Introduction to Electrical Depth

The electrical redesign for the Holy Cross Hospital – North Addition focuses on 2 separate alternatives and the effectiveness of their implementation in comparison to the existing electrical system. The first alternative will consider the cost impact of replacing six existing 480Y/277V to 208Y/277V step-down transformers located throughout the addition with a single 480Y/277V to 208Y/277V step-down transformer and all electrical system issues associated with that change. The second alternative will entail a much more in-depth look at the hospital's electrical system and emergency back-up. I will investigate the feasibility of provide an emergency back-up generator for the entire North Addition portion of the hospital (both emergency and normal branches) and will investigate the financial implications this change will have on the project.

Since hospitals have such a critical need for consistent uninterrupted power supply, the emergency system of a hospital is much more extensive and has more regulations governing its installation. When considering changes to this hospital, I must be very aware of these added regulations and make sure my redesign conforms to the code set forth by the NEC.

Electrical Depth

For my Electrical Depth, I quickly realized I would be performing a lot of load calculations due to the nature of my two alternates and the amount of redistribution I would be analyzing. To aid in the accuracy of my analysis, I created my own excel program that allows me to load a panel inputting each circuit's information as it would be documented on a set of drawings. However, I can also input the associated volt-amps into the proper load type column (with its respective demand factor) and the excel program will determine the connected, demand, and growth load for that panel. I felt the need to document the creation of the excel program before I began my alternates discussion because its assistance was imperative to the success and simplification of my calculation process. The following panel is a sample of the program at use and can be found in the entire panel schedule excel files on the enclosed CD-ROM:

Panel Schedule

Panel: LP-1N

Voltage: 480Y/277			Mains: MLO		Loads (VA)										Loc: 1ST FL ELEC RM			AIC: 25K
Amps: 200	Wires: 4		Phase: 3												Mounting: SURFACE			
Branch Circuit	**Amp**	**P**	**Description**	**Cir**	Ltg		Recept		Motor		Lg Motor		Equip		**Cir**	**Description**	**P**	**Amp**	**Branch Circuit**
1" C/3#4+1#8GRD	70	3	XFMR T-1	1	0	0	12600	5220	0	0	0	0	7236	12360	2	XFMR T-9	3	70	1" C/3#4+1#8GRD
-	-	-	-	3	1287	0	12780	5220	0	0	0	0	7200	13280	4	-	-	-	-
-	-	-	-	5	213	0	11520	5940	0	0	0	0	3636	13080	6	-	-	-	-
3/4" C/2#12+1#12GRD	20	1	LTG: PUBLIC TOILETS	7	170	1202									8	LTG: RM 375-377	1	20	3/4" C/2#12+1#12GRD
-	20	1	SPARE	9		2604									10	LTG: RM 326-334	1	20	3/4" C/2#12+1#12GRD
3/4" C/2#12+1#12GRD	20	1	LTG: COFFEE BAR	11	1163	2090									12	LTG: RM 335-342	1	20	3/4" C/2#12+1#12GRD
3/4" C/4#10+1#10GRD	30	3	PANEL DIM	13	6500	1953	0		0		0		0		14	LTG: GIFT SHOP	1	20	3/4" C/2#12+1#12GRD
-	-	-	-	15	5552	832	0		0		0		0		16	LTG: SHELL SPACES	1	20	3/4" C/2#12+1#12GRD
-	-	-	-	17	4056	1445	0		0		0		0		18	LTG: GIFT SHOP	1	20	3/4" C/2#12+1#12GRD
3/4" C/2#12+1#12GRD	20	1	LTG: GRD FLR STORAGE	19	2176										20	SPARE	1	20	-
3/4" C/2#12+1#12GRD	20	1	LTG: GRD FLR STORAGE	21	1924	768									22	LTG: RM 391, 393	1	20	3/4" C/2#12+1#12GRD
3/4" C/2#12+1#12GRD	20	1	LTG: GRD FLR CORRIDOR	23	1746										24	SPARE	1	20	-
1" C/4#6+1#10GRD	60	3	PANEL XP	25	13211	0	0	0	0	0	0	0	0	3696	26	XFMR T-11	3	100	1 1/2" C/3#1+1#8GRD
-	-	-	-	27	9095	0	0	180	0	0	0	0	0	5640	28	-	-	-	-
-	-	-	-	29	6220	0	0	180	0	0	0	0	0	6360	30	-	-	-	-
Connected Load Phase A: (A)			239.4		25211.5		17820		0		0		23292			Demand Load Phase A: (A)	248.1		
Connected Load Phase B: (A)			239.6		22061.7		18180		0		0		26120			Demand Load Phase B: (A)	244.7		
Connected Load Phase C: (A)			208.1		16932.62		17640		0		0		23076			Demand Load Phase C: (A)	209.6		
Total VA:	184565																		
Load: (A)	222.1																		
25% Growth: (A)	277.6																		