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Construction Management
Tech Assignment 2
Advisor: David Riley
October 31, 2005

Executive Summary

The Research and Economic Development Center Building is split up into four phases by the four areas of the building. The schedule shows the key construction work to be excavation, foundations, steel erection, MEP rough-in, equipment installation, and finishes. It is shown on the schedule that the work does not appear to flow well through the floors leading to large gaps in work. This is due to keeping crews with consistent work which will lead to better productivity. The schedule also denotes the key activities as well as a number of milestones, namely the start and finish of the building. These dates are June 3, 2004 and January 31, 2006. This leads to a project length of 20 months.

The assemblies estimate is for the exterior cladding system. The main areas of exterior are standard bricks with metal stud back up and metal siding using corrugated aluminum panel. The glass is insulated single hung glass. The last thing that was taken into account in this estimate was the exterior doors. The final estimate for the cladding system came to \$1,690,061.

For the structural system estimate, calculations are based on one bay located on the west side of Area 1 for all three floors. This was used because it had a section of foundation wall, meaning that the wall could be subtracted to yield a central bay. Utilizing that the typical bay size in this building is 30' by 30', and that there are bays of a similar size and 9 of a 30' by 40' size, a total building super structure has been estimated. This yields that the total structural estimate is \$13,896,427.11. This estimate falls just high of actual cost of the structure \$13,379,000.

The program ICE 2000 was used to come up with a general conditions estimate. All costs and times were estimated using both aerial photographs and the construction schedule. This schedule is for the CM Agency only. It does not take into account any of the general conditions estimates of the other prime contractors. It is important to remember this when one looks at site photographs because there are a number of trailers on the site but only one of those belongs to Turner and resultantly shows up on this estimate. This estimate came to just under \$2,500,000.

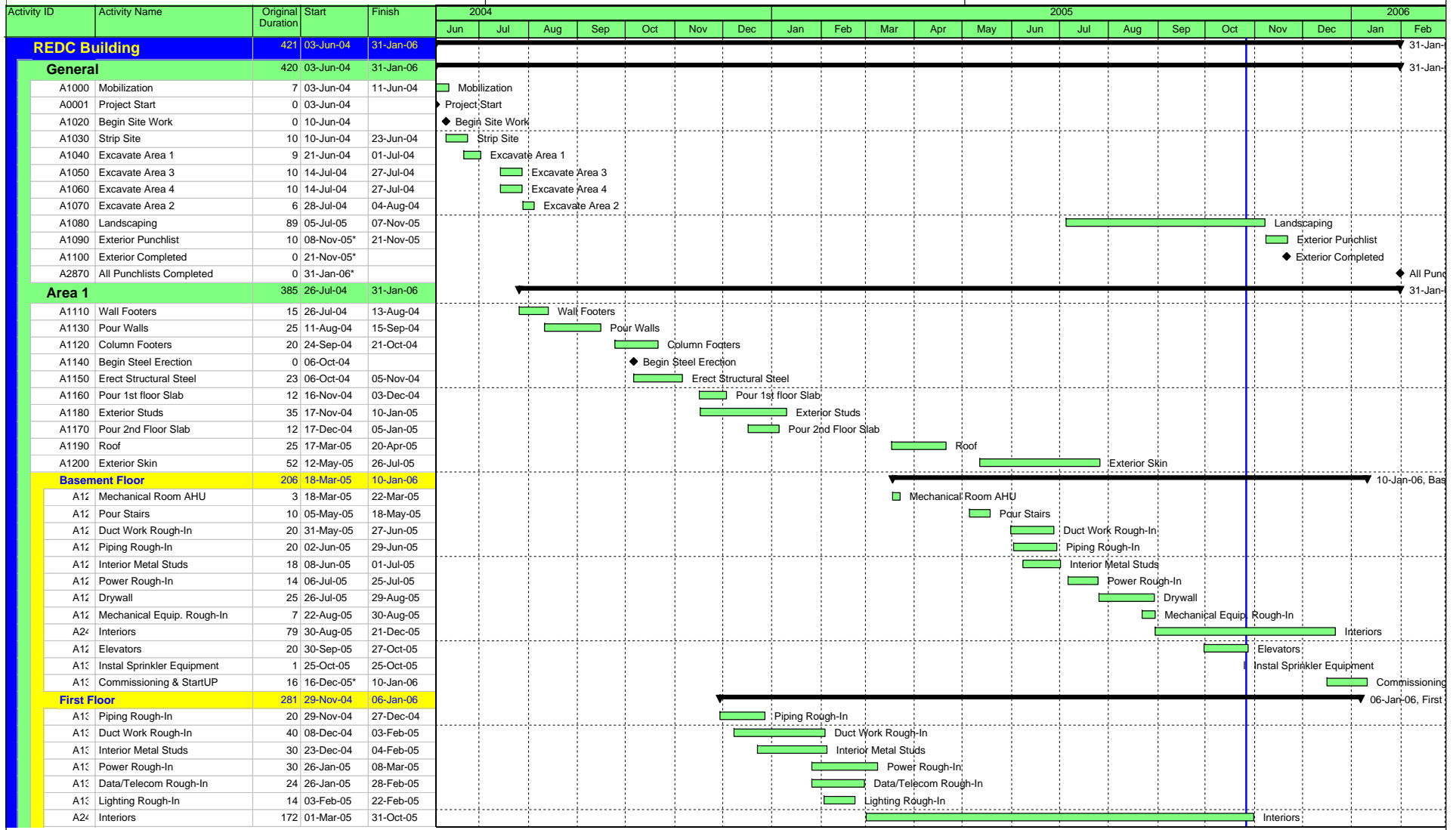


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Technical Assignment 2 Cost and Methods Analysis

Detailed Project Schedule:

This project was split up into four phases broken by the areas of the building. The schedule shows the key construction work for the building. Excavation, foundations, steel erection rough-in, equipment installation, and finishes are the order of all floors. Although the work for each area does not flow well, if the entire schedule is viewed, the schedule makes more sense. Some trades were brought only in for certain periods of time, e.g. sprinkler systems installation. Another thing to take into account is that foundations and excavation was done at one period of time and the steel erection was done at another for many areas of the building. The last thing that needs to be taken into account when viewing this schedule is that the roof was place and the initial work on it done well before the mechanical systems were all done. All of these points lead to the leveling of crews as well as preventing crews from taking long breaks in work. This will lead to better productivity.



█ Actual Work
 █ Critical Remaining Work
 ▶ Summary
█ Remaining Work
 ◆ Milestone

Assemblies Estimate:

Name	Quantity	Cost/ SF	Total
Glass	17012	\$55	\$935,660
Brick	24270	\$26.99	\$655,047.3
Metal Siding	3900	\$4.61	\$17,979
Glass Doors	15	\$5425 (per door)	\$81,375
		Total	\$1,690,061

Above is shown an estimate for the exterior cladding system. The main areas of exterior are brick and metal siding. In this, are different types and sizes of glass as well as glass doors. Standard bricks with metal stud back up walls are the assembly for the brick areas. The metal siding areas are standard corrugated aluminum panel. The glass is insulated single hung glass. Because the glass was estimated in R.S. Means by window size, an estimate per square foot was found. The last thing that was taken into account in this estimate was the exterior doors. These were counted up and a price per door was found.

Detailed Structural Estimate:

The calculations are based on one bay located on the west side of Area 1. This was used because it had a section of foundation wall, meaning that the wall could be subtracted to yield a central bay. Utilizing that the typical bay size in this building is 30' by 30', and that there are 59 bays of a similar size and 27 of a 30' by 40' size, a total building super structure has been estimated.

- 3 Floor Exterior Bays 30' by 30': 26
 - Uses 1, 2, 3 (2), 4, 5

#	Price	Quantity	Total
1	\$43,855.71	1	\$43,855.71
2	\$165,726.00	1	\$165,726.00
3	\$32,961.65	2	\$65,923.30
4	\$986.82	1	\$986.82
5	\$1,395.00	1	\$1,395.00
		Total	\$277,886.83

- 2 Floor Exterior Bays 30' by 30':13
 - Uses 1, 2, 3, 4, 5

#	Price	Quantity	Total
1	\$43,855.71	1	\$43,855.71
2	\$165,726.00	1	\$165,726.00
3	\$32,961.65	1	\$32,961.65
4	\$986.82	1	\$986.82
5	\$1,395.00	1	\$1,395.00
		Total	\$244,925.18

- 3 Floor Interior Bays 30' by 30': 11
 - Uses 1, 2, 3 (2), 5

#	Price	Quantity	Total
1	\$43,855.71	1	\$43,855.71
2	\$165,726.00	0	\$0.00
3	\$32,961.65	2	\$65,923.30
4	\$986.82	0	\$0.00
5	\$1,395.00	1	\$1,395.00
		Total	\$111,174.01

- 2 Floor Interior Bays 30' by 30': 9
 - Uses 1, 3, 5

#	Price	Quantity	Total
1	\$43,855.71	1	\$43,855.71
2	\$165,726.00	0	\$0.00
3	\$32,961.65	1	\$32,961.65
4	\$986.82	0	\$0.00
5	\$1,395.00	1	\$1,395.00
		Total	\$78,212.36

- Bays 30' by 40': 27
 - Uses a factor of 1.25 times 1,2,4,5

#	Price	Quantity	Total
1	\$43,855.71	1.25	\$54,819.64
2	\$165,726.00	0	\$0.00
3	\$32,961.65	0	\$0.00
4	\$986.82	1.25	\$1,233.53
5	\$1,395.00	1.25	\$1,743.75
		Total	\$57,796.92

3 Floor Exterior Bays 30' by 30'	\$7,225,057.58
2 Floor Exterior Bays 30' by 30'	\$3,184,027.34
3 Floor Interior Bays 30' by 30'	\$1,222,914.11
2 Floor Interior Bays 30' by 30'	\$703,911.24
Bays 30' by 40'	\$1,560,516.84
Total	\$13,896,427.11

This yields that the total structural estimate is \$13,896,427.11. This estimate falls just high of actual cost of the structure \$13,379,000.

General Conditions Estimate:

The program ICE 2000 was used to come up with this estimate. All costs and times were estimated. The interesting thing to note about this estimate is that it is for a CM Agency. This project had multiple prime contractors. That means that each of these contractors would have a general conditions estimate as well. It is important to remember this when one looks at site photographs. There are a number of trailers on the site but only one of those belongs to Turner and resultantly shows up on this estimate.

Estimate Detail - REDC Building

Detail - Without Taxes and Insurance

Estimator : Krsiten Eash
Project Size : 0 sqft

ItemCode	Description	Quantity	UM	Lab.Unit	Mat.Unit	Eqp.Unit	Sub.Unit	Eqp.Rent.Unit	Temp.Mat.Unit	Other Unit	Tot.UnitCost	TotalCost
01110.100	Fees	21.00	MO				30,000.000				30,000.000	630,000.00
01310.100	Project manager	89.00	WEEK	1,589.6500							1,589.650	141,478.85
01310.110	Superintendent	70.00	WEEK	1,241.1500							1,241.150	86,880.50
01310.120	Assistant superintendent	89.00	WEEK	898.5500							898.550	79,970.95
01310.130	Job engineer	356.00	WEEK	841.2500							841.250	299,485.00
01310.160	Secretary	89.00	WEEK	729.1500							729.150	64,894.35
01310.190	Living expenses	89.00	WEEK	412.8500							412.850	36,743.65
01310.210	Purchase drawings	2.00	LS		1,200.000						1,200.000	2,400.00
01310.220	Travel expenses	1.00	LS				5,000.000				5,000.000	5,000.00
01320.100	Prograss photographs	21.00	MO					238.000			238.000	4,998.00
01320.110	CPM schedule	1.00	LS				4,852.000				4,852.000	4,852.00
01510.110	Job telephone	21.00	MO				89.350				89.350	1,876.35
01510.120	Electric light bill	21.00	MO				283.000				283.000	5,943.00
01510.130	Water bill	21.00	MO				89.000				89.000	1,869.00
01510.140	Temporary heat	15.00	MO				1,107.850				1,107.850	16,617.75
01510.150	Temporary fire protection	21.00	MO				206.000				206.000	4,326.00
01510.100	Temporary wiring	18.00	MO				258.000				258.000	4,644.00
01520.100	Office trailer	21.00	MO				374.000				374.000	7,854.00
01520.110	Job tool house	3.00	EACH				1,210.000				1,210.000	3,630.00
01520.120	Portable chemical toilet	5.00	MO				87.250				87.250	436.25
01520.130	Water, ice and cups	21.00	MO				138.000				138.000	2,898.00
01520.140	First aid supplies	42.00	MO				50.000				50.000	2,100.00
01520.150	Safety supplies	42.00	MO				150.000				150.000	6,300.00
01520.160	Office supplies	21.00	MO				275.750				275.750	5,790.75
01540.120	Buck hoist	10.00	MO			850.000					850.000	8,500.00
01540.200	Welding machine	21.00	MO			208.000					208.000	4,368.00
01540.220	Gasoline and lubricating oil	6,000.00	GALS			1.850					1.850	11,100.00
01540.240	Pickup truck rental	42.00	MO			521.000					521.000	21,882.00
01540.250	Truck rental	42.00	MO			874.000					874.000	36,708.00
01540.260	Pumps	10.00	MO			115.000					115.000	1,150.00
01540.290	Forklift	21.00	MO			631.000					631.000	13,251.00
01540.310	Scaffolding	15.00	LS		15,000.000						15,000.000	225,000.00
01540.320	Jobsite communications	21.00	MO		87.500						87.500	1,837.50
01540.190	Air compressor	21.00	MO			261.000					261.000	5,481.00
01540.100	Crane rental	16.00	MO			191.000					191.000	3,056.00
01540.140	Crawler crane	300.00	DAY			550.000					550.000	165,000.00
01540.150	Backhoe	1,120.00	HOUR			62.500					62.500	70,000.00
01540.160	Front end loader	1,120.00	HOUR			68.000					68.000	76,160.00
01540.170	Bulldozer	1,120.00	HOUR			73.000					73.000	81,760.00
01540.180	Small tools	21.00	MO			167.750					167.750	3,522.75
01560.100	Watchman	89.00	WEEK	518.2500							518.250	46,124.25
01560.120	Temporary job fence	5,000.00	LNFT	1.2800	11.280						12.560	62,800.00
01560.130	Protect trees	5.00	EACH	24.5000	16.100						40.600	203.00
01560.170	Temporary storage	1.00	LS							5,000.000	5,000.000	5,000.00
01560.180	Weather protection	1.00	LS							50,000.000	50,000.000	50,000.00
01580.100	Job sign	3.00	EACH	275.0000	114.000						389.000	1,167.00
01720.100	Layout supplies	80.00	WEEK		81.000						81.000	6,480.00
01740.100	Job clean up	16,100.00	SQFT	0.3800							0.380	6,118.00
01740.110	Clean glass	1,000.00	SQFT	0.5100							0.510	510.00
01740.120	Trash chutes	2.00	FLRS				214.000				214.000	428.00
01740.130	Rubbish removal	10,000.00	CUYD	15.1100	1.265						16.375	163,750.00
01830.100	Turn on HVAC early	5.00	MO							500.000	500.000	2,500.00
Total Estimate											500.000	\$2,494,845