Portable Electric Tools – Toolbox Talk 30

INTRODUCTION

Each year many workers on construction sites suffer electric shock using portable electrical tools and equipment. The nature of the injuries, including those caused by ground faults, ranges from minor injuries to serious secondary injuries. There also is the possibility of electrocution. A secondary injury occurs when a worker recoils from an electric shock and, as a result, sustains an injury. Depending largely on the surrounding physical conditions, such an accident can result in a bruise, a broken bone, or a fatal fall.

HOW ELECTROCUTION OCCURS

Electrocution occurs when the shock current exceeds 70 mill amperes, or there about, causing ventricular fibrillation of the heart and death. Typically, electrocution occurs when employees contact electrically energized parts. It is usually the frame of the tool that becomes accidentally energized due to an electrical fault, providing a conductive path to the tool casing. This conductive path can occur instantaneously or can develop gradually over a relatively long period of time. If a worker contacts an energized tool, an unwanted path or circuit of electricity develops from the tool through the worker to ground. The amount of current that flows through the worker depends, primarily, upon the resistance of the fault within the tool the resistance of the worker, and the resistance of the path from the worker back to the electrical supply. Moisture in the atmosphere may contribute to the electrical fault by intensifying both the conductive path within the tool and the external path back to the electrical supply. Moisture also may increase the severity of the shock by decreasing the worker's contact resistance. Consequently, the extent of the hazard increases with an increase in the amount of moisture at the job site.

METHODS OF PROTECTION

Equipment grounding conductor commonly known as the 3rd, or green, wire.

- This equipment grounding conductor grounds the exposed, non-current carrying metal parts of tools or equipment and carries off the leakage and fault currents, thus limiting the voltage on the tool frame by providing a low resistance path to ground. This provides protection to tool users. Fuses or circuit breakers. These provide protection from a fire safety standpoint but won't entirely protect you, the tool user.

Ground-fault circuit interrupter (GFCI).

- This device continually monitors the current and detects current leaking to ground via a path outside of the circuit conductors. If the leakage current to ground exceeds the trip level, the circuit is interrupted quickly enough to prevent electrocution.

Before you use any portable electrical power tool, the worker shall inspect…

- The plug, cord, on-off switch and housing.
- Look for cracked, broken or frayed insulation, exposed wires or connections, and for any evidence of damage in general. One last thing before you plug in and start work: Check the outlet, extension cord, tool and work area to determine if they are clean and dry.

NOTE: Identified hazards such as damaged tools shall be properly tagged and turned in for repairs. Don't use it! After you've checked out the tool, you still have done only half the job. Now check out the extension cord or outlet you plan to plug into! Look for the same things you looked for when inspecting the tool - evidence of damage and exposed conductors.