How could electrical workers be exposed to lead?

There are many ways electrical workers can be exposed to lead. A worker doesn't need to be directly involved with work that is creating the lead hazard. Congested construction areas where different contractors are working together in close proximity can lead to exposures to airborne lead particles or contact with lead contaminated surfaces. It's important in these multi-employer environments that safety & health professionals work together to identify on-site lead hazards and take steps to control them.

Image Courtesy of Quanta Underground

Lead exposures can occur while performing routine maintenance activities or when disturbing existing facilities during upgrades or expansions. Although it's becoming less common, Paper Insulated Lead Cable (PILC) is the most obvious exposure for an electrical worker. Tasks that involve handling, splicing, and terminating lead covered cables can be a direct source of exposure if not controlled properly.

- Abrasive blasting
- Sanding
- Cutting
- Burning
- Welding
- Soldering
- Smelting
- Cable installation and removal
- Splices
- Terminations

Adverse Health Effects

Lead exposure is often overlooked since many symptoms develop slowly over time. High levels of lead can result in serious health effects such as kidney damage, brain damage, and death.

- Abdominal pain
- Constipation
- Tiredness
- Headaches
- Irritability
- Loss of appetite
- Memory loss
- Pain or tingling in the hands and/or feet
- Weakness

Workers with long term exposures are at risk for heart disease, elevated blood pressure, kidney disease and reduce fertility. Health officials have determined through studies that long term lead exposure can cause cancer in humans.

Studies show that children are at a higher risk for lead poisoning than adults, showing signs of severe lead toxicity at lower levels. Most notably, lead can lead to neurological and intellectual disorders in children under 6. Pregnant women are at risk of exposing not only themselves but also their unborn children since lead can easily penetrate the placental barrier leading to serious developmental issues. It's important for workers to practice good housekeeping and hygiene to prevent taking lead contaminants home with them on their tools, clothing, and skin.

Identify Lead Hazards

OSHA requires employers to assess the workplace for lead hazards. In some cases, this is straight forward and at other times requires some investigation. For example, some manufacturing processes and/or sites have known lead exposures that must be communicated by the owner or controlling contractor. In other cases, the employer must assess the workplace through sampling when lead is suspected. Air sampling by a qualified person should occur where employees will be exposed and for a duration of a full shift, at least 7 hours. Any concentration greater than the Action Level of thirty micrograms per cubic meter of air (30 ug/m^3) will require monitoring every six months. A medical surveillance program must be instituted for workers who are exposed at or above the Action Level for more than thirty days a year.

Protecting Workers

By applying the Hierarchy of Safety Controls, employers should attempt to eliminate the lead hazard entirely or substitute with a less toxic alternative. Is there a way to remove the lead in advance of work through abatement activities? Lead concentrations above the Permissible Exposure Limit (PEL) of fifty micrograms per cubic meter (50 ug/m^3) will require additional control measures. The PEL is likely to change as OSHA is currently revising the lead standard with an intent to make it more protective.

- Reduced exposure times
- Localized exhaust ventilation
- Apply good housekeeping practices
- Train workers on lead hazards and control methods
- Use of PPE, such as respirators and protective clothing

Training

Training must take place within 180 days of effective date with refresher training taking place annually. Training shall include the following:

- Content of the Lead standard – OSHA CFR 29 1926.62
- Operations which could result in lead exposure
- Details of Medical Surveillance Program
- Engineering controls and work practices
- Proper care, fit, and use of respirators
- How to properly remove lead contaminates from their bodies

Final Thoughts

Some industries and processes involve lead more than others. A workplace or project hazard assessment will help employers determine if lead exposure is a possibility. From there, sampling will determine the level of exposure. When exposures exceed the Action Level of 30 ug/m^3 employers shall develop a written program, train workers, and implement safety controls. Eliminating or substituting the hazard if possible and applying effective controls including protective clothing and respirators as required.