



Ship operation in small Polish ports of Szczecin Lagoon

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Abstract

Szczecin Lagoon ports fulfil various functions and serve different kinds of crafts. Mainly of those ports' actions are based on such functions as loads fishery, yachting and passenger transport. The main goal of seaports as load transshipment is gradually disappearing. However, there are the chances of their development on the basis existing supra- and infrastructure.

1 Introduction

Seaports are economic structures, situated on the borderline between land and sea, properly prepared to trans-ship commodities, in respect of technical, technological, organisational, lawful and economical issues, which are translocated in continental-maritime and maritime-continental relations. The ports are also adapted to serve sea and continental conveyances engaged in transporting those supplies [1].

Taking location of the ports into consideration, there are [2]:

- ports situated at open sea coast (Baltic Sea),
- ports situated inland at different water areas (e.g. rivers, bays, lakes).

Taking the significance of ports in the world exchange of commodities that are transferred by sea into consideration, there are [1]:

- ports of local importance,
- ports of regional importance,
- ports of international importance.

The small seaports suprastructure and infrastructure are developed to a certain level. Regarding the suprastructure of such a port, small area of water and land is

occupied and there is a small number of quays and port basins. However, such ports do not have plenty of cargo gears, mechanised equipment, craft, store places and magazines.

The ports situated in Szczecin Lagoon and Dziwna narrows region can be defined as seaports because their location is at sea-waters (internal) and they are subject to maritime administration, represented by the Maritime Office in Szczecin; and these include ports in Kamień Pomorski, Wolin, Stepnica, Trzebież and Nowe Warpno (presented in Figure 1). On the coasts of Szczecin Lagoon havens of Lubin, Karsiborz, Przytor, Wapnica and Sierosław exist along with the above-mentioned ports.



Figure 1: Map of Szczecin Lagoon.

A small seaport is usually a versatile economic structure whose actions and administrative borders are stated by The Ministry of Transport. A harbour, respectively, is a one-function structure whose subject of activity and administrative borders are defined by a manager of an administratively relevant maritime office.

Szczecin Lagoon is divided by the German – Poland border. In German ports (west of lagoon) there are some ports and havens like Altwarp, Uckermunde, and Kamminke. Also in the Peene River mouth there are many ports. Nowadays there

are a few connections between Polish and German ports, like Nowe Warpno-Altwarpo, where near to one million passengers use this line.

This paper covers only the small ports of Szczecin Lagoon and the mouth of the Dzwina region. There are five ports set around Szczecin Lagoon; diversity between them is visible regarding accessibility, types of loads in port-turnover and fulfilled function.

2 Kamien Pomorski

This port is situated at the eastern part of Kamienski Bay.

Two fairways lead to the port [5,9]:

- from Dziwnow, about 2.8 metres deep
- from Wolin, about 3.3 metres deep.

An approach to the port is hindered because of frequent changes of current and Dziwna depth. There is a well-developed road connection to the south to Szczecin, to the north-eastern direction via Trzebiez to Koszalin, and to the west via Dziwnow to Swinoujscie. Kamien Pomorski is the only one among small ports with a railway connection where rail tracks reach the berth. The railway contributes to a convenient link with Szczecin.

The port area is 100 400 m². Two basins: Fishing and Yachting, and three berths: Barging, Grain and Repairing comprise Kamienski Bay[2,3,9].

- Fishing Basin is 40 metres long, 36 metres wide, 1.5 metres deep. It is intended for mooring and unloading small fishing boats,
- Yachting Basin is 105.7 metres long, 58.2 metres wide, 3.2 metres deep. It is intended for yachts to moor there,
- Barging Berth is 265.5 metres long and 3.0 metres deep,
- Grain Berth is 100 metres long. There is a grain elevator, however this berth is not suitable for exploitation,
- Repairing Berth is 108.5 metres long and 3.2–3.6 metres deep. It is intended as a stopping-place for large sport crafts when minor repairs are being executed.

Apart from the mentioned objects, there is a pier used to serve passenger ships sailing between ports in Kamien Pomorski, Dziwnow and Miedzywodzie. This hydrotechnical structure is 60 metres long and 3.0 metres deep; crafts with a maximum draught of 2.1 metres can moor here.

Individual fishery, yachting and, for the past several years, passenger-shipping are the well-developed purposes of this port. Nevertheless, the function of transport and trans-shipment, in spite of the port's technical potential, is slowly disappearing. In the beginning of the 1990's, almost 23000 tons of bulk cargo was being reloaded annually, it contained mainly grain and mineral aggregate [4]. That was caused chiefly because of shallowing of the waterways leading from Dziwnow to Wolin and farther on to Szczecin Lagoon.

Approximately 800 fishing crafts, 200 passenger-ships and 200 yachts call at the port in an average year.

Trans-shipment of fish and the passenger service in Kamien Pomorski port (years 1996-1999) are shown in Table 1.



Table 1. Trans-shipment of fish and the passenger service in Kamien Pomorski port (years 1996-1999)

Years	Fish (T)	Passengers (persons)
1996	107	25 358
1997	146	24 584
1998	190	33 019
1999	185	34 200

3 Nowe Warpno

Nowe Warpno port, situated at Nowowarpieskie Lake, forms the western part of Szczecin Lagoon. The geographical location of Nowe Warpno is in direct relation with communication routes existing in this region. There is no railway connection with the port, and the nearest railway station is about 20 km away in Trzebiez. There are good road connections instead, and these are[8]:

- national road of IV technical class leading from Szczecin to Trzebiez via Tanowo and Police
- local road leading from Szczecin to Mysliborz Wielki.

The approach fairway to the port lies between Wyspa Lysa on the Polish side and the German port Altwarp. The fairway consists of two parts: first - about 8450.0 metres long, with a minimal depth of 4.5 metres and 150.0 metres wide, leading to Brama Torowa 2 in the German border direction; second - from the terminal buoy "14" to the port. The latter section is divided into three parts with different parameters, with the most inconvenient last segment, which is about 1380.0 metres long and 30.0 metres wide, and has a minimal depth of only 1.8 metres [5].

The port area is 26.600 m². The port's infrastructure consists of:

- Passenger Pier, about 87 metres long and 1.5-2.0 metres deep,
- Fishing Berth with 4 fishing gangplanks, about 95 metres long and 1.5-2.0 metres deep,
- Trans-shipping Berth, about 60 metres long and 1.5-2.0 metres deep,
- Berth at the border checkpoint about 62 metres long and 3.0 metres deep.

Nowadays there are no cargo handling devices on berths because of a shortage of loads in port turnover.

The stabilised function of the port is fishery. The port turnover is formed only by unloading fish, which are sent on to hinterland because it is not possible to process them at the port area. The function potentially developing is yachting and ferry shipping.

The construction of the infrastructure for shipping ferries and opening the port border checkpoint in July of 1996 was noted as a crucial date for the port. From this date, ferry shipping has been developing rapidly. It is based on short passenger transport between Nowe Warpno port and the German Altwarp port.

The main reason for these cruises is to make it possible for passengers to do shopping in ships' duty-free shops [6].

Annually, approximately 2,000 fishing craft, over 8,000 passenger craft and over 2,000 yachts call at the port on average.

Trans-shipment of fish and the service of passengers in port Nowe Warpno (years 1996-1999) are shown in Table 2.

Table 2. Trans-shipment of fish and passenger service in Nowe Warpno port (years 1996-1999).

Years	Fish (T)	Passengers (persons)
1996	121	241722
1997	144	719 319
1998	193	823 298
1999	204	1 040400

4 Stepnica

This small port is situated on the east coast of Stepnicka Gulf. There is a convenient road connection both with the province and with the country through national road No 3; the water connection is convenient with the ports of Szczecin Lagoon and with ports of the Odra River and Baltic across the fairway from Swinoujscie to Szczecin.

The approach fairway to Stepnica leads from the main fairway, Swinoujscie-Szczecin. It is 4000 metres long, 73–35 metres wide and 3.5–4.5 metres deep. A manoeuvring basin, 130 metres in diameter and 3.5 metres deep, is found 100 metres away from the port's entrance [5].

The port consists of two basins – Railway and Fishing [3].

- Railway Basin – 314 metres long and 3.5 metres deep. Motor barges and cargo ships of 1500 t capacity are being served here. This Basin is supplied with two breakwaters about 13 metres long. The width of the entrance is 18.5 metres.
- Fishing Basin – 80 metres long and 1.0–2.0 metres deep. Fishing boats moor in this Basin.

The major functions of this port are: commodities shipping, trans-shipment and fishery. The main unloading products are mineral fertilizers and aggregates, and, for loading, fodder for animals. On average, the annual import is 30,000 tons, and export 88,000 tons.

The port also serves as a passenger harbour, to a certain degree, mostly in national tourist and recreation transfer [7]. The port's potential used is 50 % at present.

Railway Basin is equipped with cargo handling devices used in trans-shipment of bulk cargo, i.e. grain, gravel, fodder and cement. All devices are movable and they are not attached to the berth, because they may be required in various points of the port. Railway Basin consists of three berths equipped with 2 mobile cranes



with lifting capacity of about 2-8 tons; belt conveyors; grain-loading device; car scales and two store places of common area of 7900 m². On either side of the Railway Basin there are two tracks of narrow-gauged railway about 140 metres long.

At Fishing Basin there is berth for waiting and trans-shipment; it is also equipped with a lift for fishing boats; warehouses for storing fish, local magazine of fuels and 10 warehouses for fishing equipment as well. 17 fishing boats are stationed at this berth [8].

It is possible to operate two ships simultaneously in the port. Daily trans-shipment, depending on goods, is feasible as follows:

- palettes – 900 tons per day
- grain – 1 200 tons per day
- gravel – 2 100 tons per day.

1,500 fishing crafts, 250 bulk carriers and about 300 yachts call at this port on average annually. Table 3 shows the trans-shipment of fish and other loads in Stepnica port (years 1996-1999).

Table 3. Trans-shipment of fish and other bulk in the port (years 1996-1999).

Years	Fish (T)	Other loads (T)
1996	213	73 752
1997	460	23 594
1998	435	24 094
1999	425	27 000

5 Trzebiez

Trzebiez port is located on the west coast of the narrowing, which joins the south part of Szczecin Lagoon from Roztoka Odrzanska. It is the largest fishing, passenger and nautical port at Szczecin Lagoon. Two approach tracks lead to it from the water area, which are directly linked with the waterway Swinoujście–Szczecin [2]:

- the northern track is about 2 500 metres long, 60 metres wide and 4.5 metres deep
- the southern track is about 1 200 metres long, 60 metres wide and 4.5 metres deep.

Both tracks are connected with the main fairway Swinoujście–Szczecin. The port is shielded with two breakwaters about 38 metres and 40.5 metres long.

There are fine connections through [5]:

1. water:
 - via Szczecin Lagoon, Dzwina and Swina with ports of mouth of Odra River at Baltic Sea
 - via Szczecin Lagoon and Odra River with Szczecin and farther up Odra River.
2. road: with Nowe Warpno, Police and Szczecin
3. railway: electricity railway line via Police to Szczecin.

Trzebiez port consists of 3 basins: Nautical, Transit-Passenger and Southern [3]. Nautical Basin is equipped with a hoist for yachts, a slip to drag smaller nautical craft and a hangar to store yachts. This Basin consists of three berths; 120 nautical craft of different classes can be admitted simultaneously.

Transit-Passenger Basin is equipped in a goods yard of an area about 1,000 m², light installation, telephone communication and UHF. Due to the cessation of trans-shipment this part of the port is not supplied with stable trans-shipping devices. This Basin is divided into two berths Transit and Trans-shipping ones. A place for passenger ships from Ückermunde is situated on the Transit Berth along with customs office for German tourists.

Trans-shipping Berth belongs to the Excavating and Dredging Work Company. Up to 1990, this part of the port was used to fulfil functions covering turnover of transit and trans-shipment of cargo. Nowadays, its functions concern passenger-tourist transfer along with transit [8].

Fishing Basin consists of three basins. Forty fishing craft can call at the basin simultaneously. Fishing Basin is equipped with: devices to lift fishing crafts, a yard for drying fishing-nets, a partly hardened yard for different purposes, workshop building, fish storehouse and an auxiliary equipment warehouse. In the southern part of Fishing Basin there is the only petrol station on Szczecin Lagoon, which is adapted to serve sailing craft [7].

Regular connections of ships between Trzebiez and German ports are served by agency firms. There are duty-free shops on every vessel in which various kinds of goods are sold. And those shops are the main reason for tourist excursions on the bay.

Trzebiez is the only a transit port for commodity shipping, as several years ago the trans-shipping function disappeared. The transit port serves barges sailing the route from Swinoujscie to Szczecin. Polish and German barges transport such loads as mineral aggregates and fodder for animals. They call at Trzebiez in order to prepare customs documents, which is not a cause of the increasing number of trans-shipments in Trzebiez, because loads transported in transit are not served here. Starting passenger shipping on 2nd May 1991 became the most prominent issue in this port. This kind of shipping is profitable, because its realization brings better income and it is less harmful to the natural environment and inhabitants.

Trzebiez port fulfils various service functions. The best developed are fishery and yachting as well as tourist-passenger shipping. The above-mentioned activities of the port are supplemented by sea-life-rescue, sea administration, customs and border terminal [4]. About 3,500 fishing crafts, over 200 passenger crafts and about 400 tourist recreation crafts call at this port on average annually. Table 4 shows trans-shipment of fish and service of passengers in Trzebiez port (years 1996-1999).



Table 4. Trans-shipment of fish and service of passengers in Trzebiez port (years 1996-1999).

Years	Fish (T)	Passengers (persons)
1996	714	61 975
1997	1 220	10 107
1998	1 820	13 300
1999	1 850	25 000

6 Wolin

Wolin port is situated at the south-east bank of Wolin island along western bank of river Dziwna. Connection with eastern bank of river takes place through two bridges whose parameters limit the size of crafts sailing into the port. The worst limit is that of the rotatory road bridge in Wolin (its clearance is 2.70 metres) and it is opened once every twenty-four hours [5].

The port is connected through water with the ports of Szczecin Lagoon and Odra River, and across Dziwna narrowing and Swina with the ports of the seacoast. The location of Wolin along national road No 3 makes a good connection with all the hinterland of the country; however, there is no railway connection. Two approach fairways lead to the port: south from Szczecin Lagoon and northwards from Kamienski Bay is about 1.6–4.5metres deep.

Wolin port consists of [3]:

- Grain Berth (at elevator) about 80 metres long and 1.1–1.6 metres deep, which is detached from exploitation due to bad technical condition.
- Stopping Berth – about 246 metres long and 1.0–2.5 metres deep.
- Unloading Berth – about 62 metres long and 4.0 metres deep.
- Fishing Berth – about 168 metres long and 1.5–2.0 metres deep, with fishing boxes, a small fishing warehouse and ice generator.

The main functions of this port are fishery, service of passengers and tourist-recreation crafts [4]. About 800 fishing craft, 200 passenger craft and 200 tourist-recreational craft call at this port on average every year. The trans-shipment of fish in Wolin port is running at 300-320 ton average every year.

7 Summary

Szczecin Lagoon polish ports fulfil various functions and serve different kinds of craft. Mainly, the ports' activities are based on such functions as: fishery, yachting and passenger transport. The main goal of the seaport as a load trans-shipment is gradually disappearing; only the Stepnica port serves merchant ships.

The present state of port infrastructure and suprastructure is rather poor which is a result of irregular maintenance of the constructions erected during the interwar period and the small number of port devices is caused by low trans-shipment potential, thus there is a lack of request for those.



The passenger service function has been enlivened recently in small ports. Passenger ships can be divided into two different kinds [6]:

- excursion transport between Polish ports,
- excursion transport between Polish and German ports (performed mostly because of duty-free shops found on the decks of these craft).

This means of transport is still going to develop because this is the most admired form of transport among inhabitants from areas around Szczecin Lagoon. Therefore, the port infrastructure should be arranged.

Apart from passenger shipping on Szczecin Lagoon one can observe the increasing development of yachting. Year on year this form of relaxation is more and more popular and the number of craft calling at small ports is still growing [9].

Small ports should undertake activities aiming to adapt berths to serve those kinds of craft, to dredge the port basins fairways (depth for small crafts is 3 metres, for bigger ones 5-6 metres) [10]. The presented proposition of actions in small ports of Szczecin Lagoon below. Nowadays, ports in Trzebiez and Stepnica are in the best hydrotechnical condition, but certain changes should be introduced anyway.

Trzebiez port ought to have its basins and fishing berths modernised; berths for tourist-recreation craft, along with repair subsidiaries, adjusted and expanded; activity of providing fuels, oils and grease for sailing crafts enlarged; reservoirs and devices for yachts rendered accessible; the south entrance dredged and expanded.

In Stepnica a sea terminal passage should be formed (customs clearance of merchant ships is executed by terminal services from Szczecin or Goleniow at present); the Railway Basin entrance breakwater should be rebuilt; the stopping berth ought to be constructed; the approach fairway to the port should be modernised.

A hindrance in calling at Wolin and Kamien Pomorski ports for larger craft than fishing craft, passenger craft and yachts, is the presence of drawbridges across the river Dziwna in Dziwnow and Wolin and the lack of suitable exploitation depth in approach fairways to ports in Dziwna narrowing.

There are good technical conditions to create a nautical centre with boatbuilding workshops to service yachts, to bring into cultivation and to use berths trans-shipping, to rebuild berth at elevator and to modernise harbour fishing in Kamien Pomorski.

In Wolin there isn't the possibilities for ships to call with a draught above 3,0m. This port can serve only fishing craft, passenger individuals and yachts and other tourist craft.

Nowe Warpno became greatest port in respect of served passengers from 1996. There is the larger movement of yachts, too. So, that port should build a yacht port with full technical subsidiaries and to adopt existing berths to the mooring of yachts. Attitude this should be held warranted depth of approach fairway, improved marking navigational and modernises fishing footbridge.



An example of Nowe Warpno-Altwarzp (Poland-Germany) connection is evidence of the development possibility of the small ports of Szczecin Lagoon, especially in view of Poland's participation in the European Community.

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