



*The 11<sup>th</sup> International Scientific Conference*  
**“DEFENSE RESOURCES MANAGEMENT  
IN THE 21<sup>st</sup> CENTURY”**  
Braşov, November 10<sup>th</sup> -11<sup>th</sup> 2016



## **An Operative Area for Amphibious Ships: Fighting Piracy**

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### **Abstract:**

Piracy has always been a big problem for sea routes. Several years ago the Gulf of Eden was the high risk area for mariners. United Nations task groups, big war ships took charge for maritime security and 2016 became a quieter year in that area. But piracy never diminished globally despite total efforts and millions of dollars spent. The new High Risk Areas seem to be Gulf of Guinea and around Malacca Strait. Malacca Strait is also a narrower and risky area for big ships. This article compares different kinds of warships, to offer a new way of fighting against piracy, while reducing costs for flag states and increasing effectiveness.

*Key Words: Maritime security, amphibious ships, piracy, BMP4, IMO, Malacca Strait, Gulf of Guinea.*

### **1.Introduction**

People have used the oceans for fishing, transportation and leisure for millennia, all the while facing dangers both natural and man-made. Illegal acts like piracy can be an example of man-made dangers. States have built navy vessels to maintain security of the oceans: Maritime Security. Keeping oceans clean of illegal acts requires usage of weapons, which is expected to be according with Geneva Conventions and international law.

Piracy activities have a high cost for international economy. Boats in various shape and size are used for these illegal acts. Navy vessels navigate around problematic areas to chase those boats and reduce harmful activities. This study focuses on navy vessels' operations against boats of the pirates, considering both effectiveness and accordance with universal law. In order to achieve meaningful conclusions, different types of naval vessels will be compared.

Assumption of the writer is that the navy vessels of respective states roam the waters around the piracy affected sea areas just for maritime security, with no politic intentions.

### **2.Sea Routes and Security**

#### **2.1 Security of the Sea Routes, Problematic Areas**

Through history, states which used the seas for trade and hold the trade routes under control have always been dominant among others. For this reason great nations always wanted to keep trade routes safe for their own wealth. It must also be stated that trade routes have also been important for poor nations' easier access to food and goods and their sociological well-being.

Piracy has always been a serious problem of mankind. The term “piracy” stands for illegal actions like violence, burglary or kidnapping against ships for personal

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gain.[1] The piracy incidents cost billions of dollars every year around the World.[2] Some can declare that this loss is only of trading countries. But providing that any money earned from piracy can be used for international terrorism, piracy should be seen as a worldwide problem.

Besides, it's not only a money issue. Captain Joshua Slocum, who circumnavigated the world alone in his yawl *Spray* at the end of 19<sup>th</sup> century had security troubles only with uncivilized tribes and whales.[3] But navigators around the world in 21<sup>st</sup> century have to look out for civilized pirates in many areas.

Along the years, different parts of the World became more contaminated with piracy. The problem caused by Somali pirates seems to be reduced in the last couple of years, but numbers of incidents have risen around Malacca Strait and Gulf of Guinea.[4] In 2016 most of the reported incidents happened around Malacca Strait, Gulf of Guinea, Caribbean Sea and Arab Sea.[5] The change in the numbers in different areas of the world shows us that maritime security practices may have been effective for specific areas, but, in the end, they are not effective against piracy around the World. So, new approaches should be taken under consideration.

### **2.2 Marine Security Practices**

#### **2.2.1 Practices of Nations**

Law of the sea (admiralty law, marine law) is a complex issue. For any incident happened in a ship, legal issues are considered along with respective flag state laws. Vessels in international waters are subject to their flag state laws with exceptions mentioned in international law.

A ship in coastal waters of a country is generally subject to host state laws. Although, there are several restrictions on coastal state's power of intervention according to international law.[6] Piracy-like illegal acts in coastal waters are defined as "armed robbery against ships" since 2002.[7] Coastal state has full authority along with full responsibility for these acts. While states are expected to have full control over their coastal waters, their actions are limited with the laws themselves. There have been unfortunate examples happened in coastal waters of some states like Somalia.

So we can say that any one nation is not capable of even reducing piracy (or armed robbery against ships) alone. This fight should be done along with other nations.

#### **2.2.2 Practices of International Organizations**

IMO (Intergovernmental Maritime Organization) has published many documents about safety issues and seaman training. For example a document named BMP4 (Best Management Practices) on piracy off the coast of Somalia was published in 2011.[9] With that document, ship masters are advised to take some exact precautions in and around Gulf of Eden. Precautions include usage of a sea corridor. Ship master should give information about position, cargo and names of personnel to the security offices as they enter and leave that corridor. But it's stated in that document that even if you take every precaution mentioned, your safe passage is not guaranteed.[10]

Similarly, UN has published a paper in 2006 stating its determinism against terrorism and precautions that should be taken.[11] According to that, navy ships operate in a defined area off the coast of Somalia as UN Task Group, trying to take pirates under custody and hand them over legal units. In these operations, we come across proportionality, which will be discussed later.

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## **2.2.3 Practices of Ship Companies**

Some ship companies try to take action against piracy by hiring private security, which can be determined within the law of the sea. But there are also restrictions on this area in international literature.[8] This study does not focus on ship personnel's actions, because security of the seas is the first and foremost job for navies.

## **3.Navy Ships**

Navy ships are specially equipped with different kinds of weapons and used by governments to ensure security of both territorial and international waters. Sizes of the navies differ according to respective states' income, environmental factors, neighbors, and natural resources which attract other countries' attention. Besides, size of their navies effect super powers like USA, Russia or China's involvement in international affairs. These navies come with a price. Those costs can be discussed in categories such as personnel, material, maintenance and repair.[12] In this study, the production and personnel costs of ships are mentioned instead of making full detailed cost analysis.

### **3.1 Aircraft Carriers**

These ships literally carry the flag state's strategy across the World.[13] Aircraft carriers of strategically important size are owned by super powers. They operate with guarding units as task groups capable of defending the main ship and able to carry strategic concerns of flag states far away. Production cost of USA's Nimitz class carriers is 8,5 billion dollars (FY2012) each.[14] They are operated by nearly 5000 personnel and cost hundreds of million dollars each year for maintenance.

### **3.2 Cruisers**

Cruisers are multi task war ships. They can be used as guards to carriers or amphibious task groups, and also in individual tasks. Their great variety of weapons let simultaneous engagement to all subsurface, surface and air threats. They can also be used as a strategic force with their ballistic missile capabilities, or deployed off coast to intercept incoming ballistic missiles. Building one of USA's Ticonderoga class cruisers cost 1 billion dollars, and can be operated with 330 personnel.[15]

### **3.3 Destroyers**

These ships have less firepower but more maneuverability than cruisers, and can be used for similar tasks. Frigates can be considered in this group. Their weapons vary from guided missiles to cannons and anti-air weapons. These weapons are mostly used through weapon systems with great track and engage abilities against ships and aircrafts. These weapon systems' accuracy against pirate vessels, which are generally 20-30 meter boats, mostly wooden and with low radar section area, is arguable. USA's Zumwalt class destroyers cost more than 1 billion dollars each.[16]

### **3.4 Amphibious Ships**

Their main aim is to transfer troops and machinery to enemy lands. Different kinds of amphibious ships are built to be used in different amphibious concepts. Some types are as followed:

LST (Landing Ship Tanks) has a ramp at the bow that lets landing maneuver and transferring personnel and vehicles to the shore.

LSD (Landing Ship Dock) is similar to LST but with an additional dock inside, to keep landing crafts or AAVs (Advanced Amphibious Assault Vehicle).

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LPD (Landing Platform Dock) has the addition of greater platform for helicopters.

LHD (Landing Helicopter Dock) has bigger flight deck than LPD.

In this study, LSD and LPDs are considered as usable examples for marine security operations with their dock capabilities and lower building costs. Amphibious ships are operated by 300-400 personnel and can transfer 600-1000 amphibious personnel and various vehicles when needed.[17]

### **3.5 Corvettes**

Being designed for close-to-shore missions, corvettes have high speed and maneuverability and are much smaller than destroyers. They are generally equipped for one kind of warfare like anti-air or anti-submarine, with specific weapons including guided missiles and cannons.[18] USA continues its Littoral Combat Ship(LCS) program, which are similar to corvette class, with a unit cost of 359 million dollars.[19] These ships have lower freeboard that enables better self-protection, which will be mentioned during comparison. One important disadvantage is that they require replenishment more often.

### **3.6 Submarines**

These ships can be used for defense/attack or reconnaissance missions. Nuclear powered submarines do not have a time limit for underwater navigation but conventional ones must get to the surface once a day to recharge their batteries[20]. They can be used to detect pirate activities.

### **3.7 Boats**

In this study, the term “boat” refers to 20-30 meter boat with hard hull[21], with over 45 knots[22] of speed, operated by 10-15 personnel and have stabilized small caliber weapon systems that can be used from inside. With their limited fuel capacities, they are not to be considered to operate alone far from shore. For this reason, in this study they are considered to be hosted by an amphibious ship until operation.

## **4. Maritime Security Operations of Navy Vessels**

### **4.1 Usage of Weapons**

Navy Vessels are to be operated in legal boundaries of flag states due to some operative steps which are formed during before/during/after exercises. In these exercises, all weapon systems are planned to be used against some enemy units. During a war, a destroyer can hit a patrol boat with whatever weapon chosen, without thinking of the difference in size. Main idea is to de capacitate the enemy vessels.

In accordance with that weapon usage against pirates, should be considered in international law and regulations, and also with humanity. This is where we come across with proportionality. Proportionality is defined as usage of enough weapons to eliminate threats without causing collateral damage.[23] Main thought to trigger this study was the unnecessary usage of navy ships with guided missiles and cannons against pirate boats, which sounded against the legal tenets of proportionality. Also considering billions of dollars lost every year because of piracy, it seems meaningless to use navy ships which cost billions of dollars themselves.

The structure of war has changed in the late years into hybrid war [24]. This makes it necessary to alter engagement rules and weapon systems accordingly. Navy vessels used for maritime security operations should be equipped with proper weapons against small pirate boats. The probable responsibility of using un-proportionate weapons should be removed from shoulders of operational decision makers.

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### **4.2 Reconnaissance**

Navy vessels operate as reconnaissance units with their equipment like radar and sonar, as well as optical sensors. Using all their equipment, decision makers try to define and engage threats. In this regard, to consider any vessel as hostile, one needs to compile several types of information. In this case, including visual awareness of whatever going on inside the suspect boat. Defining any vessel as hostile needs exact information, mostly based upon optic reconnaissance. Otherwise there can be some unwanted and unlawful casualties, making the decision maker feel a lifetime of self-judgment, also likely affecting future decisions.

To define a suspect as hostile, high tech optic sensors can be used, which are effective for long distances. But the distance of optic surveillance is limited by the spherical shape of the world. An observer at 30 meters of altitude can see only 19,56 kilometers away [25]. That distance is nearly 10NM which means a navy ship with an observer at 30 meters, can have a reconnaissance area of 10 NM radius. Using helicopters or satellites is possible of course, but in that case the pirates' ability of having anti-air missiles like STINGER should be considered at all times.

Considering each ship's surveillance area is 10NM, 40000 ships would be needed to fully handle the 1600000 square mile High Risk Area (HRA)[26] off the coast of Somalia. In order to maintain security in this area, a transit corridor has been formed, advising the masters of passing vessels to join convoys which are guarded by navy vessels. But as mentioned before, safe passage is not guaranteed.[27] Several navy vessels are still operating through HRA as a UN Task Force, along with other navy vessels from several other countries. The total cost of navy units in this area can be a topic for another study. With the thought of effective planning and reducing costs, new ideas should always be considered.

### **4.3 Comparing the Navy Ships**

Table-1 compares the navy ships that are generally used in maritime security operations. The classifications used are as follows:

- Spd.(Speed): Maximum speed and maneuverability is degreed through 1-5. Boats are considered operating with and under control of amphibious ships, so their maneuverability scored highest.

- Wpn.( Weapons):(G/M: Guided Missile, C: Cannon, S/A: Small Arms) Effectiveness of weapons against pirates degreed through 1-5. Guided missiles are powerful weapons but they are not considered to be used against pirate vessels. Bullet sizes of cannons are 20mm and above. Using cannons against any vessel can mean completely destroying the vessel and people inside, which is a hard decision to make. Also bouncing bullets can cause unwanted harm. Small arms refer to weapons up to 12,7 mm.

- Per.(Personnel): Number of personnel available who can be active at any given time, use fast boats and board pirate vessels. Degreed through 1-5. Corvettes are considered to have much less availability for this, because of limited personnel numbers.

- Boat/Helo: Availability of boat/helicopters to be used against pirates. Boat refers to hard hull, 20-30 meter boats with stabilized weapons. Helo refers to Helicopter with optical surveillance ability. Degreed through 1-5.

- Self P.(Self Protection-Close Quarters): Self-protection capabilities of the ships at close quarters is degreed through 1-5. Ships can defend themselves to whatever threat they detect, but asymmetric threats in shallow waters, harbors, straits, etc., makes self-protection harder for big ships. Higher freeboards limit usage of stabilized weapons. Boats' self-protection ability is also considered within amphibious ship row.

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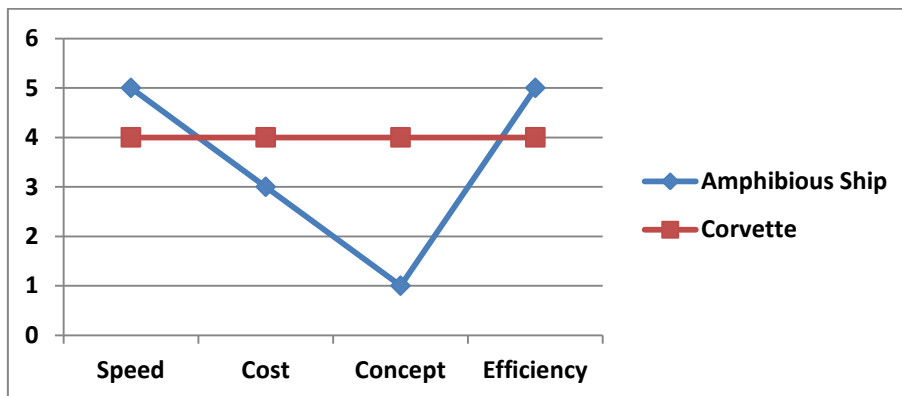
- Cost B.(Cost of Building): Reversely degreed through 1-5.
- Cost P.(Cost of Operating): Reversely degreed through 1-5.
- Eff.(Effectiveness): Total of points given. Higher sums point out more effective types of ships.

Ship Type	Spd.	Wpn.	Per.	Boat/ Helo	Self P.	Cost B.	Cost P.	Eff.
Aircraft Carrier	1	G/M: - C: 2 S/A: 5	5	Boat: - Helo: 5	1	1	1	21
Cruiser	2	G/M: - C: 2 S/A: 5	3	Boat: - Helo: 2	2	1	2	19
Destroyer	2	G/M: - C: 2 S/A: 5	2	Boat: - Helo: 2	3	2	2	20
Corvette	4	G/M: - C: 2 S/A: 5	1	Boat: - Helo: 1	4	4	4	25
Amph. Ship (Boat)	5	G/M: - C: 2 S/A: 5	5	Boat: 5 Helo: 5	1(+4)	3	2	31(+4)
Submarine	1	G/M: - C: - S/A: -	-	Boat: - Helo: -	5	1	3	10

**Table1: Ship-Effectiveness Matrix**

Amphibious Ships and Corvettes seem to get more points according to speed, self-protection and costs. Comparison of these two types of ships is shown in Graphic-1.

These two ship types have a common disadvantage: durability. Every kind of ship (along with the personnel inside) is dramatically affected by sea states. Ships like cruisers and destroyers are more durable for high seas, but amphibious ships and corvettes, with their low drafts, are much less durable, lowering their operating capacity. But there's the option of using different types of ships at the same time.



Graphic 1: Amphibious Ships vs. Corvettes

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After the comparison, using boat carrying amphibious ships seems another good option for fighting against piracy. Amphibious ships' main mission and design input is assault, not pirate-fighting. Planning the use of any vehicle out of intended area comes with some disadvantages, and needs serious work on new lines of concept. Moreover, 600-1000 amphibious personnel would be a burden during a maritime security mission. Considering 5-10 boats which are navigated with 10-15 personnel (including boarding units) would let to reduce that number to 100-200. In this way the personnel cost would be near to a cruiser.

An amphibious ship hosting boats seems to be a good unit of surveillance, reconnaissance and, if needed, assault on pirate vessels. Each boat widens reconnaissance area of the ship for 6 additional miles (observer height is considered to be 3 meters above sea level). They can reach 15 NM away in short time, being a sentry or scout. A stabilized weapon system with smaller blind zone is indeed a better choice than G/Ms or cannons against hostile individuals. Amphibious ships with fast boats can be a good option in pirate infested areas.

### **5. Conclusion**

At the beginning of this study, the main idea was proportionality. Proportionality can be lost by inappropriate usage of heavily armed navy ships against pirates. Pirates are indeed criminals who should be taken in front of justice. But being civilized means caring for every human being's rights, even criminals. This idea ignited some research and several types of ships have been compared by their open source abilities against piracy. The comparison technique mostly rests upon 12 years of navy experience of the writer. Further cost-benefit analysis can be made, including environmental issues, new techniques and technologies. As for the comparison in this study, it is found that amphibious ships can be used in maritime security operations with great effect.

Another conclusion was reached through the research that considering the annual cost of piracy incidents, using several great war machines, which cost nearly 1 billion dollars each, seems inappropriate. Especially if these war machines have big weapons that literally cannot be used against small vessels, this seems a topic to be discussed.

Super powers of the world will always have some strategic purposes on the seas. There will always be great war machines around the world, pursuing their respective states' benefits. In this case, using some cheaper, more humane and more effective means of struggle against pirates can be taken under consideration. Especially in narrow sea ways like Malacca Strait, where cannon usage can be dangerously un-proportionate, amphibious ships carrying fast boats can be a solution. Further research can be made on maritime security operations concept.

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