Electronic Flare Testing – 27th January 2018

Introduction.

On Saturday the 27th of January 2018, I journeyed to Bridport Tasmania as a guest of Surf Lifesaving Tasmania to witness a series of tests performed, comparing various types of Marine distress flares. The concept was to demonstrate flares on a beach to members of the general public as part of a community education program. Also a Jet Rescue Boat was used to demonstrate the deployment of the different types of flares in an offshore environment.

Weather, location and environment.

The test location was Bridport Beach, northeast Tasmania. The weather was overcast with a low cloud base, but no rain. The wind appeared to be relatively consistent on shore from a northeasterly direction at between 10-15kts. Sea conditions close to the shore appeared to be around 0.5m. The test was conducted in generally a north to north-north-easterly direction from the shore. The rescue vessel skipper reported via radio that as the vessel travelled further offshore, conditions became “a bit lumpy”. The rescue vessel was approximately 6m long. The moon was almost overhead but appeared to be in its second quarter. Between the lack of reflection from the moon, and the generally overcast condition of the sky, moonlight was not significant. The offshore testing commenced at approximately 21:15 hours AEDT. There was zero remaining daylight.

The devices tested

On shore, two types of pyrotechnic Marine distress flare were demonstrated:

- Orange hand held smoke flare
- Red hand held flare

From the rescue vessel, two traditional pyrotechnic types were demonstrated:

- Red hand held flare
- Red parachute flare

Furthermore, two types of electronic devices were tested:

- rescueME EDF1 electronic distress flare
- A laser flare of unknown make

The electronic distress flare as shown is a lithium battery powered device, which has a series of LEDs, mounted facing outwards at various angles around the head of the device. These LEDs flash sequentially upon activation producing a somewhat randomised red very fast flashing pattern.

The laser flare is a smaller device with a single laser, which oscillates faster than the eye can see across a small arc in a straight line. This has the effect of painting a narrow stripe on a wall which is

approximately 200mm long over a distance of 10m. The beam at this point is only a millimetre or two wide.

Figure 1. Electronic Distress Flare

Figure 2. Laser Flare

Testing methodology

After hands-on testing on the beach, the spectators were invited to watch deployments of various types of flares from the Jet-Rescue Boat. Tests were conducted over the following distances:

- 1NM
- 2.5NM
- 5NM

The vessel let off flares in the following order at each location:

- Red parachute pyrotechnic flare
- Red hand-held pyrotechnic flare
- Electronic Distress Flare
- Laser Flare

I was able to clearly observe all testing from my vantage point on shore at sea level adjacent to the ocean. I stood in a position at the start of the dunes such that I was elevated by approximately 1 metre, simulating my vantage point from a rescue vessel as closely as I could.

Results of test

- Every device worked as its manufacturer intended.
- With the low cloud cover that night, each pyrotechnic device lit up the bottom of the cloud layer
- Every device was visible over all tested distances

Personal observations

- I frequently saw only the briefest glimpse of the laser flare at night
- I was able to see the Electronic Distress Flare at all times at which it was in use
- Both hand held and parachute versions of the pyrotechnic devices lit up the cloud base
- Pyrotechnic devices are many times brighter than electronic devices

Opinions of the report writer

Problems with current pyrotechnic distress flares

It is possible for the average recreational vessel operator in Australia, to use their vessel lawfully over a period of time without receiving training on the use of pyrotechnic distress flares. Whilst there is sometimes general encompassing legislation such as the "Master's General Safety Obligation" in Queensland, there is little formal direction for a recreational master to seek specific training in the use of distress flares. I believe most recreational users purchase flares when they intend to operate in waters that require the carriage of this equipment. They proceed to carry and store the flares on board and rarely bother to learn how to use them, or consider the associated risks.

This leads to two major potential risks:

- A person may be startled by the intensity of heat and light emitted and immediately drop the flare, possibly into the vessel with disastrous consequences.
- A person facing perceived dire consequences may deploy their entire complement of flares over a short period of time with little prospect of being seen in the initial distress phase. This leaves them with no way to attract the attention of searches later in the search & rescue phase.

Sadly, also a small mischievous percentage of society derives pleasure from deploying distress flares to generate a hoax.

Electronic distress flares address these issues via the features they offer:

- Electronic devices do not emit significant heat. Any part of the device can be touched during operation without risk to the user
- An electronic device can be deployed and then switched off multiple times and over an extended period of time. This will naturally focus the user's efforts into intelligently attracting attention
- Electronic devices are simply a fancy flashing light, which will not hold a great fascination compared to the mischief created by setting something on fire as it flies up into the sky and thus is far less likely to used fraudulently.

Are Electronic Devices ready to take over from Pyrotechnic devices?

In the opinion of the report writer, no.

The sheer luminance and behaviour of traditional pyrotechnic devices is well known and difficult to mistake. At the time of testing, the pyrotechnic devices clearly illuminated the cloud base. To untrained observers, there is little doubt that the deployment of such a device is an event that requires investigation.

Electronic Distress Flares

These devices work well. They can select the output power and can restrict their illumination to a forward arc if required helping to concentrate light in a chosen direction.

However they lack the sheer brilliance of pyrotechnic devices.

If I personally saw one of these devices in use, I would be inclined to investigate mostly out of curiosity more than a sense of urgency. I agree the flash pattern does not match any known navigation mark even though the light colour is red. The flash pattern brings to my mind, a mental image of the emergency beacons fitted to the top of many emergency service road vehicles.

Electronic Distress Flares however have the huge advantage that they emit no heat, can be used intermittently over a long period of time and can be easily operated by a person in the water.

I am conscious of my 20 year career as a marine rescue vessel skipper. In that time, most of the occasions on which I have out to sea to investigate reports of flares, these reports have either been unsubstantiated, or proven hoaxes. Of the remaining times when I have personally witnessed the deployment of flares, 5 of 7 occasions have been at the direction of police or other rescuers, in order to learn the position of a person in distress. So for all except two occasions in 20 years and more than 15 activations for distress flares, an electronic device would have suited our purposes with a greater degree of safety than a pyrotechnic device.

Laser Flares

Laser devices are smaller again in size and would easily fit into a pocket. However, they have their own issues. It is my opinion that the arc of light is too narrow. The rougher the seas and bigger the distance, the more difficult it will be for the user to aim it accurately at rescuers. Indeed, over all distances, the light from the device, whilst visible, as observed by me, would not warrant investigation on my part. Upon seeing one, I would likely assume it to be a an aircraft operating close to the horizon, or a port navigation running light with intervening waves blocking its view as the device inevitably waved around.

Conclusion

At time of writing, I do not believe electronic devices would attract the same attention as a pyrotechnic device. However, I am considering the purchase of an electronic flare, to carry on my own personal lifejacket in order to enhance my safety at sea.

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