

CHAPTER V

CONCLUSION AND SUGGESTION

5.1. Conclusion

This study shows that location 4 is the most effective location with the lowest travel time duration and lowest cost. The calculations used in this study are classified as simple calculations, but it can provide an overview of which location is effective. The second option is location 3. Both are located between the supply and demand area; the distance is quite a balance between supply and demand. We can conclude that the area between these two will perform the fastest mobility and the lowest cost.

The factor that slows down the material transport is the location of the tower crane. For example, location 1 and 5 are located on the edge of a feasible area. The hook position is at the end of the jib, the movement becomes slow, especially during the slewing and the trolley movement. Other contractors need to consider the placement of tower crane so the cost can be reduced.

5.2. Suggestion

Base on this study, the suggestion for further research is to add more variables to the research, such as material weight. With the material weight data obtained, the material transport calculations will be more accurate. Alternatively, add one more research object, such as comparing how fast the project is carried out using one tower crane and two tower crane.

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TOWER CRANE SPECIFICATION

一、性能表

I、CHARACTERISTICS LIST






吊钩垂直高度时,吊钩与小车的四脚位开足吊钩距离为 0.1m 时的理论吊钩高度
Hook height theoretical obtained, jib horizontal, limit wrench protection, distance of 0.1m between pulley block and trolley

吊钩高度 (m)	吊钩型式	吊钩重量 (kg)	吊钩高度 (m)	吊钩重量 (kg)	吊钩高度 (m)	吊钩重量 (kg)	吊钩高度 (m)	吊钩重量 (kg)	吊钩高度 (m)	吊钩重量 (kg)	吊钩高度 (m)	吊钩重量 (kg)	吊钩高度 (m)	吊钩重量 (kg)	吊钩高度 (m)	吊钩重量 (kg)	吊钩高度 (m)	吊钩重量 (kg)
60m	DM	12000	15000	20000	25000	30000	40000	50000	60000	80000	100000	120000	150000	200000	250000	300000	400000	500000
	SM	12000	15000	20000	25000	30000	40000	50000	60000	80000	100000	120000	150000	200000	250000	300000	400000	500000
55m	DM	12000	15000	20000	25000	30000	40000	50000	60000	80000	100000	120000	150000	200000	250000	300000	400000	500000
	SM	12000	15000	20000	25000	30000	40000	50000	60000	80000	100000	120000	150000	200000	250000	300000	400000	500000
50m	DM	12000	15000	20000	25000	30000	40000	50000	60000	80000	100000	120000	150000	200000	250000	300000	400000	500000
	SM	12000	15000	20000	25000	30000	40000	50000	60000	80000	100000	120000	150000	200000	250000	300000	400000	500000
45m	DM	12000	15000	20000	25000	30000	40000	50000	60000	80000	100000	120000	150000	200000	250000	300000	400000	500000
	SM	12000	15000	20000	25000	30000	40000	50000	60000	80000	100000	120000	150000	200000	250000	300000	400000	500000
40m	DM	12000	15000	20000	25000	30000	40000	50000	60000	80000	100000	120000	150000	200000	250000	300000	400000	500000
	SM	12000	15000	20000	25000	30000	40000	50000	60000	80000	100000	120000	150000	200000	250000	300000	400000	500000

吊钩型式	吊钩重量 (kg)	吊钩高度 (m)	吊钩重量 (kg)	吊钩高度 (m)	吊钩重量 (kg)	吊钩高度 (m)	吊钩重量 (kg)	吊钩高度 (m)	吊钩重量 (kg)	吊钩高度 (m)	吊钩重量 (kg)	吊钩高度 (m)	吊钩重量 (kg)	吊钩高度 (m)	吊钩重量 (kg)	吊钩高度 (m)	吊钩重量 (kg)	吊钩高度 (m)	
标准吊钩 标准吊钩机构 1200-1500 1500-2000 2000-2500 2500-3000 3000-4000 4000-5000	12000	15000	20000	25000	30000	40000	50000	60000	80000	100000	120000	150000	200000	250000	300000	400000	500000	12000	12000
可选吊钩 可选吊钩机构 1200-1500 1500-2000 2000-2500 2500-3000 3000-4000 4000-5000	12000	15000	20000	25000	30000	40000	50000	60000	80000	100000	120000	150000	200000	250000	300000	400000	500000	12000	12000

机构特性

Specifications (Mechanisms)

名称 Names	机构代号 Models	工作速度 m/min Operating speeds (m/min)	起重量 t Hoist Weight (t)	绕绳量 Rope Length	电动机 kW Motor kW	
起升 Hoisting	ZSLVF30R 	双绳 2 fall	0-40	6	600m	55
			0-80	3		
		四绳 4 fall	0-20	12	>600m *	
			0-40	6		
变幅 Luffing	X120 	15-38-58			撑杆力矩 120N.M	
回转 Slewing	RCV185B 	0-0.7 r/min			撑杆力矩 2X185N.M	
行走 Travelling	RT443	0-12.5-25			4X1.7/3.4	
电力 Mains	380V-50HZ-110KVA					

* 根据用户特殊要求提供

* To be supplied as per client's specific requirements



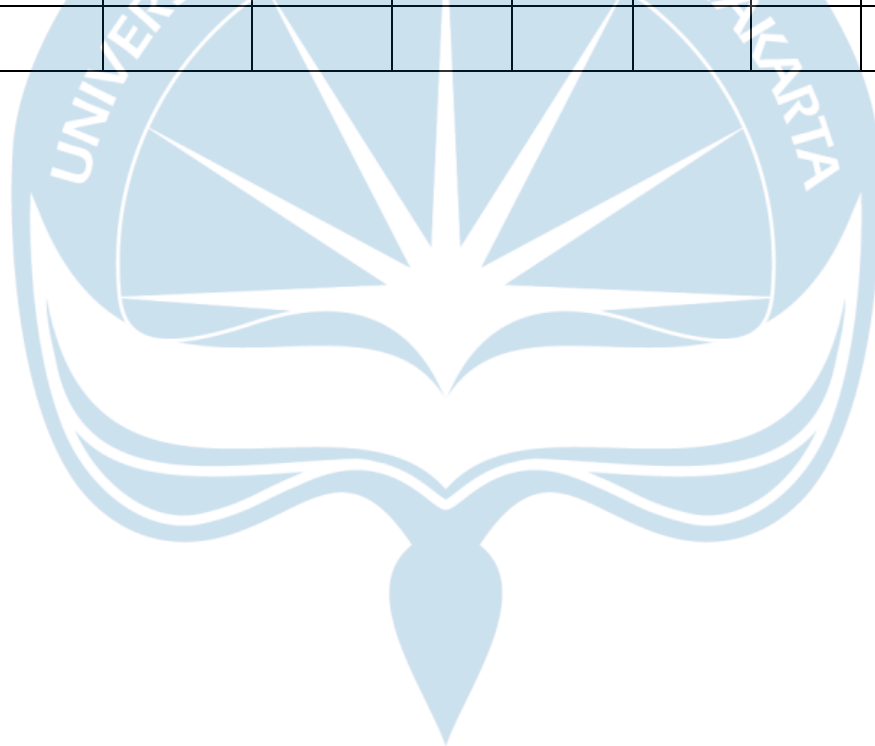
TRAVEL TIME CALCULATION

LOCATION 1

REBARS TABLE

Zone	$\rho(D_j, Cr_k)$	$\rho(S_i, Cr_k)$	$l_{i,j}$	$T_{r(i,j)}^k$	$T_{w(i,j)}^k$	$T_{h(i,j)}^k$	$T_{v(i,j)}$	$T_{i,j}^k$	Total Time
1-A	137,6250	114,3731	182,8155	1,1626	2,5439	2,8345	0,4033	3,2379	9,4757
1-B	139,1992	114,3731	170,5488	1,2413	2,7948	3,1051	0,4033	3,5084	10,0168
1-C	142,1298	114,3731	163,0009	1,3878	2,9646	3,3116	0,4033	3,7149	10,4298
1-D	148,7238	114,3731	154,0027	1,7175	3,1918	3,6212	0,4033	4,0246	11,0491
2-A	118,5000	114,3731	168,3110	0,2063	2,5439	2,5955	0,4033	2,9988	8,9976
2-B	120,3246	114,3731	154,9000	0,2976	2,8345	2,9089	0,4033	3,3122	9,6244
2-C	123,7033	114,3731	146,5483	0,4665	3,0290	3,1456	0,4033	3,5489	10,0979
2-D	131,2265	114,3731	136,4695	0,8427	3,2840	3,4946	0,4033	3,8980	10,7959
3-A	101,0000	114,3731	155,9146	0,6687	2,5439	2,7110	0,4033	3,1144	9,2287
3-B	103,1347	114,3731	141,3322	0,5619	2,8836	3,0240	0,4033	3,4274	9,8547
3-C	107,0572	114,3731	132,1256	0,3658	3,1072	3,1986	0,4033	3,6020	10,2040
3-D	115,6682	114,3731	120,8499	0,0648	3,3924	3,4085	0,4033	3,8119	10,6238
4-A	83,5000	114,3731	144,5775	1,5437	2,5439	2,9298	0,4033	3,3331	9,6662
4-B	86,0698	114,3731	128,7170	1,4152	2,9522	3,3060	0,4033	3,7093	10,4186
4-C	90,7331	114,3731	118,5346	1,1820	3,2139	3,5094	0,4033	3,9127	10,8254
4-D	100,7491	114,3731	105,8205	0,6812	3,5336	3,7039	0,4033	4,1073	11,2145
5-A	66,0000	114,3731	134,5675	2,4187	2,5439	3,1485	0,4033	3,5519	10,1037
5-B	69,2226	114,3731	117,3620	2,2575	3,0544	3,6188	0,4033	4,0221	11,0443
5-C	74,9416	114,3731	106,0953	1,9716	3,3664	3,8592	0,4033	4,2626	11,5252
5-D	86,7994	114,3731	91,6720	1,3787	3,7220	4,0667	0,4033	4,4701	11,9401
6-A	48,5000	114,3731	126,2010	3,2937	2,5439	3,9296	0,4033	4,3330	11,6659
6-B	52,8017	114,3731	107,6667	3,0786	3,2213	3,9909	0,4033	4,3943	11,7885
6-C	60,1041	114,3731	95,2601	2,7135	3,5970	4,2753	0,4033	4,6787	12,3573

6-D	74,3666	114,3731	78,8798	2,0003	3,9778	4,4779	0,4033	4,8812	12,7624
7-A	31,0000	114,3731	119,8227	4,1687	2,5439	4,8046	0,4033	5,2080	13,4159
7-B	37,3733	114,3731	100,1144	3,8500	3,5316	4,7329	0,4033	5,1362	13,2724
7-C	47,1301	114,3731	86,6329	3,3621	3,9655	4,8060	0,4033	5,2093	13,4187
7-D	64,3362	114,3731	68,2114	2,5018	4,3239	4,9494	0,4033	5,3527	13,7055
8-A	11,6250	114,3731	115,4754	5,1374	2,5439	5,7734	0,4033	6,1767	15,3534
8-B	23,8936	114,3731	94,8682	4,5240	4,3150	5,6027	0,4033	6,0061	15,0121
8-C	37,3549	114,3731	80,5131	3,8509	4,6344	5,5972	0,4033	6,0005	15,0010
8-C.9	55,3593	114,3731	62,4135	2,9507	4,8093	5,5469	0,4033	5,9503	14,9005
								total	369,790



FORMWORK TABLE

Zone	$\rho(D_j, Cr_k)$	$\rho(S_i, Cr_k)$	$l_{i,j}$	$T_{r(i,j)}^k$	$T_{w(i,j)}^k$	$T_{h(i,j)}^k$	$T_{v(i,j)}$	$T_{i,j}^k$	Total Time
1-A	137,6250	128,3201	174,7223	0,4652	2,8490	2,9653	0,4033	3,3686	9,7372
1-B	139,1992	128,3201	160,1800	0,5440	3,0998	3,2358	0,4033	3,6392	10,2783
1-C	142,1298	128,3201	150,8799	0,6905	3,2697	3,4423	0,4033	3,8456	10,6913
1-D	148,7238	128,3201	139,1999	1,0202	3,4969	3,7520	0,4033	4,1553	11,3106
2-A	118,5000	128,3201	162,1958	0,4910	2,8490	2,9717	0,4033	3,3750	9,7501
2-B	120,3246	128,3201	146,4146	0,3998	3,1396	3,2395	0,4033	3,6428	10,2857
2-C	123,7033	128,3201	136,1776	0,2308	3,3341	3,3918	0,4033	3,7951	10,5902
2-D	131,2265	128,3201	123,1106	0,1453	3,5890	3,6254	0,4033	4,0287	11,0574
3-A	101,0000	128,3201	151,9427	1,3660	2,8490	3,1905	0,4033	3,5938	10,1876
3-B	103,1347	128,3201	134,9680	1,2593	3,1886	3,5035	0,4033	3,9068	10,8136
3-C	107,0572	128,3201	123,7879	1,0631	3,4123	3,6781	0,4033	4,0814	11,1628
3-D	115,6682	128,3201	109,2490	0,6326	3,6974	3,8556	0,4033	4,2589	11,5178
4-A	83,5000	128,3201	143,1021	2,2410	2,8490	3,4092	0,4033	3,8125	10,6251
4-B	86,0698	128,3201	124,9319	2,1125	3,2572	3,7854	0,4033	4,1887	11,3774
4-C	90,7331	128,3201	112,7612	1,8793	3,5189	3,9888	0,4033	4,3921	11,7842
4-D	100,7491	128,3201	96,5762	1,3785	3,8387	4,1833	0,4033	4,5867	12,1734
5-A	66,0000	128,3201	135,9498	3,1160	2,8490	3,8282	0,4033	4,2316	11,4632
5-B	69,2226	128,3201	116,6709	2,9549	3,3595	4,0982	0,4033	4,5016	12,0031
5-C	74,9416	128,3201	103,5336	2,6689	3,6714	4,3387	0,4033	4,7420	12,4840
5-D	86,7994	128,3201	85,6218	2,0760	4,0271	4,5461	0,4033	4,9495	12,8989
6-A	48,5000	128,3201	130,7630	3,9910	2,8490	4,7032	0,4033	5,1066	13,2132
6-B	52,8017	128,3201	110,5836	3,7759	3,5264	4,6575	0,4033	5,0608	13,1217

6-C	60,1041	128,3201	96,6221	3,4108	3,9020	4,7547	0,4033	5,1581	13,3161
6-D	74,3666	128,3201	77,1214	2,6977	4,2829	4,9573	0,4033	5,3606	13,7212
7-A	31,0000	128,3201	127,7814	4,8660	2,8490	5,5782	0,4033	5,9816	14,9632
7-B	37,3733	128,3201	107,0414	4,5473	3,8367	5,5065	0,4033	5,9098	14,8197
7-C	47,1301	128,3201	92,5470	4,0595	4,2706	5,2854	0,4033	5,6888	14,3775
7-D	64,3362	128,3201	71,9502	3,1992	4,6290	5,4288	0,4033	5,8321	14,6643
8-A	11,6250	128,3201	127,2363	5,8348	2,8490	6,5470	0,4033	6,9503	16,9007
8-B	23,8936	128,3201	106,3900	5,2213	4,6201	6,3763	0,4033	6,7797	16,5594
8-C	37,3549	128,3201	91,7929	4,5483	4,9395	6,0766	0,4033	6,4799	15,9598
8-C.9	55,3593	128,3201	73,2195	3,6480	5,1143	6,0263	0,4033	6,4297	15,8594
								Total	399,6679

Rebars Total (minute)	369,790
Formwork Total (minute)	399,6679
Total Time (minute)	769,4580
Total Time (hour)	12,824

LOCATION 2

REBARS TABLE

Zone	$\rho(D_j \cdot Cr_k)$	$\rho(S_i \cdot Cr_k)$	$l_{i,j}$	$T_{r(i,j)}^k$	$T_{w(i,j)}^k$	$T_{h(i,j)}^k$	$T_{v(i,j)}$	$T_{i,j}^k$	Total Time
1-A	140,4819	86,2226	182,8155	2,7130	2,1829	3,2587	0,4033	3,6620	10,3241
1-B	137,8191	86,2226	170,5488	2,5798	2,4312	3,1876	0,4033	3,5910	10,1819
1-C	137,8191	86,2226	163,0009	2,5798	2,6081	3,2531	0,4033	3,6564	10,3128
1-D	140,4819	86,2226	154,0027	2,7130	2,8563	3,5346	0,4033	3,9379	10,8758
2-A	121,8063	86,2226	168,3110	1,7792	2,1304	2,5752	0,4033	2,9786	8,9571
2-B	118,7254	86,2226	154,9000	1,6251	2,4169	2,8232	0,4033	3,2265	9,4531
2-C	118,7254	86,2226	146,5483	1,6251	2,6224	3,0286	0,4033	3,4320	9,8640
2-D	121,8063	86,2226	136,4695	1,7792	2,9089	3,3537	0,4033	3,7570	10,5140
3-A	104,8596	86,2226	155,9146	0,9319	2,0660	2,2990	0,4033	2,7023	8,4047
3-B	101,2644	86,2226	141,3322	0,7521	2,3992	2,5872	0,4033	2,9905	8,9811
3-C	101,2644	86,2226	132,1256	0,7521	2,6401	2,8281	0,4033	3,2315	9,4629
3-D	104,8596	86,2226	120,8499	0,9319	2,9732	3,2062	0,4033	3,6095	10,2191
4-A	88,1294	86,2226	144,5775	0,0953	1,9770	2,0009	0,4033	2,4042	7,8084
4-B	83,8196	86,2226	128,7170	0,1201	2,3741	2,4041	0,4033	2,8074	8,6149
4-C	83,8196	86,2226	118,5346	0,1201	2,6652	2,6953	0,4033	3,0986	9,1972
4-D	88,1294	86,2226	105,8205	0,0953	3,0622	3,0861	0,4033	3,4894	9,9788
5-A	71,7672	86,2226	134,5675	0,7228	1,8469	2,0276	0,4033	2,4309	7,8619
5-B	66,4039	86,2226	117,3620	0,9909	2,3357	2,5835	0,4033	2,9868	8,9736
5-C	66,4039	86,2226	106,0953	0,9909	2,7036	2,9513	0,4033	3,3546	9,7092
5-D	71,7672	86,2226	91,6720	0,7228	3,1924	3,3731	0,4033	3,7764	10,5528
6-A	56,0962	86,2226	126,2010	1,5063	1,6422	2,0188	0,4033	2,4221	7,8442

FORMWORK TABLE

Zone	$\rho(D_j, Cr_k)$	$\rho(S_r, Cr_k)$	$l_{i,j}$	$T_{r(i,j)}^k$	$T_{w(i,j)}^k$	$T_{h(i,j)}^k$	$T_{v(i,j)}$	$T_{i,j}^k$	Total Time
1-A	140,4819	100,4783	174,7223	2,0002	2,5769	3,0769	0,4033	3,4802	9,9605
1-B	137,8191	100,4783	160,1800	1,8670	2,8251	3,2918	0,4033	3,6952	10,3903
1-C	137,8191	100,4783	150,8799	1,8670	3,0020	3,4688	0,4033	3,8721	10,7442
1-D	140,4819	100,4783	139,1999	2,0002	3,2503	3,7503	0,4033	4,1536	11,3073
2-A	121,8063	100,4783	162,1958	1,0664	2,5243	2,7909	0,4033	3,1943	9,3885
2-B	118,7254	100,4783	146,4146	0,9124	2,8108	3,0389	0,4033	3,4423	9,8845
2-C	118,7254	100,4783	136,1776	0,9124	3,0163	3,2444	0,4033	3,6477	10,2954
2-D	121,8063	100,4783	123,1106	1,0664	3,3028	3,5694	0,4033	3,9727	10,9454
3-A	104,8596	100,4783	151,9427	0,2191	2,4600	2,5147	0,4033	2,9181	8,8361
3-B	101,2644	100,4783	134,9680	0,0393	2,7931	2,8029	0,4033	3,2063	9,4125
3-C	101,2644	100,4783	123,7879	0,0393	3,0340	3,0438	0,4033	3,4472	9,8943
3-D	104,8596	100,4783	109,2490	0,2191	3,3671	3,4219	0,4033	3,8252	10,6505
4-A	88,1294	100,4783	143,1021	0,6174	2,3709	2,5253	0,4033	2,9286	8,8573
4-B	83,8196	100,4783	124,9319	0,8329	2,7680	2,9762	0,4033	3,3795	9,7591
4-C	83,8196	100,4783	112,7612	0,8329	3,0591	3,2674	0,4033	3,6707	10,3414
4-D	88,1294	100,4783	96,5762	0,6174	3,4562	3,6105	0,4033	4,0139	11,0277
5-A	71,7672	100,4783	135,9498	1,4356	2,2408	2,5997	0,4033	3,0030	9,0061
5-B	66,4039	100,4783	116,6709	1,7037	2,7296	3,1556	0,4033	3,5589	10,1178
5-C	66,4039	100,4783	103,5336	1,7037	3,0975	3,5234	0,4033	3,9267	10,8534
5-D	71,7672	100,4783	85,6218	1,4356	3,5863	3,9452	0,4033	4,3485	11,6970
6-A	56,0962	100,4783	130,7630	2,2191	2,0361	2,7281	0,4033	3,1315	9,2629

6-B	49,0482	100,4783	110,5836	2,5715	2,6641	3,3070	0,4033	3,7104	10,4207
6-C	49,0482	100,4783	96,6221	2,5715	3,1630	3,8058	0,4033	4,2092	11,4183
6-D	56,0962	100,4783	77,1214	2,2191	3,7910	4,3458	0,4033	4,7491	12,4982
7-A	41,8991	100,4783	127,7814	2,9290	1,6837	3,3499	0,4033	3,7532	10,5064
7-B	31,8508	100,4783	107,0414	3,4314	2,5275	4,0632	0,4033	4,4666	11,9331
7-C	31,8508	100,4783	92,5470	3,4314	3,2996	4,2563	0,4033	4,6596	12,3192
7-D	41,8991	100,4783	71,9502	2,9290	4,1434	4,8756	0,4033	5,2790	13,5580
8-A	30,4906	100,4783	127,2363	3,4994	0,9475	3,7363	0,4033	4,1396	11,2792
8-B	13,7337	100,4783	106,3900	4,3372	1,9777	4,8317	0,4033	5,2350	13,4700
8-C	13,7337	100,4783	91,7929	4,3372	3,8494	5,2996	0,4033	5,7029	14,4058
8-C.9	28,4235	100,4783	73,2195	3,6027	4,8293	5,7300	0,4033	6,1333	15,2666
								Total	349,7080

Rebars Total (minute)	319,992
Formwork Total (minute)	349,7080
Total Time (minute)	669,6998
Total Time (hour)	11,162

LOCATION 3

REBARS TABLE

Zone	$\rho(D_j \cdot Cr_k)$	$\rho(S_i \cdot Cr_k)$	$l_{i,j}$	$T_{r(i,j)}^k$	$T_{w(i,j)}^k$	$T_{h(i,j)}^k$	$T_{v(i,j)}$	$T_{i,j}^k$	Total Time
1-A	145,4911	58,5182	182,8155	4,3486	1,7094	4,7760	0,4033	5,1793	13,3587
1-B	138,7435	58,5182	170,5488	4,0113	1,9414	4,4966	0,4033	4,8999	12,7999
1-C	135,7398	58,5182	163,0009	3,8611	2,1153	4,3899	0,4033	4,7932	12,5865
1-D	134,1250	58,5182	154,0027	3,7803	2,3726	4,3735	0,4033	4,7768	12,5536
2-A	128,0747	58,5182	168,3110	3,4778	1,6129	3,8811	0,4033	4,2844	11,5688
2-B	120,3547	58,5182	154,9000	3,0918	1,8736	3,5602	0,4033	3,9636	10,9271
2-C	116,8793	58,5182	146,5483	2,9181	2,0733	3,4364	0,4033	3,8397	10,6794
2-D	115,0000	58,5182	136,4695	2,8241	2,3726	3,4172	0,4033	3,8206	10,6411
3-A	112,6250	58,5182	155,9146	2,7053	1,4989	3,0801	0,4033	3,4834	9,9668
3-B	103,7617	58,5182	141,3322	2,2622	1,7906	2,7098	0,4033	3,1132	9,2263
3-C	99,7097	58,5182	132,1256	2,0596	2,0211	2,5648	0,4033	2,9682	8,9363
3-D	97,5000	58,5182	120,8499	1,9491	2,3726	2,8599	0,4033	3,2632	9,5264
4-A	97,8680	58,5182	144,5775	1,9675	1,3495	2,3049	0,4033	2,7082	8,4164
4-B	87,5229	58,5182	128,7170	1,4502	1,6765	2,0391	0,4033	2,4424	7,8848
4-C	82,6787	58,5182	118,5346	1,2080	1,9472	2,2492	0,4033	2,6525	8,3051
4-D	80,0000	58,5182	105,8205	1,0741	2,3726	2,6411	0,4033	3,0445	9,0889
5-A	84,1688	58,5182	134,5675	1,2825	1,1494	1,5699	0,4033	1,9732	6,9464
5-B	71,8784	58,5182	117,3620	0,6680	1,5117	1,6787	0,4033	2,0820	7,1640
5-C	65,8940	58,5182	106,0953	0,3688	1,8353	1,9275	0,4033	2,3309	7,6618

FORMWORK TABLE

Zone	$\rho(D_j, Cr_i)$	$\rho(S_i, Cr_i)$	$l_{i,j}$	$T_{r(i,j)}^k$	$T_{w(i,j)}^k$	$T_{h(i,j)}^k$	$T_{v(i,j)}$	$T_{i,j}^k$	Total Time
1-A	145,4911	72,1316	174,7223	3,6680	2,2857	4,2394	0,4033	4,6427	12,2855
1-B	138,7435	72,1316	160,1800	3,3306	2,5176	3,9600	0,4033	4,3633	11,7267
1-C	135,7398	72,1316	150,8799	3,1804	2,6915	3,8533	0,4033	4,2566	11,5132
1-D	134,1250	72,1316	139,1999	3,0997	2,9488	3,8369	0,4033	4,2402	11,4804
2-A	128,0747	72,1316	162,1958	2,7972	2,1892	3,3445	0,4033	3,7478	10,4956
2-B	120,3547	72,1316	146,4146	2,4112	2,4498	3,0526	0,4033	3,4559	9,9119
2-C	116,8793	72,1316	136,1776	2,2374	2,6496	3,2089	0,4033	3,6122	10,2245
2-D	115,0000	72,1316	123,1106	2,1434	2,9488	3,4847	0,4033	3,8880	10,7761
3-A	112,6250	72,1316	151,9427	2,0247	2,0751	2,5813	0,4033	2,9846	8,9692
3-B	103,7617	72,1316	134,9680	1,5815	2,3669	2,7623	0,4033	3,1656	9,3312
3-C	99,7097	72,1316	123,7879	1,3789	2,5973	2,9420	0,4033	3,3454	9,6907
3-D	97,5000	72,1316	109,2490	1,2684	2,9488	3,2659	0,4033	3,6693	10,3386
4-A	97,8680	72,1316	143,1021	1,2868	1,9257	2,2474	0,4033	2,6508	8,3015
4-B	87,5229	72,1316	124,9319	0,7696	2,2528	2,4452	0,4033	2,8485	8,6970
4-C	82,6787	72,1316	112,7612	0,5274	2,5234	2,6553	0,4033	3,0586	9,1172
4-D	80,0000	72,1316	96,5762	0,3934	2,9488	3,0472	0,4033	3,4505	9,9011
5-A	84,1688	72,1316	135,9498	0,6019	1,7256	1,8761	0,4033	2,2794	7,5589
5-B	71,8784	72,1316	116,6709	0,0127	2,0879	2,0911	0,4033	2,4944	7,9888
5-C	65,8940	72,1316	103,5336	0,3119	2,4116	2,4896	0,4033	2,8929	8,7858

5-D	62,5000	72,1316	85,6218	0,4816	2,9488	3,0692	0,4033	3,4726	9,9451
6-A	72,1328	72,1316	130,7630	0,0001	1,4536	1,4536	0,4033	1,8570	6,7139
6-B	57,3171	72,1316	110,5836	0,7407	1,8356	2,0208	0,4033	2,4241	7,8483
6-C	49,6061	72,1316	96,6221	1,1263	2,2249	2,5065	0,4033	2,9098	8,8197
6-D	45,0000	72,1316	77,1214	1,3566	2,9488	3,2880	0,4033	3,6913	10,3826
7-A	62,7247	72,1316	127,7814	0,4703	1,0873	1,2048	0,4033	1,6082	6,2164
7-B	44,9055	72,1316	107,0414	1,3613	1,4293	1,7697	0,4033	2,1730	7,3460
7-C	34,5256	72,1316	92,5470	1,8803	1,8667	2,3470	0,4033	2,7503	8,5006
7-D	27,5000	72,1316	71,9502	2,2316	2,9488	3,5067	0,4033	3,9101	10,8201
8-A	56,9575	72,1316	127,2363	0,7587	0,5694	0,9011	0,4033	1,3044	5,6088
8-B	36,4179	72,1316	106,3900	1,7857	0,7058	1,9621	0,4033	2,3655	7,7310
8-C	22,4005	72,1316	91,7929	2,4866	0,9495	2,7239	0,4033	3,1273	9,2545
8-C.9	8,4308	72,1316	73,2195	3,1850	2,4986	3,8097	0,4033	4,2130	11,4260
								Total	297,7069

Rebars Total (minute)	279,895
Formwork Total (minute)	297,7069
Total Time (minute)	577,6016
Total Time (hour)	9,62669

LOCATION 4

STEEL REINFORCEMENT (REBARS) TABLE

Zone	$\rho(D_j \cdot Cr_k)$	$\rho(S_i \cdot Cr_k)$	$l_{i,j}$	$T_{r(i,j)}^k$	$T_{w(i,j)}^k$	$T_{h(i,j)}^k$	$T_{v(i,j)}$	$T_{i,j}^k$	Total Time
1-A	113,9468	70,6497	182,8155	2,1649	0,4768	2,2841	0,4033	2,6874	8,3748
1-B	100,2949	70,6497	170,5488	1,4823	0,2304	1,5399	0,4033	1,9432	6,8864
1-C	92,3534	70,6497	163,0009	1,0852	0,0175	1,0896	0,4033	1,4929	5,9858
1-D	84,1812	70,6497	154,0027	0,6766	0,3463	0,7631	0,4033	1,1665	5,3330
2-A	101,3147	70,6497	168,3110	1,5333	0,6997	1,7082	0,4033	2,1115	7,2230
2-B	85,6731	70,6497	154,9000	0,7512	0,4522	0,8642	0,4033	1,2675	5,5351
2-C	76,2231	70,6497	146,5483	0,2787	0,2218	0,3341	0,4033	0,7374	4,4749
2-D	66,0855	70,6497	136,4695	0,2282	0,2079	0,2802	0,4033	0,6835	4,3671
3-A	91,7467	70,6497	155,9146	1,0549	0,9533	1,2932	0,4033	1,6965	6,3930
3-B	74,1125	70,6497	141,3322	0,1731	0,7273	0,7706	0,4033	1,1739	5,3478
3-C	62,9503	70,6497	132,1256	0,3850	0,4965	0,5928	0,4033	0,9961	4,9922
3-D	50,2003	70,6497	120,8499	1,0225	0,0047	1,0236	0,4033	1,4270	5,8539
4-A	84,7511	70,6497	144,5775	0,7051	1,2569	1,4331	0,4033	1,8365	6,6729
4-B	65,2530	70,6497	128,7170	0,2698	1,0897	1,1571	0,4033	1,5605	6,1210
4-C	52,2306	70,6497	118,5346	0,9210	0,8996	1,1458	0,4033	1,5492	6,0984
4-D	35,8519	70,6497	105,8205	1,7399	0,3992	1,8397	0,4033	2,2430	7,4860
5-A	80,9972	70,6497	134,5675	0,5174	1,6013	1,7306	0,4033	2,1340	7,2680
5-B	60,2971	70,6497	117,3620	0,5176	1,5370	1,6664	0,4033	2,0697	7,1394
5-C	45,8892	70,6497	106,0953	1,2380	1,4574	1,7669	0,4033	2,1703	7,3405
5-D	25,7517	70,6497	91,6720	2,2449	1,1905	2,5425	0,4033	2,9459	8,8917
6-A	80,9372	70,6497	126,2010	0,5144	1,9622	2,0908	0,4033	2,4942	7,9883

FORMWORK TABLE

Zone	$\rho(D_j, Cr_k)$	$\rho(S_i, Cr_k)$	$l_{i,j}$	$T_{r(i,j)}^k$	$T_{w(i,j)}^k$	$T_{h(i,j)}^k$	$T_{v(i,j)}$	$T_{i,j}^k$	Total Time
1-A	113,9468	60,9237	174,7223	2,6512	0,1440	2,6872	0,4033	3,0905	10,1810
1-B	100,2949	60,9237	160,1800	1,9686	0,3904	2,0662	0,4033	2,4695	8,9390
1-C	92,3534	60,9237	150,8799	1,5715	0,6033	1,7223	0,4033	2,1256	8,2513
1-D	84,1812	60,9237	139,1999	1,1629	0,9671	1,4046	0,4033	1,8080	7,6160
2-A	101,3147	60,9237	162,1958	2,0196	0,0789	2,0393	0,4033	2,4426	8,8852
2-B	85,6731	60,9237	146,4146	1,2375	0,1686	1,2796	0,4033	1,6830	7,3659
2-C	76,2231	60,9237	136,1776	0,7650	0,3990	0,8647	0,4033	1,2681	6,5361
2-D	66,0855	60,9237	123,1106	0,2581	0,8287	0,8932	0,4033	1,2966	6,5932
3-A	91,7467	60,9237	151,9427	1,5412	0,3324	1,6243	0,4033	2,0276	8,0552
3-B	74,1125	60,9237	134,9680	0,6594	0,1065	0,6861	0,4033	1,0894	6,1788
3-C	62,9503	60,9237	123,7879	0,1013	0,1243	0,1496	0,4033	0,5530	5,1059
3-D	50,2003	60,9237	109,2490	0,5362	0,6161	0,7502	0,4033	1,1535	6,3070
4-A	84,7511	60,9237	143,1021	1,1914	0,6361	1,3504	0,4033	1,7537	7,5074
4-B	65,2530	60,9237	124,9319	0,2165	0,4689	0,5230	0,4033	0,9263	5,8527
4-C	52,2306	60,9237	112,7612	0,4347	0,2788	0,5043	0,4033	0,9077	5,8154
4-D	35,8519	60,9237	96,5762	1,2536	0,2216	1,3090	0,4033	1,7123	7,4246
5-A	80,9972	60,9237	135,9498	1,0037	0,9805	1,2488	0,4033	1,6521	7,3043
5-B	60,2971	60,9237	116,6709	0,0313	0,9162	0,9240	0,4033	1,3273	6,6547
5-C	45,8892	60,9237	103,5336	0,7517	0,8366	1,0246	0,4033	1,4279	6,8558
5-D	25,7517	60,9237	85,6218	1,7586	0,5697	1,9010	0,4033	2,3044	8,6087
6-A	80,9372	60,9237	130,7630	1,0007	1,3414	1,5916	0,4033	1,9949	7,9899

6-B	60,2165	60,9237	110,5836	0,0354	1,4019	1,4108	0,4033	1,8141	7,6282
6-C	45,7833	60,9237	96,6221	0,7570	1,4769	1,6661	0,4033	2,0694	8,1389
6-D	25,5624	60,9237	77,1214	1,7681	1,7297	2,2005	0,4033	2,6038	9,2076
7-A	84,5790	60,9237	127,7814	1,1828	1,6868	1,9825	0,4033	2,3859	8,7718
7-B	65,0294	60,9237	107,0414	0,2053	1,8514	1,9027	0,4033	2,3061	8,6121
7-C	51,9509	60,9237	92,5470	0,4486	2,0392	2,1514	0,4033	2,5547	9,1094
7-D	35,4433	60,9237	71,9502	1,2740	2,5373	2,8558	0,4033	3,2592	10,5183
8-A	92,3874	60,9237	127,2363	1,5732	2,0217	2,4150	0,4033	2,8184	9,6367
8-B	74,9042	60,9237	106,3900	0,6990	2,2504	2,4252	0,4033	2,8285	9,6571
8-C	63,8805	60,9237	91,7929	0,1478	2,4822	2,5192	0,4033	2,9225	9,8450
8-C.9	52,4561	60,9237	73,2195	0,4234	2,9069	3,0127	0,4033	3,4160	10,8321
								Total	255,985

Rebars Total (minute)	241,193
Formwork Total (minute)	255,985
Total Time (minute)	497,178
Total Time (hour)	8,286

LOCATION 5

REBARS TABLE

Zone	$\rho(D_j, Cr_k)$	$\rho(S_j, Cr_k)$	$l_{i,j}$	$T_{r(i,j)}^k$	$T_{w(i,j)}^k$	$T_{h(i,j)}^k$	$T_{v(i,j)}$	$T_{i,j}^k$	Total Time
1-A	91,6106	126,8716	182,8155	1,7630	1,9606	2,4014	0,4033	2,8047	8,6095
1-B	71,2738	126,8716	170,5488	2,7799	1,8635	3,2458	0,4033	3,6491	10,2982
1-C	57,2571	126,8716	163,0009	3,4807	1,7546	3,9194	0,4033	4,3227	11,6454
1-D	38,0520	126,8716	154,0027	4,4410	1,4621	4,8065	0,4033	5,2098	13,4197
2-A	89,7845	126,8716	168,3110	1,8544	2,3111	2,7747	0,4033	3,1781	9,3561
2-B	68,9109	126,8716	154,9000	2,8980	2,3162	3,4771	0,4033	3,8804	10,7608
2-C	54,2875	126,8716	146,5483	3,6292	2,3221	4,2097	0,4033	4,6131	12,2261
2-D	33,4172	126,8716	136,4695	4,6727	2,3394	5,2576	0,4033	5,6609	14,3218
3-A	91,6466	126,8716	155,9146	1,7613	2,6313	3,0716	0,4033	3,4750	9,9500
3-B	71,3201	126,8716	141,3322	2,7776	2,7293	3,4599	0,4033	3,8632	10,7265
3-C	57,3147	126,8716	132,1256	3,4778	2,8392	4,1876	0,4033	4,5910	12,1819
3-D	38,1385	126,8716	120,8499	4,4367	3,1336	5,2201	0,4033	5,6234	14,2468
4-A	96,6925	126,8716	144,5775	1,5090	2,9284	3,3056	0,4033	3,7090	10,4180
4-B	77,6974	126,8716	128,7170	2,4587	3,0949	3,7096	0,4033	4,1130	11,2259
4-C	65,0792	126,8716	118,5346	3,0896	3,2683	4,0407	0,4033	4,4441	11,8881
4-D	49,0396	126,8716	105,8205	3,8916	3,6634	4,8075	0,4033	5,2108	13,4216
5-A	104,4618	126,8716	134,5675	1,1205	3,1887	3,4688	0,4033	3,8722	10,7443
5-B	87,1764	126,8716	117,3620	1,9848	3,3932	3,8894	0,4033	4,2928	11,5855
5-C	76,1456	126,8716	106,0953	2,5363	3,5898	4,2239	0,4033	4,6272	12,2544

FORMWORK TABLE

Zone	$\rho(D_j, Cr_k)$	$\rho(S_i, Cr_k)$	$l_{i,j}$	$T_{r(i,j)}^k$	$T_{w(i,j)}^k$	$T_{h(i,j)}^k$	$T_{v(i,j)}$	$T_{i,j}^k$	Total Time
1-A	91,6106	108,3067	174,7223	0,8348	1,6981	1,9068	0,4033	2,3101	7,6203
1-B	71,2738	108,3067	160,1800	1,8516	1,6009	2,2519	0,4033	2,6552	8,3104
1-C	57,2571	108,3067	150,8799	2,5525	1,4920	2,9255	0,4033	3,3288	9,6576
1-D	38,0520	108,3067	139,1999	3,5127	1,1995	3,8126	0,4033	4,2160	11,4319
2-A	89,7845	108,3067	162,1958	0,9261	2,0486	2,2801	0,4033	2,6835	8,3669
2-B	68,9109	108,3067	146,4146	1,9698	2,0537	2,5461	0,4033	2,9495	8,8989
2-C	54,2875	108,3067	136,1776	2,7010	2,0596	3,2159	0,4033	3,6192	10,2384
2-D	33,4172	108,3067	123,1106	3,7445	2,0769	4,2637	0,4033	4,6670	12,3341
3-A	91,6466	108,3067	151,9427	0,8330	2,3688	2,5771	0,4033	2,9804	8,9608
3-B	71,3201	108,3067	134,9680	1,8493	2,4668	2,9291	0,4033	3,3325	9,6650
3-C	57,3147	108,3067	123,7879	2,5496	2,5766	3,2140	0,4033	3,6174	10,2347
3-D	38,1385	108,3067	109,2490	3,5084	2,8711	4,2262	0,4033	4,6295	12,2590
4-A	96,6925	108,3067	143,1021	0,5807	2,6659	2,8110	0,4033	3,2144	9,4288
4-B	77,6974	108,3067	124,9319	1,5305	2,8324	3,2150	0,4033	3,6184	10,2367
4-C	65,0792	108,3067	112,7612	2,1614	3,0058	3,5461	0,4033	3,9495	10,8989
4-D	49,0396	108,3067	96,5762	2,9634	3,4009	4,1417	0,4033	4,5450	12,0901
5-A	104,4618	108,3067	135,9498	0,1922	2,9262	2,9742	0,4033	3,3776	9,7551
5-B	87,1764	108,3067	116,6709	1,0565	3,1307	3,3948	0,4033	3,7982	10,5963
5-C	76,1456	108,3067	103,5336	1,6081	3,3273	3,7293	0,4033	4,1326	11,2652
5-D	62,9898	108,3067	85,6218	2,2658	3,7182	4,2847	0,4033	4,6880	12,3760

6-A	114,4011	108,3067	130,7630	0,3047	3,1459	3,2221	0,4033	3,6254	10,2509
6-B	98,8689	108,3067	110,5836	0,4719	3,3647	3,4826	0,4033	3,8860	10,7719
6-C	89,2944	108,3067	96,6221	0,9506	3,5609	3,7985	0,4033	4,2019	11,4037
6-D	78,3777	108,3067	77,1214	1,4965	3,9160	4,2901	0,4033	4,6935	12,3869
7-A	125,9978	108,3067	127,7814	0,8846	3,3280	3,5491	0,4033	3,9524	10,9049
7-B	112,0843	108,3067	107,0414	0,1889	3,5464	3,5936	0,4033	3,9969	10,9938
7-C	103,7368	108,3067	92,5470	0,2285	3,7321	3,7892	0,4033	4,1925	11,3851
7-D	94,5034	108,3067	71,9502	0,6902	4,0477	4,2202	0,4033	4,6236	12,2471
8-A	140,2727	108,3067	127,2363	1,5983	3,4923	3,8918	0,4033	4,2952	11,5903
8-B	127,9214	108,3067	106,3900	0,9807	3,7018	3,9470	0,4033	4,3503	11,7006
8-C	120,6744	108,3067	91,7929	0,6184	3,8723	4,0269	0,4033	4,4302	11,8604
8-C.9	113,5221	108,3067	73,2195	0,2608	4,1174	4,1826	0,4033	4,5859	12,1718
								Total	342,2926

Rebars Total (minute)	378,070
Formwork Total (minute)	342,2926
Total Time (minute)	720,3623
Total Time (hour)	12,00604