Electrical Safety: Ground Fault Protection

Portable tool use is very common whether working on a construction site, managing a facility, or performing technical work. Flexible cords are often used to power these tools. These cords put stress on fixed outlets when tools are moved, or cords are pulled on. This can cause joint terminals for internal wiring to become loose and touch conductors or cause current leakage. Job activities aren't the only hazard to flexible cords, window edges, doors, wet environments, staples and fasteners, and powered industrial vehicles can all cause abrasions in the protective shielding exposing internal conductors. Exposures can cause risks of shocks, burns, or fires. Wet environments are particularly dangerous. When a person picks up a wet cord connector, they are exposed to electric shock by creating a path for leaked energy to travel through themselves to ground.

When there is an electrical leakage current in tools below 1 ampere, the grounding conductor has a low resistance and no shock should be perceived. If the resistance of the equipment grounding conductors increase, the current that travels through the body will also increase, and even small leakages of current greater than 1 ohm can become dangerous.

GFCI, or ground fault circuit interrupter, is a device that is used in-line between a power source and the intended powered equipment that detects current flowing along an unintended path, such as a person through water. They are commonly seen in residences in outlets near water sources such as the bathroom or kitchen sink. GFCI uses the A/C, or alternating current, to measure current leaving one side of a source of power and comparing it to the returning current. If the returning current is not equal to the leaving current, the GFCI will shut off the power leaving it to be manually reset. If the problem or hazardous condition is not fixed, even when reset, the GFCI will continue to shut off the power.

GFCI's are effective, but do not protect against every electrical hazard. They do not function in protecting against line-to-line contact hazards. For example, if a worker is holding two "hot" lines or a "hot" and neutral line in each hand. However, ground faults, overheating, and insulation destruction are still the more common forms of electrical shock hazards, which the GFCI is effective against.

Insulation and grounding are the main two recognized means of preventing electrical injuries during equipment operations. Conductor insulation is any nonconductive material, such as plastic, wrapping around the internal conductor of a wire. Conductors inside of a metal enclosed electrical outlet or circuit breaker box are grounded to the metal enclosure to prevent ground faults and electrical shock hazards.

The Occupational Safety and Health Administration (OSHA) assigns responsibility to the employer to provide GFCIs on construction sites for receptacle outlets in use and not part of the permanent wiring of the building or structure; or a scheduled and recorded assured equipment grounding conductor program that covers all cords, receptacles not part of the permanent wiring, and equipment connected by cord and plug which are used by employees. A competent person should be designated to implement the program. For more information on GFCI and assured equipment grounding programs, see 29 CFR 1926.404(b)(1)(ii).

Additional Topics: _____

Meeting Date: _____

Conducted By: _____

Notes: _____

Attended By:

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