BATTERY "AEROBICS"

We have talked about how to keep your battery out of the morgue. We talked about how "batterycide" is committed. That can easily be done by not charging them for months at a time or overcharging them for a long period. Then we talked about a few important voltages that can mean life or death to our batteries. To top it off there was a lesson on how to interpret all those meters on our boats.

I'm afraid by now that fear has struck deep into the hearts of those who sincerely don't want to commit "batterycide." The meters are being read and compared to the charts. Batteries are being charged. Some chargers are being turned on and some off. But the question is, "are we treating our batteries right?"

I think the best way to answer that question is to describe a little device that puts our batteries through an "aerobic exercise program." It is an alternator regulator designed by Dave Smead of Ample Power Company. By studying what it does we will know what has to happen to our batteries for their best health.

The first thing it does when turned on is sense the voltage and temperature of our battery with a sensor at the battery. Let's say it is March 24, 1989 and it is a cold, rainy, miserable day. It doesn't know that; but it does know that the temperature of the battery is 47 degrees and has a voltage of 12.3. It's reaction is simple -- CHARGE!

Our regulator tells our alternator to put out all it can to charge the battery. The alternator will continue to put out its maximum current until 14.6 volts is reached. (At normal room temperature it would stop at about 14.2 volts.) This would give our battery what is called the "bulk" charge and hard gassing will have started.

Now our regulator goes through what is called an "absorption cycle." It reduces the current of the alternator to maintain the hard gassing level of 14.6 volts. This level is held for a time (25 to 45 minutes) relative to how long it took the battery to reach 14.6 volts.

Satisfied that the battery is fully charged, our smart little device reduces the alternator output to 13.5 volts (13.2 at 70 degrees). This is called the float voltage. Our batteries may be left at this level for months at a time without worry of damage.

As you can see, there are three steps to charging our batteries. First there is the bulk charge which gives us about an 80 percent cycle. Then we have the absorption cycle. The hard gassing that occurs here completes the charge and helps reduce sulphation, prolonging battery life. Lastly we reduce the charge to a float voltage for maintaining the batteries without danger of harming them.

"THE BIG COMPROMISE"

To get the best possible life out of your batteries they need to be on a good exercise program. Just like our bodies, poorly taken care of batteries will have a poorer, shorter life.

I told you previously about the Ample Power three step regulators that did everything right. Now I will tell you when and why the old system is an acceptable compromise. We will discuss reasons for improving the system that you have.

We first need a short history on batteries to understand why the stock regulators on our alternators are not necessarily the best. When lead acid batteries were first discovered, they were simply built, used, and then rebuilt. It was a long time before Edison provided electricity to everyone's door and battery chargers were available. "Batterycide" abounded.

The best research on good battery care was done during the beginning of this century. Researchers then knew how to get the best life from lead acid batteries, but the technology was not available to do the job automatically. The first regulators were electromechanical (how's that for a six bit word?) devices that used a vibrating relay to regulate the alternator at one fixed voltage. These regulators were used for more than half a century.

Recently the old regulators were replaced with newer solid state devices. Unfortunately they were no smarter than the old ones. They were set at a fixed voltage around 14.4 volts. This would do little to properly charge a battery setting at 30 degrees which needs about 14.8 volts for a complete charge. The engineers had to assume that you were sitting on an L.A. freeway in August. They hoped that the commute wouldn't take more than a couple of hours and that the water level would be checked sometime. If not, it would just mean that many more millions for the battery manufacturers.

So what do we do? Batteries in your car will usually last three to five years treated this way. Not bad. Some cold morning you go out and the lizzy won't start. You lose a couple hours work, buy a $39.95 special and off you go again. But what about the boat? All but the tiniest boats should have two good batteries. (It is hard to pull over to the side of the channel and hold out jumper cables when needed!) That's at least a $120 investment. Some larger boats have over $2,000 in batteries.

Marine service is also much harder on batteries. I have replaced many batteries after only one year of service. It is very common to see only two years of life. Beyond that it can be assumed that the batteries have seen fairly good care.

Now we get down to where the rubber meets the road. What is our best cost to benefit trade off? If we have a boat with a couple of good small batteries, a VHF radio, running lights and a couple of cabin lights, we should not worry about making any big changes to our charging system. Just do the minimum to prevent gross "batterycide." (Please see previous articles.) Have your batteries checked at the beginning of each season and replace when needed.

If, on the other hand, we have refrigeration (the #1 big one), an inverter, lighted companion ways, and a 12 volt toaster (don't laugh), we need a battery system that will last through at least three cold beers. We also need a charging system that recharges our batteries without running the engines 4 to 5 hours daily. this system should have the capability to give our batteries regular aerobic exercise.

What you invest in your batteries and charging system depends on many factors. These include: all the electrical equipment on your boat, your cruising habits, how reliable you want your system to be, and of course, your pocket book. All this and other factors need to be considered in properly engineering a battery system.