

## “CONCEPTS ON ANTI-PIRACY MEASURES”

### AUTHORS:

T. SATHISH (304B) [304sathish@gmail.com](mailto:304sathish@gmail.com)

M.S. SHAMSHUL HALIQ (305B) [shamshulmarine305@gmail.com](mailto:shamshulmarine305@gmail.com)

[R. SUBASH \(310B\) subashraghu@yahoo.com](mailto:R.SUBASH(310B)subashraghu@yahoo.com)

[SCHOOL OF MARITIME STUDIES, VELS UNIVERSITY,](#)

[OFF OLD MAHABALIPURAM, THALAMBUR, CHENNAI-603103](#)

[CONTACT NO: +91-9524488229, +91-9941725112,+91-9092121732](#)

### **ABSTRACT:**

For a number of years, in the international shipping, we have been only concerned about marine pollution issues, safety of the vessel, etc. and we as the seafarers had not bothered about the safety of the lives and that of the ship from the hands of the sea pirates. Piracy had become a great hinder to the international shipping industry. Pirates have been around longer than ocean trade routes have existed. Piracy has been growing tremendously alongside the shipping industry. In this article we going to deal about some of the measures to control anti-piracy and some concepts on the anti piracy weaponry that can be used onboard ship.

### **INTRODUCTION:**

"Piracy is the act of boarding any vessel with intent to commit theft or any other crime, and with an intent or capacity to use force in furtherance of that act." **Piracy** is committed by private parties that engage in acts of [robbery](#) and/or [criminal violence](#) at [sea](#). As we head towards 2010, it is clear that piracy remains a clear & present danger to all those who navigate our oceans. Attacks are on the increase – even though global naval forces are deploying impressive fleets to combat this ancient trade: hijacks & kidnapping that often result in multi-million pound ransoms.

### **ANCIENT ORIGINS:**

Piracy has existed for as long as the oceans were plied for commerce. The earliest documented instances of piracy are the exploits of the [Sea Peoples](#) who threatened the [Aegean](#) and [Mediterranean](#) in the 13th century BC. They were known as the [Illyrians](#) and [Tyrrhenians](#). Some of them were specialized in kidnapping boys and girls to be sold as [slaves](#). During the 1st century BC, there were pirate states along the [Anatolian](#) coast, threatening the commerce of the [Roman Empire](#) in the eastern Mediterranean. In 75 BC, [Julius Caesar](#) was kidnapped by

[Cilician](#) pirates and held prisoner. They demanded very huge ransom to release him. The Senate finally invested with powers to deal with piracy in 67 BC and after three months, naval warfare [managed](#) to suppress the threat.

### DAWN OF PIRACY ERA:

Seaborne piracy against transport vessels remains a significant issue with estimated worldwide losses of [US \\$13](#) to [\\$16 billion](#) per year, particularly in the waters between the Red Sea and [Indian Ocean](#), off the [Somali](#) coast, and also in the [Strait of Malacca](#) and [Singapore](#), which are used by over 50,000 commercial ships a year. Modern pirates favour small boats and taking advantage of the small number of crew members on modern cargo vessels. They also use large vessels to supply the smaller attack/boarding vessels.

Pirates often operate in regions of developing or struggling countries with smaller navies and large trade routes. In 2006, there were 239 attacks, 77 crew members were kidnapped and 188 taken hostage but only 15 of the pirate attacks resulted in murder. In 2007 the attacks rose by 10% to 263 attacks. There was a 35% increase on reported attacks involving guns. Crew members that were injured numbered 64 compared to just 17 in 2006. In 2009 the number of attacks rose to 306 from 293. The pirates boarded the vessels in 114 cases and hijacked 34 of them so far in 2009. Modern pirates are not interested in the cargo and are mainly interested in taking the personal belongings of the crew and the contents of the ship's safe, which might contain large amounts of cash needed for payroll and port fees.

### THE PIRACY TRIANGLE:

Piracy is a product of three causative factors:

- Motivation for gain,
- Ability to project an armed force with the capability to seize vessels in shipping lanes, and
- Safe havens pirates can use for home bases from which they can market their loot.

Remove or interrupt any one of these factors and piracy is eliminated or reduced.



Figure 1: PIRACY TRIANGLE

### MODERN PIRATES TECHNOLOGY:

Modern pirates also use a great deal of technology. It has been reported that crimes of piracy have involved the use of

- [Mobile phones](#),
- [Satellite phones](#),
- [GPS](#),
- [Sonar](#) systems,
- Modern [speedboats](#),
- [Assault rifles](#),
- [Shotguns](#),
- [Pistols](#),
- Mounted [machine guns](#),
- RPG (rocket-propelled grenade)
- [Grenade launchers](#).

#### **ANTI-PIRACY WEAPONRY:**

Combating the threat of pirates is much more difficult than it may seem. Pirates typically use speedboats out maneuver the slow-moving cargo ships. Once level with the stern of the vessel, they toss grappling hooks upon the rails, and board the ship via rope ladders. Pirates are also heavily armed with a selection of assault rifles, automatic machine-guns and, rocket-propelled grenade launchers. Unfortunately, modern ship crews do not carry arms for a number of reasons, one being that armed vessels are not allowed to dock in many of the world's ports. The fear is that use of guns by crew members could easily escalate both the violence of these attacks and the harshness of pirate reprisals. Moreover, shooting the "wrong pirate" may cause political, military or legal problems that are simply impossible to solve. We can't even use a cell phone or walkie-talkie on a tanker for fear for making a spark which might explode the vessel, so imagine the problem of firearms! With no arms on board, the crew has no way of defending themselves, for that they rely on the help of local Navies. But the military cannot escort all cargo that passes through these dangerous waters, so a number of non-lethal weaponry can be used onboard.

Some of the non-lethal weapons that can be used as anti-piracy weaponry on the vessels are as follows:

- Remote controlled fire hoses
- Sonic weapons,
- Molotov cocktails,
- Rubber bullets,

- Electric fencing,
- Blinding weapons,
- Pain ray.

### REMOTE-CONTROLLED FIRE HOSES:

The most common means of deterring pirates is with the use of firehoses. A ship's crew will line up on deck, activate the large fire pumps in the engine room and use the pressurized sea water to knock pirates off of boarding ladders. While this is effective it's of little use when the boarding craft approaches with its 50 caliber machine gun armed.



Figure 2: REMOTE CONTROLLED HOSE

But if there were more pirates in other boats aiming guns, the crew would have to give up. To solve the obvious problems of guns against water, we can use remote-controlled high-pressure water cannons that don't expose the crew to enemy fire.

### JET GUN:

This is an innovative water-jet system which defends the vessel against forced boarding by the pirates. It consists of two water jet guns mounted on the shipside, rotating 90 degrees and continuously shooting a high pressure stream of water. It can be installed on all kind of vessels and is especially suitable for oil, chemical, LPG and LNG ships as it is intrinsically safe. This system is easy to install and operate, because it uses the existing facilities of fire fighting pumps, pipelines and hoses. Therefore no additional installation is required onboard the vessel.

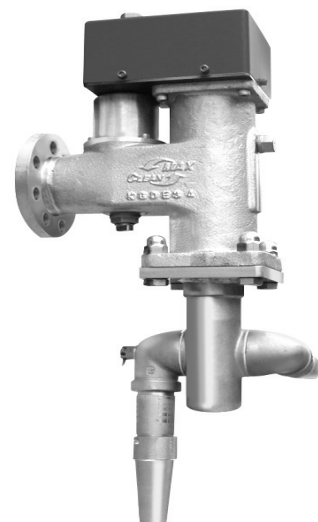


Figure 3: JET GUN (HOSE)

The machines using the water pressure from the fire fighting system pre-installed on all ships provides a continuous water curtain along the hull and makes boarding by pirates almost impossible. The system can be operated for an indefinite amount of time and can be started from a safe location within the accommodation. The water pressure being used is of 8~16 bar and the flow rate is about 30~100m<sup>3</sup>/hr.

### ADVANTAGES:

- Easy installation
- Quick operation which is completely safe for crew onboard as the pressure works only along the shipside.

- No further requirement for setting the machine angle or changing the cycle.
- Simple, effective and maintenance free design.
- Continuous repeating cycle without the need to for human intervention.
- Can be installed and used on all kind of vessels safely as is intrinsically safe.
- Option of selecting the various additives for maximizing the effect.

### SONIC WEAPONS:

Sonic weapons are weapons of various types that use sound to injure or incapacitate the pirates. One of them is the long range acoustic device (LRAD). The LRAD is designed to emit a painful blast of sound for up to 300 meters away. Its output is up to 155 db, which is sufficient to produce permanent ear damage and temporarily disrupt vision. The possibility of a device that produces frequency that causes vibration of the eyeballs and therefore causing distortion of vision. It may also be used simply as a very effective [megaphone](#) prior to any use as a weapon.



Figure 4: LRAD

### MOLOTOV COCKTAILS:

The Molotov cocktail is also known as petrol bomb or gasoline bomb. Due to relative ease of production they are frequently used by non-professionally equipped fighters and others who cannot afford, manufacture, or obtain [hand grenades](#).

They are primarily intended to set targets ablaze rather than instantly destroy them. A Molotov cocktail is a [glass bottle](#) containing a flammable substance, usually with a source of ignition such as a burning cloth [wick](#) held in place by the bottle's stopper. On board ships, Molotov cocktail can be prepared using available fuel and are targeted towards the pirates.



Figure 5: MOLOTOV COCKTAIL

### RUBBER BULLETS:

Rubber bullets are [rubber](#) or rubber-coated [projectiles](#) that can be fired from either standard [firearm](#). Like other similar projectiles made from [plastic](#), [wax](#), and [wood](#), rubber bullets may be used for short range practice. Firing rubber bullets at attacking pirates is one of the best techniques; however most rubber bullets today are fired from real guns that are not allowed in most ships. But the



Figure 6: RUBBER BULLETS

crew could use high-powered air guns to fire the bullets; this would certainly cause pain if not serious injury.

### **ELECTRIC FENCING:**

An electric fence is a barrier that uses [electric shocks](#) to prevent unauthorised persons from gaining access to the deck of a ship. A 9000 volt wire fence can be installed around the perimeter of your vessel to repel the pirates away from it. The system would be similar to that of the 5-strand wire outrigger used on the top of perimeter fencing. The Electro-Net would be attached to the foot-well or rail of the deck at an angle of 45 degrees and extend outwards for approx 50cm which would make climbing aboard from below without touching the Electro-Net impossible - they would have to climb up, out and over without touching the Electro-Net. The Electro-Net would give a short, sharp shock, which has been proved to deter anyone from having a second attempt. Full monitoring facilities would be installed producing an alarm if the system were interfered with by shorting, cutting or reducing the voltage. The Electro-Net could be rolled up and stowed until next required.



Figure 7: ELECTRIC FENCING

### **BLINDING WEAPONS:**

This is also known as dazzle gun is developed by the U.S Air Force. A futuristic-looking rifle designed to temporarily blind adversaries who get too close to base. This technology could easily be used by the crew aboard cargo ships.

It is a hand-held, single-operator system for troop and perimeter defense. The laser light used in the weapon temporarily impairs aggressors by illuminating or “dazzling” individuals, removing their ability to see the laser source.



Figure 8: DAZZLE GUN

### **PAIN RAY:**

Pain ray, also known as **Active Denial System** (ADS) is a [less-lethal](#), [directed-energy weapon](#) developed by the [U.S. military](#). This non-lethal weapon induces a lot of pain by focusing a tight beam of electromagnetic waves on the skin.



Figure 9: PAIN RAY

## **HIGH-TECH ANTI SEA PIRACY SYSTEM:**

**BAE systems** have developed a sophisticated electronic early warning system to combat piracy on the high seas. This system can be used in defence and security to detect suspected pirate vessels at a long range of 25 km. Long range detection gives ship's crew enough time to take preventive/offensive actions against suspected piracy vessels.

The systems current capabilities include:

- **High Frequency Surface Wave Radar (HF SWR)** to detect small boats well beyond the horizon at up to 25 km.
- **Panoramic Area Surveillance System (PASS) 360°** video camera and display system for visual identification, movement detection, threat level alarms. Integrating with infra-red systems for detection is also being taken up.
- **Passive Radar Identification System (PRISM)** to provide early warning of an unidentified radar carrying vessel.
- **Laser Dome:** Improved lighting to increase the likelihood of detecting intruders within the immediate vicinity of the ship at night and act as a deterrent.

Fine tuning of the system is being done by coordinating with major ship owners to assess commercial requirements and security agencies so as to bring out the most effective solution to sea piracy.

## **CONCLUSION:**

The number of terror incidents at sea related to the maritime industry may be minimal at this point of time compared to others but we must realize that sooner or later this can change. As we know that "For every action there is an equal and opposite reaction", pirates keep on developing strongly inspite of finding new technology. We as mariners can take steps to control piracy and cannot completely eradicate them. We may not be able to eliminate the menace totally but all we are trying to reduce the risk. Company and ships better prepared to face the modern day threats of terrorism will benefit ultimately.

## **ACKNOWLEDGMENT:**

We hereby thank our DIRECTOR MR. S. GOVINDARAJAN for providing a good environment in preparing this paper presentation. We also thank our Respected PRINCIPAL, DEAN, COURSE CO-ORDINATORS and FACULTY MEMBERS who were giving us an excellent assistance in this paper. We also thank our beloved friends for their extraordinary support. At last we extend our sincere thanks to TOLANI for giving us an opportunity & bringing our ideas into light.

## **REFERENCES:**

1. <http://www.gcaptain.com/>  
[Fox news takes on anti-piracy weapons]
2. <http://www.marinebuzz.com/>
3. <http://www.vesselextractions.com/>
4. <http://en.wikipedia.org/>  
[Wikipedia, the free encyclopedia]
5. <http://www.eaglespeak.us/>
6. <http://www.seabird-marine.com/>
7. <http://www.moim.tv/>  
[Moim and Tanktech consultancies, Piracy Solution Jet gun\_P SJ1008 and PSJ1004]
8. <http://www.ngoilgas.com/>  
[Preventing a pirate attack and anti-piracy weapons]
9. <http://www.recaap.org/>  
[Information sharing centre, Report for November 2010]

