Casualties: Collier misses turn, runs aground in Chesapeake Bay

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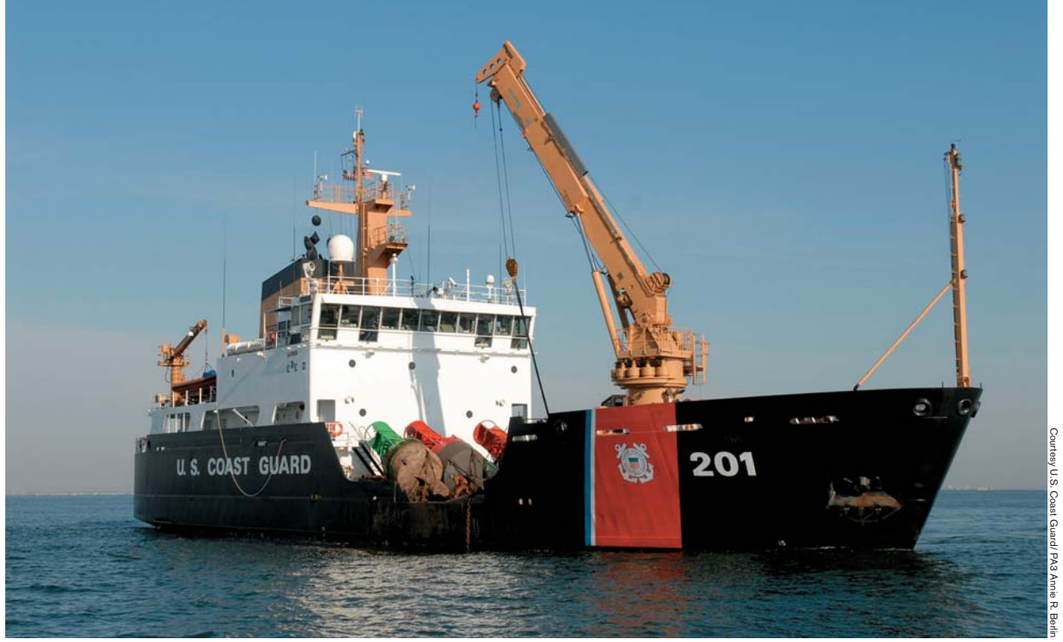
Cutter crew installs new, more dependable lights on navigation aids

By Dom Yanchunas



Courtesy U.S. Coast Guard/ PA3 Anne R. Bofin

"Coming up on the main!" That was the warning shout from the buoy deck supervisor aboard the USCGC *Juniper*, as the cutter's crane prepared to lift a 6-ton buoy out of Sandy Hook Channel.

"In and out with the cross deck" came the command when the buoy was in position to attach the cross deck line that would help the crew direct the buoy onto the working deck.

"Gripes" and "Break it free" were heard, as deck riggers secured the buoy with chains and got ready to work on it.

This sequence has been repeated hundreds of times by the crew of *Juniper*, a 225-foot buoy tender responsible for regular maintenance of navigation aids along the northern sector of the East Coast.

But this particular job — on a sunny December morning in Lower New York Bay — was far from routine. *Juniper*'s crew wasn't simply performing regular maintenance on a pair of channel buoys. The crew was also converting the incandescent lanterns to self-contained LEDs.

The all-in-one LEDs — or light-emitting diodes — combine a high-tech light fixture, battery and solar panels in a single compact unit that can be bolted easily to the top of a buoy.

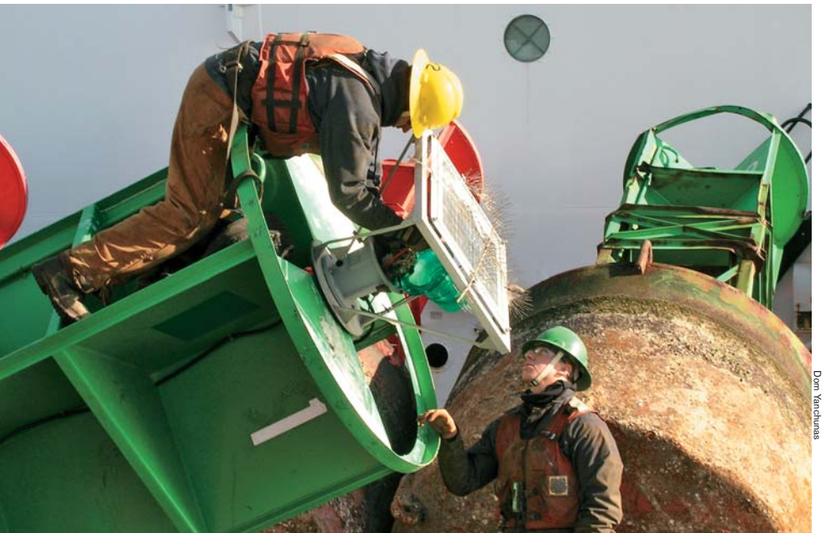
The LED units are more durable, with a longer-lasting light than the lantern system they are replacing. That will result in fewer problems for mariners navigating the channels, said *Juniper*'s commanding officer, Lt. Cmdr. Richard Wester.

"They appear to require much less maintenance and seem to be more reliable than the standard lights, improving service to the mariner," Wester said.

The new technology will also allow the Coast Guard cutters to lengthen the maintenance cycle for the buoys equipped with LEDs, which do not burn out like traditional light bulbs.

"Buoy tending is a potentially dangerous operation, and more reliable lights should help to reduce the frequency that we need to bring a buoy up on deck for both scheduled and unscheduled servicing," Wester said. "This week alone, we had to correct buoy discrepancies due to a water-damaged lantern and a faulty lamp changer, both of which would likely have been averted with an all-in-one LED."

The two buoys *Juniper* converted in December weren't the first LEDs to be installed in the area. Sandy Hook Channel was the site of three test buoys that received LEDs about a year earlier.



Dom Yanchunas

Left, Petty Officer 2nd Class Greg Shriver and Seaman Kenneth Galanis remove the incandescent lights from a buoy. The system being replaced includes an automatic light-changing device that periodically rotates a series of light bulbs, a solar panel and battery packs. This complex array is susceptible to breaking.

Jack Olthuis, director of waterways management and training with the Sandy Hook Pilots, said his pilots watched those test buoys closely. They determined that the brightness was satisfactory, and it's reassuring to know that they can expect fewer discrepancies in the future.

"The pilots seem to like them," said Olthuis, a former Coast Guard officer and buoy tender. "They are at least as good as the older-style buoy lanterns, and they're going to be a lot easier to maintain and less susceptible to outages. We're always pleased when the reliability of the aids to navigation goes up."

The Coast Guard began using self-contained LEDs when it purchased 30 units in 1999. Those lanterns were installed in scattered areas — usually recreational waterways.

The Providence River was the first major shipping channel to receive a comprehensive installation of LEDs. About 25 buoys in the river were converted in 2005, said Kevin Blount, chief of waterways management for the Coast Guard's First District, covering an area from the Canadian border to Toms River, N.J.

Eventually, most of the nation's 6,500 buoys will be converted to LEDs, said Larry Jaeger, technical expert with the Ocean Engineering Division of Coast Guard headquarters.

In Sandy Hook Channel, Wester's crew was installing an LED unit manufactured by Carmanah Technologies Inc. of Victoria, British Columbia. The LEDs can be set for just about any characteristic, or the combination of length, frequency and pattern of the flash. Available colors include the familiar red and green used to guide mariners through a channel, among others.

The Coast Guard uses two other approved suppliers for navigation LEDs — BWT Lighting Inc. of Newark, Del., and Vega Industries of New Zealand. In 2000 at Grand Haven, Mich., Vega's VLB-36 was the first LED ever to be installed on a major fixed aid to navigation in the Great Lakes.

Recently, the company Dr. LED of Seattle received Coast Guard approval to provide aftermarket navigation replacement bulbs.

In traditional buoy lanterns, an automatic light-changing device is needed to rotate a series of light bulbs into place periodically. The incandescent bulbs contain filaments, which have a tendency to break and stop working prematurely. A separate solar panel on a rack recharges the battery packs, which are usually installed inside hatches on the main body of the steel buoy. Wiring is needed to connect everything.

These separate parts atop the buoy are vulnerable to damage due to collisions with ships and fishing-boat outriggers. Damage to any one of the components can extinguish the lantern.

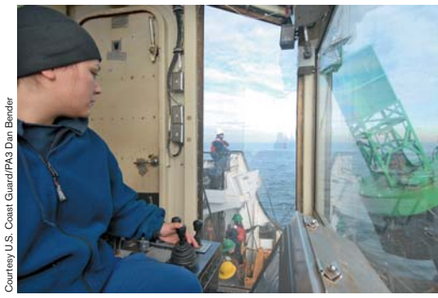
Jaeger said the LEDs are also less susceptible to failure caused by the persistent vibration from the buoy's bell or gong. Each LED unit has solar panels and batteries already built in.

"They're a lot more physically rugged. We're talking about a very mean environment out there, and buoys do get hit," Jaeger said. "There's no filament that will break. No more connecting everything with big wires."

The solid-state LEDs are more efficient because the batteries' energy is focused better on producing light. Traditional incandescent lamps, Jaeger said, waste as much as 75 percent of their energy because they also produce a lot of heat. The Coast Guard expects the LEDs to last 10 years, while the lifespan of the old lanterns is about two years.

The LEDs will also help thwart a common buoy problem that has nothing to do with power and lighting — flooding of the hull. Because battery packs no longer need to be stowed under hatches, those hatches can be welded shut.

That means lights will no longer be extinguished because their battery packs became soaked — and Coast Guard cutter crews will spend less time pumping water out of buoys.



Courtesy U.S. Coast Guard/PA3 Dan Bender

Top left, *Juniper*, a 225-foot buoy tender, prepares to service buoys in New York Harbor. Above, Petty Officer 2nd Class Jennifer Fattorusso operates the crane that lifts the 6-ton buoys onto the cutter's deck.

The new LED systems make it less likely that bird poop will accumulate on the solar panels and decrease their efficiency. That's because the new solar panels are built along the sides of the unit, perpendicular to the sky and water. On old lanterns, the solar panels are facing directly upward at the sky — an easy target for seabirds.

Wester said the newly installed LEDs will allow the cutters to service certain buoys every three years instead of every two years. The removal and replacement

of the equipment will be easier than with the traditional lanterns, which require separate operations for detaching solar panels and lights from the top of the buoy and batteries from inside the hatches.

"There is a servicing simplicity that is

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Courtesy U.S. Coast Guard

Above, Chief Warrant Officer 2nd Class Mike Tomasi watches as a buoy with a new light is lowered back into the water. Right, closeup views of the rugged and simple LED units.

associated with the LEDs," Jaeger said. "This is just bolt-off, bolt-on if you want to replace the system. The time on deck is definitely shorter."

Time saved from buoy tending can be devoted instead to more training, law-enforcement and security duties.

Even routine buoy tending is labor-intensive. Buoys can weigh 16 tons or more, including the 12,500-pound concrete sinker and 5,000 pounds of 1.5-inch steel chain.

After *Juniper*'s crane lifts a buoy hull onto the main deck, boatswain Chief Warrant Officer Michael Tomasi's crew still must ensure that they safely retrieve the mooring chain and sinker. Upon hearing the command "Pull chain," the deck hands connected the mooring chain to their winch and pulled it up.

The eight-person deck crew inspected the chain for wear, including a careful measurement of the shiny "chafe" area that slides and bounces along the sea bottom. Other specialists inspected the battery hatches, looked for bent equipment and used hand tools to dislodge mollusks from the bottom of the hull. Sometimes they must pump seawater out of the hull. Occasionally they weld buoy component parts back together or repair dents to the cage after damage from collisions.

A Coast Guard aids-to-navigation technician, wearing straps and other climbing gear, pulled himself up on the buoy. Instead of servicing the bulbs, light changer and wiring, he disconnected the entire system and replaced it with an all-in-one Carmanah LED unit.

The whole servicing process can take two hours before it's time to "Hook and hang!" — connect the buoy to the mooring chain while crane operator Petty Officer 2nd Class Jennifer Fattorusso lifts it back over the side of the ship.

When the buoy was in the proper spot, the crew waited for the command from the bridge to "Set it." Deck hands disconnected the main hook, pelican hook and cage line to turn the buoy loose in the water.

The Coast Guard maintains an inch-thick paper file for each and every buoy. The report specifies the buoy's characteristics, including lamp type, chain length and size, wear rate, history of discrepancies and hull-relief schedule.

Buoy hulls that are banged-up or need a new paint job are removed from service. In the First District, they are taken to the Coast Guard Buoy Depot in South Weymouth, Mass., for an overhaul.

The Newport, R.I.-based *Juniper*, one of the Coast Guard's newest buoy-tenders, holds its position using a differential global positioning system. DGPS allows Wester's crew to put a buoy back into place with an accuracy range of 3 feet.

Channels like the ones around Rhode Island, Cape Cod and Sandy Hook aren't the only waterways that can be used to gauge the LEDs' reliability. During the Iraq War, the Coast Guard installed Carmanah systems in reestablishing the Khawr 'Abd Allah waterway in Iraq. Wester himself was aboard the cutter *Walnut* for that mission in 2003.

Officials from the Coast Guard's First District intend to convert buoy lanterns along all the approaches to New York Harbor, including approximately 20 buoys in Ambrose Channel, 10 buoys in Chapel Hill North and Chapel Hill South, and other channels. That project should be completed by the end of 2007.

"If everything goes right, within the next 12 months is definitely a doable cycle," Blount said in January.

Blount said conversions are also scheduled this year in New England in Narragansett Bay and Mount Hope Bay.

The LEDs aren't more expensive than the 1960s technology they are replacing. Jaeger said one self-contained LED that costs $1,500 substitutes for a traditional lantern hardware setup that costs $1,700.

One thorny issue the Coast Guard is studying is the visibility range of the LED lights. The Carmanahs — models 701 and 702 — in Sandy Hook Channel were approved for a range of 3 nautical miles, versus 4 nm for the old lanterns.

Jaeger said newer models made by Carmanah and the two other suppliers will have an approved range of at least 4 nautical miles.

Olthuis said his pilots haven't noticed a difference. "There is no degradation in the quality of the signal," he said. "If the chances are less that a buoy is going to become extinguished, we're happier." •