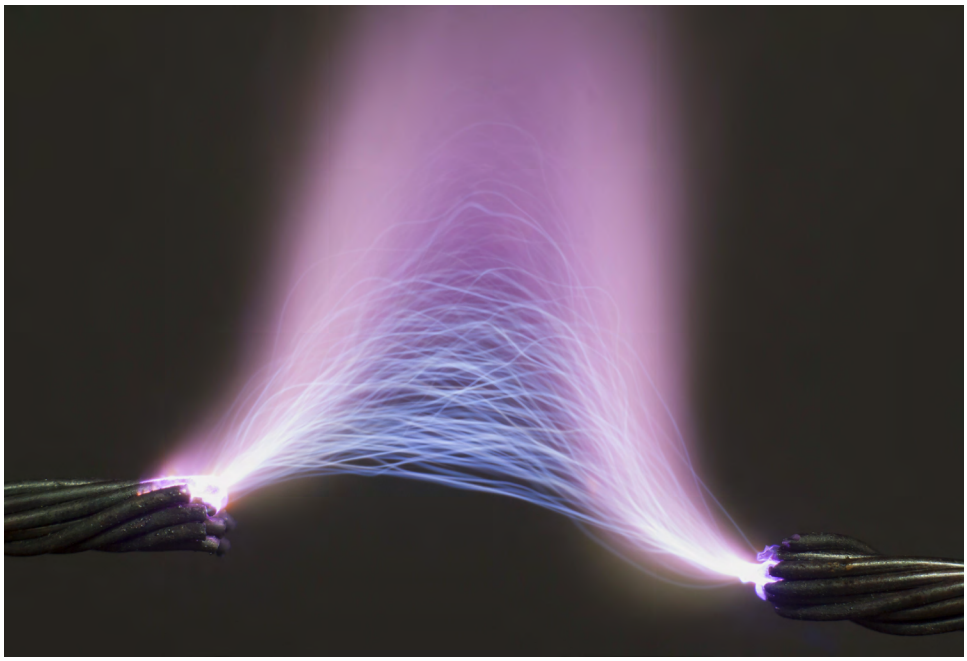
Understand the dangers of arc flash to protect your business and employees.

An arc blast can result in noise level up to 140 dB, blast pressure upwards of 2,000 lbs./square foot, with projectiles potentially flying at over 700 mph.



Arc Flash/Arc Blast is a serious event that can cause devastating injuries, resulting in hospitalization, or fatality. Property damage from an arc flash/blast caused by fire that can rapidly spread through a building. It is estimated that approximately 30,000 arc flash incidents occur every year and about 80% of worker fatalities are due to burns, not shock.

An Arc Flash occurs when electrical current leaves its intended path and travels through the air from one conduct to another or to ground. Arc Flash creates a plasma fire ball with temperatures as high as 35,000°F (for reference, the surface of the sun is 9,000°F). These extreme temperatures rapidly heat the surrounding air and creates pressure, which results in an arc blast.

Cause of an arc flash can be the result of several factors ranging from tools/material dropped across conductors, accidentally touching conductors to material failure, corrosion and faulty installation. Lack of timely maintenance and cleaning of electrical equipment can be significant causes of arc flashes.

Employers should have a documented electrical safety program that provides guidance on safely managing and controlling electrical hazards. The electrical safety program should be part of an employer's overall health and safety management program. For information as to what shall be included in an electrical safety program, refer to NFPA 70E 110.1 and Annex E.

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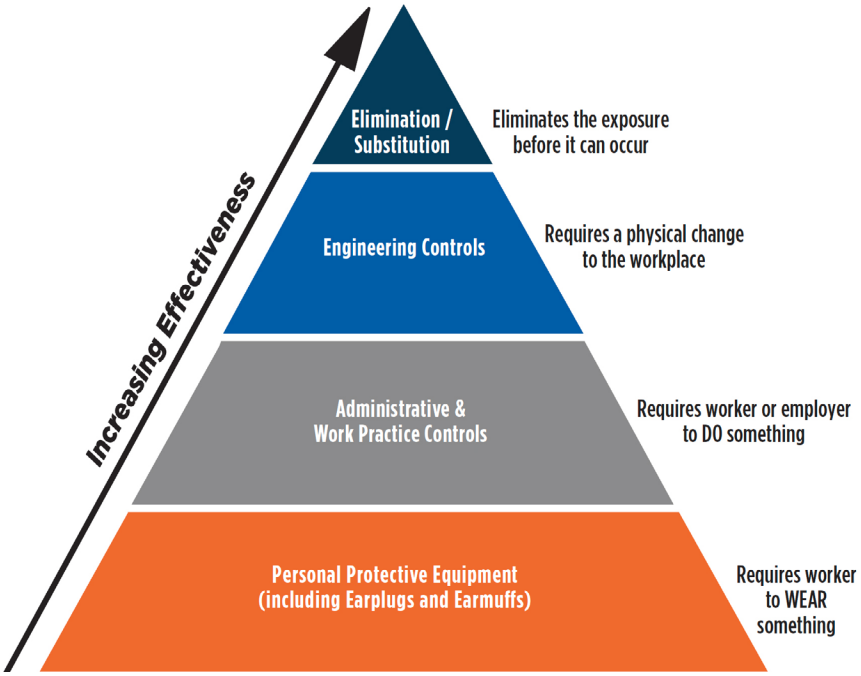
Continued >>

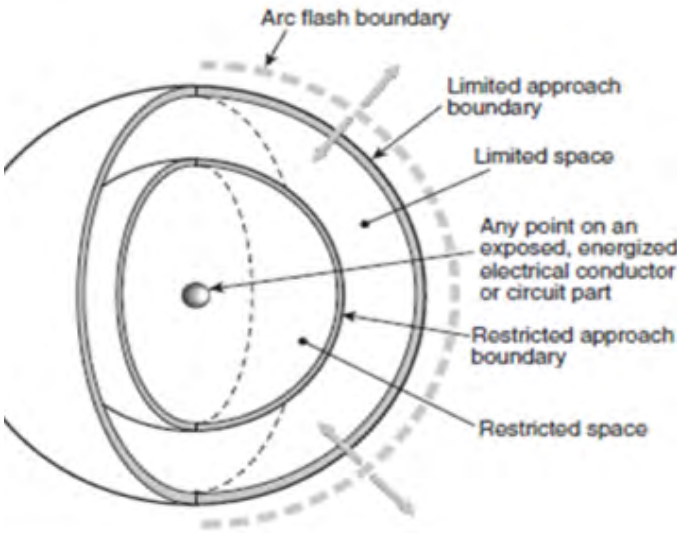
First priorty in the **hierarchy of controls**, is to eliminate the hazard. Electrically safe work condition, is when an electrical conductor or circuit has been disconnected from energized parts, locked out and tagged in accordance with established standards (OSHA 1910.333 & NFPA 70E-article 120), then tested to ensure the absence of voltage.



Situations arise where electrical parts need to be energized. When this occurs, an employer will need to demonstrate that it is infeasible to perform work in a de-energized state (i.e., performing diagnostics/testing) or introduces additional hazards or increases risk (i.e., interrupting life-support equipment).

When workers are exposed to energized equipment, an Arc Flash Risk Assessment, which includes a Shock Risk Assessment must be conducted by the employer. The Risk Assessment must identify the arc flash hazards, estimate the likelihood of occurrence, potential severity and determine if additional protective measures are required including Personal Protective Equipment (PPE).

Risk assessment will help identify the three different approach boundaries. When within any of the approach boundaries, Arc Flash Protection is required. Boundaries and level of Personal Protective Equipment will vary depending on the exposure to the electrical equipment. The three specific boundaries are;



NFPA 70E, Annex C (Figure C.1.2.3)
Limits of Approach

1. **Arc Flash Boundary** – This is the outer layer where workers are exposed to an arc flash that would receive a second-degree burn.

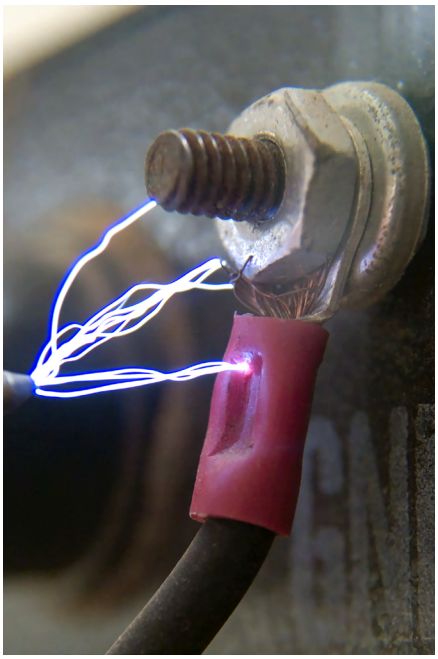
2. **Limited Approach Boundary** – Shock hazard exist within this boundary. Only qualified workers, that received proper training are allowed within this boundary,

3. **Restricted Approach Boundary** – Restricted space and considered the equivalent to working on a live part.

When energized work is performed within the restricted approach boundary or interacting with equipment conductors, an energized work permit must be utilized. Qualified personnel shall only be allowed to cross the limited approach boundary.

Employees exposed to electrical hazards shall be trained initially and at intervals not exceeding every three years. Retraining can be provided more frequently if work practices are not followed, changed or performed less than once per year.

Human error is often a root cause of incidents and is similar with electrical incidents. Annex Q in NFPA 70E introduces the concept of human performance to help manage human error that compliments the hierarchy of risk control methods.



References:

NFPA 70E – Standard for Electrical Safety in the Workplace

NFPA 70 – National Electrical Code (NEC)

NFPA 70B – Recommended Practices for Electrical Equipment Maintenance

OSHA 1910.333 – Selection and use of work practices

OSHA 1910.335(a)(1)(i) – Use of protective equipment when working where potential electrical hazards exists.

OSHA 1910.132(d) – Hazard assessment and equipment selection

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