SHIFT BRIEFING

ARC FLASH BEST PRACTICES

An arc flash occurs during a fault, or short circuit condition, which passes through an arc gap. The arc flash can be initiated through accidental contact, equipment that is underrated for the available short circuit current, tracking over insulated surfaces, or deterioration or corrosion of equipment or parts.

An arc flash event can expel large amounts of energy. The arc causes an ionization of the air, with arc flash temperatures reaching as high as 35,000^{0}F. This is hotter than the surface of the sun.

To accurately evaluate the dangers of an arc flash, we must quantify the hazard. The measure, which was developed to assess arc flash events, is incident energy. This is the energy measured on a surface at a specified working distance from the arc flash location.

For low-voltage equipment, this is 24 inches and approximately corresponds to the arm length of a typical worker. The unit used for this energy is calories/cm^2. A value of 1.2 cal/cm^2 results in 2nd-degree burns to bare skin, and a value of 8 cal/cm^2 is for 3rd-degree burns. The incident energy is inversely proportional to the square of the working distance and directly proportional to the available fault current and duration of an arc flash event.

To identify the specific arc flash hazard at a given piece of equipment, a study must be done. The result of the study will categorize the hazard at specific equipment based on the incident energy, as well as identify the *Arc Flash Protection Boundary*. This is the closest approach allowed before personal protective equipment must be worn). Inside the Arc Flash Protection Boundary, a worker must be wearing the proper clothing **and** personal protective equipment (PPE). The objective of the personal protective equipment is to limit the burns to the body resulting from an arc flash event to a survivable level (i.e., 2nd-degree or partial-thickness burns degree or less).

Hazard Risk Categories as outlined in NFPA 70E are as follows:

Hazard Risk Category	Clothing	Cal/cm2
0	Non-melting, flammable materials (I.e., untreated cotton, wool, rayon, or silk, or blends of these materials) with a fabric weight of at least 4.5 oz/yd2	N/A
1	FR shirt and FR pants or FR coveralls	4
2	Cotton underwear - conventional short sleeve and briefs/shorts, plus FR shirt and FR pants	8
3	Cotton underwear plus FR shirt and FR pants plus FR coverall, or cotton underwear plus two FR coveralls.	25
4	Cotton underwear plus FR shirt and FR pants plus multilayer flash suit.	40
Extreme Danger	No PPE Available	>40

The arc flash hazard is undergoing increased study in today's safety-conscious environment. The standards intend to provide an increased level of safety for the electrical worker.