

Team Meeting

10/15/2018

Coover 1324

Type of meeting:	Meeting with Client
Note taker:	Chufu Zhou

Attendees: Whole team present

Please read:

Please bring: Laptop

Minutes

Agenda item: Safety Moment

Presenter: YJ

Discussion:

Walking on the ice, which is merely dangerous every time. And what we are suppose to do when we walk on ice, and how to identify the thickness or the ice strength.

Agenda item: Voltage Drop Calculation

Presenter: Kataji

Discussion:

The value of power per rack that we got from the template does not match the calculation from the array parameter tool, did we input the values wrong for vmp and imp?

So we only use current parameter, to calculate the parameter in following chart

8 Input Disconnect Combiner Box								
Circuit	from	to	power (W)	Voltage (Vmp)	Current (Imp)	DCB Fuse (A)	Cable Size (AWG)	Cable Length (Ft)
1	ER - 1	DCB	28,674	972	29.5	30	10	200.3
2	ER - 2	DCB	28,674	972	29.5	30	10	137.9
3	ER - 3	DCB	28,674	972	29.5	30	10	75.5
4	ER - 4	DCB	28,674	972	29.5	30	10	14.1
5	ER - 5	DCB	28,674	972	29.5	30	10	14.1
6	ER - 6	DCB	28,674	972	29.5	30	10	75.5
7	ER - 7	DCB	28,674	972	29.5	30	10	137.9
8	ER - 8	DCB	28,674	972	29.5	30	10	200.3
Total:			229,392		236			

With DCB whip wire referring, we use 500 to calculate the rack harness resistance. As following chart.

=ROUND(E4*G4/500,3)

Strings per Harness	IMP for circuit	Rack Harness Length	Rack Harness wire size	Rack Harness resistance	Rack Harness resistance	Voltage Drop from Rack to CB	Jumper Length	Jumper wire size	Jumper resistance	Jumper resistance	Voltage Drop Across a String	DCB Whip length	DCB Whip wire size	DCB Whip resistance	DCB Whip resistance	Total resistance	Total voltage drop	Voltage drop for branch
per rack	Amp	feet	AWG	Ohm/kft	Ohm	Volts	feet	AWG	Ohm/kft	Ohm	Volts	feet	AWG	Ohm/kft	Ohm	Ohm	Volts	percent
2	29.5	200.3	10	0.9969	0.4	4.72708	62.4	12	1.588	0.198	0.3644784					0.598	5.0915584	0.52%
2	29.5	137.9	10	0.9969	0.275	2.2374275	62.4	12	1.588	0.198	0.3644784					0.473	2.6019059	0.27%
2	29.5	75.5	10	0.9969	0.151	0.6726295	62.4	12	1.588	0.198	0.3644784					0.349	1.0371079	0.11%
2	29.5	14.1	10	0.9969	0.028	0.0232932	62.4	12	1.588	0.198	0.3644784					0.226	0.3877716	0.04%
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2	29.5	75.5	10	0.9969	0.151	0.6726295	62.4	12	1.588	0.198	0.3644784					0.349	1.0371079	0.11%
2	29.5	137.9	10	0.9969	0.275	2.2374275	62.4	12	1.588	0.198	0.3644784					0.473	2.6019059	0.27%
2	29.5	200.3	10	0.9969	0.4	4.72708	62.4	12	1.588	0.198	0.3644784					0.598	5.0915584	0.52%
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2	29.5	200.3	10	0.9969	0.4	4.72708	62.4	12	1.588	0.198	0.3644784					0.598	5.0915584	0.52%

Disconnect Combiner Box NUMBER	INPUT DC FUSE SIZE	NUMBER OF STRINGS	NUMBER OF INPUTS	SHORT CIRCUIT CURRENT (ISC)	MAX POWER CURRENT (IMP)	MAX POWER VOLTAGE (VMP)	DC FEEDER WIRE SIZE AND TYPE	ONE WAY DISTANCE NOT TO EXCEED (FT)
DCB#-##	AMP			AMP	AMP	VOLT		
				18.8	29.50	972		
DCB1-01	30	16	8	150	236	972	(<QUANTITY>) - <WIRE SIZE AND TYPE>	
DCB1-02	30	16	8	150	236	972		
DCB1-03	30	16	8	150	236	972		
DCB1-04	30	16	8	150	236	972		
DCB1-05	30	16	8	150	236	972		
DCB1-06	30	16	8	150	236	972		
DCB1-07	30	16	8	150	236	972		
DCB1-08	30	16	8	150	236	972		
DCB1-09	30	16	8	150	236	972		
DCB1-10	30	16	8	150	236	972		
DCB1-11	30	14	7	150	207	972		
DCB1-12	30	14	7	150	207	972		
DCB1-13	30	16	8	150	236	972		
DCB1-14	30	16	8	150	236	972		
DCB1-15	30	16	8	150	236	972		
DCB1-16	30	16	8	150	236	972		
DCB1-17	30	16	8	150	236	972		
DCB1-18	30	16	8	150	236	972		
DCB1-19	30	16	8	150	236	972		
DCB1-20	30	16	8	150	236	972		
DCB1-21	30	16	8	150	236	972		
DCB1-22	30	16	8	150	236	972		
INVERTER 1 TOTALS		348	174	3302	5133	972		

Based on NEC 310 Table 300.50

Solar Plant Cost				
Panels	236664	48.279456	million \$	
CBs	432	0.55320192	million \$	
Inverters	36	15.556275	million \$	
Land	348.2920827	0.195	million \$	560 acres
Total Cost		64.58393292	million \$	

Results from Voltage Drop Calculation sheet

Combiner	Strings	Racks in	Per CB Output (A)
1	16	8	236
2	16	8	236
3	16	8	236
4	16	8	236
5	16	8	236
6	16	8	236
7	16	8	236
8	16	8	236
9	16	8	236
10	16	8	236
11	14	7	206.5
12	14	7	206.5
13	16	8	236
14	16	8	236
15	16	8	236
16	16	8	236
17	16	8	236
18	16	8	236
19	16	8	236
20	16	8	236
21	16	8	236
22	16	8	236
Total			5133

Total Voltage Drop from Panels to CBs in an Array	399.1329114 V
Percentage of Voltage Drop Per CB	1.88% 20 CBs
	1.77% 2 CBs
Average	1.87%

Action items

- ✓ Final plant layout
- ✓ Voltage drop sheet

Person responsible

Kat and Nur
Cole

Deadline

10/15
10/9

Agenda item: Ground Coverage Ratio

Presenter: Nur

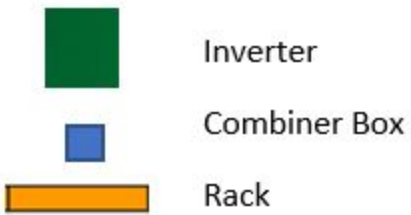
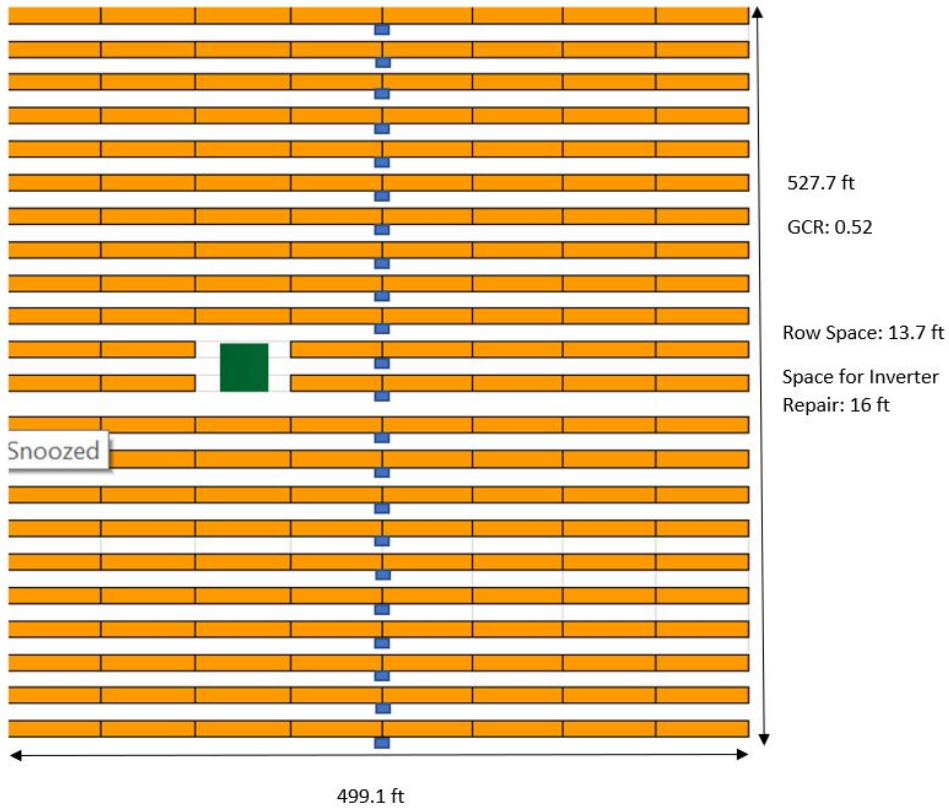
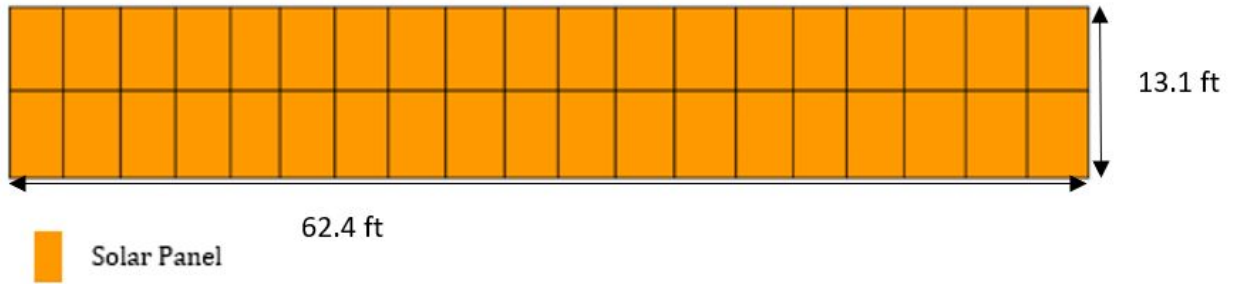
Discussion:

Using the supplementary software provided, students design the layout and ground Coverage ratio by given

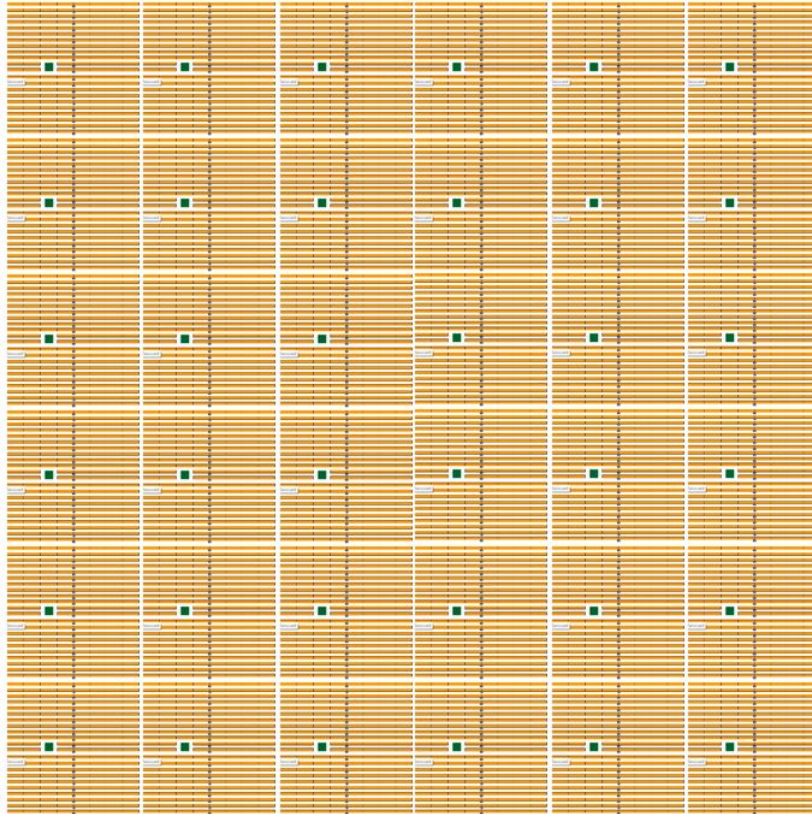
Row space = height of rack + tan(tilt angle) = 13.65 ft

Pitch = height of rack + row space

GCR = height of rack/pitch = 0.52



Single Array Layout: 8x22 Racks With 2 Removed, 1 Inverter, 22 CBs, ILR: 1.29



Solar Plant Layout: 36 Arrays, 36 Inverters

Conclusions:

With so far given research, we designed above layout.

Action items

✓ n/a

Person responsible

Deadline

Agenda item: Collector & Feeder

Presenter: Ahmed & Tam

Discussion:

Students have research about collector and check how the collector work and how it display on AutoCAD, Collector Arrangement can collect the output from the inverters and transformers (inverter skid). Each inverter has a step-up transformer attached to it. It sum up all the skids output and deliver it to the 3 bus feeder. Inverter skid details: Combiner box coming from the solar array, inverter DC to AC, an attached step-up transformer And about feeder, the Output of collector

- Input to 34.5 kV bus.

