

## 30 Cycle Ratings...Short Circuit Studies & Coordination Studies

A Short Circuit Study and a Coordination Study are two highly important steps that should be taken to protect personnel and the electrical distribution system.

The Short Circuit Study will determine the magnitude of current available at various points of the electrical distribution system when a fault occurs. It is imperative that the protective devices on the line side of the selected point in the Short Circuit Study be capable of interrupting the current available at the time of the fault. Likewise, any non protective device in that segment of the distribution system that would be exposed to a fault of the magnitude calculated in the Short Circuit Study must be able to withstand the current available at the time of the fault for the calculated duration of that fault.

The Coordination Study is made to determine the proper settings of the protective devices in the distribution system so that the area of an outage due to a fault is limited to the affected portion of the distribution system that is experiencing the fault. This will leave the remainder of the system undisturbed and will preserve the continuity of service. Isolation of a faulted circuit from the remainder of the installation is mandatory in today's modern electrical systems. Widespread power blackouts cannot be tolerated in today's electrical systems.

This isolation is achieved by selective coordination as calculated in the Coordination Study. For circuit breaker coordination the engineer must take into account the fact that when a high fault current occurs on a circuit having several breaker in series, the instantaneous trip on all breakers may operate without coordination. This would result not in selective isolation of the faulted portion of the circuit, but rather a widespread power blackout. In these cases, the instantaneous protection can be suppressed and the short time delay setting used to improve system coordination. While the use of circuit breaker short-time delay settings may negate some degree of protection and increase any arc flash hazard, the avoidance of a widespread power blackout is mitigated.

How does this affect the selection of the transfer switch in the installation. Quite simply, any transfer switch being placed in an electrical distribution system must not only have the ability to withstand the fault current calculated by the Short Circuit Study, but it also must be able to sustain that fault for the time period required by the Coordination Study.

Since most transfer switches on the market are series rated for only 3 cycles when coordinated with upstream protective devices, care should be taken when applying these transfer switches where the specific requirements of the Short Circuit and Coordination Studies indicate the potential of a fault in excess of that minimal three cycle duration.

Lake Shore Electric Corporation has been manufacturing our Insulated Case Transfer Switches for more than 15 years. These transfer switches have not only our published fault current ratings that are not series rated and thus dependent on upstream protection, but also all can be adjusted to allow downstream breakers to clear for up to 30 cycles. In addition, they all carry a 60 cycle rating.