Colloquium 1(53)/2024
ISSN 2081-3813, e-ISSN 2658-0365

DOI: http://doi.org/10.34813/03coll2024

INFRASTRUCTURE AND MEANS OF MARITIME TRANSPORT MOST COMMONLY ATTACKED BY TERRORISTS IN THE YEARS 1961–2022

Infrastruktura i środki transportu morskiego najczęściej atakowane przez terrorystów w latach 1961–2022

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Abstract

The article discusses infrastructure and means of maritime transport most often attacked by terrorists. The introduction presents methodological assumptions, including the aim, research problem, and research hypothesis, as well as research methods. Sea transport, including the terminology, the advantages and disadvantages of sea transport was characterized in the first part of the article. The second part of the work discusses the basic terminological differences between maritime terrorism and piracy, as well as legal aspects and their imperfections. Characteristics of the most important terrorist attacks on the means and objects of maritime transport have been made. The research problem has been solved and the research hypothesis has been positively verified.

Keywords: maritime transport means and objects, maritime terrorism, cyberterrorism.

Streszczenie

Artykuł dotyczy omówienia infrastruktury i środków transportu morskiego atakowanych najczęściej przez terrorystów. We wprowadzeniu przedstawiono założenia metodologiczne, w tym cel, problem i hipotezę badawczą oraz metody badawcze. W pierwszej części pracy scharakteryzowano transport morski, z uwzględnieniem terminologii dotyczącej tego rodzaju transportu oraz wad i zalet transportu morskiego. W drugiej części pracy omówiono podstawowe różnice terminologiczne między terroryzmem morskim a piractwem, a także aspekty prawne i ich niedoskonałości. Dokonano charakterystyki najważniejszych zamachów terrorystycznych na środki i obiekty transportu morskiego. Problem badawczy został rozwiązany, a hipoteza badawcza zweryfikowana pozytywnie.

Słowa kluczowe: środki i obiekty transportu morskiego, terroryzm morski, cyberterroryzm.

Introduction

The aim of the article is to discuss infrastructure and means of maritime transport most often attacked by terrorists.

The research problem was defined as follows: *Which maritime transport infrastructure and means are most often attacked by terrorists?*

The solution to the above problem is the research hypothesis: *Terrorists most often attack the following maritime transport infrastructure and means: cargo and passenger ships, ferries, navy ships, seaports, port and reloading installations.*

In order to solve the main research problem and verify the research hypothesis, the following qualitative and quantitative research methods were used:

- the analogy was used to formulate the research hypothesis and search for similarities between issues in the field of challenges and threats to maritime transport facilities,
- system analysis allowed to solve the complex problem of maritime security systems in the context of current threats,
- statistical method, enabled the acquisition, presentation and analysis of data describing events on maritime transport facilities,
- historical method postulates the study of phenomena in a historical aspects, its advantage is that it deepens research by analysing processes taking place today, based on the regularity of interactions in the past, allowed for the reconstruction and analysis of past and present threats to maritime transport facilities,
- the analytical method made it possible to take into account the factors of terrorist threat to maritime transport facilities,
- comparative method, on its basis, the basic mechanisms related to the safety of maritime transport were examined and analysed,
- behavioural method, made it possible to recognize and explain by observing the behaviour of individuals and terrorist groups during attacks.

The most serious threat among the new threats to the international security system of individual countries, including Poland, is posed by organized international terrorism (Stawnicka & Bekulard, 2020). However, the degree of risk for individual countries varies.

Statistics show that terrorists, in order to cause as many victims as possible, attack transport facilities, including maritime ones, in particular: cargo and passenger ships, ships, ports, port installations and reloading facilities (Zelenkova et al., 2022).

Seaports are vulnerable to terrorist attacks, a ship standing on the yard is completely unprotected (Melnyk et al., 2022). To carry out an effective spectacular attack, it is enough for a small boat, or a dinghy with a suicide bomber and an explosive on

board, to approach it. It took place in the case of the attack on the American destroyer USS Cole.

Terrorist attacks against maritime facilities account for only about 2% of all terrorist incidents that have occurred in the world from 1980 to 2010 (Kalitowski, 2010).

Characteristics of maritime transport. Terminology

According to I. Tarski, transport means a technological process of moving people, objects, or energy, over a distance, i.e. it is a phenomenon caused by a permanent causative cause and it is repeatable (Tarski, 1973).

On the other hand, according to J. Hołowiński (1961), transport is generally a conscious movement of matter and energy, i.e. activities performed consciously by humans.

Currently the maritime transport is required improving door to door coordination via digitized transport chains, especially three important components are important (Lind et al., 2018):

- universal digital data exchange standard (S-211) for sharing both the intentions and outcomes of movements and services is being developed by the International Association of Aids to Navigation and Lighthouse Authorities. It is based on the international S-100 digital data exchange standard, endorsed by the IMO for e-Navigation. This standard builds upon the port call message format developed to meet the demands of PortCDM. It was validated in 13 European ports in early 2018;
- an international PortCDM Council has been established, providing guidelines for the global governance of PortCDM implemented at regional and local levels;
- universal framework PortCDM maturity level and common decisions on how to measure the success and impact of PortCDM has been developed.

Maritime transport has also being reshaped by the digitalization of transport and logistics. In the past maritime transport has been slow to adopt digital solutions, but especially since the COVID-19 pandemic it has been catching up – by the new technologies, such as the Internet of Things (IoT), blockchain, big data, and AI start to improve efficiency, sustainability and resilience. Data and document-sharing platform is making more use of blockchain technology. Ports are improving their operations, security, infrastructure, and management – using smart sensors and the IoT, along with terminal automation, port community systems, and traffic management systems (UNCTAD, 2022).

Transport is closely related to other sectors of the economy. Its development determines their development and vice versa – worse development of the economy or

transport is associated with the deterioration of the situation in transport and economy, respectively.

Maritime transport is the transport of goods and people by water, across seas and oceans from one port to another. In this respect, the following are distinguished: coastal sea transport, domestic sea transport, international sea transport.

According to W. Mirowski (1996), infrastructure is an international concept, meaning a set of basic facilities, devices and institutions of a service nature, necessary for the proper functioning of society and the productive sectors of the economy.

The maritime transport infrastructure consists in particular of: sea space, sea channels, seaports together with the infrastructure necessary for transport operations in the port, navigation aids, approach ports, motorways of the sea, related equipment and intelligent transport systems.

ITS (intelligent transport systems) in a safe, secure, eco-efficient and capacity-efficient manner, may also include on-board equipment, provided that they form an inseparable system with the relevant infrastructure elements.

A naval fleet includes vessels used to transport cargo and passengers across the sea. They can be divided into: cargo and passenger, and combining both functions, i.e. passenger-freight and cargo-passenger (Psaraftis, 2021).

Due to its size, ships can accommodate huge amounts of goods, therefore it is the most cost-effective means of transport over long distances.

Passenger ships – ships with cabins for the carriage of more than 12 passengers, can take postal cargo, passenger cars, etc.

Sea transport is one of the most popular means of transporting goods. Compared to the transport of people it is several times superior to it. Transport of goods by sea is carried out using specialized vessels.

Advantages and disadvantages of sea transport

Maritime transport is extremely popular, despite the fact that it carries a much smaller number of passengers compared to air transport, but many times more cargo. In 2022, airlines worldwide transported 3.8 billion passengers and 60.2 million tons of cargo (Liwiński, 2023). In 2021, ships worldwide transported 10.65 billion tons of cargo (Statista, 2023). In EU, passengers transported by air were 820 million in 2022, and maritime passengers 348.6 million (Eurostat, 2023 November).

Specially designed types of ships are used to transport goods, including bulk carriers, general cargo ships, container ships, and tankers. The transport of passengers by this transport is much smaller compared to air, or rail transport, because traveling by ship is less comfortable and takes more time. Nevertheless, sea transport has a low accident rate, especially in relation to road transport – Table 1.

Table 1.
Risk of death in 2008–2010 depending on the means of transportation

Means of transportation	The casualty rate per million passenger-kilometres
Plane	0.101
Maritime transport	0.12
Railway transport	0.156
Bus	0.443
Car	4.45
Two-wheel drive vehicle	52.6

Sources: European Railway Agency, 2013; Sitarz et al., 2013.

The advantages of sea transport include:

the ability to transport bulk cargo with the widest range of transport susceptibility, worldwide range of serviced transport routes, the most favourable transport prices over long distances resulting from a decrease in unit costs, cheap, long range, very high load capacity, any type of goods can be transported, low risk, unlimited sailing range of ships, very high payload. (Rydzkowski & Wojewódzka-Król, 2013)

Disadvantages include:

low speed, low frequency of courses, low cargo security due to sensitivity to moisture and delivery time, the need to use delivery services due to the low number of ports, technically inflexible, mainly multi-purpose vessels are used, sometimes the market needs specialized ones, complicated in terms of organization (complex customs procedures, clearance and documentation), dependent on the weather and too slow when it comes to the frequency of ships and their delivery times, slow speed, water pollution occurs during tanker accidents, serves only coastal areas, addicted to weather, the need for reloading, risk of damage to moisture-sensitive loads, the need to build expensive ports, appropriate ship type for each carriage. (Rodrigue, 2017)

Characteristics of terrorism and maritime terrorism. Terminology, legal aspects and statistics of terrorism

Terrorism is not a new phenomenon, but it is a variable, multifaceted and dynamic phenomenon, e.g. the forms, means and goals of terrorist activities change. The phenomenon of terrorism is influenced by the development of civilization, as well as scientific and technical progress, especially in the field of new means of communication, mass media, and advanced communication techniques.

Terrorism – the unlawful use of force, or violence, against persons, or property, in order to intimidate, or coerce the government, civilian population, in order to achieve political, or social goals (Liedel & Piasecka, 2008: 46).

According to academic circles, terrorism is ideologically motivated, planned and organized activities of individuals, or groups in various ways, resulting in the violation of the existing legal order. Terrorist actions are undertaken in order to force certain behaviours and benefits from state authorities and society, often violating the interests of third parties. These activities are carried out ruthlessly, using various means (physical violence, the use of weapons and explosives), in order to give them publicity and deliberately create fear in society (Jenisch, 2010).

In accordance with Community legislation, each Member State shall take the necessary measures to ensure that intentional acts (defined under national law as offenses which, by their nature and context, are likely to cause serious damage to a country, or an international organization) are considered terrorist offences, when committed for the purpose of:

- seriously intimidate the population, or
- unlawfully compel a government or international organization to take or refrain from acting, or
- serious destabilization, or destruction, of the fundamental political, constitutional, economic, or social structures of a country, or international organization.

Between 2007 and 2022, the largest number of deaths from terrorism was recorded in the Middle East and North Africa (MENA) region, at 51,679 deaths from 23,108 attacks (Table 2).

Table 2.
Number of terrorist attacks and fatalities in selected regions 2007–2022

Region	Number of fatalities	Number of terrorist attacks
Middle East and North Africa	51,679	23,108
South Asia	39,246	17,854
Sub-Saharan Africa	35,256	11,435
Asia-Pacific	4,687	5,393
Europe	2,478	2,840
South America	1,919	3,536
Russia and Eurasia	1,426	1,573
North America	285	149
Central America and the Caribbean	33	91

Source: Global Terrorism Index, 2023.

South Asia recorded 39,246 deaths during the same period from 17,854 attacks, with another 35,256 occurring in sub-Saharan Africa.

Sub-Saharan Africa had the most lethal terrorist attacks, averaging three people killed per attack respectively.

There were more terrorist attacks than total deaths from terrorism in Asia-Pacific, Central America and the Caribbean, Europe, South America, and Russia and Eurasia between 2007 and 2022.

Terminology and legal aspects of maritime terrorism

The Asia-Pacific Council Working Group on Security Cooperation in the Asia-Pacific Region (CSCAP) defined maritime terrorism as: undertaking terrorist acts and activities in the marine environment, using against ships or fixed platforms at sea, or in port, or against any of their passengers / staff / facilities (port areas and port cities – Sheng, 2012).

Piracy (marine robbery) – the term defined by the Convention on the High Seas as (UN, 1958):

- any illegal act of rape, detention, or any robbery committed for personal purposes, by the crew / passengers of a private ship or aircraft and directed:
  - (on the high seas) against another ship or aircraft, or against persons or property on board such ship or aircraft,
  - against a ship, aircraft, person, or property in a place outside the jurisdiction of any State,
- any acts of voluntary participation in the use of a ship, or aircraft, as long as the person who performs them is aware of the facts that give the ship / aircraft a pirate character.

Maritime terrorism can be understood as the unlawful use (or a threat) of force against persons, or property, to coerce, or intimidate governments and societies, often for political, religious, or ideological gain (Snoddon, 2007). It aims to force state authorities, societies, or individuals to behave in a certain way, concessions or financial benefits (Wardin, 2009).

According to A. Rajput, a maritime terrorist attack can take any one of the various forms (Rajput, 2022):

- hijacking of a passenger, commercial, or naval ship,
- attack on a passenger, commercial, or naval ship,
- terrorist attack on maritime infrastructure,
- smuggling of weapons of mass destruction for terrorist purposes,
- use of a ship to transport terrorists, or materials, that may be used to carry out terrorist activities,

– entering a coastal state to commit terrorist acts, or passing through a coastal state to enter another state to commit terrorist acts.

Some authors identified five main forms of maritime terrorism (Zelenkova, 2022):

1) The use of the sea as a means by which terrorist attacks can be carried out;
2) The use of ships carrying weapons, military equipment, and ammunition to support the capacity building of terrorist groups;
3) Hijacking ships and passengers to negotiate and achieve their political goals;
4) Terrorist attacks against critical maritime infrastructure, the destruction of which could mean an attempt to challenge and damage the prestige and dominance of the great powers, and through it, the Western perception of life;

The use of water drones as means of carrying out a terrorist attack. Aquatic drones are unmanned maritime vehicles that can operate autonomously or remotely. They do not move at the speed of airborne drones, but they can cause a significant damage to transportation security facilities if caught by terrorists.

Terrorist attacks on maritime transport infrastructure and means

For a long time there has been an increase in the number of terrorist attacks on maritime transport facilities. Although, these activities currently account for a small percentage of all incidents of this type, due to the fact that most of the intercontinental trade is carried out by sea, including the transport of crude oil and natural gas, sea areas are becoming attractive targets for terrorists.

Selected terrorist attacks on maritime transport infrastructure and means, carried out in the years 1961–2022, around the world, are presented in Table 3.

Terrorists have used explosives to attack, also suicide boats, light aircraft, merchant and cruise ships, commercial vessels as launch platforms for missile attacks, underwater swimmers to infiltrate ports, and unmanned underwater explosive delivery vehicles (Parfomak et al., 2007).

In the past, in the 20th century, attacks carried out by terrorists against maritime transport included persons, ships, port facilities, and installations at sea (Kalitowski, 2010). In the post-war period, the event that marked the beginning of the era of modern maritime terrorism was the hijacking of the passenger liner Santa Maria on January 22, 1961. This act, compared to the subsequent evolution of terrorist activities at sea, can be described as "soft hostage terrorism". Subsequent acts of maritime terrorism were no longer just an attempt to demonstrate to the world the problem or the demands of the attackers, without paying for it with the blood of the victims. In recent years, terrorist activities at sea have taken on a different character, the terrorists noticed, among others: effectiveness of suicide attacks on vessels and port facilities, also used ships, cutters, yachts and midget submarines to attack from underwater (Kalitowski, 2010).

Threats related to cyberterrorism remain one of the most important challenges for the sector. In 2017, there were an average of about 10 cyberattacks per day on major ports, and in 2020 the number of attacks on the maritime industry increased by 400 percent (Information Business Service, 2021). Among the European ports that fell victim to cyberterrorism were, among others, Rotterdam, Barcelona and Marseille.

Table 3.
Selected terrorist attacks on maritime transport infrastructure and means in the years 1961–2022

Date of attack	Maritime transport means and objects
January 22, 1961	Hijacking of the passenger liner Santa Maria by 70 Portuguese rebels, in order to take steps against Salazar's ruling junta in Lisbon. After entering the port of Recife in Pernambuko, the rebels surrendered to the authorities, and were granted political asylum.
1974	The hijacking of the Philippine ferry Laju by terrorists from the Popular Front for the Liberation of Western Sahara - Polisario. After several days of negotiations, they were granted free flight to Kuwait.
1979	Bomb attack on Lord Moutbatten's yacht by members of the PIRA (Provisional Irish Republican Army). The explosion killed 4 people, including a member of the royal family.
October 3, 1985	The hijacking of the passenger ship Achilles Lauro by the Palestinian Liberation Front terrorists who demanded the release of 50 Arab activists imprisoned in Israel. They murdered one of the passengers and negotiated Cairo's permission for safe passage to Tunisia. An Egyptian Boeing 737 was forced to land in Sicily at the Sigonella NATO base, after which the terrorists were arrested by Italian carabinieri.
1996	The hijacking of a Turkish passenger ferry in the Black Sea, when 9 armed Chechen rebels held 255 passengers for 2 days, drew the world's attention to the Chechen problem.
July 11, 1998	City of Poros cruise ship hijacked by terrorists. 89 people were killed, or seriously injured. A fundamentalist organization called Holy Islamic War claimed responsibility for the attack.
October 12, 2000	Suicide attack on the American ship USS Coole (Yemen coast), using a boat with C4 explosive – 270 kg. 17 sailors were killed and 40 were injured. Al Qaeda claimed responsibility for the attack.
2000, 2001	Sinking of maritime ships of Sri Lanka.
2002	Suicide attack on the super tanker MV Limburg (297,000 barrels of oil) using a boat with TNT explosive – approx. 100 - 200 kg. Because of the ship fire (Yemen), 50,000 barrels of oil spilled into the sea. Two sailors were killed. Al Qaeda claimed responsibility for the attack.

Date of attack	Maritime transport means and objects
2004	— Attack on the Khor al-Amaya and Al Basra oil terminals in Iraq, using a small boat filled with explosives, 3 people were killed. The attack was carried out by two organizations: Jamaat al-Tawhid and Fighting Jihad. — Abu Sayyaf Group bomb attack on Philippine Superferry. The explosion of a 5 kg TNT charge caused the death of 119 passengers and crew members, 300 people were injured. — Suicide attack by two shahids in the port of Ashod, Israel. 10 people were killed. Hamas and the Al-Aqsa Martyrs' Brigades claimed responsibility for the attack.
2005	Shooting with 3 Katyusha missiles at the USS Ashland in the port of Aqaba in Jordan. The rockets missed the target. One random person died. Al Qaeda claimed responsibility for the attack.
February 5, 2008	Bombing in Boosaso, Somalia, two explosions killed 25 people and injured more than 90 people. The Somali terrorist group Al-Shabab claimed responsibility for the attack.
May 22, 2011	Taliban attack on Karachi naval port. 24 dead, 21 injured.
April 25, 2014	Terrorists (Abu Sayyaf Group) kidnapped a German sailor couple, Stefan Viktor Okonek and Henrike Dielen. They were held for six months and released after paying $5.5 million.
2017	The port of Rotterdam was infected with Petrwrap, a modified version of Not-Petya ransomware. As a result, the operation of two container terminals operated by APMT, a subsidiary of the Møller-Maersk group, was completely paralyzed.
September, 2018	There was a cyberattack in the port of Barcelona, internal IT systems were attacked, which affected transhipment processes.
March, 2020	The port of Marseille fell victim to ransomware: Mespinoza/Pysa. In this case, the target of the attack was not the maritime infrastructure directly.
December 25, 2022	The port of Lisbon, one of the largest in Europe, fell victim to cyberattack. The port was suspended for several days on the port's website and internal computer system.

Source: BBC, 2011; Gospodarka Morska, 2022; Information Business Service, 2021; Kalitowski, 2007, 2020.

Conclusions

1. Sea transport is one of the oldest and safest ways of transporting people and cargo between distant countries. About ninety percent of the world's goods are transported by sea.
2. Sea transport has many advantages, including: the ability to transport very large loads, goods and a large number of passengers to all corners of the world, and the most favourable transport rates. The disadvantages of sea transport include: long transport time of passengers and goods, increased risk of damage to goods more

sensitive to humidity, the need to use additional delivery services, which results from limited access to sea harbours.

3. This transport sector is exposed to certain risks, especially to terrorist attacks (Schneider, 2020: 194). Below are the most common means and facilities affected by the attacks of terrorists (especially from 1968 to 2010):
   1) destructive armed assault against ships in port or at sea (without bombs) – 22%,
   2) hijacking of civilian ships – 19%,
   3) bomb attacks on ships – 18%,
   4) attacks at maritime facilities in port and offshore – 14%,
   5) (explosive) boat-to-boat collision attack – 9%,
   6) kidnapping of small civilian groups (tourists or officials) – 7%,
   7) sea mines placed on maritime trade routes – 6%,
   8) land-based, long-range attack on maritime tourist traffic – 2%,
   9) others – 3%.
4. Since 2011, a new threat from cyberterrorism has emerged for maritime transport, with the number of attacks increasing rapidly. Currently, the targets of these attacks are seaports and ships, in the future also navigation systems and systems managing the transport of goods.
5. On the basis of the presented conclusions, it has been identified that the aim of the work has been achieved, the research problem has been solved, and the research hypothesis has been positively verified.

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