CYME
Power Engineering Software and Solutions

Fault Analyses

Assess the potential impact of faults in electric power systems

Fault analysis is an essential tool for the determination of short-circuit currents that result from different fault phenomena, the estimation of fault locations, the identification of under-rated equipment in electric power systems and the sizing of various system components. The CYME power engineering software features a comprehensive fault analysis module to assist engineers in the assessment of the effects of short-circuit of varying severity on the overall system reliability.

The knowledge of the magnitude of the short-circuit current that can be present at any point in an electric system is crucial to ensure the system's reliability. The abnormal current level produced by faults put an important stress on the electrical equipment, and if the latter are not properly rated, it could lead to equipment damage, personnel injuries and system downtime.

The Fault Analysis module of the CYME power engineering software is a comprehensive module offering various analyses and functionalities to help engineers carefully assess issues related to short-circuit.

The module features:

- Conventional short-circuit calculations
- IEC short-circuit calculations
- ANSI® short-circuit calculations
- Series fault analysis
- Simultaneous fault analysis
- Voltage sag analysis
- Fault locator
- Equipment rating verification analysis

Conventional short-circuit

The conventional short-circuit calculation is a robust calculation algorithm that does not follow any particular standard. It offers:

- Sequence and phase-domain calculations
- Computation of short-circuit current at all nodes, or computation of the effect of a fault applied at a given location
- All fault types (LLL, LLL-G, LL, LL-G, L-G)
- Sliding fault option
- Impedance tolerance adjustments
- Machine short-circuit contributions

Powering Business Worldwide

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IEC-60909© short-circuit

The IEC-60909© short-circuit calculation adheres to the international IEC-60909© guidelines and supports fault current calculations for three-phase radial or meshed AC networks.

- Four types of fault current calculations: Initial short-circuit current, Maximum asymmetrical fault or peak current, Breaking fault current and Steady-state fault current
- Standard-based or user-defined voltage factors
- Impedance correction factors for transformer, generator, network feeders and power station units
- Report of typical X/R ratios for generators, motors and network feeders

ANSI® short-circuit

The ANSI® short-circuit calculations adheres to the North American ANSI® C37.5, ANSI® C37.010, ANSI® C37.13 standards relevant to short-circuit studies of specific duty types.

- Duty types studied include: time-delayed, contact parting, closing/latching
- Low voltage circuit breaker rating assessment
- Automatic selection of multipliers applied to motor sub-transient reactance as dictated by the standard

Series fault

The Series fault analysis evaluates the effect of open circuits or asymmetrical line impedance conditions on the network, which usually causes a significant increase in the neutral current.

Types of series fault studied:

- Single-phase open fault
- Two-phase open fault
- Asymmetrical impedances

Simultaneous fault

The Simultaneous fault analysis studies the impact of having faults at different locations simultaneously on the network.

- Study the combination of both shunt and series faults
- Assess the impact of faults occurring simultaneously at two or more network locations

Voltage sag

The Voltage sag analysis assesses the impact of a sudden reduction of voltage magnitude caused by network faults, or other disturbances such as motor starting or overloads.

- Assert the validity of the clearing time of different protective device through the determination of sag frequency and duration calculation
- Determine the voltage dip caused by a disturbance

Fault locator

The Fault Locator analysis takes the short-circuit recorded from a current measuring instrument to determine possible locations of the fault on the network.

Equipment rating verification

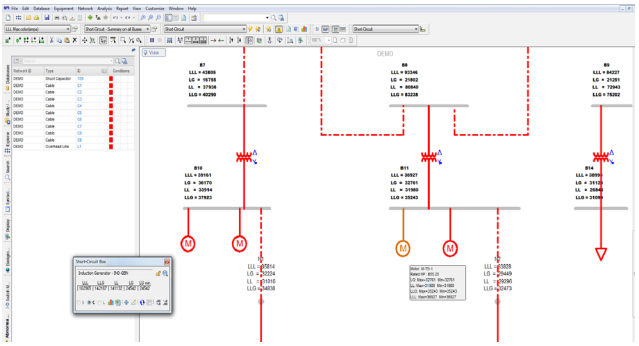
The Equipment rating verification analysis evaluates devices to determine if they are properly sized to perform their intended functions as the stress on them increases along with the growing energy demand.

- Determine, with the short-circuit analysis, if network devices can withstand fault currents as per ANSI® or IEC requirements
- Pinpoint, with the power flow analysis, if network devices are overloaded or suffered voltage violations during steady-state conditions
- Detailed report and visualization of results on the one-line diagram

Result Viewing

Different reporting tools are available to facilitate the visualization of results:

- Reports and charts
  - Detailed reports in tabular format that can be exported to Microsoft Excel®, XML or database format
  - Report content customizable with the use of keywords
- One-line diagram display
  - Color-coding to illustrate anomalies according to user-defined criteria
  - Customizable tags and tooltips at user-defined locations on the one-line diagram



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