a crucial part in determining which solution is most economical and feasible. One analysis will compare the cost of a concrete slab on composite metal deck supported by steel beams to that of a two way flat slab with drop panels. This analysis will include the price difference due to a change in the lateral system from concentric chevron braced frames to either shear walls or concrete moment frames. Both shear walls and concrete moment frames will be researched to determine which a better option is. Another analysis will be of the construction schedule. This will clearly show critical paths and task durations for optimum construction processes for both the steel and concrete buildings. With all the changes made to the structure, there will be additional construction issues such as material availability, cost, constructability, and labor forces.

Mechanical

As a result of redesigning the structural system, mechanical system issues will arise. Changing the floor system to a two way flat slab will affect a number of things related to the current mechanical system design; such as routes of duct work, optimal mechanical systems used. Running duct work along walls may yield a smaller concrete slab rather than the current design of running it through interior sections of the floor. Also, it may be more efficient to use a totally different HVAC system such as individual units. This could possibly eliminate the need for punching large holes in the slab for duct work. Calculations will be performed to determine whether the current mechanical system is adequate to service the new structural systems. Adjustments to the mechanical system will be made as necessary.