BATTERY SELECTION AND BATTERY SAFETY

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Amateur radio operators work with many types of batteries. Each battery type has specific charging and safe use requirements. Charging requirements will be covered in separate lesson. The lead acid battery is commonly used in amateur radio emergency communication service particularly for long term communication. They are also a good choice to have in your home as a source of backup power for your radio. What are the different types, why use one type vs. another, and what safety procedures should be followed when used them?

Types of Batteries

- Alkaline
- Nickel based: Nickel-cadmium, Nickel-metal-hydride.
- Lithium.
- Lead acid.

Which Battery to Use

- Alkaline batteries, the AA size, are most commonly used in HT's. They are a good source of emergency power that can be purchased almost anywhere. Alkaline batteries cannot be recharged.
- Nickel based rechargeable batteries can be used in place of the alkaline battery. They are commonly used in HT battery packs. Battery packs generally contain multiple individual batteries. The nickel based battery can deliver several hundred to one thousand charge/discharge cycles.
- Lithium batteries are smaller and provide the largest power capacity for their size. They are used in HT's, GPS, cell phones, etc. The lithium battery has the longest idle life span of any battery construction.
- Plain lead acid batteries deliver large amounts of instant energy and are used most commonly in automobiles. Deep discharging plain lead acid batteries will quickly damage them.
- Deep cycle lead acid batteries deliver a longer-term energy supply and are design for hundreds of discharge cycles.
- Wet cell (flooded), Gel cell and Absorbed Glass Mat (AGM) are variations of the lead acid battery. The Gel cell and AGM cost significantly more than the wet cell but are not as prone to degradation. They are the safest to use because of less hydrogen gas evolution and any exposure to sulfuric acid is unlikely. However, they do require special charging rates. The AGM battery is the most versatile and should be given strong consideration for stand by power use. They hold a charge better; have greater life span, and greater cycle life. Deep cycle AGM batteries that are not discharged more than 60% will last several hundred cycles.

Buy the battery with the greatest reserve capacity or amp hour (AH) rating as possible. Nickel based battery and lithium battery packs along with deep cycle batteries usually list an **(**AH**)** rating. A battery rated for 50 AH should deliver 5 amps for 10 hours.

Extending Battery Life

The longer a battery sits without being re-charged, the greater amount of damage. In extreme temperatures (hot or cold) 24 hours can be too long.

Hints:

- Follow the charge/recharge recommendation for nickel based and lithium batteries.

- Recharge batteries immediately after discharge.
- Keep an energy input on stored lead acid type batteries.
- Don't use deep cycle batteries for starting automobile engines.
- Don't use plain lead acid batteries for deep discharge applications.
- If you are running your radio off your automobile battery for a long period, remember to start your vehicle and charge the battery periodically so that you do not become stranded when your assignment is finished. I use my deep cycle battery for long term stationary automobile use so that I do not have to worry about the vehicle battery.
- Undercharging allows sulfation to occur and will damage the battery.
- Avoid temperatures greater than 100F and less than 32F.
- Use the right charger for your battery. Gel cell batteries require a charger designed and adjusted for this type of battery.
- Be aware of any constant power drains which discharge the battery. Many of the HT's and GPS devices have a constant power drain even when turned off. I remove the battery from any of my devices which have this problem so the battery remains charged for a longer period.

<u>Safety Tips</u>

- Don't store batteries in a bag or pocket where they can possibly short and cause a fire.
- Never put batteries in a fire. They can explode.
- Do not over charge lithium batteries, they can catch fire.

<u>Specific Safety Tips for Lead Acid Batteries</u>

- Remove all jewelry when working around lead acid batteries. These batteries can deliver up to 800amps of instant power. Connecting one post to the other can blow the post completely off the battery. This can be equivalent to a 45 caliber bullet.
- Wear safety goggles. If acid enters the eyes, flush eyes with water for 30 minutes and see a doctor.
- Wash acid off skin.
- Keep sparks away from the battery.
- When working on vehicles, disconnect the ground cable first.
- Don't make live connections to a battery.
- Keep children away.
- Properly ventilate the charging area.
- Store in cool, dry place.
- Lead acid batteries are heavy so protect your back by using proper lifting techniques.
- Do not use metallic tools long enough to reach between battery terminals.
- Install fuses as close to the battery as possible. It is a good idea to fuse both positive and negative side.
- Protect the top of the battery so equipment can't fall onto the terminals.

A properly selected, used, maintained, and charged battery can be a great source of emergency power.