TEDDER'S TECHNICAL FACTS

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Yes, Short Circuit, Coordination, Load Flow, and Arc Flash Studies are all needed for electrical distribution systems.....

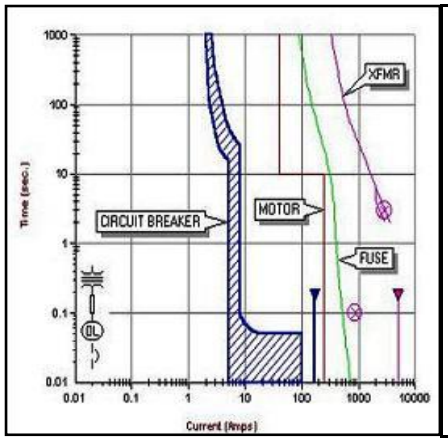
Why??

To avoid this >>>

High School modernizations, college and university infrastructure upgrades, **campus-wide medium voltage distribution feeder expansions**, converting from closed-loop to open-loop systems, and a myriad of other renovations are being performed that require thorough technical analysis to assure safe practices. However, the technical analysis is all too often inadequate or even non-existent. **Hampton Tedder Technical Services (HTTS) can help.**

Short Circuit and Coordination Studies (SC&C) are one of the most important steps you may ever take to protect either yours or your client's personnel and electrical distribution system. When an electrical fault exceeds the interrupting rating of a protective device, consequences can be devastating. Injury, damaged electrical equipment, and costly downtime are all very likely.

In a ***Short Circuit Study***, faults are assumed at different points on the line side of various devices that will be interrupting the power system. This determines if a device can interrupt current available at the time of a fault. Many times the source side of the interrupting device is an electrical bus in a piece of switchgear. Current that flows through bus bars creates forces between different phases of the bus. During a fault, current magnitude is radically greater than normal current flow. This highly magnified force between bus bars increases by the current increase squared (i.e. 16x normal, if fault current is 4x normal). A Short Circuit Study yields information necessary to determine if breakers & fuses are capable of interrupting these faults and to determine whether or not switchgear bus sections are adequately supported to withstand the dramatic forces generated by fault currents.



Over the last 10 years or so, technical studies have expanded beyond just Short Circuit and Coordination into Load Flow and Arc Flash Hazard Analysis. The importance of these deeper analyses grew with society's evermore complex & sensitive electrical distribution systems.

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A ***Coordination Study*** determines how to set protective devices in order to minimize the outage area. Selectivity is established such that a fault is interrupted only within its affected circuit, thereby, minimizing power disruption. Every power system adds and/or removes loads & transformers. Electric utilities add and/or change generation and transmission facilities. These changes alter an electrical system's overall impedance & protection requirements. Adequacy or inadequacy and proper device settings can ***only*** be determined through SC&C Studies, or when a device can't interrupt a fault. You'll know it was inadequate when it likely burns or explodes, sometimes catastrophically.

Two studies that HTTS additionally recommends are ***Load Flow*** & ***Arc Flash Hazard.***

A Load Flow Study is performed to evaluate proper component or circuit loading, bus voltage profiles, real and reactive power flow, power system losses, and transformer tap settings. Conducting a load flow study using multiple scenarios helps to ensure that the new or modified power system is adequately designed to satisfy desired performance criteria for the most economical expenditure of the initial capital investment and future operating costs.

An Arc Flash Hazard Study establishes safe distances around electrical equipment and determines appropriate Personal Protection Equipment to be worn by personnel for working safely around such electrical components. Arc Flash labels are then attached to equipment enabling facility managers to comply with NFPA and IEEE guidelines that are enforced by OSHA inspectors. These labels can be provided by the engineering firm providing the studies.

Look for more discussion about Arc-Flash in our next newsletter.

Arc flash hazard labels are now required on all new electrical equipment.

The Professional Engineers at HTTS can help with any of the above Studies and likely most other Engineering Services that you might need!!

Call one of our offices today for discussions and details.

Technical Competence is the Result of Fifty Years of Excellent Service!!!! *1958—2008*

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