

Ample Power Company



The Preferred System

The Preferred System consists of a single house bank, and a dedicated starter battery for all engines. A separate generator battery is sometimes present.

Support for Two House Banks

With the accuracy and reliability of Amp–Hour instruments, and the improved charging performance offered by our regulators and chargers, a two house bank system is no longer necessary. In fact, the more battery banks in use, the less reliable the system will be, while also increasing cost and management problems.

The Reliable System

The most reliable system is a single house bank of parallel or series/parallel batteries and another battery or bank solely to start the engines. The reasons for this system to be preferred over multiple house bank system are many. First, there is the initial cost. The total battery capacity, and hence battery costs will stay the same, however, the wiring costs will be reduced along with instrumentation costs. Instead of a 1–2–both switch, a simple parallel switch can be used to start the engine from the house bank if needed. That switch is only used in an emergency.

Failures of the 1–2–Both Switch

What is perhaps the most failure prone part of a typical electrical system? The 1–2–both switch! There are a lot of ways that particular switch causes problems. It can fail, of course. It can also be turned off with the alternator charging, destroying the alternator and electronics. The good old 1–2–both switch can also be left in the both position, flattening both batteries and leaving you in the lurch. We've even forgotten to put the switch in both to charge and only luck saved us from losing our boat. By tossing the 1–2–both switch overboard, you can increase system reliability by an order of magnitude. The alternator should be wired to directly charge the house bank without a switch in series.

Here is another good reason to get the 1–2–both switch out of the charging path . . . it can decide to open up all by itself. **A fried switch!!!**

The Savings Begin to Add Up

So far we've tossed out lots of wires used to wire two house banks instead of one, and the selector switch to choose which bank. We did add back into the system

a parallel switch, but since it is only used if the starter battery dies, the potential for human oversights has been greatly reduced. But isn't a single house bank risky? What happens if a cell fails in a battery . . . isn't the bank out of service?

What About Cell Failures?

If you made the house bank out of a single battery and you get a cell failure, you do indeed have a problem. Likewise if you make the house bank out of two series connected 6–Volt units a cell failure is a problem. But, if you make the house bank from parallel batteries a cell failure in one only knocks out that battery. The remaining batteries are still available. With proper maintenance cell failures are very rare. With proper instrumentation, cell failures are easily detected. Even if you don't immediately spot a cell failure, it takes a long time before a bad cell adversely affects the other batteries. In a properly instrumented and managed system, parallel batteries are not only appropriate, they are preferred.

The Positive Benefits

There are other positive benefits of a single house bank versus two. As reported in *Power News*, November 1991, and August, 1992, a gain in effective capacity results because the rate of discharge relative to battery capacity is reduced. That is, since the relative discharge rate is less, the losses due to Peukert's law are less. Peukert's law is a well known equation that relates battery capacity to the rate of discharge. The faster a battery is discharged, the less total Amp–hours it will yield.

In contrast to the preferred system, a dual house bank system is also used for engine starting. As the house banks wear out, they have a higher and higher probability of failure. That means a higher probability that the engine won't start when needed. The preferred system keeps the starter battery reserved just for starting the engine, and with proper care, the probability of failure remains lower for a longer period of time. See *Power News*, January 1993, for more details about electrical system reliability.

The single house bank is easier to charge, particularly if the Eliminator is used to maintain the starter battery. The battery charger is less expensive and the regulation circuits can be tuned just for the house bank, rather than

compromised to account for two banks which are in different states of charge.

In Review

To recap, the preferred system;

- Costs less to instrument and wire
- Is easier to manage
- Is less prone to human mistakes
- Provides a capacity gain
- Achieves better charging performance
- Has a more reliable starting battery due to less stress

If you're retro-fitting an older boat, or building a new

boat consider the preferred system. Even on an existing boat, conversion to the preferred system is easily done with very few wire changes. Properly implemented, operating the system is as easy as operating the electrical system in an automobile. When you want to start the engine you only need the ignition key. No more hassles with the 1-2-both switch. When you run the engine, you're charging. No one can turn off the selector switch underway and blow up the system. When you get to your favorite anchorage, shut off the engine and relax . . . you don't have to worry about the selector switch being in the both position. Enjoy Ample Power!