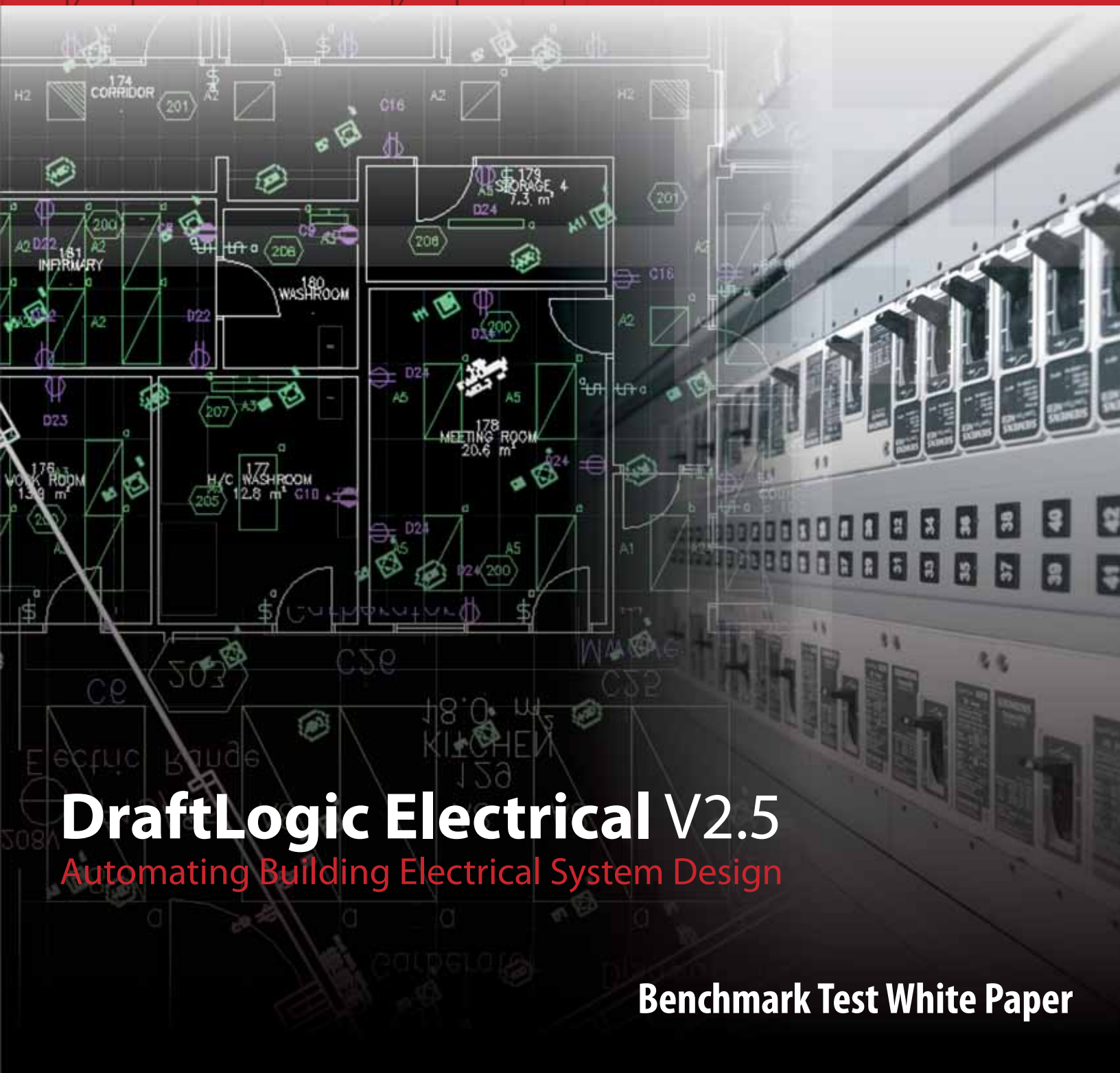
DraftLogicElectrical

automating building electrical system design



DraftLogic Electrical V2.5

Automating Building Electrical System Design

Benchmark Test White Paper

DraftLogic

403-270-1498 / 780-906-2888 9918 - 75 Ave NW, Edmonton, AB, T6E 1J2.
gstebnicki@draftlogic.com, dwhitford@draftlogic.com.

Electrical panel photo on front cover by Alan Hochberg.

DraftLogic Electrical V2.5

Benchmark Test

2009/10/30

Synopsis

In September and October of 2009, DraftLogic arranged for a medium sized electrical engineering firm to perform a benchmark test for us. The benchmark tester is an intermediate building electrical systems designer, having spent four years performing building electrical systems design for schools, offices, apartments, banks, and commercial buildings. The tester is also an experienced AutoCAD user, with four and a half years of using a mix of AutoCAD 2000, 2006, and 2008. What makes our results reasonably conservative is that the tester is not a DraftLogic Electrical expert; although he has been formally trained in the use of DraftLogic Electrical, he had time for only one production project and a couple of practice projects prior to performing the benchmark test. So we did not use a DraftLogic Electrical 'ringer' for this test!

Methodology

The benchmark test was performed using the exact same architect source drawing for each portion of the test and the exact same minimum deliverables requirements for each portion of the test. The designer was allowed to use any AutoCAD functions and TWS Engineering extra CAD tools for the manual portion of the test, and then any DraftLogic Electrical functions in addition to these for the DraftLogic Electrical portion of the test. We thus have closely simulated what

typically goes on in medium to large size design environments since many organizations of this size have implemented some sort of CAD tools to aid manual work—things like drawing cleaning functions and keyboard shortcuts for often-used functions.

Expectations and Overall Results

Prior to running the formal benchmark, we knew from the designer's production job that our clients will see a minimum doubling (2x) of performance in generating project deliverables. This minimum expectation was due to the fact that the production job had systems devices types and locations detailed by the electrical contractor, meaning that much of DraftLogic Electrical's automation could not be taken advantage of on that job. We expected to see a ten times gain when better advantage was taken of DraftLogic Electrical's functions.

In reality, the benchmark test proved out a thirteen times performance gain! The project took just under 8% of the total time to complete using DraftLogic Electrical versus the manual method. So we are now confident in stating that our users will see 2x to 13x performance gains in generating project deliverables in using DraftLogic Electrical versus regular AutoCAD.

White Paper To Come, Source Data Available Now

Within the next couple of months, a complete white paper will be written to detail the benchmarking process and results. For now, please find to follow the raw data that was generated. We are happy to provide any of the fourteen deliverables packages (seven for each portion of the benchmark test) if you desire to see the drawings produced.

Regards,

Dean Whitford, B.Comm.
Chief Operating Officer
DraftLogic
780-902-2888
www.draftlogic.com

DRAFTLOGIC ELECTRICAL BENCHMARK TEST VERSUS MANUAL CAD (CORPORATE PRE-EXISTING TOOLS USED IN BOTH SCENARIOS)

BENCHMARK RESULTS SUMMARY:

	Production Gain	Time Required Versus Manual	
Project Type Where DraftLogic Electrical's Strengths Are Completely Used			
DraftLogic Electrical Performance Multiplier Including Branch Circuit Wiring:	**1309%**	**8%**	Demo school project run by designer in both manual and DraftLogic Electrical environments.
DraftLogic Electrical Performance Multiplier Without Branch Circuit Wiring:	**622%**	**16%**	Demo school project run by designer in both manual and DraftLogic Electrical environments.
Project Type Where DraftLogic Electrical's Strengths Are Not Completely Used			
DraftLogic Electrical Performance Multiplier Without Branch Circuit Wiring:	**200%**	**50%**	As per designer on large format retail store in Innisfail (actual job) wherein lights / motors / receptacles were to be in specified locations from electrical contractor

DRAFTLOGIC BENCHMARK PROJECT LOG TIME:

TASK	CADD (Minutes)	REMARKS
Drawing Set Up (FROM E1.0 TO E5.0)	17	
Layout - Lighting, Switches, Exit, Emergency, Fixture tags, and Fixture Selection	359	
Power and Auxiliary - Receptacles, Data/Telephone, Fire Alarm,	238	
Details and Diagram	20	First Deliverables
Lighting Calculation	93	
Circuiting - ligthing, power and mechanical Motor Schedule	365	Second Deliverables Without AC
Re-Circuit Lighting and Power, revised panel schedule	125	
Lighting Wattage per Square Foot calculation (6 classrooms; time grossed up to cover whole project)	204	Third Deliverables
Update Drawings, Add RTU's, revised SLD, revised Motor Schedule	43	Fourth Deliverables With AC
Update drawings, 6 rooms to be computer room, revised lighting layout & re-circuit, add power/data and add circuit	122	Fifth Deliverables 6 rooms to be computer room
Update drawings, 6 baseboard heater added, circuit heater, update motor list, update panel schedule	25	Sixth Deliverables 6 baseboard heater added
Update drawings, Kitchen Equipment added, circuit equipment, create kitchen schedule, update panel schedule	105	7th & Final Deliverables
Update drawings: create ceiling grid (T-Bar), move lighting fixture	166	
Update drawings: branch circuit wiring (lighting) Base on 6 class rooms	39	Reworked later, retained to reflect typical rework required in manually done project.

TASK	DRAFTLOGIC (Minutes)	REMARKS
Drawing Mapping	8	
Automated Room Creation	1	
Complete Room Review	17	72 rooms
Ceiling Grid Creation	1	
Automated Placement	2.25	Lights & Power
Editing of Ligthing & Power, Addition aof FA / Auxiliary Ceilingf Grid Editing	122	Combination of TWS and DraftLogic Tools have been used
Creating Report and Error fixing	6	
Create and Insert Title Block	5	First Delivery
Update drawings, Add mechanical	38	2nd Delivery
Set up Automated Circuiting, Automated Circuiting	9	2nd Delivery
Manual circuiting	7	2nd Delivery
Create and Insert Title Block	25	2nd Delivery
Create Wattage Per Square Foot Report	6	3rd Delivery

TASK	CADD (Minutes)	REMARKS
Update drawings: branch circuit wiring (power) Base on 2 class rooms	28	Reworked later, retained to reflect typical rework required in manually done project.
Update drawings: bill of materials	51	Reworked later, retained to reflect typical rework required in manually done project.
Update drawings: voltage drop calculation Perform fault levels calculations and update single line drawing	24 98	NOTE: Feeders only, not BCW. Manual test thus did less than DraftLogic Electrical in this regard (DraftLogic Electrical performs voltage drop test/remediation on both feeders and branch circuits).
Update drawings: Banch Circuit wiring (Lighting) Base on 6 class rooms	0	See calculations schedule, partial time removed for gross up to cover entire project and included in total below
Update drawings: branch circuit wiring (power) Base on 2 class rooms	0	See calculations schedule, partial time removed for gross up to cover entire project and included in total below
Update drawings: bill of materials	0	See calculations schedule, partial time removed for gross up to cover entire project and included in total below
Total branch circuit wiring line drawing time	2249	
Time to perform bill of materials calculations for branch circuit wiring and populate schedule values for entire project	461	
Total number of minutes	**4832**	**min**

TASK	DRAFTLOGIC (Minutes)	REMARKS
Update drawings, Manual Circuiting, added 5 Condensors	15	4th Delivery
Create Report, Panel Schedule, Motor Schedule, Floor Plan (Ltg & Pwr), Single Line Diagram	4	4th Delivery
Create and Insert Title Block	16	4th Delivery
Update drawings, Manual Circuiting, 6 class rooms changed to computer room	15	5th Delivery
Create Report, Panel Schedule, Floor Plan (Power), Single Line Diagram	2	5th Delivery
Create and Insert Title Block	7	5th Delivery
Update drawings, Manual Circuiting, 6 electric baseboards added	8	6th Delivery
Create Report, Panel Schedule, Floor Plan (Power), Single Line Diagram	3	6th Delivery
Create and Insert Title Block	5	6th Delivery
Update drawings to include BCW for all devices project wide (run automation)	3	7th Delivery
Manual touch up of automated BCW	30	(not done, estimated)
Create Report, Floor plans (lighting) Floor Plan (Power), Bill of Materials	3	7th Delivery
Create and Insert Title Block, insert FA details, Tel / Data details, Data Rack Details, Finalized Drawings	11	7th Delivery
Total number of minutes	**369.25**	**min**

Calculations to Gross Partial Project Work Up to Full Project & Recognize Fault Levels

Raw Data Stats for Calculations

Total Rooms	72	
Total Lights	467	(NB: DraftLogic version 397 due to differences in luminaires used)
Total Receptacles and Motors	365	(NB: DraftLogic version 367)

Lighting Wattage per Square Foot

Lighting Wattage per Square Foot calculation (6 classrooms)	17	Third Deliverables
Rooms calculation completed for	6	
Gross up to entire project time for calculations	8.33%	% of rooms calculated
	204	Time grossed up to cover all rooms

Branch Circuit Wiring and Bill of Materials

Update drawings: branch circuit wiring (lighting)	39	Reworked later to add armored cable to junction box groups
Base on 6 class rooms		
Update drawings: branch circuit wiring (power)	28	Reworked later to style with conduit and routing rules
Base on 2 class rooms		
Update drawings: bill of materials	51	Reworked later to reflect changes
Update drawings: voltage drop calculation	24	
Update drawings: Banch Circuit wiring (Lighting)	97	
Base on 6 class rooms		
Update drawings: branch circuit wiring (power)	48	
Base on 2 class rooms		
Update drawings: bill of materials	41	
Total lighting branch circuit wiring for 6 classrooms	97	Only grossing up based on second run
Number of lights	69	
% Lights BCW Drawn For	14.78%	
Total power branch circuit wiring for 2 classrooms	48	Only grossing up based on second run
Number of receptacles	11	
% Receptacles and Motors BCW Drawn For	3.01%	
Total bill of materials time for lighting (6 classrooms) and power (2 classrooms)	92	

Time to do branch circuit wiring for all lighting	656.51	Used number of lights BCW completed for versus total lights in project to gross time up to cover 100% of lights.
Time to do branch circuit wiring for all receptacles and motors	1592.73	Used number of receptacles BCW completed for versus total receptacles and motors in project to gross time up to cover 100% of them.
Total branch circuit wiring line drawing time	**2249.23**	
Time to perform bill of materials calculations for branch circuit wiring and populate schedule values for entire project	**460.96**	Used average of % completed for each system and grossed up BOM time to get to 100%

Fault Levels

Time to manually calculate fault levels (actual)	45	Other designer performed
Time to update single line diagram with fault level values (estimated)	8	Not done, estimating
Time to update bill of materials with fault levels and to assign suitable kaic values to all breakers on all panels and disclose such values on bill of materials, including sorting of breakers in sensible order by breaker size and kaic rating for 'total breakers' section (estimated)	45	Not done, estimating
Total Time on Manual Project for Fault Levels	**98**	