

NON-LETHAL BOAT STOPPING SYSTEMS

1. Introduction

BCB has developed a range of non-lethal Boat Stopping Systems for use by naval, police and private security forces. This range utilises the same basic system consisting of a compressed pneumatic launcher that fires an arrestor line across the bow of a suspect or intruding vessel.

Maritime Law Enforcement Agencies have seen the potential for these systems in Littoral Waters, Inland Waterways and Harbours where choke points can be easily identified, manageable patrol areas can be established and routes of escape can be denied. Use of the systems on the high seas as part of a layered defensive measure against piracy and sabotage is also feasible.

2. Systems Overview

There are three launcher systems that comprise the range as follows:

- **Barracuda** – a small hand held/fired pneumatic launcher that fires a munition comprised of a dyneema line and two inflatable drogues. Effective range is approximately 40 meters. The Barracuda is ideally suited for onshore foot patrols or use in small boats and is suitable for stopping smaller fast boats (rigid inflatables, small fishing vessels etc).



- **Buccaneer** – A medium sized mobile launcher that is ideally tripod mounted on a patrol vessel with the speed and range to pursue, overtake and subdue suspect vessels. Buccaneer fires the same munition make-up as Barracuda but has a longer line and a resulting longer effective range of 100 meters. The Buccaneer comes in single barrel or “V Shaped” barrel configurations and can also be remotely fired. The Buccaneer is fixed on a tripod mounting that may need to be of bespoke design based on the constraints of the vessel or shore installation being used. Buccaneer is effective at stopping larger vessels of up to 3 or 4 tonnes displacement. It is optimally used in a high speed pursuit boat that can draw alongside a target vessel (at a safe distance) and fire the munition across either bow of the target vessel.



- **Sea Stinger** – a large shore mounted or ship mounted (as opposed to a boat mounted) pneumatic launcher which fires either a dyneema line and drogues or a heavy duty meshed net. It has an effective range of up to 200 meters and can also be remotely fired from a distance of up to 500 meters. Sea Stinger is ideally suited for denying entry into or exit from harbours or inland waterway choke points.

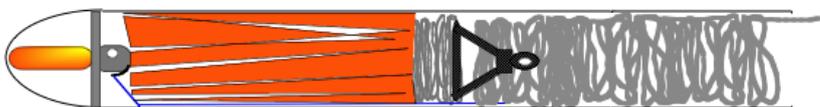


3. Munitions

Each system fires a floating Dynema or Spectra line with a sea anchor at both ends. Sea Stinger can also fire a meshed net which is capable of stopping larger, heavier vessels.

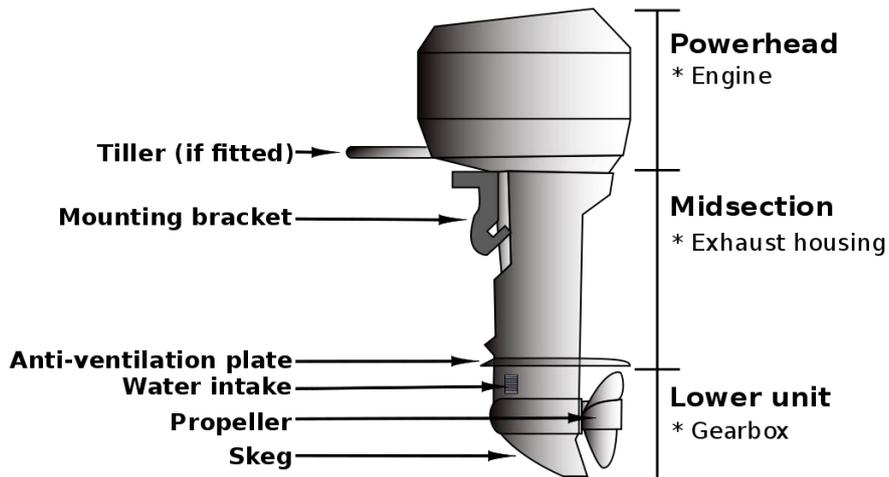


The line and sea anchors are launched in a streamlined container (the munition). At the end of the flight the sea anchors deploy. The floating line captures the cavitation plate/anti-ventilation plate on outboard or inboard/outboard motors, the sea anchors then inflate and create drag to slow the target vessel to a stop in a matter of seconds. The line does not foul the propeller or damage the vessel in any way.



The line and drogue munition brings the target vessel to a crawl in less than 0.8 of its length. In other words, a 100 yard long arresting line will slow a boat to a crawl in 80 yards.

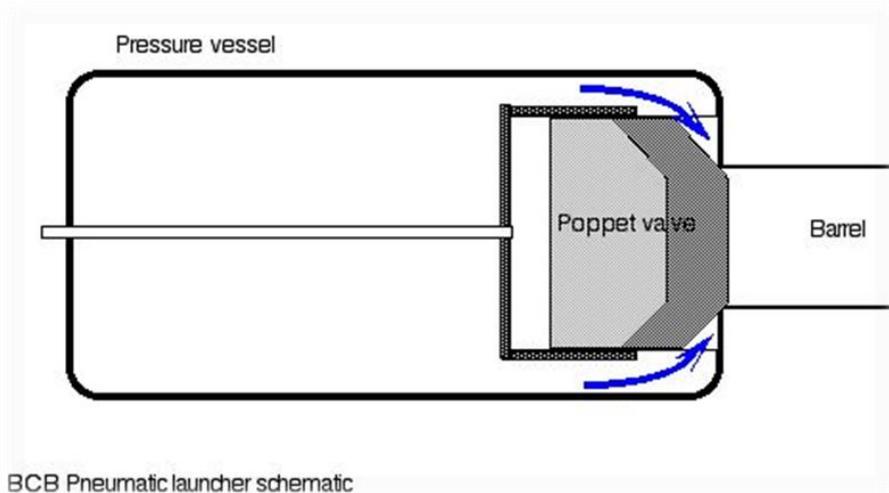
During rigorous and extensive trials and development, the arrestor line system proved capable of bringing a twin 250hp engine 28 foot RHIB traveling at 40 knots to a speed of less than 4 knots within a matter of meters.



4. Principles of Operation

Each of the three systems consists of a reservoir which is charged with compressed air. Typically the source of the compressed air is from a single SCUBA cylinder which provides sufficient air for 3-7 firings. Additional cylinders can be added to increase the number of firings or alternatively the source of the compressed air may be from a fixed continuous source. Adjusting the working pressure up or down allows the operator to vary the weapon range to define employment parameters.

Once charged with compressed air the reservoir can remain in the charged state for extended periods without loss of pressure. The systems are triggered by venting a small amount of air from behind the valve. This causes the poppet valve to move backwards, releasing the stored air and driving the projectile down the barrel.



Subsequently the reservoir can be recharged from the compressed air source within 6 – 10 seconds. Re-loading the launcher takes a bit longer. In normal circumstances the launcher can be ready to fire a second munition in less than one minute providing the second munition is already prepared.

The Buccaneer and Sea Stinger can be fired by infrared remote control or by hard wired options and could be configured to be triggered by sensors. This allows the weapons to be operated remotely provided line of sight from the operator to the weapon is maintained (nominally 500m).

5. Payload

The payload is typically determined by the barrel diameter. In the case of the standard munitions, the leading end of the munition is muzzle loaded into each system with an underslung barrel used to store and deploy the mid and end sections of the munition. In the case of Sea Stinger the mid and end sections of 200 meter dyneema line or the meshed net munition is normally neatly coiled or laid out at the foot of the mounting. With minor modifications all three systems can be loaded with a gravity fed magazine of varying payloads.



Photo shows Buccaneer muzzle loaded with underslung payload as well as a remote firing cable (pictured at the rear of the mount).

6. Operating Parameters

A SCUBA cylinder holds 2000ltrs of compressed air stored at 200 Bar (2900PSI) or 275 Bar (4000 psi). This is sufficient to charge the reservoir to 1000PSI. The reservoir has a safe operating pressure of 2000PSI and has a Lloyds Certificate for safe design and manufacture.

The Sea Stinger is mounted on a robust framework which includes a recoil system. The Sea Stinger reservoir holds compressed air up to 1000PSI. The reservoir will achieve sufficient propellant force to launch a payload projectile of 22lbs to a range of 700yds at a pressure of 600PSI.

The Buccaneer is also mounted on a robust framework and has a simple recoil mechanism. At 600PSI the Buccaneer has compressed air sufficient to launch a suitably shaped payload projectile of 7lbs to a range of 700 yards.

7. Operating Environment

All three systems are currently manufactured from stainless steel, steel, aluminium, and in the case of the Barracuda, carbon fibre (barrel). For marine applications weather proof coating including galvanizing, zinc plating and powder coated finishes are used to prevent corrosion. The systems are robustly constructed and resistant to shock and vibration meaning they can be mounted on a sea going vessel without affecting performance.

8. Tactical Employment

As mentioned above the three systems are optimally used deploying munitions comprised of arresting lines and, in the case of Sea Stinger, nets to slow suspect vessels to a stop. Equally they are capable of launching a variety of other payload types depending upon the tactical requirement. Examples include, but are not limited to; PAVA pepper, marking paintballs, UV paintballs, smoke canisters and 'flash bang' projectiles.

As currently designed, these systems can also be employed as a Waterside Threat Protection Device, for use against surface threats. The system would be employed to dissuade, disable or destroy these threats. It can also be used aboard vessels at sea for denying access to potential attackers, by either deploying arresting lines, or by launching solid plastic or rubberized spheres (driven to velocities and energy levels capable of damaging small craft and injuring or killing attacking personnel, if necessary).

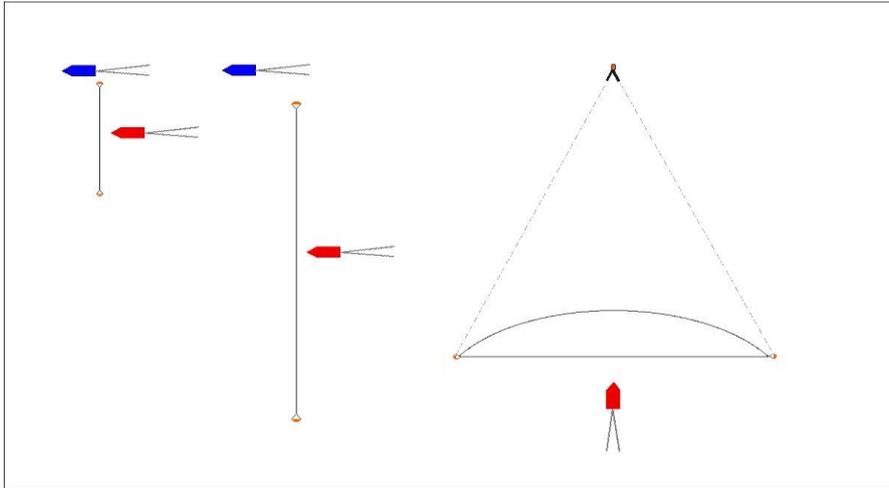
Real world trials against vessels have been conducted and proved successful in deploying snaring line payloads against small vessels providing proof of concept.

9. Tactics

As mentioned earlier Buccaneer is optimally used in a high speed pursuit boat that can draw alongside a target vessel (at a safe distance) and fire the munition across the bow of the target vessel. Barracuda can also be used the same way but, as a hand held/fired system it could be unruly in rough seas therefore additional stabilising methods should be considered.

The key to either launcher's success is the ability to launch the munition close to the front of the target vessel to nullify any chance of the target vessel taking avoiding action by skirting around the deployed arresting line.

The Buccaneer can also be used in a head on situation against a target vessel utilising its "V" Barrel configuration. In this situation two arresting lines are fired in a v-shape across the approaching vessel's path.



Target vessel shown in red.



Buccaneer with "V" Barrel configuration.



Sea Stinger Firing Mesh Capture Net

10. Detailed Specification

	Sea Stinger	Buccaneer	Barracuda
Barrel Diameter	175mm	125mm	125mm
Barrel Length	1.2m	1.2m	50cm
Total weight	195kg	33kg	7.9kg
Munition Range	200m	100m	40m
Operating Charge	600psi (40 bar)	600psi (40 bar)	160 psi (11bar)
Remote Control	Yes	Yes	No
Two Barrel configurable	No	Yes ("V" shaped)	No