

The Analysis of Offenses in Inland Navigation in Poland 2013-2017

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ABSTRACT: The article presents an analysis of offenses in inland navigation in 2013-2017, based on the number and reasons for issuing fines by Offices of Inland Navigation in Poland. In the investigated period, in Poland, over 1,300 fines were issued on the basis of five articles of the Act of 21st of December 2000 on Inland Navigation. Based on the collected data, the most common reasons for punishing crews of inland vessels were determined and the impact of these offenses on the safety of inland navigation in Poland was identified. In addition, recommendations for changes in the classification of offenses were presented due to the too wide spectrum of individual articles, which adversely affects the ability to interpret the most common offenses and makes it difficult to assess the causes and effects of their occurrence.

1 INTRODUCTION

The policy of sustainable development, limited possibilities of expanding the road and railway infrastructure at the back of seaports in Poland cause that with the increase of port turnover, problems with their servicing increase. Therefore, the inland waterway transport, environmentally friendly and not requiring additional areas, is being included to support sea ports with a distribution of its loads. Inland waterways are not loaded with congestion, they have large capacity reserves, and the large capacity of the fleet and its mass allow for quick discharge of congestion in ports. One large sea ship can be served by 60 river vessels (225 trains and 9,000 cars), which additionally allows to increase the transshipment efficiency. [Król'17]

The development of the Szczecin-Świnoujście and Gdańsk ports makes it possible to observe increasing pressure to raise the river class of the Oder and Vistula, so that both rivers can be actively involved in

handling cargo delivered to the two largest seaports in Poland. Thanks to such activities, it would be possible to transfer a large part of logistics streams from existing means of road and rail transport to river transport vehicles. This is in line with the adopted European Union transport policy, which assumes that by the year 2030 30% of freight transported at distances greater than 300 km should be delivered by rail or water transport, and by 2050 - more than 50% [White Paper] . This provision of the White Paper aims to facilitate the development of ecologically effective transport corridors. In connection with this, it is planned to connect the most important seaports with rail and river transport [Christowa'18].

The choice of inland waterway transport as an alternative to road transport results from three characteristics of this mode of transport:

- lower energy intensity - water transport is the most energy efficient form of transport. Diesel consumption by inland waterway transport for every 100 tonne-kilometres is lower than for other

- forms of transport, such as rail or car [Gołębowski'16];
- lower emissions - according to German and EU data, the external costs of inland water transport is many times less than for other forms of transport. The external cost of transport using inland waterways for 1000 tonne-km is 19 euro less compared to the same transport by road [Wojewódzka-Król'14] and
 - a higher level of transport safety.

This third aspect is of particular importance in the research carried out by the authors, because it is safety that is considered as one of the key parameters describing the quality of transport [Rolbiecki'15]. Since inland waterway transport is perceived as one of the safest transport systems, it is assumed that the increase in its use in transport of cargoes may play a special role in the process of improving the security of transport in whole supply chains. This is due to the fact that the number of registered accidents and breakdowns in this mode of transport is much smaller than the others, which positively affects the assessment of the safety of transport operations. Transport safety is concerned with the protection of life and goods through regulation, supervision and technology development of all forms of transportation [Marquez'14]. In the safety analysis relating to waterway transport, it has been concluded that the boat is a major factor, also finding that passenger boats like barges, tugs and tankers, are the vessels that produce the greatest consequences when an accident occurs; likewise, the risk in navigation increases significantly caused by external factors such as bad weather and waterway conditions [Zhang et al.'13].

2 INLAND WATERWAY SAFETY

Due to the fact that inland waterway transport takes place in limited area, in order to ensure its proper functioning, it is important to define safe navigation conditions within the entire inland waterway transport system. For this reason, safety is described by the following function [Łozowicka'15]:

$$B = f(D_i, P_i, H_i, S_i, I_i) \quad (1)$$

where:

- B – safety indicator for inland navigation,
- D_i – waterway parameters,
- P_i – inland port parameters,
- S_i – inland vehicles parameters,
- H_i – hydro-meteorological conditions parameters,
- I_i – traffic intensity parameters.

As it can be seen, the safety of transport in inland navigation depends on a number of independent variables, which are factors affecting the relations between inland vessels and waterways, on which they navigate. Research conducted by Kaup and Łozowicka [Kaup'16] indicate that the most frequent events on inland vessels include: technical failures, fires and collisions with other vessels or infrastructure facilities. Due to the parameters of waterways and navigation in restricted waters, inland vessels are

exposed to grounding and close contact with other vessels. For this reason, one of the basic factors that have a major impact on the safety of navigation on limited waters are the prevailing hydrometeorological conditions and the intensity and intensity of traffic in a given place and time [Łozowicka'15].

Another factor that can cause accidents on inland waterways are the parameters of waterways (e.g. length, width, depth) and the occurrence of numerous hydrotechnical objects on them, including canals, weirs, locks, slipways or water stages. They constitute a potential source of danger in the event of their malfunction or improper operation. Infrastructure objects located above the waterway (e.g. high voltage lines, pipelines), should also be maintained in a good technical condition, because in the case of even unfavourable weather conditions they may pose a potential threat to the units passing under them [Kaup'15]. Still other factors causing accidents are the technical condition and parameters of inland vessels, which are largely determined by the date and place of their production [Łozowicka'15].

At the same time, studies on water transport systems indicate that the cause of accidents are most often [Neumann'18]:

- accidents reason by unmeant human failure,
- accidents reason intentionally by man,
- accidents due to technical failures,
- accidents due to poor weather.

In order to increase the level of safety in the existing transport systems, telematics solutions are being implemented more and more often. The inclusion of inland waterway transport into integrated transport chains, as recommended by the European Commission, also requires the use of telematics solutions to optimize and improve the processes of cargo and passenger transport [Kaup'14]. These systems, through the combination of IT and technical tools, are designed to effectively use the existing in a given place and time linear and point infrastructure of inland waterway transport. Also in Poland, the RIS (River Information System) system was introduced. The basic task of this system is to create an interoperable, intelligent traffic and transport management system, in order to optimize existing transport capacity, increase the level of inland waterway transport safety and improve interaction with other modes of transport [Report'13]. The functioning of this solution is to ensure the improvement of navigational safety on inland waterways [Kaup'14].

Including inland waterway transport into functioning supply chains, however, means generating increased traffic on inland waterways. This will significantly affect the parameters of water traffic intensity, which are one of the elements affecting the presented safety indicator. The intensity of traffic is associated with an increase in the requirements for the crew, in the aspect of maintaining adequate caution in inland waterway traffic and limiting dangerous behaviour. The state should, therefore, ensure appropriate conditions for carrying out the transport, guaranteeing proper behaviour of crew members serving river vessels. One of the tools that can be used are appropriately formulated legal provisions that explicitly determine

possible offenses together with the penalties assigned to them. As experience from the road transport system shows, the amount of these penalties significantly affects the respect of applicable laws [www].

3 INLAND NAVIGATION TRAFFIC REGULATIONS IN POLAND

While navigating on rivers, ships and their crew can undergo the inspection by Office of Inland Navigation, on which area they navigate. The inspection can be routine or caused by delation, suspicious behaviour or as a consequence of an accident.

In Poland regulations on traffic on inland waterways are gathered in Act of 21st of December 2000 on Inland Navigation [Act'00]. This Act regulates matters related to sailing in inland waters recognized as navigable under the provisions of the Water Law [Water'17]. In specific the act sets out:

- administration authorities and their competences;
- conditions of navigation;
- rules for keeping an administrative registers;
- safety requirements;
- rules for the classification and maintenance of inland waterways;
- proceedings in the event of an accident; and
- penal provisions.

In terms of the Act on Inland Navigation, directors of Offices of Inland Waterways in Poland are to adjudicate about guilt in an accident and inspectors of this offices are entitled to give a mandate for offences.

Fine penalties are granted for offenses under articles 58-62 of section 9 Act on Inland Navigation [Act'00].

The article 58 says: *Who:*

- 1 *performs the carriage of loads contrary to the transport documents or without a proof of payment for the contribution to the Inland Navigation Fund,*
 - 2 *performs carriage by a foreign ship not in accordance with the provisions of international agreements or transport permits,*
 - 3 *sail in a foreign ship without a required permit,*
 - 4 *does not fulfil the obligation to submit a registration form,*
 - 5 *performs commercial transport of goods by ship with load capacity greater than 200t without meeting the professional ability requirement,*
 - 6 *destroys, damages, moves or uses nautical signs for mooring or dragging ships,*
 - 7 *makes it impossible or difficult for inspectors of offices of inland waterways to carry out their tasks,*
- is subject to a fine.*

The article 59 says: *Who opposes the obligation of:*

- 1 *entry of the ship into the register,*
 - 2 *measurement of the ship,*
 - 3 *immediately notify about the occurrence of a shipping accident,*
 - 4 *providing assistance in rescue operations,*
- is subject to a fine.*

The article 60 says: *Who navigates a ship without a valid ship security document or a one-time travel permit is subject to a fine.*

The article 61 says: *Who:*

- 1 *navigates a ship or occupies a position of a ship's crew member without having an appropriate qualification document,*
 - 2 *being a member of the ship's crew, does not have a document confirming health conditions appropriate to the position,*
 - 3 *being a member of the ship's crew, does not have a nautical work book,*
- is subject to a fine.*

The article 62 says: *Who goes against the regulations regarding:*

- 1 *traffic and signalling on inland waterways,*
 - 2 *marking, equipment and documents of ships,*
 - 3 *conditions of traffic and docking of ships on the navigable route and in ports,*
 - 4 *the composition of the ship's crew and working time standards,*
 - 5 *transport of hazardous materials by ships,*
 - 6 *pilotage on inland waterways,*
 - 7 *sanitary conditions on ships,*
 - 8 *safety and work hygiene conditions on ships,*
 - 9 *environmental protection,*
- is subject to a fine.*

4 OFFENSES IN INLAND NAVIGATION IN POLAND 2013-2017

Since 1st of October 2018, in Poland there were 8 offices of inland navigation (now there are 3). They had their offices in: Bydgoszcz, Gdańsk, Giżycko, Kędzierzyn-Koźle, Kraków, Szczecin, Warszawa and Wrocław.

Based on mandates given by inspectors of offices of inland navigation in Poland in the years '13-'17, authors of this paper undertook a probe of estimation a security status on Polish inland waterways.

The goal of this research was to point out the most common reasons for punishing the crews of inland vessels and the impact of these offenses on the safety of inland navigation in Poland. It appears to be difficult to fulfill because the cause of given mandate is always described with a number of an article of the Act (without further details), and mandates are often granted for more than one offence.

Figure 1 presents numbers of mandates given by Polish Offices of Inland Navigation in the years 2013-2017. The number of mandates given by specific Offices of Inland Navigation is correlated with an area of operating. Gdansk and Szczecin operate on estuary of big rivers and in the area of seaports. Wrocław has most of Polish canalized river sections under its jurisdiction. And Giżycko is responsible for Masurian Lake District, where many tourists sail. As a consequence – this four offices give over 75% of all mandated on Polish inland waterways. The other four offices gives less than 10% of all mandates each.

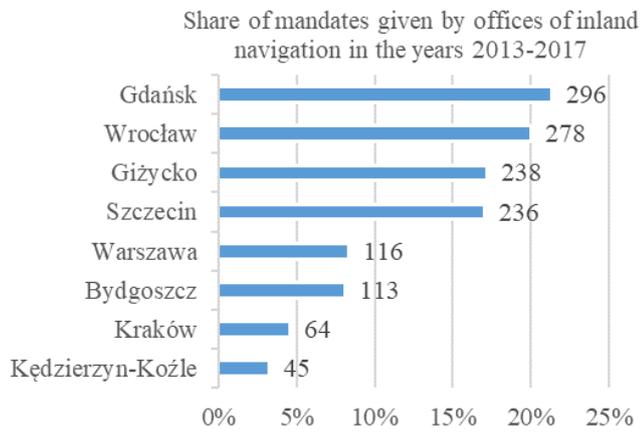


Figure 1. Share of mandates given by offices of inland navigation in the years 2013-2017

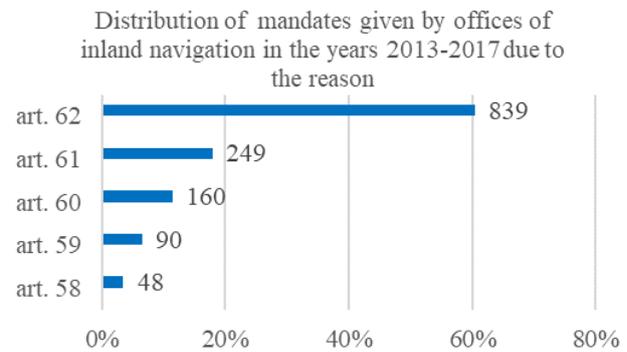


Figure 3. Distribution of mandates given by offices of inland navigation in the years 2013-2017 due to the reason

Number of mandates given by offices of inland navigation in Poland in the years 2013-2017

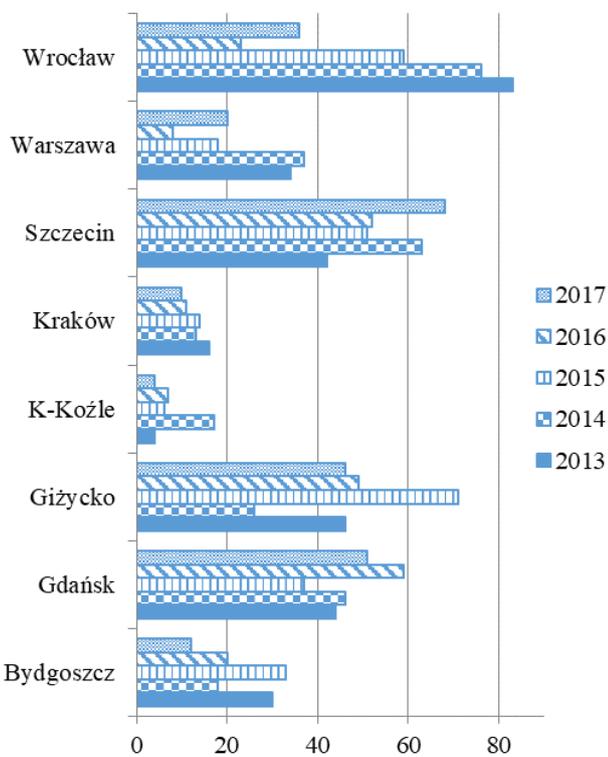


Figure 2. Number of mandates given by offices of inland navigation in Poland in the years 2013-2017

Number of mandates given by particular offices of inland navigation over 5 analyzed years differ, as it can be seen on figure 2. It was caused by different duration of navigation season on area of offices jurisdiction – caused by e.g. navigation conditions and closing/opening waterway sections due to renovation of hydrotechnical equipment.

To refer to the safety of inland navigation in Poland, types of offenses connected to ships traffic are important. Figure 3 shows distribution of the given mandates due to the reason (by articles of the Act).

The results of the carried out research shows that over 60% of mandates were given as a result of violation of article 62, and less than 5% of them were about the article 58.

Distribution of reason of giving mandates by particular offices of inland navigation in the years 2013-2017

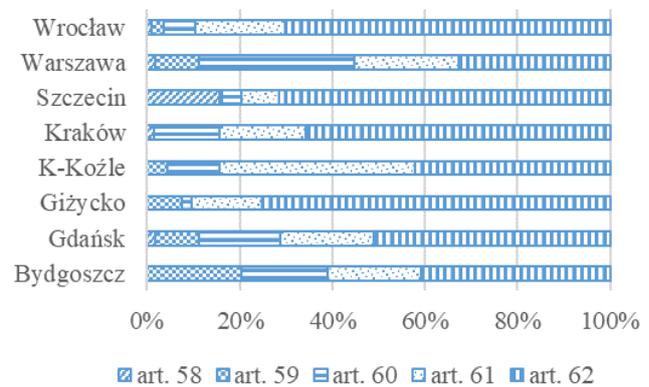


Figure 4. Distribution of reason of giving mandates by particular offices of inland navigation in the years 2013-2017

Share of particular offices in the given mandates by the reasons

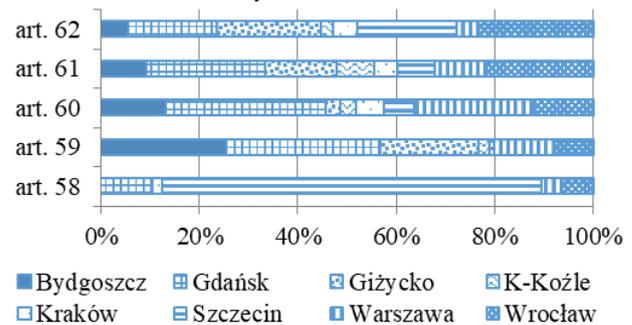


Figure 5. Share of particular offices in the given mandates by the reasons

At the same time most of offices (5 of 8) gave more than half of all mandates due to article 62 (figure 4). Most of mandates were given with a similar share by all of offices. Only mandates given due to the article 58 were mostly (over 70%) given by office of Szczecin (figure 5).

As the mandates are given for offences described by whole article of the Act, the authors tried to find a general rule for each of them or at least shorten the definition. The article 58 concerns mostly navigating contrary to the transport documents; destroying nautical signs and making it difficult for inspectors to

work. The article 59 concerns ships documents and acting in the event of accident. The article 60 is short itself and concerns navigating without security document or a permit. The article 61 concerns crew documents. The article 62 concerns traffic regulations; ships equipment, crews working conditions and environmental protection.

Previously it was indicated that over 60% of all offences concerns article 62. That is the most extensive article and concerns many problems, but is the only one article concerning traffic on waterways. It may be assumed that the traffic is the reason of most of the offences. Therefore it would be strongly recommended to extend the traffic issue and make the regulations more specific in this field.

Nearly 20% of all mandates are given due to the crew documents.

Smaller offices (Warszawa, Krakow, Kedzierzyn-Kozle and Bydgoszcz) also give about 20% penalties for lack of navigating permission.

Problem of ships documents is divers in all of offices.

Office of Inland Navigation in Szczecin also marks a problem with navigating contrary to the transport documents; destroying nautical signs and making it difficult for inspectors to work. The problem with transport documents may be partly caused by the fact that this office has under its jurisdiction international waterway – border Oder.

5 RECOMMENDATIONS FOR THE CLASSIFICATION OF OFFENSES

The Act on Inland Navigation concerns many important issues, one of them are offences in navigating on Polish inland waterways. The regulations included in 4 articles may be divided into 6 main groups - concerning:

- 1 ships documents,
- 2 crew documents,
- 3 ships equipment and crew composition,
- 4 traffic regulations,
- 5 acting in case of accident, making work of inspectors harder, destroying nautical signs and
- 6 other.

Unfortunately this 4 articles and 6 pointed groups do not match. All of this issues are mixed in articles what makes it difficult to interpret.

The case of (1) ships documents appear in 3 of this articles, (2) crew documents in 2 articles, (3) ships equipment and crew composition is a part of a 1 article, similar to (4) traffic regulations, which could be a subject of one extended article. (5) Acting in case of accident, making work of inspectors harder, destroying nautical signs are spread out in 3 articles, instead of being in one.

The lack of clear order in the list of offences make it hard to interpret for safety research but also for inspectors and the punished. Dividing the offences in a clear way could be helpful also for analyzing by Central Statistical Office and other analyzes

conducted by researchers to improve conditions of navigating on Polish inland waterways.

During investigated 5 years, Polish offices of inland navigation registered 1386 mandates, which makes over 277 mandates per year. In the year 2017 Polish inland waterway ships transported over 75 thousand tkm [CSO'18] which gives 3,7 mandates for each 1 thousand tkm. Taking into account the fact, that ships has a great load (ships exploited on Polish waterways has on average 500ton capacity) - Polish inland ships crews gets mandates quite often (approximately once at every 150km of transportation). This leads to the conclusion that in spite not very clear regulations, inspectors of offices of inland navigation in Poland work quite effective.

6 CONCLUSIONS

On the basis of conducted investigation, the authors made some recommendations for changes in the classification of offenses due to the too wide spectrum of individual articles, which adversely affects the ability to interpret the most common offenses and makes it difficult to assess the causes and effects of their occurrence. Nevertheless it is noticeable that most mandates are connected to traffic offences which has a direct impact on navigation safety.

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