



## CYMCAP – Power Cable Ampacity Calculations

CYMCAP is a dedicated computer program for performing ampacity and temperature rise calculations for power cable installations. It addresses both steady state and transient thermal cable rating. These thermal analyses pertain to temperature rise and/or ampacity calculations using the analytical techniques described by Neher-McGrath and the IEC 287© and IEC 853© International standards. The accuracy of CYMCAP provides increased confidence when upgrading existing power cable installations and designing new ones, maximizing the benefits from the considerable capital investment associated with them. It also helps increase system reliability and the proper utilization of the installed equipment.

### Simulate the thermal behavior of power cable installations.

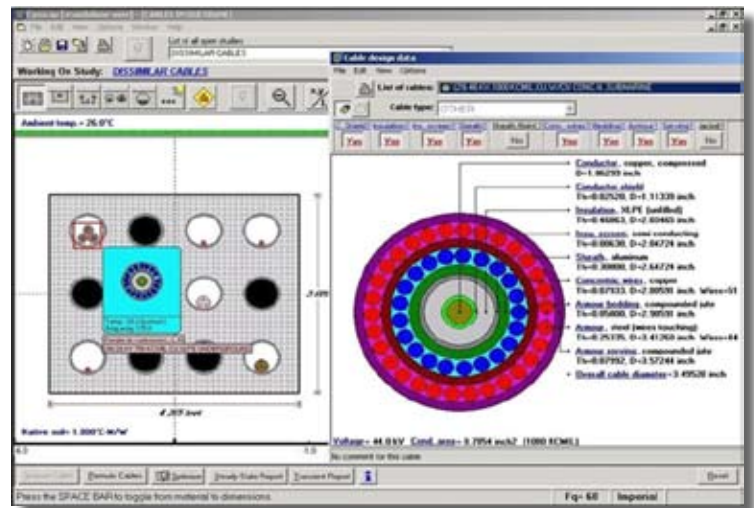
#### Program Features

CYMCAP is dedicated to performing ampacity and temperature rise calculations for power cable installations. Determining the maximum current power cables can sustain without deterioration of any of their electrical properties is important to the design of electrical installations. This package was developed jointly by Ontario Hydro (Hydro One), McMaster University and CYME International, under the auspices of the Canadian Electricity Association.

The field-tested accuracy of CYMCAP provides increased confidence when upgrading existing power cable installations and designing new ones, thus maximizing the benefits from the considerable capital investment associated with them.

#### Analytical Capabilities

- Iterative techniques based on Neher-McGrath and IEC-287© methods.
- Full compliance with North American practice and support all pertinent IEC standards IEC 60287©, IEC 60228©, IEC 601042©, IEC 60853©, etc.
- Detailed graphical representation of virtually any type of power cable. This facility can be used to modify existing cables and enrich the cable library with new ones. This includes single-core, three-core, belted, pipetype, submarine, sheathed, and armored cables.
- Different cable installation conditions such as directly buried, thermal backfill, underground ducts or duct banks.
- Cables in pipes with the pipe directly buried or in a thermal backfill.
- Independent libraries and databases for cables, duct-banks, load curves, heat sources and installations.



- Simulation of cables in air on riser poles, groups of cables in air, moisture migration, nearby heat sources and heat sinks, etc.
- Different cable types within one installation.
- Non-isothermal earth surface modeling.
- Cyclic loading patterns as per IEC-60853©, including soil dry out.
- Multiple cables per phase with proper modeling of the sheath mutual inductances which greatly influence circulating current losses and thus de-rating.
- All bonding arrangements for flat and triangular formations are supported with explicit modeling of minor section lengths, unequal cable spacing, etc.

## CYMCAP Power Cable Ampacity

Simulates ampacity and temperature rise calculations in power cable installations.

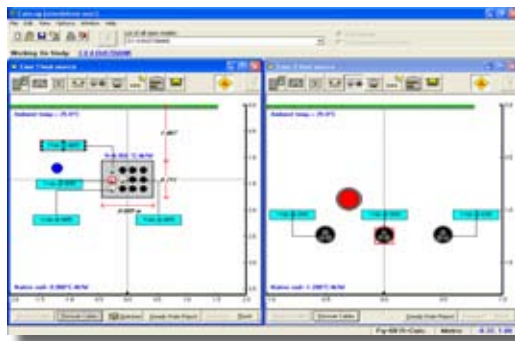
### Transient Analysis

The program supports a Transient Thermal Analysis option which includes the following:

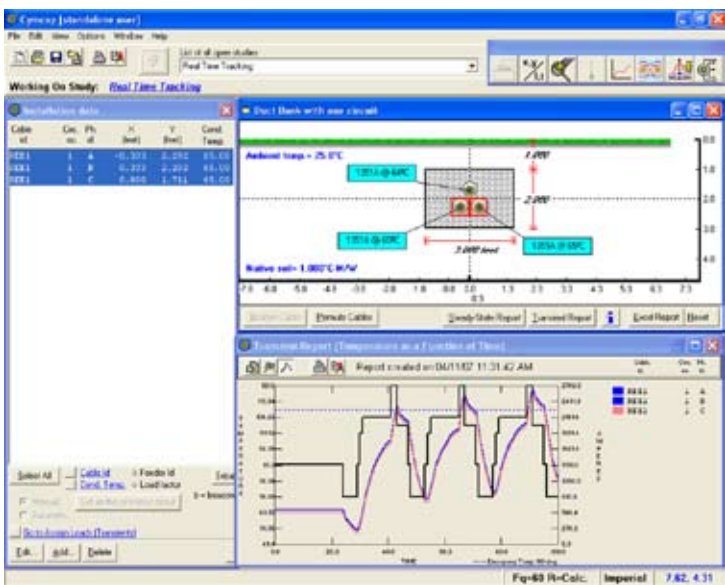
- Ampacity given time and temperature.
- Temperature analysis given time and ampacity.
- Time to reach a given temperature, given the ampacity.
- Ampacity and temperature analysis as a function of time.
- User-defined load profiles per circuit.
- Multiple cables per installation.
- Circuits can be loaded simultaneously or one at a time.



Cables on Riser Poles



Heat Source and Heat Sink



### Power Engineering Analysis Software

#### CYMDIST – Distribution System Analysis

- Balanced/unbalanced load flow
- Network optimization
- Distributed generation modeling
- Short-circuit analysis
- Energy profile manager
- Switching optimization
- Harmonic analysis
- Predictive and historical reliability assessment
- Contingency analysis
- Substation and sub-network modeling and analysis
- Secondary network analysis
- Motor starting

#### CYMTCC – Protective Device Coordination

#### CYMDIST Gateway – Creation and maintenance of CYMDIST Distribution Network Model

#### CYMGRD - Substation Grounding

#### CYMCAP – Power Cable Ampacity

- Duct bank optimizer
- Multiple duct banks modeling
- Short-circuit cable rating
- Magnetic fields
- Cables in tunnels modeling
- Real-time temperature rating
- Cable crossings ampacity reduction calculation
- Ampacity/temperature calculation of cables in casings
- Cables parameters estimation

Visit [www.cyme.com/software](http://www.cyme.com/software) for more information.

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