CYME
Power Engineering Software and Solutions

CYMCAP 7.0

Robust cable ampacity calculations at your fingertips

First of the new CYMCAP 7 Series, CYMCAP 7.0 rev.1 focuses on consolidating its assets while introducing new robust and performant algorithms which open the path for more advanced features and capabilities.

CYMCAP 7.0 offers a wide range of enhanced capabilities, featuring new modules, new functionalities and advanced computations:

- New ampacity optimization algorithm
- Feature to rate circuits with various operating frequencies
- Possibility to model multiple heat sources/sinks
- New module to study the prevention of soil dry-out in non-homogeneous media
- Improved finite element modeling capabilities for the MDB module
- Extended features for the transient analysis
- Updated reports

Multiple frequency option

The system operating frequency does not have to be a global parameter anymore. The frequency can be assigned by circuit to allow the representation, in the same thermal section, of various circuits with a different frequency for each. With this feature, it is now possible to model most installations combining DC and AC circuits or circuits operating at different frequencies like in railway applications for example.

Multiple heat sources/sinks

It is now possible to model several heat sources/sinks in the same installation in order to account for their effect on neighboring cables. Like for a single heat source/sink, it can be defined either in heat flux or in temperature. The heat source/sink can be modeled with or without insulation.

Ampacity Optimization Algorithm

For the unequally loaded solution option, the former heuristic approach has been replaced by a robust optimization algorithm which objective is to maximize the sum of ampacity in all circuits present in an installation. The new approach offers several improvements and advantages compared to the former one, such as:

- The solution provided is optimal in terms of ampacity. Hence, higher ampacity than in the former versions is expected.
- Symmetrical installations are well handled and provide symmetrical results. It is no longer necessary to use the equally loaded solution option as an alternative.
- The solution converges with very good accuracy.

EATON
Powering Business Worldwide

CYMCAP 7.0

Robust cable ampacity calculations at your fingertips

Soil Dry-Out Prevention Analysis (SDO module)

Prior to CYMCAP 7.0, in steady-state, cables could only be rated based on their conductor maximum admissible operating temperature. The Soil Dry-Out Prevention module is a new add-on module which allows rating cables based on the temperature imposed on a layer other than the conductor, such as:

- sheath
- armour
- jacket/serving
- duct/pipe
- the boundary of a backfill/duct bank

One of the main applications of this module is to rate a given cable installation in order to avoid the irreversible dry-out of the region that the cables are crossing. With the Soil Dry-Out Prevention module, this is made possible by letting the user limit the temperature at the interface between native soil and the cable installation's most outer element to the soil critical temperature. Depending on the installation, this interface could be the jacket, duct, pipe or backfills/duct banks boundaries. The Soil Dry-Out Prevention add-on module requires having the MDB module as well.

Multiple Duct Bank Backfill module (MDB) - Improved finite element modeling

Several enhancements have been made to the finite element modeling approach, yielding a more accurate solution.

- The former approach has been modified to improve the modeling of mutual thermal effects between cables. A matrix of resistivity is used instead of a vector. In cases for which the mutual equivalent resistivity is lower than the self-equivalent resistivity, this yields lower temperature or higher ampacity. On the contrary, in cases for which the mutual equivalent resistivity is higher than the self-equivalent resistivity, this yields higher temperature or lower ampacity.
- The modeling of heat sources/sinks has been improved by using their equivalent external thermal resistivity rather than the native soil resistivity to account for their mutual heating effect.
- Heat sources are now taken into account in the isothermal contour computation.
- It is now possible to select the step with which the isothermal contours will be computed (default computation step is 1°C).

Updated Reports

Both steady-state and transient reports have been revamped to include additional information. Their display has been improved as follows:

- The Steady-state report formerly available in text format is now available in Excel format instead. Its content has been updated.
- The Normal operation report (also referred as Excel Steady State report) has been extensively revised and reorganized such that all intermediate parameters are detailed according to the computations (including formulae). Please note that this report is now displayed in a separate worksheet.
- New reports in Excel format are now available for all transient options. Previously, Excel report was available only for transient option 1.

Transient analysis - Updated features

Several features of the transient analysis have been improved:

- The upper limit of the time range of transient simulations has been extended to 50,000 hours instead of the 9,999 hours imposed in former versions.
- The length of load shapes is no longer limited whereas previously, load shapes were limited to 7 days.
- For transient options which support the Participating option (option 1 and 5), it is now possible to assign a desired temperature to Not Participating circuits.
- For transient options 4 and 5, it is possible to display curves in terms of scaling factor rather than ampacity only.
- The layout of the transient data dialog box has been updated.
- The curves display has been completely revamped. This includes the possibility to zoom in and out.
- New reports in Excel format are now available for all transient options. Previously, Excel report was available only for transient option 1.

Additional features

- The cross bonded option is now available when the option "electrical interaction between circuits" is activated.
- The presence of magnetic ducts does not force the solution option to unequally loaded anymore.
- Single phase circuits can be mixed with multiple cables per phase circuits in the same installation.

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

CYME International T&D
1485 Roberval, Suite 104
St.Bruno, QC, Canada J3V 3P8
P: 450.461.3655 F: 450.461.0966
P: 800.361.3627 (Canada/USA)
CymeInfo@eaton.com
www.eaton.com/cyme

Printed in Canada
Publication No. BR 917 059 EN
July 2015

Follow us on social media to get the latest product and support information.

Powering Business Worldwide