Breadth Topic #1: Cost and Schedule Analysis

While this project was not necessarily a cost-driven one, cost is always a matter in the design of a project. In fact, this project was more reliant on the fast delivery first, which is why a precast concrete system was proposed. Therefore, the purpose of the re-design of the structure is to find the difference in cost and scheduling. Both steel erection and precast erection need lead time so the factories can make the materials and have them all ready to be shipped on-site when the schedule asks for it.

Figure 19: *On-Site Picture* of precast columns being erected

As far as the cost has represented, see Appendix K for CSI form spreadsheet, the cost of the steel is $2,000,000 higher than the cost of the precast superstructure. Even though the floor plan increases slightly with the use of precast panels, it is still a cheaper system. The cost accounted for doesn't even go to include connections or shear studs, but on the same side the concrete side doesn't account for grout. Fire resistance is also an issue since with the concrete system, the fire rating is already met where as the steel members need to be fire proofed as a separate item which adds cost and time to the project. However, the cost for the lateral systems is a little different as seen in Appendix K.

	COST	% of Overall System
Shear Wall	$ 12,531,148.24	84%
Braced Frames	$ 1,493,536.96	9%
Precast Overall	$ 14,840,417.98	
Steel Overall	$ 16,618,444.75	

Figure 20: *Comparison Chart* of pricing of the structural systems

While the steel braced frames are a cheaper lateral system, the overall system is more expensive than the precast and concrete shear wall system together. This means that if less shear walls can be designed, then it could be the overall governing system. Although, it should be kept in mind that none of the shop pricing is involved in these calculations. It can be easier to order steel because the sizes are more of a general size and can be fitted into a design much easier than the precast panel design. Each system still needs a crane on site which can accrue a large expense if kept on site for a long period of time.

The schedule created for the new system demonstrated that it would actually take longer for the precast plank system to go up rather than the steel. This is partly due to the fact that the original project schedule was never issued and just a guideline of six months to place foundations erect all the steel was given and this was a longer period due to the complex curved foundation. According to Appendix J, the precast system took about 284 days to complete which doesn't quite hold up to the steel system's 130 days to completion. However, it would seem that the precast system took a lot longer mainly due to the length of time it takes to let the concrete of the shear walls cure to begin the placement of the next floor. The way this system was sequenced is the same as the original project: by section as detailed in Figure 1. Another sequence that was considered was to start from Section III and build out simultaneously towards Section I and Section V. This was determine to make the site much too congested because two cranes would need to rented as well as multiple pumps trucks. In general, it would make the job site much too hectic and difficult to manage.