



More Information About Reliability

Planned Outages

Planned outages are based on the perceived need for electrical equipment maintenance.

Usually, maintenance is planned on an annual, bi-annual or other calendar basis -- because "that's the way it's always been done" or because it is the conservative thing to do in the absence of additional information on the equipment.

Entellisys provides equipment information that can alter traditional maintenance planning.

For example, Entellisys self monitors all electronic components – CPUs, Messengers, and communication hardware. Almost any component malfunction will be flagged by the CPU. In most cases, this won't affect protection, metering or any other user function and enable you to plan maintenance when it is convenient. Most importantly, Entellisys' constant self monitoring and interdependence of the system let's you know that everything is working properly and maintenance is not needed.

The availability of metering information at each circuit point allows users to compare values at each circuit point to make sure information is as expected. This eliminates maintenance just to see if the "trips" are working.

To gauge mechanical wear of circuit breakers, Entellisys tracks CB usage and load interruption data and informs you when a substantial percentage of perceived life is used up and maintenance should be planned.

Unplanned Outages

Unplanned outages result from unreliability, usually requiring repair to get a system functioning again.

Entellisys may provide the most reliable switchgear product in the industry due to various inherent reliability centered capabilities:

- Because Entellisys' components are outside the circuit breaker, they can be larger and more robust. They have been through broad, tough test criteria, such as EMI, and deploy faraday cases and other tougher cases, enclosures, and/or packaging.
- Redundancy: there is NO single point of failure. Dual CPUs, dual communications, and dual UPS all speak to Entellisys' enhanced reliability.
- Backup protection: The LSIG settings at the CPU always operate in the background. If the zone based functions are "turned off" because one of the required criteria is not met then the LSIG functions of the CPU for that circuit will be the next level of protection. If the CPU is not working, or not communicating with a particular messenger, then the back up LSIG at the messenger itself provides a third level of back up protection. All of these functions, if selected by the user, operate 100% of the time simultaneously. At any one time the fastest will signal the CB to open (trip if protection required). Typically the fastest will be the zone-based functions unless the instantaneous setting has been chosen and the fault is high enough to cross that threshold at which point instantaneous will be faster.
- Besides the improved protection provided by any one algorithm, Entellisys' reliability is enhanced by having different pieces of electronic hardware performing the same or different algorithms each of which extends protection.

Also, the zone-based algorithms can have designated back up circuit breakers: they can operate in case the primary controlled CB does not do its job for whatever reason:

- LSIG backs up the Zone-based functions;
- Messengers back up the CPUs; and
- Zone-based functions have designated backup-trip targets.

Troubleshooting

Entellisys' extensive troubleshooting capability covers:

- Almost 600 separate alarms
- The ability to meter every circuit
- Synchronized wave form capture simultaneously at all circuit points

Entellisys unparalleled comprehensive troubleshooting can help to identify problems in the equipment and your electrical systems. Whether timing of events cause voltage and current fluctuations or harmonics, the system's wave form capture capability will inform you.

Maintenance

Maintenance costs are driven by frequency, the number of contractors and their rate, the time spent, and the nature of the changes (repairs or replacements, for instance).

With traditional systems, maintenance is done on a predetermined schedule with little or no device history to indicate where a problem might be.

On the other hand, Entellisys provides a complete, time-stamped record of device activity and flags you when maintenance is suggested based on thresholds you determine yourself.

Because Entellisys has a significantly reduced number of components and wiring, your spare parts inventory will likewise be reduced. Conservatively figure a 50% to 70% spare parts reduction over traditional switchgear.