Minitab Headquarters

State College, PA

Erin E. Hess
Construction Management
www.arche.psu.edu/thesis/eeh124

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Consultant: Dr. David Riley

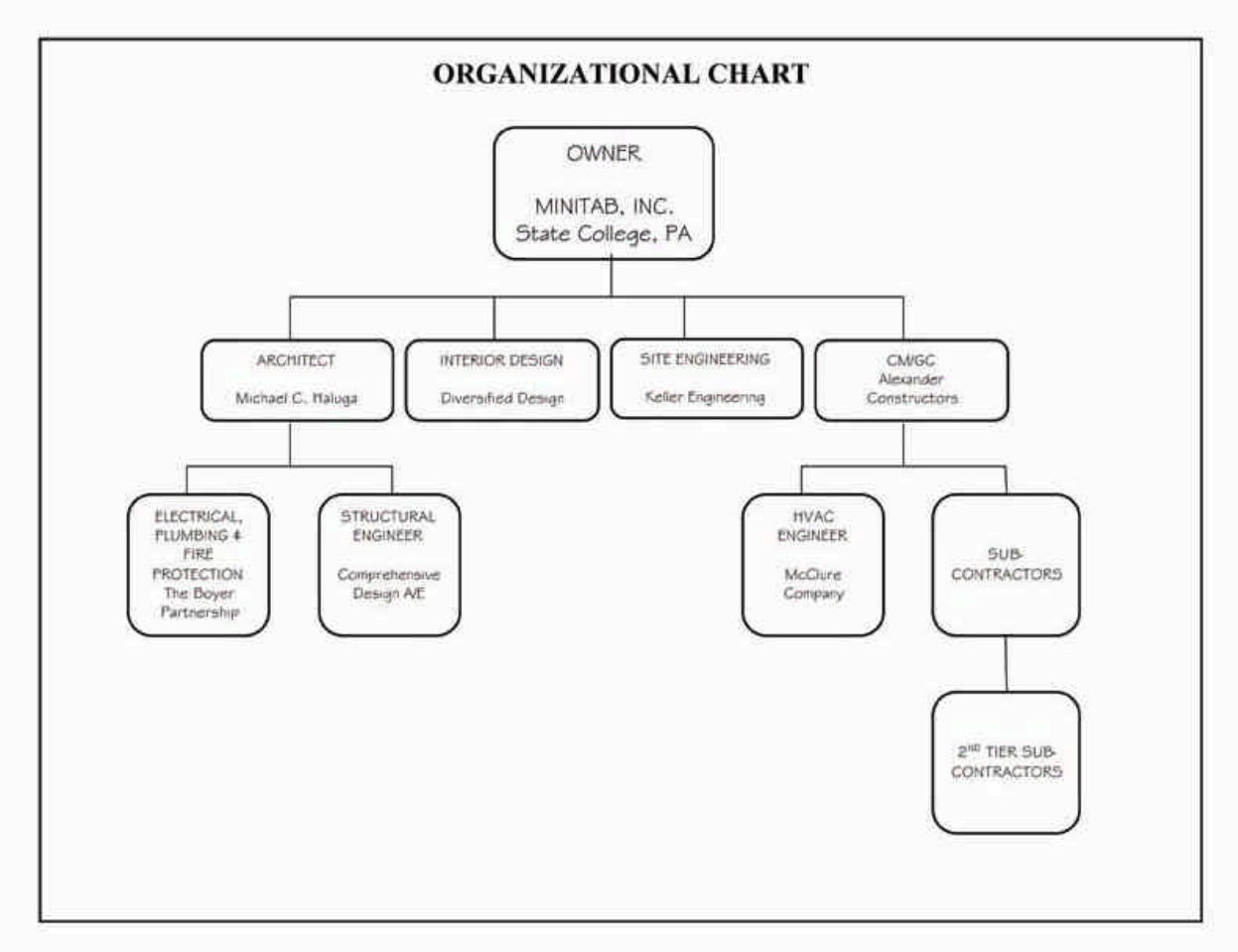
Existing Construction Conditions

EXECUTIVE SUMMARY

Analysis of the existing construction conditions of the Minitab Headquarters project provides knowledge of the building construction setup. Studies of the delivery system, schedule summary, and cost evaluation provide an overview of structure of the project. Alexander Constructors, Inc. serves as the construction manager and general contractor on the project, contractually as the CM At-Risk. Alexander holds contracts with the mechanical engineer/contractor and general construction subcontractors. The owner, Minitab, Inc., holds contracts with the architect, CM/GC, civil/site engineer, and the interior designer. The architect holds the contracts of the electrical/plumbing/fire protection engineer/contractor and the structural engineer. The purpose for this arrangement is to subdivide the contractual arrangements into stages of construction and facilitates fast-tracking of the project. The project schedule is twenty-two months with the construction phase constituting sixteen months – June 2001 thru October 2002. The total estimated cost of the project is $10,635,538 as determined by Alexander Constructors based on design development project drawings and specifications. Two methods of cost analysis were performed for the project. The first was by *R.S. Means Square Foot Cost Data 1999* which entails hand calculation of estimated square footage requirements and available cost data based on national averages. The data is then adjusted for the time of construction and location. Means cost estimate yields $7,253,871; 32% below the official cost estimate. The second cost analysis was performed using D4Cost Estimating Software. This program is a database of square foot cost information based on historical data. The program enables the user to perform multi-project averaging based on projects similar to the one being estimated. Adjustments can be made for time and location as well as line item adjustments as deemed necessary. D4Cost yields $8,545,482; 20% below the official cost estimate. Analysis of the project's structure in regard to contractual arrangements, schedule, and cost provided a helpful overview to become better aquainted with the project.

PROJECT DELIVERY SYSTEM

Alexander Constructors, Inc. serves as the construction manager of the Minitab Headquarters project. They are contracted as CM At Risk and are working under a negotiated Guaranteed Maximum Price.. The owner holds multiple contracts, as indicated in the organizational chart below. Slightly out of the ordinary is that the owner holds a contract with the interior designer, which is often part of the architect's package, and the site engineer, which is more often included in the general contractor's scope. The owner is quite particular about the interior aesthetics of the building and therefore felt that it would be appropriate to hold the contract and have the lines of communication directly with the interior designer. Minitab also chose to hold a direct contract with the site engineer, which I have not concluded as to a reason for this and plan to answer this question in future research.

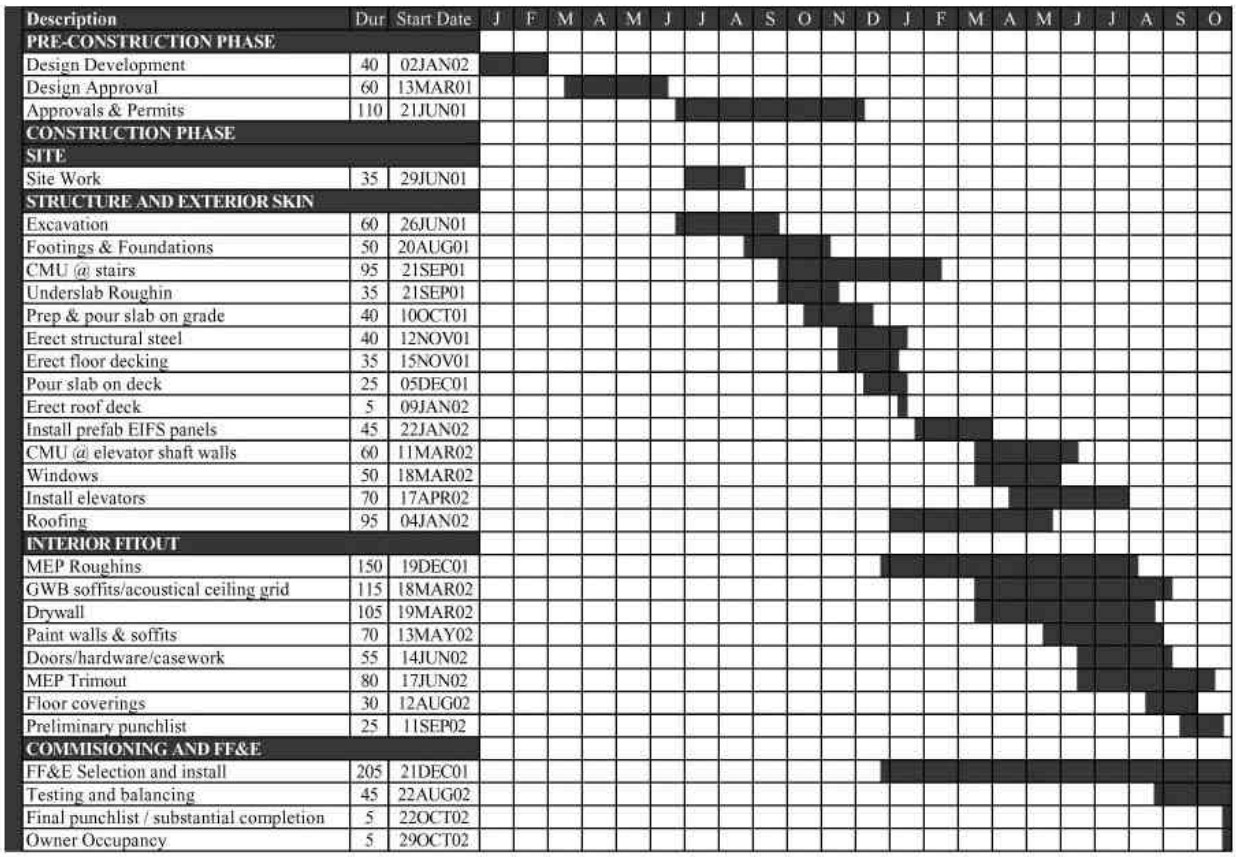


PROJECT SCHEDULE SUMMARY

The project schedule is twenty-two months, with the construction phase lasting sixteen months. The scheduled work is to progress in a top-down manner; interior fit-out will begin on the 4th floor and progress down to the garden level (the ground floor). For purpose of producing schedule summary, the floor breakdown is omitted from this schedule. Prefabricated EIFS panels on the exterior, coupled with 4 ft. ribbon windows, are the key element to pay attention to on the schedule. Panels must be fabricated and delivered to site in close coordination with the rate of work that the crew is doing. The panels should not be stored on site for long periods of time and neither should the crew be required to waste time waiting for delivery. On site alteration to the prefab panels is difficult and, as this is a fairly new approach, some problems are expected. Also of concern in this regard is that installation of the EIFS panels is to begin in the middle of January. Weather may be a hindrance to the timely installation of the panels.

PROJECT SCHEDULE SUMMARY

Description	Dur	Start Date
PRE-CONSTRUCTION PHASE		
Design Development	40	02JAN02
Design Approval	60	13MAR01
Approvals & Permits	110	21JUN01
CONSTRUCTION PHASE		
SITE		
Site Work	35	29JUN01
STRUCTURE AND EXTERIOR SKIN		
Excavation	60	26JUN01
Footings & Foundations	50	20AUG01
CMU @ stairs	95	21SEP01
Underslab Roughin	35	21SEP01
Prep & pour slab on grade	40	10OCT01
Erect structural steel	40	12NOV01
Erect floor decking	35	15NOV01
Pour slab on deck	25	05DEC01
Erect roof deck	5	09JAN02
Install prefab EIFS panels	45	22JAN02
CMU @ elevator shaft walls	60	11MAR02
Windows	50	18MAR02
Install elevators	70	17APR02
Roofing	95	04JAN02
INTERIOR FITOUT		
MEP Roughins	150	19DEC01
GWB soffits/acoustical ceiling grid	115	18MAR02
Drywall	105	19MAR02
Paint walls & soffits	70	13MAY02
Doors/hardware/casework	55	14JUN02
MEP Trimout	80	17JUN02
Floor coverings	30	12AUG02
Preliminary punchlist	25	11SEP02
COMMISIONING AND FF&E		
FF&E Selection and install	205	21DEC01
Testing and balancing	45	22AUG02
Final punchlist / substantial completion	5	22OCT02
Owner Occupancy	5	29OCT02



PROJECT COST EVALUATION

Through project cost evaluation using D4 Cost Estimating software and also R.S. Means square foot cost data analysis, attention is drawn to the dramatic differences in the two estimates compared to each other and, more importantly, the substantial contrast to the actual construction cost. D4 cost estimating returned a cost of $8,545,482; while R.S. Means square foot data lends a total construction cost of $7,253,871. The actual building construction cost is $10,635,538.

Actual building construction cost (CC) for the project is $10,635,538. The building is 88,000 SF which leads to a CC/SF of $120.86/SF. The total project cost is $11,971,912 which is $136.00/SF.

Major building costs include the following:

Building Shell	$2,924,846	$33.24/SF
Interior Buildout		
Metals	140,000	1.59/SF
Carpentry	12,450	0.14/SF
Architectural Woodwork	179,294	2.04/SF
Doors & glass	469,447	5.33/SF
Interior Partitions	623,710	7.09/SF
Ceilings	362,400	4.12/SF
Tile	64,535	0.73/SF
Floor Coverings	229,664	2.61/SF
Painting and Finishing	97,566	1.11/SF
Specialties	76,726	0.87/SF
Equipment	54,000	0.61/SF
Furnishings	12,465	0.14/SF
Elevators	115,000	1.31/SF
Interior Buildout Total	$ 2,297,258	$26.11/SF
Mechanical	$2,025,600	$23.02/SF
Electrical	$1,253,400	$14.24/SF
General Conditions	$1,086,000	$12.34/SF

D4 Cost Estimate for the project is $8,545,482; $97.11/SF. A difference of $2,090,056 to the actual building cost.

R.S. Means estimate for the project is $7,253,871; $78.26/SF. A difference of $3,381,667 to the actual building cost.

The differences between the estimated cost and the actual cost come partially from under-estimating of the mechanical and electrical systems. Where D4 was $985,000 less than the actual cost of the two systems and Means was $890,000 less. In performing the estimates, I did not take into account the unique features of the building such as the atrium, prefabricated EIFS panel exterior, and above-average finishes throughout. An acceptable error for this type of estimating is approximately ±15%; the D4 estimate has an error of 20% and the Means estimate error is 32%.

R.S. Means Square Foot Cost Estimate

Building Data

- 4-story Office Building
- 88,000 SF
- 590 LF Perimeter
- State College, PA

Commercial/Industrial/Institutional - Office, 5-10 Story				
Exterior Wall	SF Area	80,000	88,000	90,000
	LF Perimeter	410	434.8	441
Precast Concrete Panel	Steel Frame	78.90	78.26	78.10
(From *Means Square Foot Cost Data 1999*. Copyright R.S. Means Co., Inc., Kingston, MA)				

CALCULATIONS

88,000 SF * $78.26 / SF = $6,886,880

$6,886,880

Perimeter Adjustment

590 LF Perimeter – 434.8 LF Perimeter Typ. = 155.2 LF

Add $2.97 per 100 LF.

155.2 LF * $2.97/100 LF = $4.61 per SF

88,000 SF * $4.61/SF = $405, 680

+$405,680

Add for Elevators

Passenger – 3500# - $100,200

Freight – 5000# - $104,200

+$204,400

Building Sub-Total: $7,496,960

Adjust for Size

Size Factor = 88,000/52,000 = 1.69

Cost Multiplier = 0.95

$7,496,960 * 0.95 = $7,122,112

-$374,848

Adjust for Location

State College Index = 97.0%

$7,122,112 * 0.970 = $6,908,449

-$213,663

Adjust for Time

Assume 2.5% per year. Square foot data, 1999. Building Construction 2001.

$6,908,449 * 1.05 = $7,253,871

+$345,422

Total Building Estimate: $ 7,253,871