Light Up!

Corrosion and power consumption helped drive a change in navigation lights

BY GLENN MADDOX

Unlike the owners of many new production boats, we planned to use our brand-new 44-foot sloop, *Red Thread,* as our family home for five years. She would take us through the Caribbean, the Panama Canal, down the west coast of South America, and finally across the Pacific. While most of the equipment on the boat worked as we had hoped, some gear didn't perform quite as we had expected.

After cruising up and down the east coast of the United States for several months, I realized that the demands made on equipment being used full time are far different from those of weekend cruising or daysailing. We learned, often quickly, from this shakedown cruise which items were holding up and which were falling short.

LIGHTS OUT

After about 30 days we discovered that our incandescent running lights were not up to the task. We hadn't sailed much more than 500 miles before spray coming over the bow had burned out one of the bow lights. I worked on the unit and thought I had solved the water-infiltration problem, but 500 miles later I had replaced five bulbs and two complete housings. Nighttime sailing was becoming not only a safety issue, but expensive as well; regulations require that all boats under way between sunset and sunrise must, at all times, display proper navigation lights.

POWER DRAIN

An overnight passage was also a considerable drain on the batteries. Each of our running lights, two bow and one stern light, had a 25-watt incandescent bulb and between them they consumed 50 amp-hours each night. Another part of the equation is the fact that a battery has a finite number of charge-and-drain cycles in its lifetime, so the fewer cycles it has to make, the longer it will last.

A typical battery bank for a boat our size has three 4D batteries and a total capacity of 600 amp-hours. That means there are just 300 amp-hours available before the battery bank is discharged to the 50 percent level, and the 50 amp-hours the lights were consuming each night we were under way was 16 percent of the total availability. Adding the chartplotter, autopilot, and other various electrical draws meant I was not far from having to do a complete charge-discharge cycle every day.

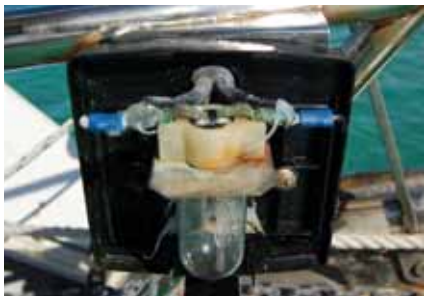
THE PROBLEM

Because incandescent bulbs burn out frequently, their housing has to be accessible. The downside is that water can get into the housing. Our housings began to corrode after just 90 days of cruising; salt water constantly attacked the lights'

I first figured out where the new LED mount would work best, taking into consideration that the LED unit must be aligned vertically for maximum visibility. I was able to use the old wire hole in the stainless pulpit; then I carefully rechecked the angle before drilling the second hole.

Because the bolts on my new Hella LED unit were a different size than those used by the incandescent units, I decided to drill and tap smaller holes on the old bracket. Correctly drilling and tapping for the replacement screws is very precise.

PHOTO BY CHARLES MASON (TOP); COURTESY OF GLENN MADDOX (BOTTOM)



I used a 7/16-inch drill bit and drilled up from under the deck joint into the stainless-steel stanchion base. This let me remove the existing wiring and clear the hole for the new wiring. The larger the hole, the easier it is to run the new wiring from the LED unit down through the stanchion and into the interior space where it's connected to the ship's wiring.

I ran the wiring for the forward LEDs to a spot in the anchor locker that would not be exposed to any water that might enter the locker. I butt-spliced the LED wire into the existing wire and then covered the entire assembly with a heat-shrink cover. In this case the hole in the deck didn't have to be resealed; any water that got into the stanchion would simply drain into, and then out of, the anchor locker. That's a far better system than having water sit in the base of the stanchion where it might corrode the stanchion from the inside out.

contact points and the hot bulbs burned out—often at very inconvenient moments—when they were sprayed by salt water. Even though the lenses remained in good shape, once the contacts were gone the only solution was to replace the entire assembly, which I did on two occasions. The units are not cheap, and of course I had to carry at least one replacement. I concluded that it was time to replace the lights with new LED (light-emitting diode) units.

THE SOLUTION

With LED technology there are no light bulbs, filaments, or exposed connection points. The units are entirely solid state, fully sealed (with no exposed connections that could be soaked by spray), and their brightness equals or exceeds incandescent or fluorescent displays. LED units work to specifications on both 12- and 24-volt systems with no adjustment or modification. And they last.

Even though the cost of LED units has dropped a lot, they remain roughly 40 percent more expensive than the incandescent alternatives. And since an LED unit is physically smaller than its incandescent counterpart, its attachment plates will be different; if you keep your existing mounting bracket, you'll have to drill new holes.

You also should consider carefully whether your LED running-light assembly could be damaged if it should hit a dock or piling or is accidentally hit by a pole or anchor. Replacing one of these units is considerably more expensive than replacing the lens of an incandescent lamp. But if you expect to see lot of spray, which happens especially in certain sailing areas of North America and the Caribbean, installing an LED can pay for itself in a short period of time because you won't have to replace it.

The power savings is also very real because you spend fewer hours recharging the batteries, thus increasing their life. An LED navigation light for a 44-footer will use 88 percent less power than a comparable incandescent unit—that is, for the required 2-mile visibility an LED will use only 2 watts as opposed to the 25 watts used by an incandescent bulb.

THE REFIT

There are several ways to change over from an incandescent to an LED navigation light. Most incandescent units are through-bolted to a mounting plate; an LED unit, at half the weight and perhaps a third the size, may not require through-bolting. Most LED units are mounted on the bow and stern pulpits, with the electrical wiring running from the unit inside the stainless pulpit tube and down below through the deck joint. 3M 4200 or an equivalent sealing compound will keep the electric wire fixed in place and the interior watertight. Here's how I changed my navigation lights from incandescent to LED.

ANCHOR LIGHT

An incandescent masthead light can be another power hog, but deciding to change it to an LED depends on how much use it will get. If you use it at anchor 20 days a year or more, I think it makes sense to install an LED unit. The LED's draw and charge cycles will be far less.

I converted all my navigation lights from incandescent to LED in Panama City before we left for the Galápagos Islands and Patagonia. By the time we reached Patagonia we had covered 5,700 miles, spent 37 nights at sea, and sailed through parts of the roaring forties. All the LED lights worked flawlessly, proof that these units are no longer something for the future.

Glenn Maddox, his wife, Pam, and their two young daughters began a circumnavigation aboard their brand-new Catalina 440, *Red Thread,* in 2006. After spending the Southern Hemisphere summer in Chile, they headed west across the South Pacific.

RESOURCES

AQUA SIGNAL,
847-639-6412, aquasignal.net

EURO MARINE TRADING (LOPOLIGHT),
401-849-0060, euromarinetrading.com

HELLA MARINE,
770-631-7500, hellamarine.com

ORCA GREEN MARINE TECHNOLOGY,
512-266-8226, orcagreen.com

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