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2011 AE Senior Thesis

ASHA National Office Building

Ryan Dalrymple

**5th year Structures Option
BAE/MAE**

Advisor: Dr. Thomas Boothby

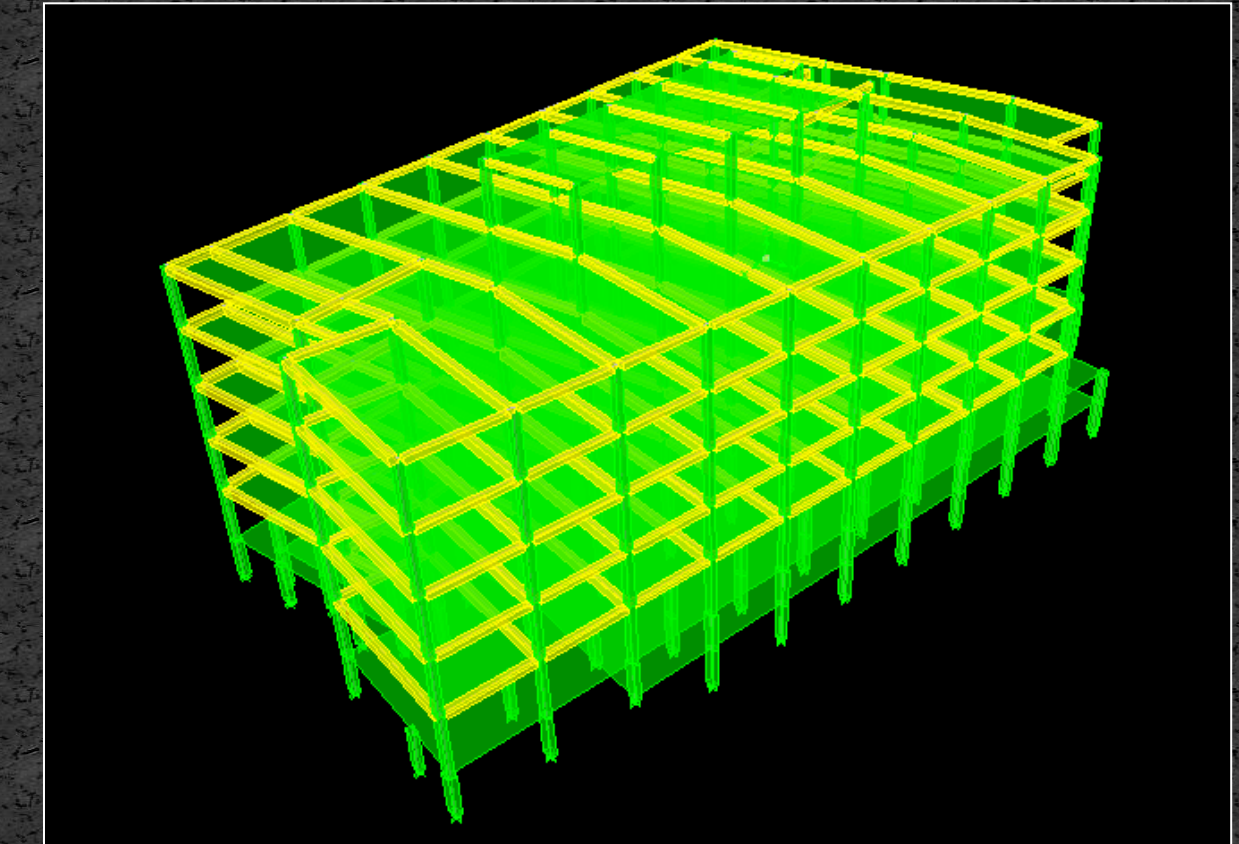
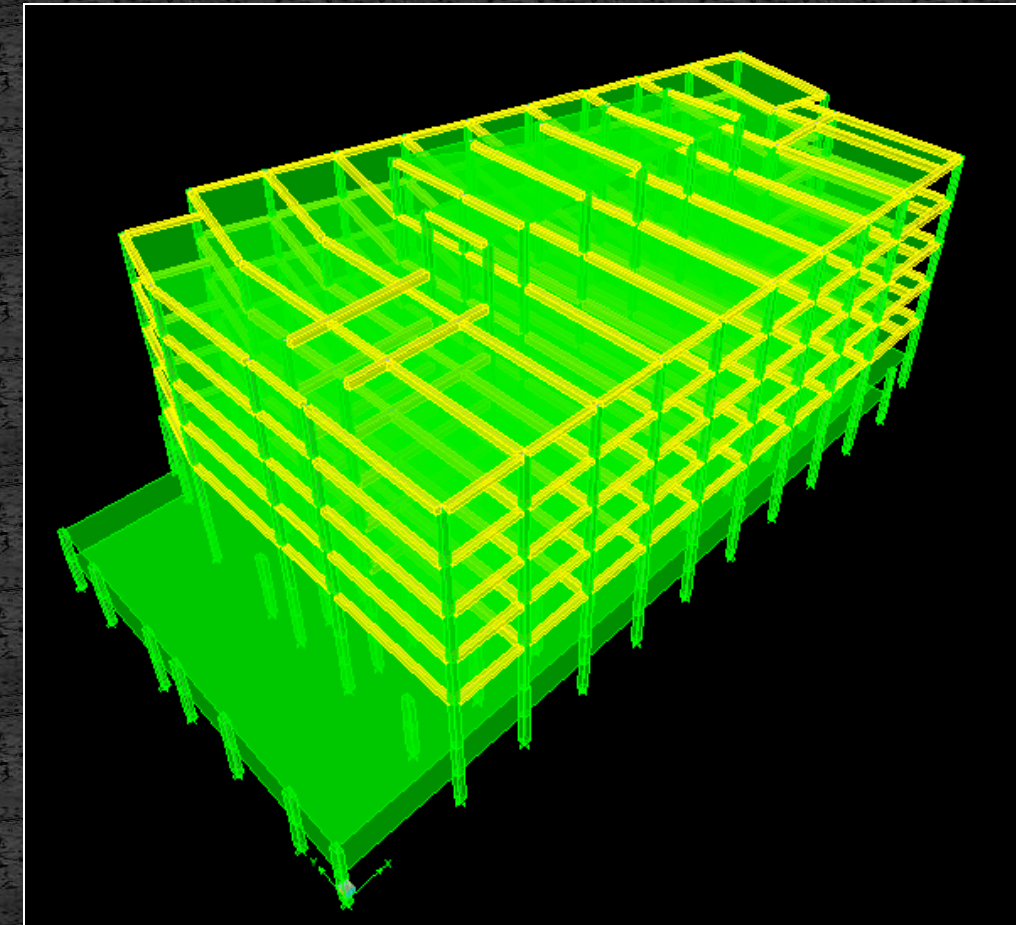


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ETABS Model

Assumptions:

- The self-weight of the columns and beams is accounted for in the model
- Rigid end zones are applied to all beams with a reduction of 50%
- The slabs are considered to act as rigid diaphragms
- The self-weight of the slab is applied as an additional area mass on the rigid diaphragm
- P- Δ effects are considered
- The moment of inertia for columns = $0.7I_g$
- The moment of inertia for beams = $0.35I_g$
- The compressive strength of all concrete is 5000 psi



Construction Management Breadth

Cost Analysis

Concrete Beam Cost Estimate										
Floor	Conc. Vol. (CY)	Conc Cost/CY	Placing Cost/CY	Formwork (SFCA)	Formwork Cost/SFCA	Reinf #7 & Below (Tons)	Cost/Ton #7 & Below	Reinf #8 & Above (Tons)	Cost/Ton #8 & Above	Total Cost
2nd	101.97	\$122.00	\$74.00	6289.50	\$10.70	2.94	\$2,550.00	7.94	\$1,900.00	\$101,087.07
3rd	101.97	\$122.00	\$74.00	6289.50	\$10.70	2.94	\$2,550.00	7.94	\$1,900.00	\$101,087.07
4th	101.97	\$122.00	\$74.00	6289.50	\$10.70	2.94	\$2,550.00	7.94	\$1,900.00	\$101,087.07
5th	101.97	\$122.00	\$74.00	6289.50	\$10.70	2.94	\$2,550.00	7.94	\$1,900.00	\$101,087.07
Roof	78.38	\$122.00	\$74.00	5453.83	\$10.70	2.94	\$2,550.00	7.94	\$1,900.00	\$88,606.83
PH Roof	6.11	\$122.00	\$74.00	511.00	\$10.70	0.59	\$2,550.00	1.59	\$1,900.00	\$10,289.36
									Total	\$462,984.91

Concrete Column Cost Estimate										
Below Floor	Conc. Vol. (CY)	Conc Cost/CY	Placing Cost/CY	Formwork (SFCA)	Formwork Cost/SFCA	Reinf #7 & Below (Tons)	Cost/Ton #7 & Below	Reinf #8 & Above (Tons)	Cost/Ton #8 & Above	Total Cost
2nd	64.50	\$122.00	\$49.00	4185.00	\$10.75	0.76	\$2,650.00	14.55	\$2,075.00	\$81,151.03
3rd	64.50	\$122.00	\$49.00	4185.00	\$10.75	0.76	\$2,650.00	14.55	\$2,075.00	\$81,151.03
4th	64.50	\$122.00	\$49.00	4185.00	\$10.75	0.76	\$2,650.00	14.55	\$2,075.00	\$81,151.03
5th	54.44	\$122.00	\$49.00	3822.75	\$10.75	0.76	\$2,650.00	14.55	\$2,075.00	\$75,985.34
Roof	54.44	\$122.00	\$49.00	3822.75	\$10.75	0.76	\$2,650.00	14.55	\$2,075.00	\$75,985.34
PH Roof	10.89	\$122.00	\$49.00	764.55	\$10.75	0.15	\$2,650.00	2.91	\$2,075.00	\$15,197.07
									Total	\$410,620.83

Concrete Slab Cost Estimate									
Below Floor	Conc. Vol. (CY)	Conc. Cost/CY	Placing Cost/CY	Formwork (SF)	Formwork Cost/SFCA	Reinf #7 & Below (Tons)	Cost/Ton #7 & Below	Total Cost	
2nd	669.89	\$122.00	\$28.00	20499	\$7.85	8.00	\$1,900.00	\$254,469.56	
3rd	669.89	\$122.00	\$28.00	20499	\$7.85	8.00	\$1,900.00	\$254,469.56	
4th	669.89	\$122.00	\$28.00	20499	\$7.85	8.00	\$1,900.00	\$254,469.56	
5th	669.89	\$122.00	\$28.00	20499	\$7.85	8.00	\$1,900.00	\$254,469.56	
Roof	655.97	\$122.00	\$28.00	20073	\$7.85	7.83	\$1,900.00	\$249,176.41	
PH Roof	82.64	\$122.00	\$28.00	2529	\$7.85	1.60	\$1,900.00	\$32,463.60	
								Total	\$1,299,518.23

Concrete Structure Cost	
Description	Cost
Mobilization & Cranes	326,963
B2 Level	1,887,782
B1 Level	1,239,164
Plaza Level	372,979
2nd Floor	462,985
3rd Floor	410,621
4th Floor	1,299,518
5th Floor	
Roof	
Columns	
Slabs	
Total	6,000,013

Original Steel Structure Cost		
Description	Cost	Adjusted 2011 Cost
Mobilization & Cranes	\$299,498.00	\$326,963
B2 Level	\$1,596,426.00	\$1,742,823
B1 Level	\$1,096,252.00	\$1,196,782
Plaza Level	\$341,649.00	\$372,979
2nd Floor	\$62,086.00	\$67,779
3rd Floor	\$51,969.00	\$56,735
4th Floor	\$51,969.00	\$56,735
5th Floor	\$51,199.00	\$55,894
Roof	\$9,852.00	\$10,755
Total Steel	\$1,372,852.00	\$1,498,747
Fireproofing	\$82,000.00	\$89,520
Total	\$5,015,752.00	\$5,475,712