

Flare Tests Enlightening

In September 1998, the Foundation conducted a test on pyrotechnic visual distress signals — handheld and aerial flares for day/night use, and smoke signals for day use. There have been significant developments in the last decade — there are new devices such as lasers on the market, there are now fewer flare manufacturers and all of the remaining flares we used in '98 are now really out of date. Perfect timing for a new test!

The primary goal of Foundation Findings has always been to let boaters experience vicariously how different equipment performs in real life. We do use scientific methods whenever possible for testing products, but our main goal is to show how things work as the average boater uses them on the water, and relate that information in plain language. This test was also captured on video that is posted on the Foundation web site to provide boaters with an even better way to see how flares work and what to expect when using them.

The Small Print

The Coast Guard requires all recreational boats 16 feet and longer to carry an appropriate visual signaling device for use when boating, either during the day or night. Non-pyrotechnic devices that are approved by the Coast Guard include such items as an orange flag with black circle and square to be used during the day, and an electric signal light that flashes SOS in Morse Code.

All pyrotechnic flares sold today have an expiration date that is 42 months after manufacture date. This predetermined lifespan ensures that flares — which are made of chemicals that degrade over time — can be relied upon to work properly throughout the designated lifespan.

Testing, Testing...

With 25 different products to test, weather on the testing day gave us ideal on-the-water conditions — not too hot, but sunny with a slight breeze and little wave action. Our test site was Sandy Point State Park and the waters of the Chesapeake Bay, just north of Annapolis, MD. An observation station was set up on the beach, and using a GPS we positioned our test boat at a

range of exactly one quarter-mile offshore. Our test boat was equipped with an array of additional safety gear including extra fire extinguishers and metal buckets filled with sand for disposing of flares. Our flare testers were likewise equipped with eye and ear protection, and heavy welding gloves — which turned out to be very much needed.



Though the boat crew thought most of the handheld flares were pretty bright during the day tests, the shore crew reported that it was the smoke that caught attention. The handheld light was barely visible from only a quarter-mile away.

In keeping with the desire to have a “real life” perspective, our test protocol relied mainly on the observations of the shore and boat crews, and the testers. While we did have a standardized method of rating the flares, performance was rated visually by people, not equipment. So while the brilliance of a flare was noted on a scale of 1 to 5, we did not measure candlepower. The height attained by the aerial flares was roughly measured using a surveyor's transit placed at our base station.

In addition to brilliance and height, we measured burn time, overall visibility, volume of smoke, and whether there were differences in performance between day and night. We also looked at how easy or complicated it was to deploy a particular device.

What We Found

Signaling devices were grouped by

class for testing — aerials, handheld devices, non-pyrotechnic and smoke. Similar to our last test conducted in 1998, the SOLAS flares dramatically outperformed flares built to the U.S. Coast Guard standard in virtually every respect, particularly the handheld flares.

Handheld flares are by far the most widely purchased pyrotechnic signaling device. Their straightforward design and relative low price make them the top choice for meeting legal carriage requirements. But performance of most handhelds during the day is lacking. One typical daytime observation was that, for Coast Guard standard flares in particular, the flares looked as if they were navigation lights — not a signaling device.

The other prime concern about handhelds was the intense heat of the molten “slag” that drips as they burn. This hot liquid metal easily burned holes in our test inflatable life jacket and nearly burned through the testers' thick welding gloves. The risk of burn injuries cannot be overstated.

Compared to handheld devices, aerial flares afford much more variety. Launchers range from 12-gauge handguns to compact pen-size rockets as well as numerous self-launched parachute flares and meteors. Here again, though they did

attract the attention of a few nearby boats, performance for most of these devices during the day was not great, leaving testers and observers wondering what was best for daytime use.

They quickly found the answer in smoke flares. Smoke was by far the best for use during daylight hours — burn time is much longer than that for flares, and the sheer volume of smoke makes it difficult to miss.

The tables turn, however, once the sun goes down, as flares are the name of the game at night. Height, burn time and brightness are the three things to consider when purchasing flares for night use. Also consider the ease of deployment when visibility is diminished and reading instructions may be impossible. Standard protocol states that aerial flares should be used for getting attention initially, and handheld flares for guiding rescuers in.

While burn time and brightness are greater concerns for near-shore and coastal boaters, height is more important for off-shore boaters, whose rescue might depend on someone at a greater distance. As with the daytime tests, SOLAS (Safety of Life at Sea) flares performed particularly well.

Oldies But Goodies?

What happens with expired flares? The most common practice for boaters is to keep recently expired flares as backups. After several years boaters will often find themselves with a large collection of expired flares, which can't simply be pitched in the trash because they are considered hazardous materials. For this test we compared expired flares' performance with that of current flares.

From diminished output to misfires and complete failure, older flares don't perform as reliably as current flares — easily justifying the expiration date and reaffirming our original test results from 1998. The one exception was the SOLAS smoke canisters. Our 10- to 20-year-old smoke canisters in particular seemed to perform as if they were new.

Laser Light Show

In addition to the pyrotechnic devices, we also took a look at alternatives to traditional flares — the SOS light and newer, non-approved 'laser flares.' These non-

pyrotechnic devices offer the ability to signal at night, and avoid the nuisance of storing flares aboard. The SOS light looks like a regular flashlight, but it flashes the SOS Morse Code pattern (...---...) when you turn it on. On the Chesapeake Bay at night, it was virtually indistinguishable from background lighting even at a quarter-mile range.

The laser lights, which also look like small flashlights, came in two colors, red and green. These devices emit a thin beam of light that has to be aimed at its intended target. The red laser, while still expensive, costs much less than the green laser. Both required a great deal of technique to aim. Observers struggled to locate the red beam in particular, despite looking directly at the test boat. The green laser was a different story. Everyone was amazed at the amount of light emitted by this tiny device. It clearly, and fully, illuminated a shoreside building at a quarter-mile range.

While the SOS light and the flares offered a change of pace from the pyrotechnics, they must be purchased with the intended purpose in mind. The SOS light might work well offshore, but it is not something we'd recommend where there is a great deal of background light, as there is on a busy waterway like the Chesapeake Bay. The signal simply won't stand out. The laser flares probably hold the most promise as potential replacements for traditional flares, but they aren't quite there yet. The

thin beam, particularly the red, requires precise aiming and the beam was not very noticeable during our test, even at night.

Final Thoughts

Pyrotechnic emergency distress signals are serious devices — certainly not to be confused with Fourth of July sparklers. Though these products offer no realistic (or legal) opportunity for practice, it definitely pays to be as familiar with your chosen products as you possibly can. There are a variety of firing mechanisms, each with its own peculiarities — and each likewise has a potential for serious injury to you and damage to your boat. While the instructions may seem straightforward in the store, trying to figure them out in the dark when your life may be on the line could be a very daunting task indeed.

The best signaling devices are the ones that are suited for your type of boating and where you go boating. A SOLAS parachute flare is overkill for a canoe on a lake, just as pocket rockets are insufficient for offshore boating. The purpose of signaling devices is for you to be seen, especially when people aren't looking for you. For a full rundown of each product tested, along with video clips and comments from our testers and observers, visit the Foundation Findings web pages at www.BoatUS.com/Foundation/Findings. ■

— By Chris Edmonston

