Application Consistency

Save time, money and frustration

One of the joys of the discipline of protective relaying is the creativity involved with determining effective solutions to unique problems. The “Eureka” moment may never come; instead, sometimes, there is only the sense of satisfaction at the end of the project that a solution was arrived at and is properly installed.

The temptation exists to approach every protection scheme design as if it is unique and deserving of special treatment. We muse over eleventeenth contingencies and ‘What if?’ scenarios. Particularly in consulting, we must resist the temptation of attempting to bolster our clients’ faith in us by saving him from this or that catastrophic but vanishingly low-probability outcome.

As engineers, we are also responsible for selecting the economic and practical solution to a given problem. One way to improve the economy of protection solutions is through consistency. To the degree that we apply consistency in appropriate aspects of a project, time is made available for the development of special solutions when needed. Where can consistency best be applied and what are the results? Here are three suggestions:

User Interface Consistency: In this area, the advancement of protective relays has made it temptingly easy to develop special functions and features for each installation. Here is where restraint is called for and appreciated by the folks who have to deal with new relays in the field. Definition of a standard command and message set for relay front panels, serial ports, and substation HMIs makes it easier for field staff to get useful, meaningful information from the new equipment. Save engineering time in the long run by:

- Taking the time to communicate with your field staff early in the design process;
- Defining a message and control set that the majority understand and accepts;
- Employing that message and control set in every similar relay application, and
- Communicating the design and its use to the field staff who live with it and the engineering staff who need to repeat it.

Integration Interface Consistency: The use of the protective relay as the eyes and hands of a SCADA system offers tremendous advantages to the utility that commits to the approach. As with the user interface, you can save a great deal of design time by:

- Defining in advance a consistent set of analog and status data to collect from each device;
- Using the same control points for breaker trip & close and protection function enables; and
- Adopting a communication protocol and architecture that is flexible in its physical channels.

Consistency of Input/Output Assignment: This area offers the greatest potential for savings and requires the most discipline. By adopting a consistent input/output set for a given application type, you achieve savings in:

- Electrical design through repeatability of both schematic and wiring elements;
- Setting definition through reuse of proven relay setting logic templates;
- Construction, commissioning, and maintenance procedures through increasing familiarity with the procedures and design.

Occasionally, there truly is a special case where we are required to abandon the efficiencies of our consistent design, maybe even to point of selecting a different protective relay that better meets the needs of the application. Nevertheless, we can still employ our adopted consistency by using the standards above to the highest degree possible within the application constraints and relay capabilities. How do we determine the difference between the typical case and the one deserving our special efforts? The answer to that question is a matter of both discipline and experience.