



Project 16-4: SEDS Enhancements – 3-Phase Min/Max Impedance

Final Report/Software prepared May 2018; available @ www.dstar.org

Project Summary:

Initially developed in 1998, the Secondary Electrical Design Software (SEDS) enables users to quickly layout a secondary design and easily assess performance measures such as voltage drop, flicker, loading and short circuit current using a customized load flow algorithm. SEDS includes load diversity in the calculations, and uses a sophisticated approach to calculate the coincident demand of dissimilar types or sizes of loads - a situation which can give silly results using conventional coincidence tables.

SEDS development benefited significantly from the testing, guidance, and input of the consortium member utilities. Development with such tight user integration resulted in a final product that provides significant flexibility and usability to the large number of utility planners all across the United States.

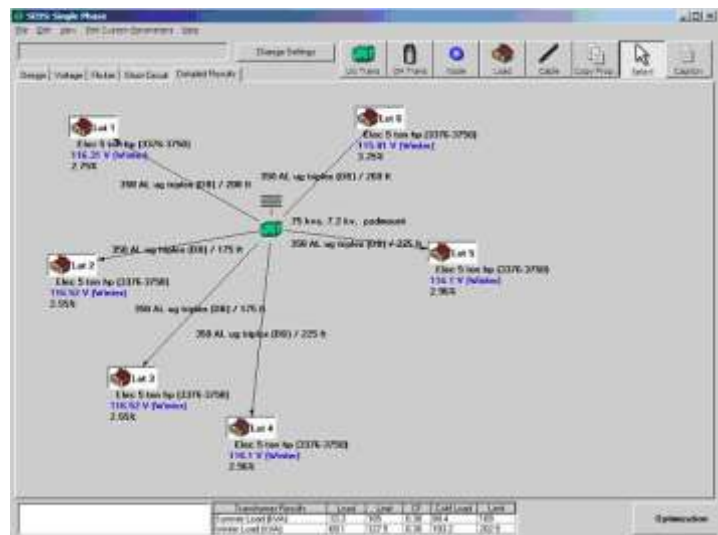
SEDS performs a variety of calculations for both single-phase and three-phase systems:

Single Phase Systems:

- Distribution transformer coincident loading
- Secondary cable loading coincident current
- Secondary service voltages
- Mutual and self-flicker
- Service-entrance short circuit currents
- Cold load pickup guidelines
- Optimization based on first cost or first order total owning cost

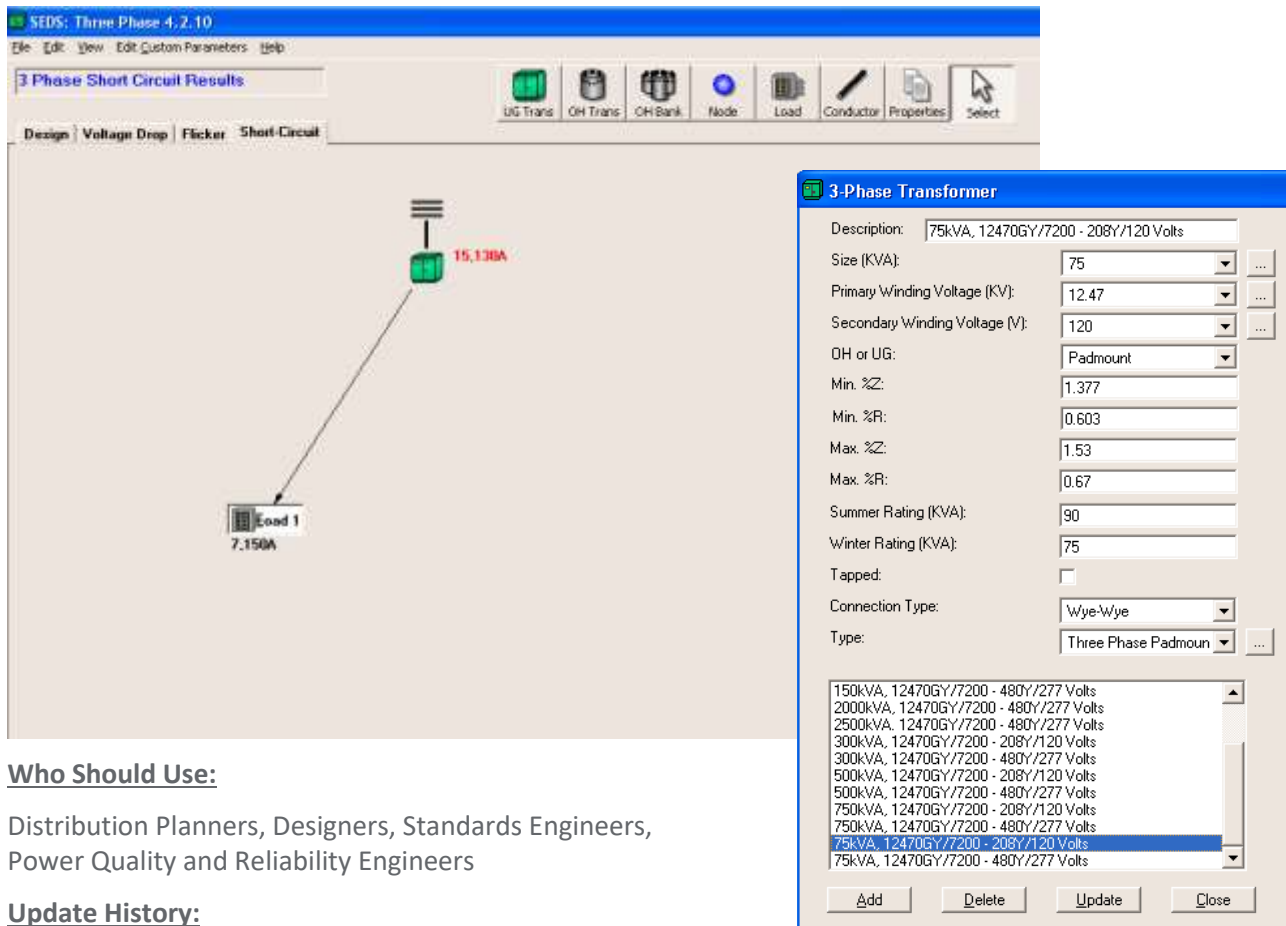
Three Phase Systems:

- Distribution transformer loading
- Secondary cable loading
- Secondary service voltages
- Voltage unbalance
- Mutual and self-flicker
- Service-entrance short circuit currents



This project is focused on adding both a minimum and maximum 3-phase transformer impedance to allow for calculation of voltage drop using the maximum value and short circuit using the minimum value. This functionality does not apply to banked 1-phase transformers which is used for a small number of applications.

SEDS User Interface:



The screenshot displays the SEDS software interface. The main window shows a 3-phase transformer connected to a load. The transformer is labeled "15,138A" and the load is labeled "Load 1 7.150A". The interface includes a menu bar (File, Edit, View, Edit Custom Parameters, Help) and a toolbar with icons for UG Trans, OH Trans, OH Bank, Node, Load, Conductor, Properties, and Select. The "3 Phase Short Circuit Results" window is open, showing a list of transformer options. The selected option is "75kVA, 12470GY/7200 - 208Y/120 Volts". The properties for this transformer are displayed in a table:

Property	Value
Description	75kVA, 12470GY/7200 - 208Y/120 Volts
Size (KVA)	75
Primary Winding Voltage (KV)	12.47
Secondary Winding Voltage (V)	120
OH or UG	Padmount
Min. %Z	1.377
Min. %R	0.603
Max. %Z	1.53
Max. %R	0.67
Summer Rating (KVA)	90
Winter Rating (KVA)	75
Tapped	<input type="checkbox"/>
Connection Type	Wye-Wye
Type	Three Phase Padmount

The list of transformer options includes:

- 150kVA, 12470GY/7200 - 480Y/277 Volts
- 2000kVA, 12470GY/7200 - 480Y/277 Volts
- 2500kVA, 12470GY/7200 - 480Y/277 Volts
- 300kVA, 12470GY/7200 - 208Y/120 Volts
- 300kVA, 12470GY/7200 - 480Y/277 Volts
- 500kVA, 12470GY/7200 - 208Y/120 Volts
- 500kVA, 12470GY/7200 - 480Y/277 Volts
- 750kVA, 12470GY/7200 - 208Y/120 Volts
- 750kVA, 12470GY/7200 - 480Y/277 Volts
- 75kVA, 12470GY/7200 - 208Y/120 Volts**
- 75kVA, 12470GY/7200 - 480Y/277 Volts

Who Should Use:

Distribution Planners, Designers, Standards Engineers,
Power Quality and Reliability Engineers

Update History:

SEDS was created in P7-2 and has been updated in P9-6, P10-15, P11-4, P12-2, P13-4 and P16-4.

Please do not hesitate to inform us of any bugs/issues, by sending an email to: dstar-support@ge.com.

For the complete report on DSTAR Project 16-4: SEDS
Enhancements, visit www.dstar.org.



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