

Project: **ETAP**
Location: 7.0.0E
Contract:
Engineer:
Filename: rrr
Study Case: LF

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SN: SSNCOLEGE2
Revision: Base
Config.: Normal

Electrical Transient Analyzer Program

Load Flow Analysis

Loading Category (1): Design
Generation Category (1): Design
Load Diversity Factor: None

	<u>Swing</u>	<u>V-Control</u>	<u>Load</u>	<u>Total</u>
Number of Buses:	1	1	1	3

	<u>XFMR2</u>	<u>XFMR3</u>	<u>Reactor</u>	<u>Line/Cable</u>	<u>Impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches:	0	0	0	0	3	0	3

Method of Solution: Gauss-Seidel Method
Maximum No. of Iteration: 2000
Precision of Solution: 0.0000010
Load Flow Acceleration Factor: 1.20
System Frequency: 50 Hz
Unit System: Metric
Project Filename: rrr
Output Filename: C:\Users\SSLab\Desktop\rrr\rrr.lfr

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Adjustments

<u>Tolerance</u>	<u>Apply Adjustments</u>	<u>Individual /Global</u>	<u>Percent</u>
Transformer Impedance:	Yes	Individual	
Reactor Impedance:	Yes	Individual	
Overload Heater Resistance:	No		
Transmission Line Length:	No		
Cable Length:	No		

<u>Temperature Correction</u>	<u>Apply Adjustments</u>	<u>Individual /Global</u>	<u>Degree C</u>
Transmission Line Resistance:	Yes	Individual	
Cable Resistance:	Yes	Individual	

Bus Input Data

Bus			Initial Voltage		Load							
					Constant kVA		Constant Z		Constant I		Generic	
ID	kV	Sub-sys	% Mag.	Ang.	MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar
Bus1	100.000	1	105.0	0.0								
Bus2	100.000	1	102.0	0.0								
Bus3	100.000	1	100.0	0.0	40.000	20.000						
Total Number of Buses: 3					40.000	20.000	0.000	0.000	0.000	0.000	0.000	0.000

Generation Bus				Voltage		Generation			Mvar Limits	
ID	kV	Type	Sub-sys	% Mag.	Angle	MW	Mvar	% PF	Max	Min
Bus1	100.000	Swing	1	105.0	0.0					
Bus2	100.000	Voltage Control	1	102.0	0.0	30.000			35.294	-10.000
						30.000	0.000			

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Impedance Input Data

Impedance		Positive Sequence Impedance			Unit
ID		R	X	Y	
Z1		0	30	0	% in 100.000 kV base and 100.0 MVA base
Z2		0	20	0	% in 100.000 kV base and 100.0 MVA base
Z3		0	40	0	% in 100.000 kV base and 100.0 MVA base

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Branch Connections

CKT/Branch		Connected Bus ID		% Impedance, Pos. Seq., 100 MVA Base			
ID	Type	From Bus	To Bus	R	X	Z	Y
Z1	Impedance	Bus1	Bus3		30.00	30.00	
Z2	Impedance	Bus3	Bus2		20.00	20.00	
Z3	Impedance	Bus2	Bus1		40.00	40.00	

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LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR	
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	% PF	% Tap	
* Bus1	100.000	105.000	0.0	10.000	23.192	0	0	Bus3	13.528	15.294	112.3	66.3		
								Bus2	-3.528	7.898	47.6	-40.8		
* Bus2	100.000	102.000	0.8	30.000	-0.337	0	0	Bus3	26.472	7.290	155.4	96.4		
								Bus1	3.528	-7.627	47.6	-42.0		
Bus3	100.000	100.705	-2.2	0	0	40.000	20.000	Bus1	-13.528	-14.160	112.3	69.1		
								Bus2	-26.472	-5.840	155.4	97.7		

* Indicates a voltage regulated bus (voltage controlled or swing type machine connected to it)

Indicates a bus with a load mismatch of more than 0.1 MVA

Bus Loading Summary Report

Bus			Directly Connected Load								Total Bus Load			
			Constant kVA		Constant Z		Constant I		Generic		MVA	% PF	Amp	Percent Loading
ID	kV	Rated Amp	MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar				
Bus1	100.000		0	0	0	0	0	0	0	0	26.849	50.4	147.6	
Bus2	100.000		0	0	0	0	0	0	0	0	30.954	96.9	175.2	
Bus3	100.000		40.000	20.000	0	0	0	0	0	0	44.721	89.4	256.4	

* Indicates operating load of a bus exceeds the bus critical limit (100.0% of the Continuous Ampere rating).

Indicates operating load of a bus exceeds the bus marginal limit (95.0% of the Continuous Ampere rating).

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Branch Loading Summary Report

CKT / Branch		Cable & Reactor			Transformer				
ID	Type	Ampacity (Amp)	Loading Amp	%	Capability (MVA)	Loading (input)		Loading (output)	
						MVA	%	MVA	%

* Indicates a branch with operating load exceeding the branch capability.

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Branch Losses Summary Report

CKT / Branch ID	From-To Bus Flow		To-From Bus Flow		Losses		% Bus Voltage		Vd % Drop in Vmag
	MW	Mvar	MW	Mvar	kW	kvar	From	To	
Z1	13.528	15.294	-13.528	-14.160	0.0	1134.4	105.0	100.7	4.30
Z3	-3.528	7.898	3.528	-7.627	0.0	271.5	105.0	102.0	3.00
Z2	26.472	7.290	-26.472	-5.840	0.0	1449.3	102.0	100.7	1.30
					0.0	2855.2			

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Alert Summary Report

% Alert Settings

<u>Loading</u>	<u>Critical</u>	<u>Marginal</u>
Bus	100.0	95.0
Cable	100.0	95.0
Reactor	100.0	95.0
Line	100.0	95.0
Transformer	100.0	95.0
Panel	100.0	95.0
Protective Device	100.0	95.0
Generator	100.0	95.0
<u>Bus Voltage</u>		
OverVoltage	105.0	102.0
UnderVoltage	95.0	98.0
<u>Generator Excitation</u>		
OverExcited (Q Max.)	100.0	95.0
UnderExcited (Q Min.)	100.0	

Critical Report

<u>Device ID</u>	<u>Type</u>	<u>Condition</u>	<u>Rating/Limit</u>	<u>Unit</u>	<u>Operating</u>	<u>% Operating</u>	<u>Phase Type</u>
Bus1	Bus	Over Voltage	100.000	kV	105.000	105.0	3-Phase
Gen2	Generator	Overload	30.000	MW	30.000	100.0	3-Phase

Marginal Report

<u>Device ID</u>	<u>Type</u>	<u>Condition</u>	<u>Rating/Limit</u>	<u>Unit</u>	<u>Operating</u>	<u>% Operating</u>	<u>Phase Type</u>
Bus2	Bus	Over Voltage	100.000	kV	102.000	102.0	3-Phase

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SUMMARY OF TOTAL GENERATION , LOADING & DEMAND

	MW	Mvar	MVA	% PF
Source (Swing Buses):	10.000	23.192	25.256	39.59 Lagging
Source (Non-Swing Buses):	30.000	-0.337	30.002	99.99 Leading
Total Demand:	40.000	22.855	46.069	86.83 Lagging
Total Motor Load:	40.000	20.000	44.721	89.44 Lagging
Total Static Load:	0.000	0.000	0.000	
Total Constant I Load:	0.000	0.000	0.000	
Total Generic Load:	0.000	0.000	0.000	
Apparent Losses:	0.000	2.855		
System Mismatch:	0.000	0.000		

Number of Iterations: 9