

## Breadth Topics

### Cost and Schedule Breadth

When altering the existing structure of Southtown Building No. 5 from a cast-in-place concrete system to a Girder-Slab system, there are many cost and schedule changes that are associated with the change. One main goal of this project was to compare the material, labor, and erection costs of the existing structure to those of the redesigned structure.

In order to achieve an accurate price of the existing superstructure, many factors were taken into account. The cost of the original structure was calculated using R.S. Means 2007 Construction Cost Data. The 2007 Cost Data was chosen to account for the June, 2007 start date. A factor of 1.31 was multiplied to the estimate for a location of New York City, NY.

The cost estimate of the existing system came to \$3.35 million. This total was derived by contacting distributors and contractors in the New York area. Those numbers were cross referenced with R.S. Means to get the final total. The takeoff consisted of the existing floor slabs, Cast-in-place columns, shear walls, foundation walls, spread footings and the mat foundation under the core of shear walls. A summary of the costs per item can be found below in Table 7.

Table 7: Existing Concrete System	
Floor Slabs	\$2,036,000
Columns	\$929,000
Shear Walls	\$240,000
Foundation Walls	\$76,000
Spread Footings	\$10,900
Mat Foundation	\$56,000
	<b>Total: \$3,347,900</b>

The cost estimate for the proposed Girder-Slab system was also derived by contacting local contractors and distributors as well as using R.S. Means. The Girder-Slab system was more expensive than the existing CIP structure and totaled \$4.3 million. In this takeoff, the elements

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that were considered were the braced frame lateral system (consisting of columns, beams, and diagonal members), the composite floor system on the first floor (consisting of beams, metal deck, shear studs, and CIP concrete), the Girder-Slab system on floors 2-Roof (consisting of D-Beams, hollow core planks, and specialized planks for the roof), steel columns, spandrel beams, spread footings, fireproofing, and erection costs. A breakdown of the costs associated with each item can be seen in Table 8.

Table 8: Proposed Girder Slab System	
Braced Frame Lateral System	893,300
Composite Floor 1	140,000
Girder-Slab Floors 2-16	1,928,000
Columns	500,000
Erection Costs	354,600
Spandrel Beams	108,000
Fireproofing	259,000
Foundation Walls	75,500
Spread Footings	10,900
Mat Foundation	56,100
	<b>Total: \$4,325,400</b>

Labor, equipment, erection times, profit and overhead were taken into account for both structural systems. A full graphic comparison can be seen in the Appendix.

Although the Girder-Slab system costs roughly \$1 million more than the CIP system, the Girder-Slab system will be able to be erected approximately 2 months quicker than the existing system. Using Microsoft Project, a Gantt bar schedule was created which can be seen in the Appendix.

Using a start date of June 25, 2007 provided by the contractor, the Cast-in-place system will top out on December 11, 2007. This is approximately five months of construction for the superstructure. A majority of the time spent on the CIP system revolves around pouring the foundation. The footings, mat foundations, foundation walls take about two and a half months

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to complete. The cellar and floors 1-3 take about a week each to form and pour (including columns, shear walls, and slab) while floor 4-Roof take only 3 days each. This is unusually fast for cast-in-place concrete but in NYC a 3 day form, pour, strip period is very achievable.

With the same start date of June 25, 2007, the Girder-Slab system is able to top out on October 12, 2007. By eliminating a mat foundation and foundation walls, the erection time is significantly reduced. Also, according to a Girder-Slab contractor, up to 8000 square feet can be erected per day. Since the typical floor is just over 8000 square feet, one floor can be erected every 2 days. This number may be reduced depending on the speed and expertise of the erection contractor.

The steel system allowed for a decrease in erection time by 42 working days and over two months total. This can give way to opening the building sooner and enable the owner of the building to generate revenue earlier. Since each unit in the building is separately owned by each tenant, it is hard to estimate the amount of revenue the owner would generate with the time savings. With condominiums ranging in price from \$575,000 for a one bedroom/one bathroom to \$1,295,000 for a three bedroom /three bathroom, the amount of interest that the owner would generate from an earlier opening would contribute to the added costs of a steel system. Additionally, less time spent in construction means less money to pay back in construction loans. These loans are usually interest-only payments during construction and become due upon completion so the quicker the construction, the less money the owner has to dish out in interest rates. This faster erection process can not only save time during the construction but money for the owner, which is always a bonus.