010: Batteries and Battery Rooms

Discussion leader duties for this session:

If there is a battery room on site, locate the emergency shower and eyewash station.

What this Safety Talk covers:

Safety considerations for working around batteries.

Discussion notes :

Why this is important

A battery cannot be turned off. There is always potential across the posts of a battery, regardless of any controls.

Batteries can cause thermal burns when current passes through your body and chemical burns if you are exposed to the acid.

The explosion from a battery can flatten a building.

Definitions

You should know some basic definitions.

Cell – The basic electrochemical unit consisting of an anode and a cathode. The nominal voltage of a lead acid cell is 2.0 volts and a nickel cadmium cell is 1.2-volts. The starting battery in your car or truck is a six-cell battery and your flashlight may require two D cells.

Jar – The container which holds a cell or group of cells. Typical jars will have one, two, three, four or six cells.

Battery – Two or more cells connected together electrically. The cells may be connected in series, parallel or both to provide the required operating voltage and current. A typical UPS system will have one or more 240-cell batteries. The nominal voltage of this battery is 480 VDC.

Flooded Cell – A cell design characterized by an excess of free electrolyte. The products of electrolysis (gasses) and evaporation can freely exit the cell through a vent. Flooded cells typically have clear jars and the electrolyte is a liquid similar in appearance to water.

Valve-regulated, sealed lead acid cell (VRLA) – A cell that is sealed and fitted with a vent, which opens to release excess pressure as required. This is the typical design of a car battery.

New batteries

Inspect every jar before removing from the shipping pallet. Jars can be damaged during shipping. Hoisting a cracked jar may result in leaking electrolyte or failure of the jar. The result is a major clean up of corrosive materials.

Refer to the manufacturer's instructions for lifting and maneuvering the jars. Use only approved materials and methods in assembly. Failure to follow the installation instructions may void the warranty.

Use hoists and slings to lift cells into place. Small VRLA jars can weigh over 100 pounds. Flooded cells can weigh over 400 pound each. Do not try to manhandle these cells.

As you assemble the cells, especially a large multi-cell battery such as for a UPS, periodically leave an inter-cell connector disconnected. This will limit the overall potential across the most positive and most negative posts. At high potentials, a battery can provide a lethal shock.

Review and Discussion

Can you turn a battery off? What are the implications of this?

What are two of the hazards a battery provides?

What is the difference between a cell, a jar and a battery?

What is the difference between a vented cell and a valve-regulated cell?

Why should you inspect a jar before moving it?

What is the proper way to lift a jar onto the battery rack?

What should you locate when entering a battery room?

What PPE might you need to work in a battery room?

When is it safe to use a cutting torch in a battery room? Is it ever?

What kind of insulated items should you use, and why?

Are there any emergency eye wash or shower stations nearby?

Battery rooms

Never work in a battery room or on a battery alone.

Follow the site check-in/checkout procedures for working in battery rooms.

Before working on any battery or in a battery room, identify the location of safety showers and eye wash stations.

Locate neutralizing agents (baking soda) and a spill containment kit and review its use.

Ensure you have an open exit route at all times. Do not allow yourself to be trapped with no escape route.

Wash your hands after working on a battery. Avoid wiping your eyes, nose or mouth with your hands while working on a battery.

Do not smoke or have open flame in or near a battery room or around jars. Most jars that you may work around vent hydrogen gas.

Verify the operation of the exhaust fan(s) in the battery room. These fans are designed to prevent the buildup of hydrogen gas, which is an explosion hazard.

Wear the PPE required for the task at hand. This may include gloves, aprons and face shields, but safety glasses are always required.

Use insulated tools. Cells have high fault currents. A single 2-volt cell may supply over 5000 amps when the positive and negative posts are shorted together. The generated heat is more than enough to melt metal and cause burns.

Use insulated blankets or other materials to shield the battery connections should you have to perform work over the battery.

Participant's Signature and Date