Polish Inland Waterways in European transport network - implications for Bydgoszcz Waterway

Introduction

Inland water transport has played a significant role in the development of cities and regions for ages. It was a main mode of inland transport until rail and later road have begun to dominate in European transport system. [1] The main objectives of transport policy in European Union is promotion and ensuring sustainable development. In this aspect inland water transport is regarded as environmentally friendly mode of transport. The importance of inland shipping is undisputed and many studies are related to problems of this mode of transport.

The main objective of the article is to present its role in European transport system and identify the barriers of the development of inland shipping in Poland. The research questions is:

- what is the place of Polish inland shipping infrastructure in European waterways system,
- what are the opportunities of Bydgoszcz Waterway?

The research methods were the analysis of European transport document, studies and statistics related to inland shipping.

1. The importance of inland shipping in the European transport system

The development of inland transport is regarded as one of the ways of solving transportation problems in the European Union. They refer to such areas as sustainable transport, meeting the increasing demand for transportation and the elimination of bottlenecks in the trans-European transport network. This mode of transport is one of the cheapest and is regarded as the most environmentally friendly. [2]

Its characteristic features such as relatively low energy consumption, low emission of fumes and low noise levels result in low external costs of this branch of transport. Inland shipping has the best statistics as far as the pollution of the environment is concerned as well as safety, with reference to the external costs. Inland shipping is the most environmentally friendly form of transport with total external costs estimated at present at 10 euros per 1000
tonnes per kilometre (in comparison with 35 euros in the case of road transport and 15 euros in the case of rail transport). [3]

Moreover, huge loading capacity for bulk cargoes results in relatively low costs of transportation. For example, 1 litre of fuel allows river vessel to transport 127 tonnes of cargo over a distance of one kilometre, while in the case of road truck transport only 50. [4] In the European Union, most cargoes are carried by water transport over a distance from 50 to 149 kilometres (39.0%) and from 150 to 499 kilometres (30.0%). [5]

In Western Europe, inland waterways network is concentrated around four water routes: [6]

- The Rhine route which represents over 63% of the volume of cargoes carried,
- The Danube route which represents about 10% of the volume,
- The North–South route between France, Belgium and Holland which represents 15% of the volume,
- The East–West route connecting Germany with Eastern Europe and the North Sea and the industry in the Ruhr District which represents about 4% of the cargo carried.

Inland waterway transport in EU countries increase by only 17% in last three decades. [7] But it plays a considerable part in the carriage of cargoes in the countries of the European Union. Inland waterways network in the West European countries includes routes of total length of 35 thousand kilometres (data for UE – 15). The average share of inland shipping in the volume of cargo carried in those countries amounts to 7% (road transport – 74%, rail transport – 14%), but there are regions where it reaches 43%. The countries where inland waterways play a very important part in the structure of transport include Germany, Belgium, Holland and France where inland transport has a considerable role in rendering services to sea ports. [8] In Netherlands it is a second mode of transport after road. [7]

Inland shipping has been increasing its ratio in container carriage. The European container barge network up to now has always been primarily focused on maritime container flows. As such, the development pattern of the barging network is strongly entwined with the development of the associated seaport system. The container barge network in Europe has its origins in transport between Antwerp, Rotterdam and the Rhine basin, and in the last decade it has also developed greatly along the north-south axis between the Benelux countries and northern France. [9] Inland navigation plays an important role in the hinterland access of the port of Antwerp. [10] as well as to ports of Rotterdam, Hamburg and Bremerhaven.
2. Inland waterway transport in the European Transport Policy

European Union Common Transport Policy states that the development of inland shipping is one of its most important priorities. These are followed by legal regulations which beside the development and improvement of water transport aim at taking care of the safety of shipping and protection of the environment. The most important of these is the White Paper, European transport policy for 2010: time to decide. This document shows common aims of the European Union transport policy, underlines the importance of the sustainable development of transport, promotes forms of cargo carriage alternative to road transport, recommends the integration of inland shipping, short sea shipping and rail transport into a common system making intermodal services possible.

In order to identify and frame inland shipping in a trans-European policy perspective four inland water transport corridors have been identified. There are: [12]

- The Rhine and its tributaries corridor (Main, Neckar, Mosel – the Netherlands, mid-western Germany, northern Belgium, Luxembourg, northern France and Switzerland),
- Northern east-west corridor (primarily around Elbe, Weser and associated canals – northern and eastern Germany, Poland and Czech Republic, connecting to Western Europe and the German ports),
- Southern east-west corridor, linking the Alpine region to the Black Sea (south-eastern Germany, Austria, Slovakia, Hungary, Croatia, Serbia, Romania, Bulgaria, Moldova, Ukraine),
- North-south corridor, consisting of the river system in the Benelux and northern France and the Rhone-Saone basin.

In January 2006, the European Commission announced the launching of an action for the promotion of inland shipping „NAIADeS“ (Navigation and Inland Waterway Action and Development in Europe). The programme aims at the activities supporting the competitiveness of water transport, in particular by improving its integration with intermodal chains of supplies.

For the development of inland shipping the AGN agreement - European Agreement on Main Inland Waterway of International Importance - is of crucial importance. The agreement was launched in 1996 by Inland Transport Committee, Economic Commission for Europe. It is based on the assumption that in the development of international transport, the role of inland waterways in Europe is considerable, so it is necessary to build a network of waterways which will be: [13]

- homogeneous, that is suited for standard ships and their convoys,
- integrated between various drainage basins of rivers through the canals and coastal/inshore routes,
- able to accommodate the most important cargo loads, which in turn depends on the proper density of the waterways network and its evenly distributed development in all European countries, also in the countries of Central and Eastern Europe.

The attempt at creating a uniform system of waterways of international importance results from the intention of the European countries to build waterways linking the most important sea port with their hinterland. The geographical range of waterways network mentioned in the AGN agreement includes the main waterways in Europe linking 37 countries.

In October 2011, the European Commission adopted a document entitled „Connecting Europe“ which defines the new regulations for the TEN-T network. Following the revised guidelines they are to include two layers: core network and comprehensive network. The aim
of this new approach is the creation of a cohesive transport system in the European Union. In the assumptions of the new policy one can clearly notice the concentration on smaller number of projects which are to bring added value to the European Union and make the unrestricted transfer of the goods and the people. [14]

The core network includes the most important connections and centres. They are treated as priority. The aforementioned comprehensive network which is developed both at the regional and at the domestic levels is to complement the core network. Both levels will include all modes of transport – road, rail, air, inland shipping, maritime transport and intermodal platforms.

The new core network is based on the concept of corridors which are to ensure the linking of multimodal centres and to support co-modal solutions in the transportation system. Inland shipping has been included into the core network in several corridors. One has to mention here the corridor from Helsinki - Warsaw via Berlin to Amsterdam/Rotterdam (North Sea – Baltic Corridor,) in which the route through West German Canals, Mittellandkanal, Hannover – Magdeburg – Berlin is to be upgraded. Another project to be carried out deals with the Mediterranean corridor, where the route Milano – Mantova – Venezia – Trieste is to be upgraded. Also upgrading of the route Hamburg – Dresden – Praha – Pardubice and the route from Basel to Rotterdam/ Amsterdam / Antwerp is very important for the proper functioning of the main seaports in Western Europe. Also routes Main – Main-Donau-Canal – Danube and Canal Saone - Moselle/Rhin have been included into the core TEN-T network. [15]

Above mentioned activities show the importance of inland shipping for the ecological policy of the European Union.

3. Inland Waterways in Poland

Inland waterways includes rivers and canals. The existing network results from the natural configuration of rivers and artificial canal connections. The length of total waterways in Poland amounts to 3669 kilometres. The density of waterways is a little higher than the average for UE countries. There are 11.6 km navigable waterways per 1000 km² in compared with the average for EU-27 countries 9.3 km per 1000 km². Higher density have Netherlands (121.6 km), Belgium (50.2 km), Finland (23.7 km), Denmark (18.6 km). [16]

The condition of the infrastructure of inland transport in Poland in comparison with the conditions of inland waterways in Western and Central Europe is bad. Waterways of international importance should have parameters corresponding to class IV and V which
means that they should be accessible for vessels of 1500 deadweight, they should have the guaranteed minimum depth of 2.10 metres, width of 60 metres, locks having dimensions 190 x 12 metres, minimum clearance under the bridges of 5.2 metres. [13] Such requirements fulfils 6% of waterways in Poland. The network is only 214 kilometres long out of 3347 kilometres of navigable waterways. [17] There are for example: The Vistula river from mouth of Przemsza to connection with the Łączyński Canal - 37.5 km (class IV), The Vistula river from Płock to Włocławek - 55 km (class V a) The Dead Vistula river - 11.5 km (class V b), The Oder river from the town of Ognica to Klucz-Ustowo cutting and continue as the Regalica river to the mouth of lake Dąbie - 44.6 km (class V b) The Western Oder river- 36.3 km (class V b). [16] Rest of the network fulfill national standards and achieve only classes of regional significance.

In Poland three international waterways have been mentioned in Blue Paper concerning the AGN agreement: [16]

- E30 - linking the Baltic Sea from the Danube river in Bratislava, including on the Polish territory of the Oder river from Świnoujście to the border with the Czech Republic,
- E40 - linking the Baltic Sea in Gdańsk with the Dniepr river in the Chernobyl area and further to the Black Sea, including in the Polish territory the Vistula river from Gdańsk to Warszawa, the Narew river and from the Bug river to the Brest river,
- E70 - linking the Netherlands with Russia and Lithuania, and on Polish territory covering the Oder river from the mouth of the Oder-Havel canal to the mouth of the Warta river in Kostrzyn, waterway Vistula-Oder and from Bydgoszcz through the lower Vistula river and Szkarpawa or the Vistula river in Gdańsk.

To fulfill the requirements of AGN agreement, these routes should be upgraded. Unfortunately non of Polish waterways have been included in core network project. Through the Polish territory passes Pan-European Corridors and Core Network Corridors. The Baltic – Adriatic Corridor passes from Helsinki via Gdańsk, Katowice to Wien and Bratislava and farther south. The projects within this corridor include only rails and sea ports. E-40 Waterway despite passing alongside the corridor have not been included. Similarly E-70 Waterway placed along the Warsaw – Berlin – Rotterdam Corridor was passed over in Polish section.
4. **Bydgoszcz Water Junction in the European waterway system**

E-70 Waterway connects Western Europe from the Antwerp through the Berlin waterway junction, Poland waterways to Kaliningrad region and further to the Neman waterway system. [19] In Polish territory it runs from Oder-Havel Canal through the lower section of Oder river to Kostrzyn, then through the Warta river and Notec river it connects with Bydgoszcz Canal and the Brda river. Further east the route links with lower Vistula river and through the Nogat river comes to Vistula Lagoon.

The Polish section of E-70 waterway has got navigable class II only. [20]. In some parts - from mouth of Drawa river to the junction with Bydgoszcz Canal only Ib parameters is achieve. The are 22 barages, most of them were constructed at the end of 19th century or at the beginning of 20th century. The width of the waterway is in between 16-25 metres and the depth is 1,2 up to 1,5 metres. [21]

Due to a convenient proximity of the Notec and Brda Rivers, in the 18th century the Bydgoszcz Canal was built. This project initiated the development of the Bydgoszcz Water Junction, the most strategic point of the E–70 international water route, Berlin–Kaliningrad. [22]. It contributes to the west European system (via the Oder) through connections with important economic centers in Frankfurt and Berlin but at the same time with the regions of
attractive natural environment. [23] In the last decades of the 20th century water transport was gradually declining, the quality of water was deteriorating. This reflect trends in inland shipping in Poland. Since 1998 though, as a result of planned, systematic actions and due to the participation in the “InWater” project – Exploiting Inland Waterways for Regional Development, the conditions have been constantly improving. Now new leading scheme “The Bydgoszcz Water Junction development and revitalisation programme” was prepared – a spatial model concept for four water stations.

Due to infrastructure, inland water transport is very low. [24] In 2000-2009 the volume of carriages by the Polish river transport has not exceeded 1 % from the general freight turnover of the country. [25] In Kujawsko-Pomorske Voivodeship in 2010 inland shipping transported 466,8 tonnes of bulk cargo nearly 25% of the volume was directed to Bydgoszcz Waterway.

As to tourism – yachts and river passenger crafts are used. The excursion sector comprises a boat tour lasting no more than one day. The most important difference with river cruises lies in the fact that the excursion sector does not provide for any overnight stay and that the boats therefore do not feature any overnight cabin accommodation. [26] Such craft could use the Bydgoszcz Waterway, but the infrastructure (locks and depth) is insufficient. Passengers who stay in Bydgoszcz embarking or visiting place make use of different services giving add value.

The present situation of considering waterways is bad. The Vistula and Notec rivers in comparison with routes in other European countries are in most places used minimally and in others not at all. The transport of a few thousands of tones is not economically effective. Also maintenance of locks and dredging only for tourism is not effective. [27] Some inland ports - in Bydgoszcz and close to Bydgoszcz Waterway Junction (ex. river port in Torun) have problems due to bad infrastructure and little demand for services. As a result they stop the business activity.

The revitalization of E-70 and E-40 Waterways is one of the most important aims of Polish transport policy. Activation of the first route was initiated with the signing the Declaration on Development Cooperation related to the E-70 in 2006, one year later Memorandum of Signatories Declaration on the Development of International Waterway E-70 was signed. It confirmed the will of Marshals of 6 Voivodeships to joint forces in renovation of this route. But it passed a couple of years, and nothing was done to active the waterway. The development of the regions and cities on riverside are directly connected with inland routes.
It is necessary to make a lot of investment in the infrastructure in order to adapt the Polish waterways to these standards. It will be necessary to remove the bottlenecks on the E-70 waterway and to upgrade to at least class IV the following routes:

- Warta – Notec – Bydgoszcz Canal – from Kostrzyn to Bydgoszcz (at present class II),
- Vistula – from Bydgoszcz to Biała Góra, The Nogat River estuary (at present class II),
- Szkarpawa from Gdanska Head (Vistula) to Elbląg (class III).

Sea-river ports are elements of the network of inland waterways. Being a part of a system of river routes, sea-river port is also strongly correlated with the existence and development of the cities. The complex spatial and functional dependencies occurring between modern river ports and cities or metropolitan areas. Bydgoszcz Waterway being an important tourist area in the Kujawsko-Pomorskie Voivodeships can positively influence on the region, creating jobs, businesses in sectors and capital flows. [29] Bydgoszcz Waterway Junction like both waterways should be a part of comprehensive network.

**Conclusions**

Inland water transportation or inland navigation is very significant mode of cargo transportation, its role is locally significant for the passenger transportation in comparison to other inland modes. [30] Inland shipping developments often take place as a result of the developments of the major gateway regions in Europe. Inland waterways are often directly connected to seaports. [12] According to transport policy of European Union, the actions to increase the turnover of cargo volume are undertaken.

The role of Polish inland shipping is marginal. The biggest threats are connected with insufficient infrastructure. Three waterways covered by AGN agreement pass through Poland, none of them achieves the agreement requirements. To make mentioned waterways navigable, they must be upgraded to international standards. To eliminate bottlenecks and increase the share of inland shipping in total volumes, as well as to change modal split, inland water infrastructure must become an important part of national transport policy. One can remember, that transport is a segment of inland water system and all sectors should be concentrated in one institution. The main Polish waterways should be included in TEN-T comprehensive network. It is a opportunity for Bydgoszcz Waterway Junction to handle goods, especially bulk and project cargoes transported from sea ports in Gdynia and Gdańsk. The big chance for Bydgoszcz waterways is proposal to form a “Vistula River Motorway” like a Motorways of...
Streszczenie

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