Winterizing Your Batteries

By Steve D'Antonio

It's well understood by anyone who has owned or operated a motor vehicle in cooler climates: the colder it gets, the more difficult it is to start the engine, particularly if the battery is weak to begin with. In fact, as temperatures drop, lead-acid (this includes flooded, gel, and AGM battery chemistries) battery efficiency falls dramatically. A battery that provides 100 percent of its capacity at 77 degrees Fahrenheit will produce about 60 percent of that energy when the temperature falls to 20 degrees.

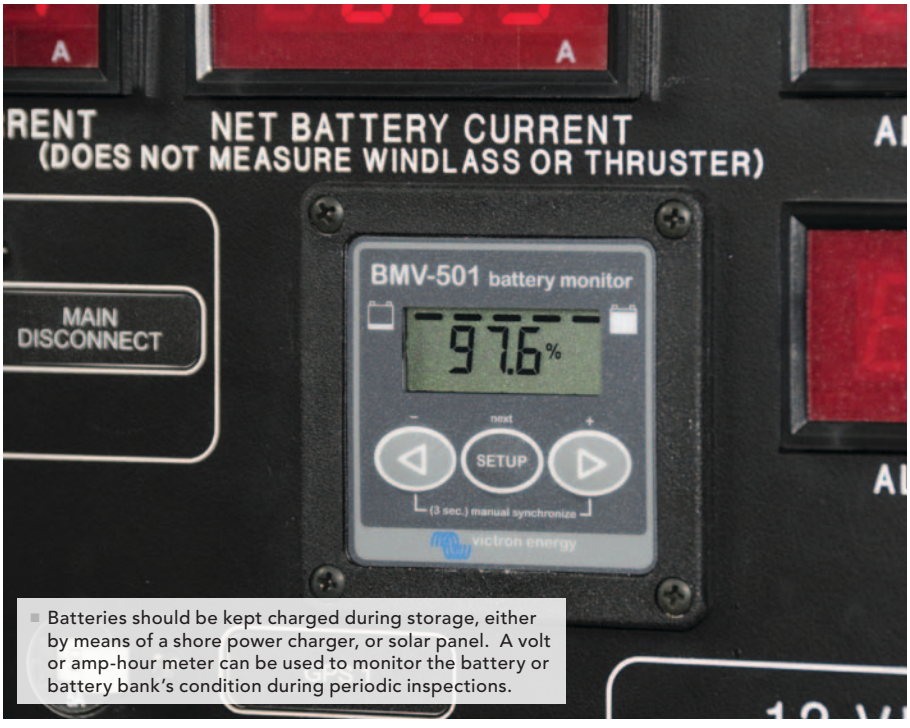
Thus, it's no secret that batteries "suffer" when the temperature drops. But is that statement really accurate? As it turns out, when it comes to battery storage, nothing could be further from the truth.

I have a clear recollection from my childhood of my father storing flashlight and transistor radio batteries in the family refrigerator. When I grew up, I naturally followed his lead by doing the same thing, without really knowing why (many parents will recognize this pattern). It wasn't until years later that I discovered that chemistry supported dad's actions. The truth is, and contrary to popular belief, while batteries may not work very well when they are very cold, they store exceptionally well when cool or downright cold. Their "metabolism" slows down when they are cool and speeds up when they are warm.

There is one important caveat to the rule of cold storage for batteries: they must be fully or nearly fully charged when left in this state. Discharged batteries, cold or warm, will suffer from sulphation, a process wherein lead sulphate that forms naturally during battery discharging hardens into crystalline form. Once this occurs, the crystals resist reintegration during the charging process, which results in reduced battery capacity.

Using a conductant paste on battery terminals reduces the likelihood of corrosion at the interface. The finished connection should then be coated with a corrosion inhibitor.

Battery installations that rely on trays and brackets or straps rather than boxes make periodic inspections during winter storage easy.

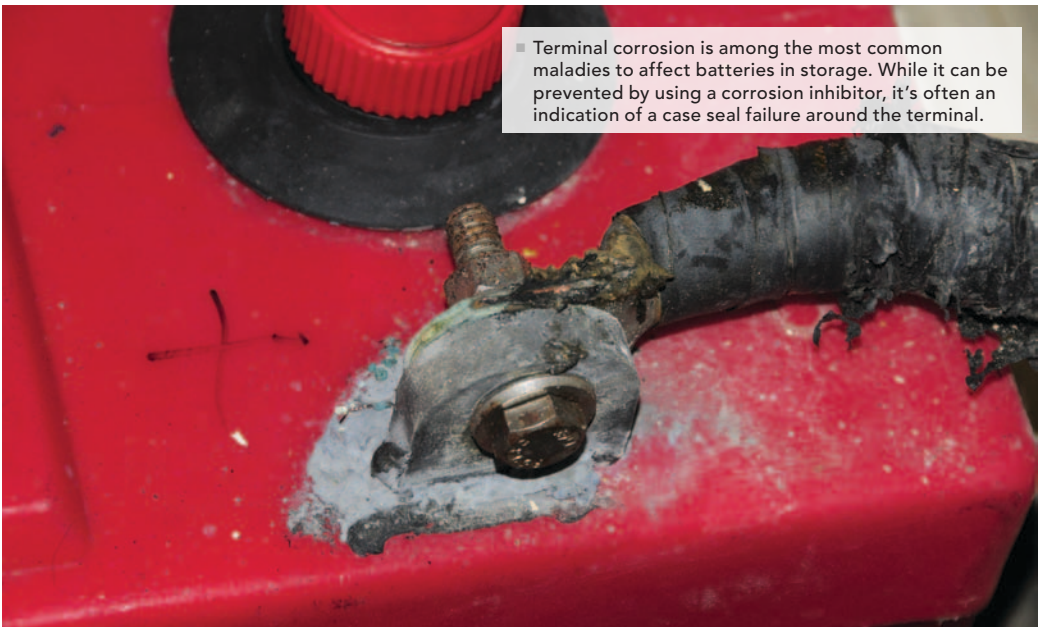


Batteries should be kept charged during storage, either by means of a shore power charger, or solar panel. A volt or amp-hour meter can be used to monitor the battery or battery bank's condition during periodic inspections.

More importantly from the cold storage standpoint, however, is that even a partially discharged battery will freeze at temperatures as high as 20 degrees F. If a battery is allowed to freeze, it will almost certainly suffer internal damage, and/or the case itself may crack. A fully charged battery's freezing point, on the other hand, is somewhere around minus-95 degrees.

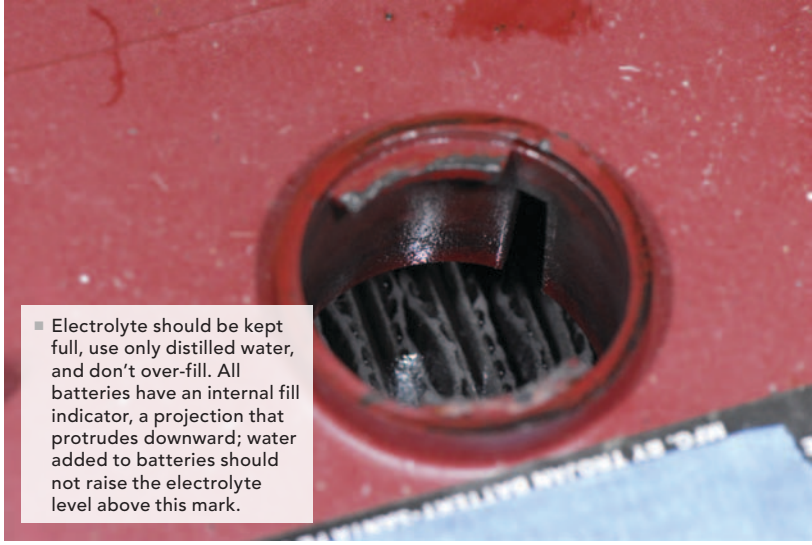
As a young mechanic, I recall winterizing vessels in the northeast and dutifully removing batteries for storage in a heated shed, being careful to "insulate" them from the concrete floor, where they were periodically charged. However, and again contrary to popular belief, it's not necessary to remove a battery from a boat for winter storage provided it can be periodically, or continuously, charged; storing a battery on a concrete floor has absolutely no effect whatsoever on its ability to hold a charge.

Additionally, flooded batteries experience a self-discharge of approximately one percent per day at room temperature, which means they should be recharged at least monthly (or better yet, float charged continuously). Because their metabolism increases as the thermometer rises, they discharge more rapidly at higher temperatures, so more frequent recharging is often necessary in tropical climates. Because of this phenomenon, chances are good that if you store your battery aboard, in cold climates, and make sure it's fully charged when you put it to sleep, it will maintain this charge provided no loads are present, for several months. Cold storage is actually preferable.



Terminal corrosion is among the most common maladies to affect batteries in storage. While it can be prevented by using a corrosion inhibitor, it's often an indication of a case seal failure around the terminal.

Review and evaluate battery banks. Check that they are properly secured (these aren't), positive terminals insulated (these aren't), and properly wired (these aren't, cables are connected to one end of the bank, which will cause uneven use).



Electrolyte should be kept full, use only distilled water, and don't over-fill. All batteries have an internal fill indicator, a projection that protrudes downward; water added to batteries should not raise the electrolyte level above this mark.

Periodic charging, monthly or as needed, will ensure the battery remains topped up, resisting freezing and sulphation (never charge a battery that's suspected of being or having been frozen, as it must first be thawed and inspected for damage). If you are using a temperature-compensated charger, and you should be, don't be surprised to see charge voltages as high as 15 volts when the mercury is in the nether regions. This is normal for cold batteries and just what they need when in this frosty state.

Finally, top up flooded battery electrolyte using distilled water (always wear safety goggles and gloves when working around flooded batteries) before storing and only *after* charging (unless the plates are exposed; then add water before charging). Make sure the top of the battery is clean and free of acid and corrosion. Terminal contact surfaces (*not* the exterior of the terminal) should be coated with a conductant paste such as T&B Kopr-Shield. The exterior of the re-assembled terminal can then be coated with an anti-corrosion spray such as CRC's Heavy Duty Corrosion Inhibitor. In this cool, charged, and corrosion-free state, your battery should live quite happily through the winter. ▪

About the Author: Former boatyard manager, technical writer, and lecturer, Steve D'Antonio, consults for boat owners and buyers, boat builders, and others in the industry. Visit stevedmarine.com for his weekly technical columns.