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Addendum 1

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1/28/2010

Problem background

The Simmons College School of Management is a 5-story LEED Gold educational building that includes instructional and administrative spaces to serve the current needs of the school. When designed, allowances were included to accommodate a nine story building expansion to be constructed to the west of the existing building. This would either be a separate building or a structure that would be separated from the existing base structure by an expansion joint.

Accommodations in the existing structure include allowances for the increased gravity load to be carried through select areas of the superstructure as well as the below grade parking garage. The existing plans indicate that the expansion will occur primarily on the west end of the building. See Figure 10 for the proposed area for future expansion. The area limit for the expansion is highlighted in red and the columns with future load consideration are circled. During the design process, it was chosen that the best way to accommodate for the expansion was to keep the structural system separate from the base building. The study to be conducted will analyze an alternative option for the expansion that allows the additional structure to be tied to the existing base building.



Figure 10 Partial Plaza Plan with Future Expansion Area

Problem Statement

Analyze an alternative solution to an on site expansion and review the implications on the existing structure.

Solution Method

A study is to be conducted on one option for a future expansion to the building and its effects on the base structure. This will analyze the option for a structurally tied expansion to the West of the building. The vertical height of the building will be limited by the existing structure. During the design process, preliminary allowances were made for the expansion. This information was not made available beyond the future factored load limitations given on the structural drawings. Therefore, it will be necessary to produce a structural layout that will be developed and analyzed throughout the study. This study of the altered structural system will incorporate both elements of structural design and analysis. The lateral system will then be analyzed for the change in torsional effects that the addition will have on the building.

Primary goals for this design will be constructability and the impact on the structure as a whole. The existing structure experiences a significant amount of torsion due to the arrangement of lateral elements and the eccentricity between the center of mass and center of rigidity. Therefore future design must take into account the effects on mass and rigidity of the entire system.

Indications from the study of the seismic forces acting on the building and the building's lateral system resulted in the seismic load case being a critical loading condition. Depending on the response of the new structural system to lateral loads, a dynamic analysis of the structure may reduce the magnitude of the seismic load. This section of the solution method will be contingent on the analysis of the expanded structure and will be assessed upon completion of the initial study.