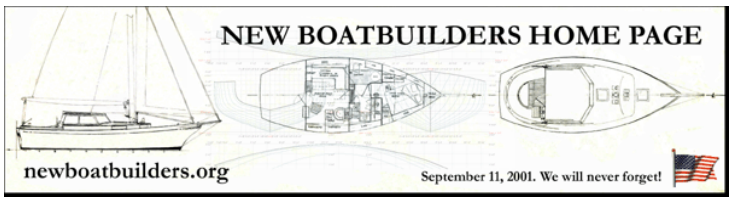

THE NEW BOAT BUILDERS HOME PAGE

Does Size Really Matter?

I often hear people say they are going to increase the size of their batteries by replacing their Group 24 batteries with Group 27s. Unfortunately they are under a misconception that group size and battery capacity are related.

Group Number: Standards for automotive and marine batteries are set by the Battery Council International (BCI). They have defined Group Number for various batteries. The group number has no relationship to the capacity of the battery. It is only a grouping based on the physical outside dimensions of the battery, and whether the lugs are on the top or sides of the case.

The BCI definition of Group Number is:

"BCI GROUP NUMBER- The BCI Group Number defines a battery by describing the following characteristics:
A.) Its maximum dimensions (L x W x H)
B.) Voltage (6 volt or 12 volt)
C.) Post configuration
D.) The type of terminal used (top, side, flag, etc.)
It should be noted that the BCI (Battery Council International) Group Number does not designate a battery's capacity, it merely defines the above listed physical characteristics."

The following excerpted chart shows various group numbers and their dimensions. http://www.rtpnet.org/teaa/bcigroup.html

BCI GROUP NUMBERS, AND DIMENSIONAL SPECIFICATIONS

BCI Group Number	Maximum Overall Dimensions footnote					
	Millimeters			Inches		
	L	W	H	L	W	H
PASSENGER CAR AND LIGHT COMMERCIAL BATTERIES 12-VOLT (6 CELLS)						

24	260	173	225	10 1/4	6 13/16	8 7/8
27	306	173	225	12 1/16	6 13/16	8 7/8
34	260	173	200	10 1/4	6 13/16	7 7/8
92	317	175	175	12 1/2	6 7/8	6 7/8
93	354	175	175	15	6 7/8	6 7/8
HEAVY-DUTY COMMERCIAL BATTERIES 12-VOLT (6 CELLS)						
4D	527	222	250	20 3/4	8 3/4	9 7/8
6D	527	254	260	20 3/4	10	10 1/4
8D	527	283	250	20 3/4	11 1/8	9 7/8
ELECTRIC VEHICLE BATTERIES 6-VOLT (3CELLS)						
GC2	264	183	270	10 3/8	7 3/16	10 5/8
GC2H	264	183	295	10 3/8	7 3/16	11 5/8

It should be noted that batteries in the same Group come in different capacities.

Battery capacity is determined by the type of battery construction: lead acid wet cell, Sealed Valve Regulated, AGM, Gel or Lithium. The number of plates and surface area of the plates, and the thickness of the plates in lead acid batteries determines whether it is a starting battery, or deep cycle and how long it can last under a known load.

Capacity; that is, how many amp hours the battery can release energy is measured by Cold Cranking Amps (CCA) which is a measure of how long the battery can continue to put out power. Below is the definition of CCA from the American Boat and Yacht Council (ABYC) http://www.abycinc.org which is the same as the BCI definition.

ABYC E-10.4 "Cold Cranking Amperage (CCA) - The discharged load, in amperes, that a new, fully charged battery at 0 degrees F(-17.8 deg C) can deliver for 30 seconds, and maintain a voltage of 1.2volts per cell or higher."

A better rating for boats is Marine Cranking Capacity (MCA).

ABYC E-10.4 "Marine Cranking Amperage - The discharged load, in amperes, that a new, fully charged battery at 32 degrees F(0 deg C) can deliver for 30 seconds, and maintain a voltage of 1.2volts per cell or higher.

If you are mainly concerned with how long your battery will last then you should look at the Battery Reserve Capacity.

ABYC E-10.4 "Battery Reserve Capacity – The number of minutes a new, fully charged battery at 80 deg F (26.7 C) can be continuously discharged at 25 amperes, and maintain a voltage of 1.75 volts per cell or higher (10.5 volts for a 12 volt battery or 5.25 volts for a 6 volt battery).

So if you want to increase the time your batteries will last, or you have added equipment and need to have more power available, you need to replace with batteries that have a larger CCA or longer Reserve Capacity. A simple way is to add an additional battery of the same Group Number and capacity as the existing ones, wired in parallel.

But, a caution. You should not mix battery capacities or types. It is ok to have two or three batteries of the same CCA ratings, but having batteries in parallel of different capacities, results in unbalanced charging. The largest one may never get fully charged. You should not mix lead acid with Gel or AGM batteries. AGM and Gel cells require chargers that limit the voltage and sense the temperature of the battery. Chargers that work fine on Lead Acid batteries may not work well with AGM or Gel Batteries.

Be aware that upgrading your batteries or adding additional batteries may also mean you need to upgrade your charging system as well, as your existing charger may not provide enough current to be able to keep the new batteries up to a full charge.

Before upgrading your dc system to larger capacity batteries or adding batteries, you should do an analysis of the loads to determine your needs. This involves listing all dc equipment on the system, whether it is a continuous load or intermittent load and what is the current draw. You can determine the current draw by dividing the number of watts the device uses, by twelve. For an explanation of how to size your battery bank see: Southeast Marine Services; Rolls Deep Cycle Batteries and charging Systems http://www.semarine.com/store/home.php?cat=87

But the conclusion is that no, size does not matter much. Your battery's group number is determined by the size and shape of

the space they fit into. The capacity you need is determined by the loads on the system, and the capacity of the battery is determined by its CCA, MCA and Reserve Capacity.

References:

Consumer Reports Car Battery Buying Guide: This also applies to boats and RVs
http://autos.msn.com/advice/CRArt.aspx?contentid=4023696

Deep Cycle Battery FAQ by Wind and Sun:
http://www.windsun.com/Batteries/Battery_FAQ.htm

Battery Council International: http://www.batterycouncil.org/

Car and Deep Cycle Battery FAQ 2010: http://www.batteryfaq.org/

Ike's List: look for **Electrical Systems and Batteries**
http://newboatbuilders.com/pages/links.html

Any Search of the internet will turn up hundreds of sites explaining batteries for Marine and Automotive use.