Running a Short Circuit Analysis

The purpose of this tutorial is to introduce the Short-Circuit Analysis module of ETAP, and provide instructions on how to run ANSI and IEC short-circuit calculations. In addition, there will be a brief look at study case editors and the Alert View function. For this section of the tutorial you should select "Example Project (ANSI)" option when starting ETAP Demo.

Results of the Short Circuit Analysis

Running Short Circuit Analysis

🖰 From the Mode toolbar, select the short circuit mode by clicking on the Short-Circuit Analysis button.


🖰

toolbar you can select the name of the output report as one already defined or "Prompt."
If "Prompt" is selected then prior to running the Short Circuit Analysis you will be
prompted to enter a report name.

From the Study Case toolbar, click the Edit Study Case button. This will open the Short
Circuit Study Case editor, allowing you to change calculation criteria and options. From
the Info page, choose a bus or multiple buses to be faulted. Click all buses except Sub 3
and select ~Fault>> to place them in the Don't Fault category. Sub 3 should now appear
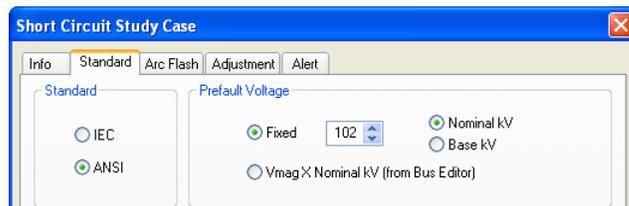alone in the Fault category. Click OK when finished.
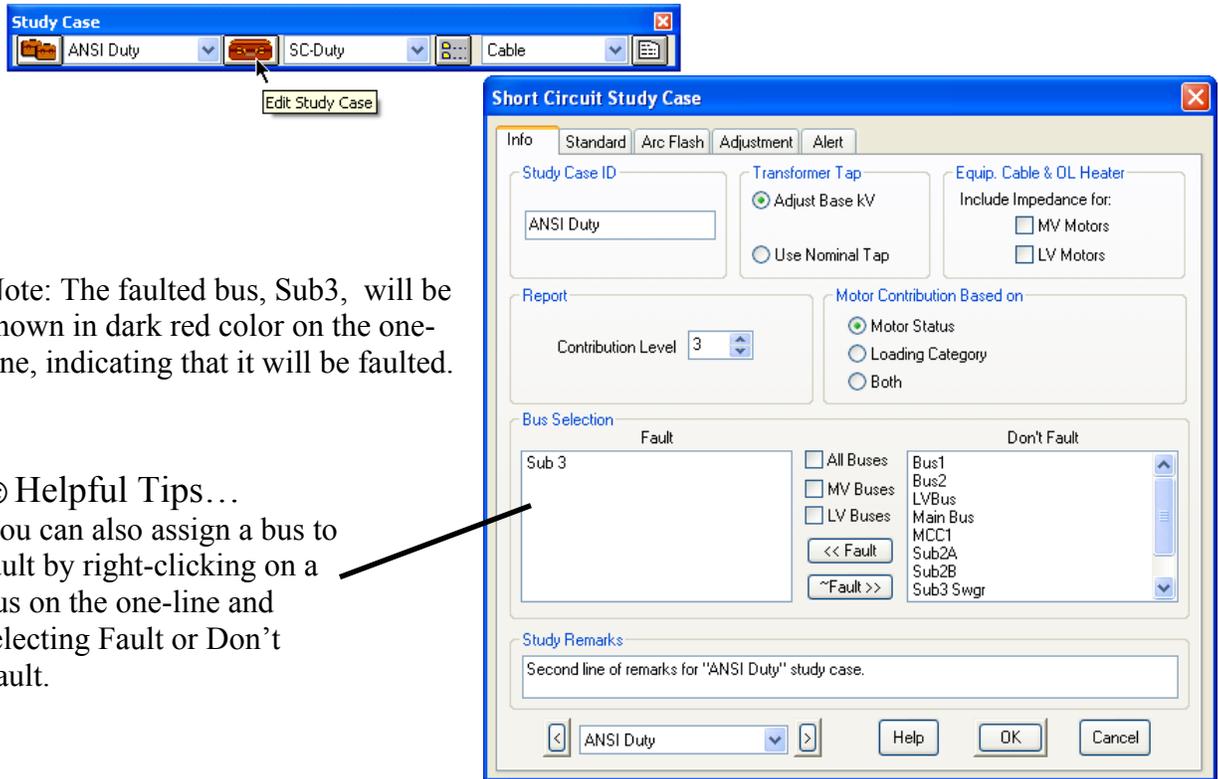
Note: The faulted bus, Sub3, will be
shown in dark red color on the one-
line, indicating that it will be faulted.

☺ Helpful Tips…
You can also assign a bus to
fault by right-clicking on a
bus on the one-line and
selecting Fault or Don't
Fault.

You can now run a short circuit (duty) study by clicking on the Run 3-Phase Device Duty
button on the ANSI Short Circuit toolbar. If Prompt was selected as the output report in
the Study Case toolbar, you will be prompted to enter a name for your output report.

There are four other types of studies besides the 3-Phase ANSI that can be performed
under the ANSI standard setting. In addition, three studies according to the IEC set of
standards can be performed. The ANSI methods are the default for short circuit studies,
but this can be changed in the Standard page of the Short Circuit Study Case editor.

Viewing the Results

👆 The results of the Device Duty Short Circuit calculation are displayed on the one-line. Changing the settings in the short circuit Display Options can modify the results displayed and their format on the one-line.

👆 Note that breaker CB9 and CB18 are now colored magenta. This flag means that the device capabilities have been exceeded in some way. Click the Alert View button on the ANSI Short Circuit toolbar to view the flagged devices (please note that the alert function is disabled in the Demo).

ANS...

- Run 3-Phase Device Duty (ANSI C37)
- Run 3-Phase (30 Cycle)
- Run 3-Phase, LG, LL, LLG (1/2 Cycle)
- Run 3-Phase, LG, LL, LLG (1.5 - 4 Cycle)
- Run 3-Phase, LG, LL, LLG (30 Cycle)
- Run Arc-Flash (IEEE 1584/NFPA70E)
- Display Options
- Alert View
- Report Manager

Short Circuit Analysis Alert View - Output Report: SC-Duty

| Study Case: | ANSI Duty | Data Revision: | Base |
| Configuration: | Normal | Date: | 02-13-2007 |

Critical

Device ID	Type	Condition	Rating/Limit	Operating	% Operating

Marginal

Device ID	Type	Condition	Rating/Limit	Operating	% Operating
CB18	HV CB	Interrupting	33.462 kA	31.191	93.2
CB9	HV CB	Interrupting	33.462 kA	31.191	93.2

👆 To view the output report click on Report Manager from the Short Circuit toolbar, and go to the Result page and select Short Circuit Report.

ANSI 3-Phase SC Report Manager

Complete | Input | Result | Summary

Short-Circuit Report

- ◉ Viewer
- ○ PDF
- ○ MS Word
- ○ Rich Text Format
- ○ MS Excel
- ☐ Set As Default

Output Report Name
SC-Duty

Path
C:\ETAP 555 Demo\Example-ANSI

[Help] [OK] [Cancel]

ETAP Report - SC-Duty / Short-Circuit Report

View Help

8 / 8+   125%

Contract:	OTI-12345678		SN:	ETAP-OTI
Engineer:	Operation Technology, Inc.	Study Case: ANSI Duty	Revision:	Base
Filename:	EXAMPLE		Config.:	Normal

This info is printed on every output report, 1st remark line. (120 characters)
Second line of remarks for "ANSI Duty" study case.

3-phase fault at bus: **Sub 3**

| Prefault voltage | = 4.243 | = 102.00 % of nominal bus kV (4.160 kV) |
| | | = 102.00 % of base (4.160 kV) |

	Contribution			1/2 Cycle					1.5 to 4 Cycle				
From Bus ID	To Bus ID		% V From Bus	kA Real	kA Imaginary	Imag. /Real	kA Symm. Magnitude	% V From Bus	kA Real	kA Imaginary	Imag. /Real	kA Symm. Magnitude
Sub 3	Total		0.00	0.779	-26.155	33.6	26.167	0.00	0.713	-25.802	36.2	25.812
Sub3 Swgr	Sub 3		0.31	0.149	-0.765	5.1	0.779	0.18	0.085	-0.436	5.1	0.444
Bus1	Sub 3		0.00	0.000	0.000	999.9	0.000	0.00	0.000	0.000	999.9	0.000
# T1~	Sub 3		86.62	0.630	-25.390	40.3	25.398	86.54	0.629	-25.367	40.3	25.375
LVBus	Sub3 Swgr		10.67	0.044	-0.183	4.2	0.188	5.94	0.022	-0.102	4.7	0.105
MCC1	Sub3 Swgr		12.09	0.031	-0.231	7.4	0.233	5.23	0.014	-0.099	7.0	0.100
Pump 1	Sub3 Swgr		106.08	0.073	-0.350	4.8	0.358	106.08	0.049	-0.234	4.8	0.239
Bus2	Bus1		0.00	0.000	0.000	999.9	0.000	0.00	0.000	0.000	999.9	0.000
# Main Bus	T1~		87.78	0.071	-2.901	41.1	2.902	87.70	0.071	-2.904	41.0	2.905
# Sub2B	T1~		91.11	0.005	-0.161	29.9	0.161	90.86	0.005	-0.155	31.2	0.155

Modifying Alert View settings

🖱 To view or modify the Alert settings, open the Short Circuit Study Case editor to the Alert page. Check the Marginal box and change the limit to 70%. Also, click the Auto Display button and then click OK. When the Marginal box is checked, all devices that have been exceeded by this limit, but remain under 100% rating will appear in the Alert View in the Marginal category. Devices that have been exceeded by 100% of rating will always be flagged, and will appear in the Critical category of the Alert View.
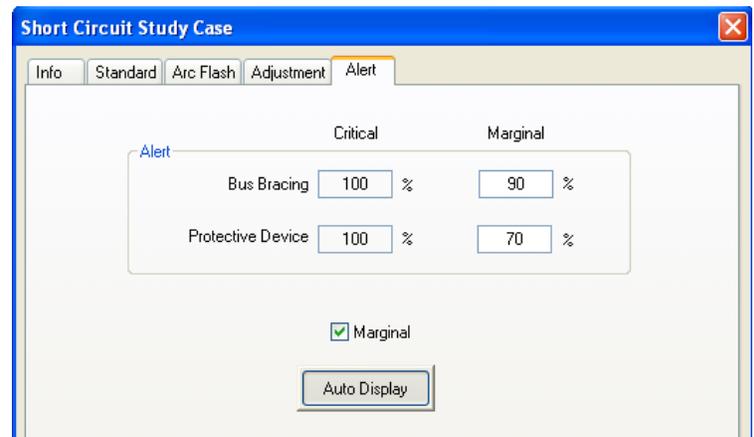
🖱 Now run the same short circuit study again by following the procedure used above. Note that once the calculation has been completed, the Alert View window will automatically open, as per the change made to the Alert page in the Short Circuit Study Case editor. Notice that other protective device conditions appear in the Marginal Alert View. Note that the short circuit results do not change.
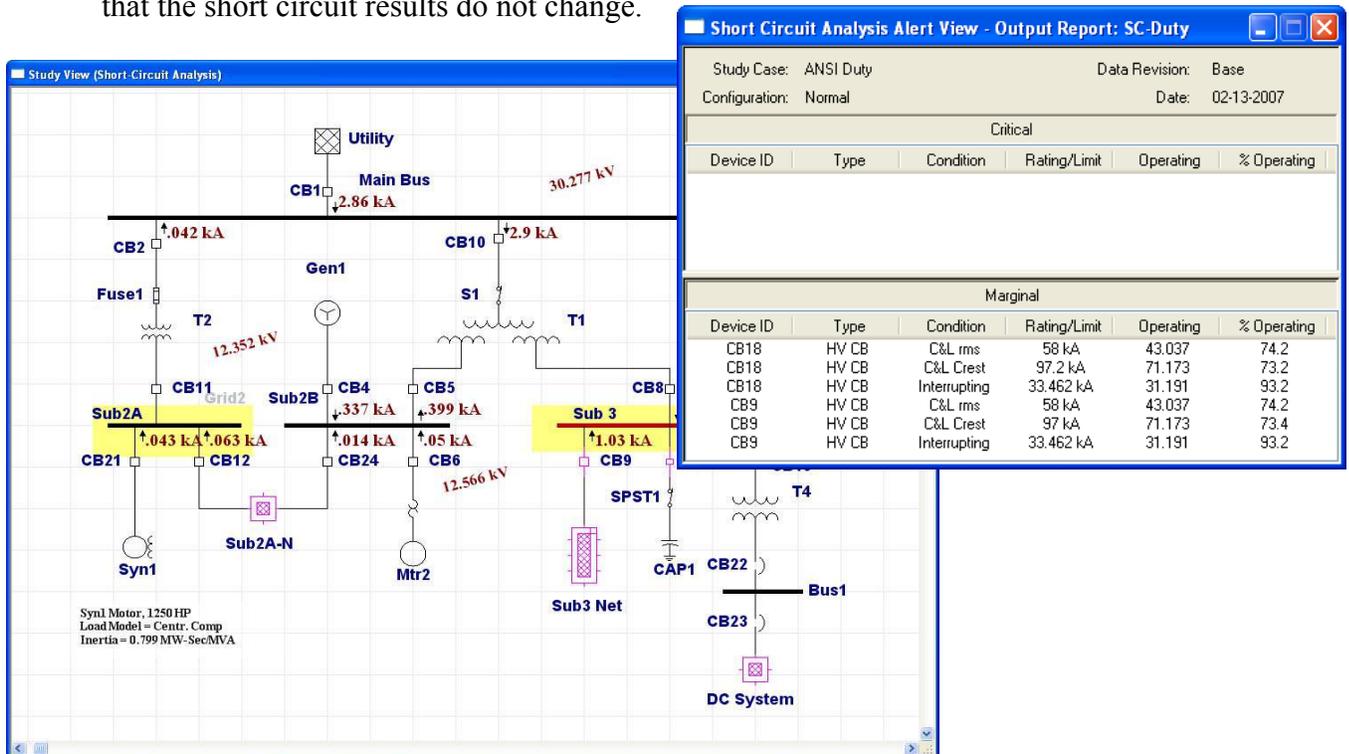
🖱 The Alert function of the Short Circuit and Load Flow modules of ETAP is a convenient way to size protective devices at your facility.