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ONE-DAY* STATIONARY BATTERY VISUAL INSPECTION AND PROBLEM IDENTIFICATION SEMINAR (ESA-0108)
0.7 CEUs Awarded

OUTLINE

TIME**	SUBJECT
8:30 AM - 8:45 AM	Introduction, substation failure video
8:45 AM – 9:15 AM	Stationary battery applications
9:15 AM – 11:30 AM	Stationary cell ratings, chemistry, cell types, plate types, and vented vs. valve regulated
11:30 AM – 12:30 PM	*****LUNCH*****
12:30 PM – 4:30 PM	Visual inspections, problem identification and corrective actions

** Seminar start and end times can be modified to suit a client's schedule

OBJECTIVE, SKILLS & TARGET POPULATION

OBJECTIVE

The objective of the Stationary Battery Visual Inspection and Problem Identification Seminar is to provide the participants with specific knowledge of how to perform a detailed visual inspection of a stationary battery installation and how to identify potential problems, sometimes before they may be detected by measurements and tests. The participant will also be provided with the knowledge on the corrective actions to be taken once a specific problem has been identified. The participant will be provided with the knowledge to perform a detailed visual inspection of the battery rack or cabinet and will discuss inspection of a spill containment system. As part of the seminar, the participants will learn the basic components of a stationary battery cell and the function of each. The basis for ratings applied to stationary batteries is discussed. The differences between vented and valve regulated cells are described. The seminar exposes the participants to a variety of battery installations and problems through the use of photographs. For those participants that are more experienced with stationary batteries, the seminar provides an opportunity for gaining

a greater depth of knowledge of stationary battery visual inspection and problem identification.

SKILLS

After completing the seminar, the participant will be able to recognize the types of stationary batteries available and identify applications they are commonly used in. The participant will be able to recall the items that must be considered when performing a visual inspection of a battery. The participant will be able to identify the visual inspections required for a battery and their frequency. He/she should be able to identify common battery problems and understand why they occur. The participant will be able to describe the corrective actions to be taken once a problem is noted and the urgency of the corrective action (e.g., immediate replacement or replacement within 4 to 6 months).

TARGET POPULATION

Maintenance, system or design engineers, operations personnel, technicians and electricians wishing to learn about stationary batteries and the visual inspections that can be used to diagnose problems or determine the state-of-health of the stationary battery. The seminar provides information for both the novice and experienced battery person alike.

Additionally, the seminar has been recognized as providing ***Continuing Education*** which has become important as more states require evidence of such seminars before renewal of an individual's electrician, professional engineer or other license or certification is granted. Depending upon the state or province, participants that successfully complete the Seminar may be able to satisfy all, or a portion, of those requirements.

SEMINAR DESCRIPTION

THE STATIONARY BATTERY VISUAL INSPECTION AND PROBLEM IDENTIFICATION SEMINAR

The seminar was developed as a subset of the two-day Stationary Battery Seminar that has been regularly presented for more than 30 years to thousands of engineers and battery professionals of all experience levels. More than 700 companies worldwide including battery manufacturers, utilities, telecommunications companies, banks, hospitals, securities companies, industrial companies, government agencies, armed forces, instrument companies, national laboratories, UPS manufacturers, battery maintenance companies, etc., have sent their personnel to the Seminar. The seminar is updated on a regular basis to reflect not only typical problems that may be observed during visual inspections but to include problems identified (e.g., through operating experience and feedback) as being observed currently on installed battery systems. Examples of this would include post leaks being experienced by one manufacturer's cells due to procedure changes made by the manufacturer in its formation process. Another example is cover cracking that has been occurring on one manufacturer's cells.

Although stationary battery systems were once limited to the telecommunications companies, electric utility companies and heavy industrial facilities, they have become commonplace in commercial buildings, health care facilities and financial institutions, just to name a few. In addition, battery manufacturers have introduced so called “sealed” and “maintenance-free” batteries in the marketplace. As industry has found out, these batteries are neither, and in fact, require more maintenance checks than do equivalent flooded batteries. However, there are no courses on stationary batteries readily available at schools or colleges, nor are there any modern textbooks that deal with the topic.

Maintenance, system or design engineers, operations personnel, technicians and electricians involved in the design, installation, maintenance and testing of stationary battery systems whether installed as part of an emergency power system, a stand-alone system or an uninterruptible power supply (UPS) system, require training in the proper methods to visually examine stationary battery cells, identify problems and determine the proper corrective action to take once a problem is identified.

VENTED VS. VALVE REGULATED

This portion of the seminar discusses the similarity and differences between vented and valve regulated lead-acid cells using a comparison of each cell type’s gassing reactions as a starting point. It explains why the terms “maintenance-free” and “sealed,” which are still commonly used to describe valve regulated lead-acid cells are misnomers. There is also a discussion of the absorbed glass mat and gelled-electrolyte designs. This discussion is meant to ensure that the participants understand that there are two design types of valve regulated lead-acid cells and to dispel the common misconception that all valve regulated cells are “gel-cells.” Photographs, including cell and component cutaways are used to reinforce understanding of the concepts presented.

VISUAL INSPECTION

This portion of the seminar discusses each of the basic components of a stationary battery cell and their functions. This portion of the seminar is based upon guidance provided by battery manufacturers, **IEEE**® Standards 450™, 1106™, 1184™ and 1188™, and the seminar developer’s experience. Safety procedures and protective equipment are included in the discussion for information. There is also a discussion on identification of cells, identification of the date of manufacture and why it is useful to know the date code of a battery prior to inspecting it. It discusses the visual inspections that can be made on each of these components and what should be observed for a “healthy” cell. For example, the color of fully charged positive and negative plates in a lead-acid cell. This portion of the seminar also discusses the visual inspections that can be made on a battery rack or cabinet, including seismic equipment, if the rack or cabinet is so equipped. There is also a short discussion on visual inspection of spill containment systems used in conjunction with stationary batteries.

PROBLEM IDENTIFICATION

Numerous photographs are used to illustrate the various problems that may be identified by a detailed visual inspection of a battery. There is also a discussion of a number of conditions that are often mistaken for problems, but are not (e.g., treeing and retainer break-up). The purpose of this module is to provide the participants with the knowledge necessary to: identify problems early; understand why the problem has occurred and identify its root cause; and recognize conditions present in a battery that are "cosmetic" in nature.

CORRECTIVE ACTIONS

The corrective actions in the seminar are based upon guidance provided by battery manufacturers, **IEEE**® Standards 450™, 1106™, 1184™ and 1188™ and the seminar developer's experience. The module describes the corrective actions to be taken as a result of the analysis of maintenance inspection data. The urgency of implementing the required corrective actions is discussed. This portion of the seminar will provide the participants with the knowledge necessary to: understand what corrective actions are and how they should be implemented. It provides the participant with the knowledge of the time frame in which the corrective actions need to be performed and in some instances, the requirements for additional monitoring of the battery's condition until the corrective actions are implemented.

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