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RISK ASSESSMENT OF TRANSPORT OPERATIONS

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The most economical majority of the world commercial transportation is done by sea. Increasing demand every day increases the volume of maritime trade. Approximately 80% of world trade is imported and exported by sea. It continues to grow rapidly in parallel with the development of world maritime trade. Piracy is one of the main threats to the maritime industry. While there is a rapid increase in maritime transport, there is a rapid increase in sea piracy activities in some transit areas of maritime trade routes such as the Gulf of Aden, Somalia and the Strait of Malacca. Pirate attacks are increasing especially in Southeast Asia, the Gulf of Aden and Somalia. And ship piracy activities are becoming more and more complex. Such activities are now better organized. Its consequences are also more severe than before. In this study, the measures to be taken to prevent piracy on merchant ships were examined practically. It has been tried to reveal how the measures are applied in commercial ships with real observations from ships. In addition, suggestions were made in the study about the importance of the subject. The growing risks of transport operations, especially in maritime transport, constantly need to be minimized. The main means of minimizing these risks are precautions. There are approved hijacking escape scenarios. The main ones include: the scenario of the crew's survival in the event of the seizure of the vessel (the crew closes in a compartment where there is a supply of water and food, in case such a situation arises, the cargo can be stolen, but the crew will remain safe and sound); protecting the vessel with the available means of the crew (water cannons, water pumps, iron wire and other available means); armed guards on board the ship; escort of the ship or groups of ships by special ships carrying out protection. The management of the shipping company or, in the case of a particularly valuable cargo, the charterer will hire a security company. The choice of this or that scenario is carried out taking into account the developed logistics and increasing the efficiency of transportation.

Keywords: safety on ship, merchant ships, pirat, risk, transport operations.

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Introduction and the problem statement

About 80% of the world trade is transported by sea, about 50 thousand merchant ships sail in the world's seas, 15 million containers are circulated, over 230 million trips are made and 6 billion tons of cargo is transported [1, p. 58].

Most of the world's maritime trade passes through narrow waterways such as Bab el-Mandap, Strait of Hormuz, Malaka Strait, Suez Canal and

Panama Canal, which are risky for navigational safety and attacks [2].

World maritime trade has been directed to China and other Asian axis lines due to the intense exports due to cheap labor and natural resources, and final consumption has brought the demand for transportation from Asia to Europe and the USA. Maritime Transportation has increased rapidly and it is estimated that world maritime trade will continue

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to grow in parallel with the development of world trade [3].

About 7000 ports are used in world maritime trade. Approximately 50% of the world container trade is handled at 20 mega ports. Ports, especially large ports, are a source of potential security threats as thousands of containers are handled every day. The economic effects of the attack on only one of the nearly 50 thousand merchant ships in motion around the world have affected the global economy, and maritime security is also the security of the global economy. The main threats to the shipping industry are illicit drug trafficking, illegal activities, stowaways, slave trade, piracy and terrorism. According to the International Maritime Bureau (IMB) Report, it is stated that piracy poses a potential threat to maritime terrorism, piracy and terrorists use similar tactics, act in a narrow geographical area, piracy and terrorism overlap and the interaction between them is increasing [4].

According to security experts; Pirates usually attack on commercially strategic waterways, with most attacks occurring in Somalia and Southeast Asia [5].

Piracy is more common in regions near nodes such as canals, straits and isthmuses, where maritime trade routes are concentrated, and especially in areas where there is a vacuum of authority and out of control, and it has become an important source of income. In general, piracy is defined as all unlawful acts, including violent attacks, by non-state actors or private individuals, without any connection with the state, against other ships, cargo, property and people on their own or their organizations' ships and vehicles to gain benefit are verbs [7, p. 119-151].

In terms of maritime security, one of the threats to energy security is piracy. On the routes of tanker transportation, seven critical points, which are generally called nodal points, are the regions most under threat [8, p. 161].

Purpose of the article

Development of practical recommendations for minimizing the risks of transport operations is the aim of the article.

Presentation of the main material

When using sea routes, it is necessary to consider the shortest distance. While short distances are preferred in terms of time and cost, cruising on tried and reliable routes is also important. Leaving the Persian Gulf and the Strait of Hormuz as their main exit point, the tankers reach Europe via the Bab el Mandeb Strait and the Suez Canal, reach China, Japan and the USA through the Strait of Malaga, and east of North America via the Cape of Good Hope. In addition, sea routes from Africa to Europe and North America, from the North Sea to Europe, from South America to North America are

also used extensively. These points, which may harm maritime energy transport if closed, are the Strait of Hormuz, the Strait of Malaga, the Bab El Mendeb Strait, the Turkish Straits, the Panama Canal, the Danish Straits and the Suez Canal [8, p. 150-151].

Sea transportation, which is a cheap method in oil transportation, is an issue that should be considered in ensuring energy security for both importing and exporting countries, where approximately 2/3 of oil trade is carried out. 34% of maritime trade in the world is carried out in the form of transportation of oil and petroleum products. The ability to transport natural gas by sea is a more costly option. Natural gas, which can be loaded into tankers as LNG, becomes liquid by cooling, keeping it cold with special methods during transportation and re-gasification for end-use are the items that constitute the cost. Despite this, it is considered economical to transport LNG over distances exceeding 3000 Km. According to 2012 figures, 31.7% of natural gas trade was carried out in LNG format [8, p. 147-158].

Of the 3613 Bcm (Billion Cubic Meters- Billion Cubic Meters) produced in 2016 (2673,62 mtons. Converted according to BP Approximate Conversion Factors), 258 Mtons of natural gas were transported by sea transport [9]. Supply LNG shipments in 2016 constitute 9.6% of the total natural gas production. In the Gulf of Aden, where an average of thirty thousand ships pass annually, an annual loss of 25 billion dollars arises due to the ships hijacked or attacked by Somali pirates [10]. In 2008, when 111 ship attacks took place, NATO carried out the task of combating piracy with the decision of the United Nations Security Council (UNSC). In addition, countries such as the USA, the EU, China, the Republic of Korea, Russia, and Japan have also carried out protection duties in the region by using national initiative. As it can be understood from the importance given to the Gulf of Aden, which is one of the main energy transit points, the international community does not tolerate threats to energy security [11].

Other high risk areas; West Africa, Tanzania, Peru, Bangladesh, Malaysia, Malacca and Singapore Straits, especially offshore of Nigeria, South China Sea including Crystal, Radisson Seven Seas and Silverseas (Fig. 1, 2).

In Fig. 3 high risk areas are shown on the map.

Piracy, which is frequently seen in maritime areas where maritime trade is intense but where authority and control is weak, and has become a profitable sector for bandits, is the act of private individuals against commercial ships, personnel or cargo with their own boats, without any state connection, in line with their own interests. denotes attacks. Unlike piracy, bandits here engage in such



Fig. 1. Peninsular Somalia and Gulf of Aden vs. Nigeria and Gulf of Guinea



Fig. 2. Southeast Asia – South Asia and Bangladesh



Fig. 3. High Risk Area map determined by maritime authorities

acts of violence without any legal basis [5].

In order for our ships to be seaworthy, they must be suitable for the cargo, suitable for severe sea conditions, fuel storage suitable for the voyage, employment of qualified employees, as well as sufficient in terms of safety. Unfortunately, our ships, which are one of the most important in transit transportation, are the target of pirate attacks, and therefore, the measures to be taken during the pirate zone crossings gain even more importance.

There are also works named [6] and [9] prepared jointly by international maritime organizations and the minimum precautions we need to take for our ships to be seaworthy as security while passing through the pirate zone.

1. Control List:

- staff briefing and training;
- assigning extra watchdogs and adjusting shift lists;
- laying fire hoses;
- keeping the fire pump ready at all times;
- laying of barbed wire;
- removing the outer door handles and supporting the doors from the inside;
- preparation of off-ship communication plan and automatic messages;
- testing the iridium phone;
- collection of portable ladders outside;
- making safe assembly point preparations;

- placement of false puppet spotters;
- switching to the machine room shift system.

Ships can receive armed protection, although it is not mandatory when crossing the pirate zone. Ships that do not receive armed protection have to navigate in convoy, accompanied by coalition ships in the region (Fig. 4, 5).

Armed guards joining the ship are required to test their weapons before crossing the danger zone.

2. Personnel Information

Before entering the risky area, the captain organizes a meeting with the crew and explains the importance of the current situation and the work to be done. In this meeting, the precautions to be taken before crossing the pirate zone, the things to be done during the cruise and the rules to be followed are explained. The entire checklist and planning should be reviewed at this meeting. In addition, a sample drill should be made.

3. Assigning Extra Watchers and Adjusting the Shift Lists

In pirate zone crossings; During standard navigation, there is also a lookout on the bridge besides the watch officer. These spotters should be increased at pirate zone crossings and shifts should be adjusted to be as short as possible. Sufficient binoculars should be kept on board for extra spotters. Radar echoes should be taken into account during navigation and the captain should be informed



Fig. 4. Ammunition count of the armed guards joining the ship (sample of Ya-Sa Golden Horn ship)



Fig. 5. View of the Ya-Sa Golden Horn during transit

without delay in case of doubt.

4. Fire Hoses Laying

Using water spray is a very effective method to deter or slow down hackers. The use of water makes it significantly more difficult for the pirate boat to stay aboard the ship and for pirates to climb aboard. Overflowing ballast tanks with water spray, where applicable, will also make climbing difficult and even create a water curtain on the deck, making walking almost impossible.

For water spray application, the existing fire hoses on the ship are connected to the hydrants and fixed to the side poles and the nozzle is adjusted



Fig. 6. Fire hose application on the ship “Ənce Akdeniz”



Fig. 7. Pressurized water application with fire hoses at pirate zone crossings on a commercial ship

slightly downwards. Below is the application of the fire hose on the ship named Ənce Akdeniz in Fig. 6.

6. Keeping the Fire Pump Ready at All Times

As in Fig. 5 above, after the fire hoses are laid, the fire pump should be kept ready to be operated at any time. Fire pumps and fire hoses must be pressurized and tested before passing through the hazardous area (Fig. 7). No maintenance should be performed on the fire pump and installation unless it is necessary during the risky area transition.

7. Laying Barbed Wires and Creating a Barrier

Pirates usually prefer light, hooked ladders or long hook masts to climb aboard. Barbed wire and

barriers are used to make entry to the ship as difficult as possible. Weak spots where pirates can enter the ship should be identified and appropriate wire or barrier application should be made. Barbed wire is a very effective method of making ship entry difficult and is widely used on ships.

The barbed wire application of the Stile Rocher ship is given in Fig. 8–9 below.

Double layers of barbed wire should be drawn around the ship so that there is no gap, and it should be ensured that these wires are equipped to withstand strong weather conditions. On the other hand, one-sided openable wire barrier application is shown below in Fig. 11-12. Weak points of access to the

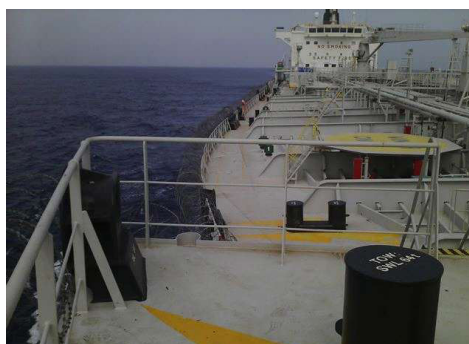


Fig. 8. The barbed wire application of the Stile Rocher ship



Fig. 9. Wire barrier application that can be opened on one side of the Stile Rocher ship

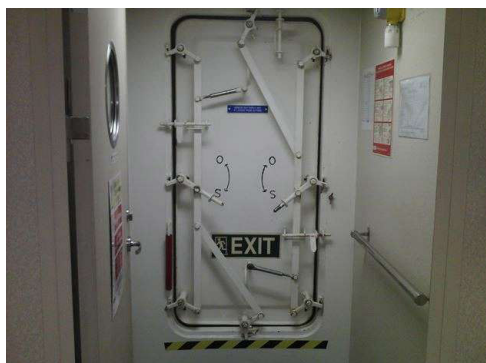


Fig. 10. Example of a door with a bolt from the inside of the ship Stile Rocher

ship and accommodation should be identified and appropriately blocked. Barriers that can be opened on one side are a very effective method in this regard.

8. *Removing the Exterior Door Handles and Supporting the Doors from the Inside*

All the doors opening to the living area can be made to be used from the inside by removing the handles from the outside. Doors whose handles cannot be removed can be made non-functional by removing the nuts connected with the handles from the inside. Another method is to install a bolt on the back of the door (Fig. 10).

Making it difficult to open interior doors as well as exterior doors will save us a lot of time. For this, boards or iron planks cut at the height of the door handle should be kept ready behind each door. At the time of escape to the safe point, the door should be closed and the available planks should be tightened to support the door handle.

9. *Preparation of Non-Ship Communications Plan and Automatic Messages*

Routine reporting before and during the dangerous zone transition is vital. The most important of these reports are the ones to be made to UKMTO (The UK Maritime Trade Operations) and MSCHOA (The Maritime Security Center Horn of Africa). These generally consist of the inception report, the daily report and the exit report. Apart from these centers, complete reports must be sent to places deemed necessary such as companies and tenants.

In addition to routine reporting, information such as messages to be sent in case of emergency or phone numbers to call is also very important. This information should be prepared in advance and hung next to each computer and phone in a way that can be seen easily. In addition, the iridium phone in the safe zone we have created inside the ship must be tested before entry.

10. *Assembling Outdoor Portable Ladders*

It should not be forgotten that the ladders around the ship are collected in order not to make it easier for the pirates to get on the ship. The side piers should be removed, the pilot's crosses and, if any, the devil's crosses collected.

11. *Making Safe Assembly Point Preparations*

During a potential pirate attack, personnel need a safe place where they can escape and be protected. For this, a suitable place on the ship should be selected and preparations should be made accordingly. The purpose of establishing a safe assembly point is to save time until help arrives and even to ensure that the pirates who cannot reach the personnel retreat. The most suitable for this job on the ship is usually the tiller room. Because we can control the ship from the tiller room, it is well ventilated and there is enough enclosed space for all

personnel to fit in.

Safe assembly point preparations must be completed before entering the danger zone. Doors opening outwards should be locked or even welded, leaving only one door open from inside the ship for entry. Sufficient water and food should be stored for all personnel. First aid kit and medicine and blankets should be placed. The iridium phone must be tested.



Fig. 11. Application of a dummy mannequin placed at the stern of the thin Marmara ship



Fig. 12. Gan-Triumph ship dummy mannequin application placed on the chest

12. *Placing False Dummy Spotters*

Puppet spotters to be deployed in certain parts of the ship give the impression that there are more people on the ship and better lookout when viewed from the outside. Puppets are an effective method of deterring pirates.

13. *Transition to the Engine Room Shift System*

Sudden maneuvers in emergency situations may affect the ship's navigation, main and auxiliary machinery. In order to take precautionary measures or intervene in a timely manner, the engine room should not be left unmanned, and a shift system should be applied during the dangerous zone transition.

Conclusion

In order to solve the piracy problem, the source of the problem must be resolved. It is necessary to examine the issue of whether it is for economic purposes or not causing harm between countries. The factors that cause piracy should be well

understood. In order to solve the problem, intensive training should be given to the crew for the precautions to be taken, especially in the regions where piracy is intense.

Among our recommendations are the hiring of personnel from private security companies to be on board during the transition from the threat areas, the establishment of rescue centers and information sharing center against piracy.

It has been concluded that the legal arrangements after the arrest of piracy should be made with international agreements.

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ОЦІНЮВАННЯ РИЗИКУ ТРАНСПОРТНИХ ОПЕРАЦІЙ

Козгун Ахмет, Ер Арзу, Чуприна Наталія, Окуян Кемаль

Найбільш економічні комерційні перевезення у світі здійснюються морем. Зростання попиту з кожним днем збільшує обсяг морської торгівлі. Приблизно 80% світової торгівлі імпортується та експортується морем. Він продовжує швидко зростати паралельно з розвитком світової морської торгівлі. Піратство – одне з основних загроз морської промисловості. Незважаючи на швидкий розвиток морських перевезень, спостерігається швидке збільшення активності морського піратства в деяких транзитних зонах морських торгових шляхів, таких як Аденська затока, Сомалі та Малакська протока. Напади піратів почастишали, особливо в Південно-Східній Азії, Аденській затоці та Сомалі. А піратська діяльність судів стає дедалі складнішою. Такі заходи тепер найкраще організовані. Їхні наслідки також серйозніші, ніж раніше. У цьому дослідженні були проаналізовані заходи, які необхідно вжити для запобігання піратству на торгових судах. На реальних спостереженнях із судів була спроба виявити, як ці заходи застосовуються на торгових судах. Крім того, у дослідженні було висловлено припущення про важливість цієї теми. Зростання ризиків транспортних операцій, особливо в морських перевезеннях, постійно необхідно мінімізувати. Основними засобами мінімізації даних ризиків є запобіжні заходи. Існують затверджені сценарії порятунку під час захоплення судна. До основних з них можна віднести: сценарій виживання команди у разі захоплення судна (команда закривається у відсіку, де є запас води та продовольства, на випадок виникнення такої ситуації, вантаж може бути викрадений, але команда залишається цілою та неушкодженою); захист судна доступними засобами силами команди (водомети, водні насоси, залізна проволка та інші доступні засоби); озброєна охорона на борту судна; супровід корабля або групи кораблів спеціальними судами, що здійснюють захист. Керівництво судноплавної компанії або при особливо цінному вантажі охоронну компанію наймає фрахтувальник. Вибір того чи іншого сценарію здійснюється з урахуванням розробленої логістики та підвищення ефективності перевезень.

Ключові слова: безпека на кораблі, торгівля судна, пірат, ризики, транспортні операції.

ОЦЕНКА РИСКА ТРАНСПОРТНЫХ ОПЕРАЦИЙ

Козгун Ахмет, Эр Арзу, Чуприна Наталия, Окуян Кемаль

Наиболее экономичные коммерческие перевозки в мире осуществляются по морю. Растущий спрос с каждым днем увеличивает объем морской торговли. Примерно 80% мировой торговли импортируется и экспортируется морем. Он продолжает быстро расти параллельно с развитием мировой морской торговли. Пиратство – одна из главных угроз морской индустрии. Несмотря на быстрое развитие морских перевозок, наблюдается быстрое увеличение активности морского пиратства в некоторых транзитных зонах морских торговых путей, таких как Аденский залив, Сомали и Малаккский пролив. Нападения пиратов участились, особенно в Юго-Восточной Азии, Аденском заливе и Сомали. А пиратская деятельность судов становится все более сложной. Такие мероприятия теперь лучше организованы. Его последствия также более серьезны, чем раньше. В этом исследовании были практически изучены меры, которые необходимо предпринять для предотвращения пиратства на торговых судах. На реальных наблюдениях с судов была сделана попытка выявить, как эти меры применяются на торговых судах. Кроме того, в исследовании были высказаны предположения о важности этой темы. Растущие риски транспортных операций, особенно в морских перевозках, постоянно необходимо минимизировать. Основными средствами минимизации данных рисков являются меры предосторожности. Существуют утвержденные сценарии спасения при захвате судна. К основным из них можно отнести:

сценарий выживания команды в случае захвата судна (команда закрывается в отсеке, где есть запас воды и продовольствия, на случай возникновения такого рода ситуации, груз может быть похищен, но команда останется целой и невредимой); защита судна доступными средствами силами команды (водометы, водные насосы, железная проволока и другие доступные средства); вооруженная охрана на борту судна; сопровождение корабля или группы кораблей специальными судами осуществляющими защиту. Руководство судоходной компании или, при особо ценном грузе, охранную компанию нанимает фрахтователь. Выбор того или иного сценария осуществляется с учетом разработанной логистики и повышение эффективности перевозок.

Ключевые слова: безопасность на корабле, торговые суда, пират, риски, транспортные операции.

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The most economical majority of the world commercial transportation is done by sea. Increasing demand every day increases the volume of maritime trade. Approximately 80% of world trade is imported and exported by sea. It continues to grow rapidly in parallel with the development of world maritime trade. Piracy is one of the main threats to the maritime industry. While there is a rapid increase in maritime transport, there is a rapid increase in sea piracy activities in some transit areas of maritime trade routes such as the Gulf of Aden, Somalia and the Strait of Malacca. Pirate attacks are increasing especially in Southeast Asia, the Gulf of Aden and Somalia. And ship piracy activities are becoming more and more complex. Such activities are now better organized. Its consequences are also more severe than before. In this study, the measures to be taken to prevent piracy on merchant ships were examined practically. It has been tried to reveal how the measures are applied in commercial ships with real observations from ships. In addition, suggestions were made in the study about the importance of the subject. The growing risks of transport operations, especially in maritime transport, constantly need to be minimized. The main means of minimizing these risks are precautions. There are approved hijacking escape scenarios. The main ones include: the scenario of the crew's survival in the event of the seizure of the vessel (the crew closes in a compartment where there is a supply of water and food, in case such a situation arises, the cargo can be stolen, but the crew will remain safe and sound); protecting the vessel with the available means of the crew (water cannons, water pumps, iron wire and other available means); armed guards on board the ship; escort of the ship or groups of ships by special ships carrying out protection. The management of the shipping company or, in the case of a particularly valuable cargo, the charterer will hire a security company. The choice of this or that scenario is carried out taking into account the developed logistics and increasing the efficiency of transportation.

Keywords: safety on ship, merchant ships, pirat, risk, transport operations.

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