Rechargeable Batteries (2 hrs)

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2.0 continuing education hours for engineers, contractors, designers and energy professionals

Course Description

Many devices and equipment nowdays rely on batteries, and many of these are rechargeable. Some provide short-term electricity during utility power outages, like uninterruptible power supplies (UPS) which are not uncommon in both small and large power settings. Some provide power to portable devices and tools, like power tools, notebook computers and smartphones. Some provide longer-term energy storage for applications like off-grid solar. Batteries come in many sizes, varieties, capacities, voltages and chemistries. Different battery chemistries offer different charging and discharging characteristics. Different kinds of batteries also have differing lifespans based on how they are used. And different kinds of batteries must be recycled differently. Engineers, contractors and designers often need to understand more about these matters to address, fix or select batteries.

"**Rechargeable Batteries**" begins by explaining what batteries are, including a short history of batteries and summary of how they are used nowdays in so many common devices and applications. Common battery terms are explained, like nominal and deliverable voltage and amp-hours, lifespan, self-discharge rate and stored capacity per battery weight. Common types of rechargeable batteries are compared by their differences in internal chemistry, like lead-acid, lithium ion, nickel-metal hydride and nickel cadmium (nicad). Characteristics of each are presented, including how to recognize or research the type of a particular battery. Each battery type's pros and cons are discussed relative to discharging and recharging, including how most rated capacities and lifespans change based on the typical speed of discharge or recharge. Recommendations for how to maximize battery life are presented, especially by reducing amps and volts during recharging. Creating battery packs with higher voltage or amps by connecting in series or parallel is also explained and compared. Common problems with rechargeable batteries are covered, like batteries overheating due to charging or discharging too fast or at too high voltage. The proper recycling of batteries is also discussed

Learning Objectives

- Understand what a battery is, how batteries work and a short history of batteries
- Become familiar with the many different common battery chemistries
- Appreciate the varying characteristics of batteries with different chemistries
- Learn how longer battery life can be achieved by better management of volts and amps during recharging
- Understand the importance of battery recycling

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