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# More Power To You!

A functioning electrical system with a minimum of two batteries is at the heart of the vessel infrastructure. These 'black boxes' allow us to start the engine, run electronics and provide the necessary energy for our running lights during long night passages. While we cannot easily change the electrical system on a boat, we can still avoid unpleasant surprises by watching a few key aspects:

1) Diligently **draw power only from one battery at a time**, avoiding the 'All' setting on the switch like the proverbial plague. Know which battery you are drawing from (#1 or #2), know its charge state (~12.6V voltage without load indicates full charge for a common wet cell battery), and know its capacity (typically around 100 AmpereHours (Ah) for typical smaller batteries; see Fig. 1 below.).
2) **Never deplete a battery to more than 50% of its capacity**. To find out your depletion, multiply the current drawn by the total time you are drawing that current to give you the consumption. E.g., drawing 0.5A for a typical cabin light for 5 hours will use 2.5Ah of the battery's capacity.

**Figure 1:** A well designed battery box on the Ericson34. The batteries are well secured; the two fused wires are properly sized for bilge pump and charger; chafe protection and sealed ring terminals are visible. Looking neat and simple, problems can be spotted easily and quickly.

3) Ensure that a **battery is charged fully** (or almost fully) a few times during the season. The consequences of under-charging are most notably 'sulfation' of the plates which is synonymous to loss of *mojo* for the battery. The battery may appear fully charged but is unable to deliver specified capacity. A process called 'equalization' may restore the full capacity but it is also hard on the battery itself.

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4) Don't forget to **check the water level** (distilled!) in the cells if you have wet cells with filler caps. The level should be well above the top of the plates. Often overlooked, low electrolyte levels in the cells can and will destroy your battery.
5) A note on battery sizing: Your **engine should start on one battery alone**. If you require the 'All' setting, you have no redundancy or your batteries have deteriorated too much. Time to upgrade or replace!

Much is written about electrical systems (e.g., Nigel Calder, *Boatowner's Mechanical and Electrical Manual*, International Marine), and, like with everything else on board, a lot can be studied. With the few suggestions above, you'll hopefully have time *and light* enough to learn even more.

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