



CAPE Technical Advantages Power for Protection Engineers

CAPE software supports the system protection function within electric power utilities. CAPE is used by major utilities in more than 50 countries on six continents worldwide because of its serious tools for detailed modeling that help engineers manage voluminous and complex network data, uncover potential problems, and examine alternative solutions.

This is a brief summary of the main features of CAPE that distinguish it from other products.

Detailed Relay Models. CAPE has a growing library of over 1,100 manufacturer Models (close to 6,000 relay Styles) of significant detail. Each one represents a particular style of a specific manufacturer's product, e.g. Schweitzer SEL-421, 311; REL670; AREVA P546; General Electric D60, T60; and so on. These models use actual manufacturer-named settings, not generic names, and they include the actual comparator equations of operation.

Interactive Simulation of Whole Protection System. CAPE has the only stepped-event simulation of all types of relays together to accurately simulate protection system response to faults from inception to clearing. Overcurrent, distance, directional, timer, voltage, current differential, and auxiliary elements are all simulated together, including internal and external supervision among them.

Autoreclosing and Relay Reset. CAPE's stepped-event analysis can model automatic breaker reclosing with the required associated relay reset modeling. Therefore, overcurrent relay ratcheting leading to possible misoperation can be simulated.

Wide-Area Automated Coordination Review. CAPE uses the above stepped-event system simulation to apply thousands of faults automatically and find miscoordinations automatically. See the CIGRE 2007 and Western Protective Relay Conference (October 2007) papers on this subject by REE, Madrid, Spain that describe the highly successful application of CAPE to a country-wide coordination review; 16% of the cases had miscoordinations and this number was reduced to 1%. Not mentioned in the papers was the discovery by CAPE during the REE study of a faulty relay design that permitted zone 1 ground distance operation for external faults; 300 such elements had to be temporarily disabled until a manufacturer correction became available. See also the papers on this topic at WPRC (October 2010) and Georgia Tech Relay Conference (May 2011) co-authored by Quanta Technologies, Electrocon, and National Grid. CAPE is the only software to support wide-area coordination review.

Automated Relay Setting. CAPE has a library of user-expandable algorithms that compute relay settings based on detailed fault studies. Published technical papers on this subject are available on request.

True Database of All Data for Network and Protection System. CAPE uses an open, commercial database that is ODBC- and SQL-compliant. One may access it with Microsoft Access, for example.

Graphical Database Building. CAPE has a one-line diagram interface that supports the building of both the network AND the detailed protection system models graphically and interactively.

Integrated, Object-Oriented Line Constants Program. CAPE has a line constants program that can solve for any amount of zero-sequence mutual coupling and send the results back to the database with a single mouse click, for immediate use by the short circuit analysis.

Most Powerful Short Circuit Program. CAPE's short circuit algorithm solves any size system instantaneously and solves any kind of fault the user can imagine. It can solve faults and unbalances that involve up to 30 buses simultaneously, for example. (In fact this capability permits realistic modeling of single-pole opening and series capacitor MOV operations during faults; also broken conductors, stuck breaker poles, etc.)

Detailed Bus Structures. The user may model the following bus structures in detail: breaker-and-a-half and higher, ring, transfer, double, triple, quadruple, and spare bus/breaker. Bus splitter and bus coupler breakers are part of these models, as well.

IPS-CAPE Bridge™ provides two-way data exchange between the IPS-RELEX™ protection system data management software and the CAPE protection system simulation environment.

CAPE-TS Link™. This unique simulation tool combines our premier stepped-event protection system simulation with time-domain transient stability programs. It enables for the first time a reliable simulation of the bulk electric power system in a way that models the effect of protective relay operations on the dynamic behavior of the system. The ability of the installed or planned protective devices to meet critical clearing time criteria can now be demonstrated. CAPE's library of detailed distance, overcurrent, voltage, and differential protective devices has been augmented with frequency and out-of-step relays to support unexcelled realism.

Don't hesitate to let us know if you would like more detail on any of these points.

Electrocon: expertise, stability, and responsiveness...when you need us

Electrocon is a full-service software firm founded in 1981 and dedicated to serving the utility industry and protection engineering. Conversion of your existing electronic data from most popular formats is included with CAPE. Our custom training gets your team started quickly and confidently, and our ongoing technical support is excellent.

CAPE users are part of an active network of protection engineering expertise, worldwide. Annual Users' Group Meetings in North America and periodically in Europe provide content-rich opportunities to make connections in person. Our customer forum and independent email group allow even broader connections every day, year-round.



CAPE's product experts deliver customized training classes to get you and your team started quickly and confidently.

How can CAPE's power help you?

We'd love to hear from you. Our staff is happy to answer your questions about putting CAPE to work to improve the effectiveness of your protection engineering function. Contact us at eii@electrocon.com or 1-734-761-8612 (1-888-240-4044 toll-free in the US), 8 am-5:00 pm Eastern US time, Monday-Friday.



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