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Compliance Takes More Than a Label

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Compliance Takes More Than a Label

Since the release of IEEE-1584 in September 2002 and NFPA-70E, 2004 Edition, I have talked with hundreds of facility engineers in the U.S. and Canada who are concerned about NFPA-70E arc-flash hazard compliance. NFPA, the IEEE Safety Committee, and various other groups have done a great job of spreading the word regarding arc-flash hazards and the need to address this specific safety issue. With the development and pending 2008/2009 release of the CSA Z462 standard in Canada, the importance of this topic will gain still greater recognition.

Unfortunately, most engineers I have spoken with are under the misconception that if they label equipment for arc-flash hazards, and enforce the use of personal protective equipment (PPE) as per the label, they are in compliance with 70E (Z462) and OSHA requirements. Nothing could be further from the truth. Arc-flash hazard labeling and PPE compliance are only a small part of 70E (Z462) compliance and even a smaller part of a properly defined safety program.

Very few facility engineers appear to understand the thought process behind 70E (Z462) or the basis for the standards. If maintenance people are not informed why they must work within certain safety constraints, then the arc-flash label and PPE requirements become merely another task that can be sidestepped.

Safety as a principle

Gary McGuire, a safety manager for a large pulp and paper mill in the Northwest says, "Safety must be operated by principal, not practice." He stresses the "why" of safety, not just the dos and don'ts of a task. This knowledge gives people confronted with something out of the ordinary, the background to understand the potential dangers, enabling them to make safe choices. Safety is a culture that must be ingrained with principal. This culture starts from management and filters down to the worker where ultimate responsibility rests.

The current arc-flash phenomenon appears to be operating on fear rather than principal. The fear is massive lawsuits and OSHA/governmental fines if an accident does occur, rather than sound reasoning as to why a safety culture makes good business sense in daily operations. While it may have taken some fear in the initial movement to motivate companies toward implementing safety standards, if the safety aspect of arc flash is limited to labeling and PPE requirements, the inclination will soon wear off.

Labeling or stating PPE requirements will not prevent accidents. Accidents are prevented and lives are saved through a foundation of safety.

NFPA-70E and the Safety Culture

In lieu of the fact that the CSA Z462 standard has not yet been released, this article will provide only the 70E specifics. Several aspects of 70E in particular make good business sense and help promote a safety culture in your facility:

Article 205.2, 120.2(F)(1)(a) Updated and verified one-line diagram — An updated and accurate electrical one-line diagram is an essential ingredient for electrical safety. If workers do not have an accurate map of the system, they can be exposed to potential back feeds from alternate sources, energized capacitors, undocumented switching conditions, and unknown voltages, in addition to the problem of not being able to accurately perform lock-out-tag-out procedures. This is one of the most neglected aspects of electrical safety in our industry. Very few of the facilities I have reviewed in the past 20 years maintain accurate electrical one-line diagrams. Accurate one-lines make good business sense because work will get done more quickly, efficiently, and safely.

When workers do not receive managerial support and are tasked with dangerous job functions, their morale deteriorates and incidents increase. This seems to be an unrecognized cost in today's business culture.

Article 400.5, 400.6 Equipment duty verification — Another important aspect is proper application and rating of equipment for the available short circuit duty. One facility I reviewed recently had underrated 13.8 kV breakers in an open switchyard. We informed them of the problem, but management did not take the warning seriously, since it had operated for twenty years without a problem. We were called in approximately a year later to inspect one unit that had exploded into hundreds of pieces of shrapnel-like metal!

Almost every facility has improperly applied equipment that will not withstand the available fault current and potentially will not clear an arc-hazard. These types of accidents, while not common, are very dangerous. Properly rated and verified equipment makes good business sense. Unplanned outages and disaster recovery costs are expensive, and improperly rated and applied equipment can be considered negligence.

Article 110.7, and 130.1-3 Electrical Safety Program, Work Permits — In my opinion, this is the heart of 70E and worker safety. Without safety program principals, procedures, hazard/risk evaluation, work permits, and job briefing and planning, safety is relegated to a mere label with a PPE number. Workers are then left to fend for themselves "to get the job done" as many have done for years. When workers do not receive managerial support and are tasked with dangerous job functions, their morale deteriorates and incidents increase. This seems to be an unrecognized cost in today's business culture.

NFPA-70E is a comprehensive document that approaches safety from a system viewpoint, just as system engineers do when analyzing an electrical system. While I do not agree with everything in 70E, I do believe the standard is well laid out and provides sufficient flexibility to allow tailoring a safety program to the individual facility. This is an important step in developing a "safety culture" for your facility.

As the word continues to spread regarding 70E and the soon to be released CSA Z462 standard, we hope more companies will begin to understand that labels and PPE do not fulfill the requirements for safety compliance. Worker safety can only be implemented through principals and culture, which will in the long term pay benefits to the bottom line.

- By Chet Davis, P.E.