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The place of inland shipping in transport corridors for oversize cargo

1. INTRODUCTION

Cargo that needs special means of transport and lifting facilities to be moved is called oversize cargo (OC), although other terms are sometimes used, such as outsized, bulky or non-standard cargo, heavy lifts, XXL, etc. It is not precise, and the only definition of the oversize cargo. This is due to the multiplicity of forms which that kind of cargo has, including heavy lifts, overwide, overhigh units and cargo, which exceeds axle load. Their parameters differ from each other, which effects in the multiplicity of means of transport engaged in the oversize transport. Sometimes they are specially designed to transport a particular type of oversize cargo.

Below are oversize cargo definitions in the different modes of transport: road, rail, inland shipping, sea and air transport.

It should be borne in mind that criteria (parameters) for classifying cargo as oversize differ for various modes of transport. What is regarded as oversize cargo in road and rail transport is by no means oversize for inland or maritime carriers.

In road transport oversize cargo exceeds maximum permitted parameters of standard road vehicle or exceeds permissible axle load of the vehicle. In consequence, there are oversize vehicles instead of oversize cargoes.

In rail transport oversize cargo exceeds standard loading gauge or exceeds permissible axle load of the railway. Such a situation is called extraordinary delivery, which means, such transport can cause difficulties in rail transport and it is necessary to take special technical and/or operating actions.

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In air transport oversize cargo is such cargo, which cannot be located in air container or on special consolidation unit. The only way to transport it is to use the special transport airplane.

In inland shipping oversize cargo is cargo, that overcomes the vessel's length or/and width or which overcomes the standard air draft of the vessel (vertical clearness of bridges, gates etc.). It is taken under consideration the restricted visibility of the helmsman as well.

In the sea transport the oversize cargo is defined as: break bulk or general cargo unit, which overcome the parameters of standard cargo units. It means, it weights hundreds or even thousands of tons and its dimensions are counted in tens or even hundreds of meters [2].

2. OVERSIZE CARGO IN INLAND SHIPPING

In inland shipping oversize cargo is divided into two types.

The first type of oversize cargo includes:

Ships, which at least one parameter is inconsistent with requirements given in appropriate regulations on shipping on inland waterways, that means:

- length, width, height of the highest indivisible part of a ship, draught, speed of a ship/combination of ships, are not corresponding with operating parameters of waterway, on which oversize transport is planned,
- ships' maximum dimensions, the highest number of ships lashed together and either pushed or pulled by tugs, the permissible draught in relation to the transit depth, the permissible speed on the waterway, are not corresponding with requirements described in local law regulations,

The second type of oversize cargo includes:

- cargo protrudes from ships' hold and exceeds permissible height, taking into consideration the highest indivisible part of the ship, the infrastructural parameters of the waterway (bridge vertical clearance, lock gates) and helmsman's limited visibility,
- cargo protrudes beyond the horizontal outline of the ship.

State institution engaged in inland shipping oversize transport is the Inland Navigation Office (Urząd Żeglugi Śródlądowej - UŻŚ), which administrates waterways and inland shipping traffic. The institution issues permissions for shipowners transporting oversize cargoes/ships. The following companies are experienced in inland shipping transport of oversize cargo: ODRATRANS SA, Navigar Deneko Garbień Sp.j., Odra Lloyd Ltd., etc [8].

In inland water transport oversize cargo transport is regulated by:

- Ordinance of Infrastructure Minister of April, 28th 2003 on regulations for shipping on inland waterways,
- Local law regulations published by appropriate territorial Inland Navigation Office Directors. For example for lower section of the Odra river there are:
  - Ordinance of Inland Navigation Office Director in Szczecin from June, 7th 2004 regarding local law on inland waterways.
  - Ordinance of Inland Navigation Office Director in Szczecin from December 4th 2009 regarding shipping on the border waters of Oder, West Oder and the river Lusatioan Neisse.

Regulations for shipping on inland waterways describe, that oversize carriages in inland shipping as special deliveries, which can take place only on the base of permission. It is issued, upon request of shipowner, by the Inland Navigation Office appropriate for the place of the beginning of the route. For every special transport requirements the ship's crew should be given. The crew members have to comply with the appropriate requirements of shipping regulations and requirements on professional qualification.

Special transit routes in inland shipping are identified in the application submitted to the Inland Navigation Office appropriate for the place of the beginning of the route. Before issuing the permission, the administration checks shipowner's proposal taking into consideration shipping traffic safety. Eventually, if it is possible, the route is optimally adapted to the operating parameters of the ship/combination of ships and to the parameters of the waterway.

Documents needed to apply for the permission are enlisted below:

- valid navigability certification,
- ship's dimensions,
- cargo stowing and securing plan and information about ship's stability,
- the watertight test for the hulls transported from the shipyard.

The official period to obtain such permission for inland shipping oversize transport is 2 weeks, in practice:

- the Inland Navigation Office in Wrocław – 3-7 days,
- the Inland Navigation Office in Szczecin – without delay if the permission requires an inspection of the vessel and the inspector cannot perform it on the day of application - then 2-3 days.

The period of validity of the permission - a depends on the length of the route planned for the boat and the final date is always given in considerable extension. The weather conditions, the state of water, possible delay due to breakdowns of facilities are always taken into consideration.

In years 2007-2009 the Inland Navigation Office in Szczecin issued 10 permission to carry large loads, and 21 permission associated with vessels of exceeded size [6]:

2007

–7 permissions related to the exceeded dimensions of ship,
–8 permissions related to oversize cargo,

2008

–7 permissions related to exceeded dimensions of ship,

2009

–7 permissions related to the exceeded dimensions of ship,
–2 permissions related to oversize cargo.

The Inland Navigation Office in Wroclaw issued, in the years 2007-2009, in total of 50 permits, primarily related to the exceeded dimensions of ships [7].

3. INFRASTRUCTURE OF INLAND WATERWAY TRANSPORT

The following types of vessels are used in the inland waterway transport of the oversize cargo:

- motor barges and barges without propulsion,
- tugboats and push boats with train of towed or pushed barges,
- pontoons.

In general, these are the standard vessels with reinforced bottoms and sides, suitable to carry different heavy lifts.

Inland waterways are divided into seven classes, depending on the permissible parameters, including:

- the air draft (minimum clearance under bridges, pipelines and other devices crossing the waterway overhead),
- the minimum draft (clearance of the water under keel).

The higher the class of the waterway, the better are conditions to carry oversized cargo. Class V offers better technical parameters, i.e. bigger permissible draft, easier manoeuvrability for watercrafts, larger clearances under bridges, allowing safer transport of oversize cargo then the lower classes.

The main inland waterway in Poland is the Odra Waterway, along with the Gliwicki and the Kędzierzyński Canals. However, there are foul navigational conditions, i.e. depth of the main transit, in the central section of the river from Brzeg Dolny to the estuary of the Warta river. Therefore, transport between the upper and lower section of the Odra is not possible during the most of the navigation season [4].

There are many Polish inland ports (Fig. 1), but most of them have been closed due to poor condition of the Polish waterways.

Fig. 1. Sea ports, inland shipping ports and waterways

The restrictions in inland shipping are specified in local law issued by the Inland Navigation Office. Limitations are related to the dimensions of the navigable routes, locks and clearance under bridges, pipelines and other devices crossing the waterway, the width of the bridges and the depth of the shipping route.

The administration ordinances give such particulars as the dimensions of vessels and towing trains permitted to navigate on specific sections of waterways.

4. PROSPECTS FOR OC TRANSPORT IN THE REGION OF NORTHERN POLAND

Prospects for the future carriage of oversize cargo in Poland cannot be limited to the regions of Northern Poland, as these areas are not densely populated, except such city areas as Szczecin, Gdańsk, Gdynia, Bydgoszcz and Toruń. The northern territory of Poland is to a large extent covered with forests, and agriculture is its major sector.

An analysis of the spectrum of enterprises across the country indicates that the majority of potential senders or recipients of oversize cargoes is located in the central or southern part of the country.

Besides, the central part and south of the country are criss-crossed by pan-European transport corridors running along east-west and north-south directions and, consequently, have better road and rail infrastructure than the north. It follows that the region under consideration will be mostly a transit area for OC transport. At present the main north-south OC transport routes connect major seaports with a number of industrial areas.

Investment plans in Poland for the years to come include a few thousand projects, many of which require oversize transport. In connection with the EURO 2012 event, many express roads and motorways are being built or modernized, which involves new junctions, ring roads, flyovers and bridges.

One of the most important investment projects in Poland in the nearest future is the construction of a nuclear power plant in Żarnowiec.

The construction of gas-fired power plants, gas blocks in power plants, and gas blocks in power stations and biogas production plants is justified by a need to diversify the sources of natural gas supply and the necessity to produce energy from other than coal and gas sources. Additionally, there are plans to build a number of underground gas storage facilities, a major component of the national gas transport system [3].

Other large investment projects, where oversize cargo pieces will have to be transported, and which are supposed to increase the inland cargo transport volumes, are part of the planned modernization of waterways. One project will aim at the modernization of the Odra Graniczna (Border Odra), while Wrocław authorities make efforts to regulate the Odra River along the section to Malczyce. Dąbie, one of the largest lakes in Poland, will be deepened to increase its economic potential. The navigable route running from Schwedt (Germany) to Zatoka Pomorska (Pomorska Bay) will be upgraded to enable navigation for river-sea vessels. To increase the accessibility of harbours located along the Odra mouth for inland shipping, the railway bridge over the Regalica River (at 733.7 km) will be rebuilt according

to the programme of Szczecin-Wrocław railway modernization. The plans for the Vistula River include a dam in Nieszawa. The concept of modernizing the international E-70 waterway (including the Vistula-Odra waterway) is being developed with the aim of upgrading the whole route parameters to class II. Another project that is likely to be executed is the construction of a canal known as the Danube-Oder-Elbe Link.

Investments planned in the seaports of Szczecin, Świnoujście, Gdańsk and Gdynia are related to the construction and modernization of road and rail infrastructure from the hinterland in order to imporve port access on the land side. Each port has plans to modernize existing and to build new quays. Świnoujście is the location of the future LNG terminal, while Gdynia will be operating a new ferry terminal.

Companies operating at Special Economic Zones may also be either senders or recipients of oversize shipments.

Another destination of oversize cargo pieces will be future wind farms. The selection of their locations depends on local meteorological conditions. In this connection, the area of Zachodniopomorskie voivodeship is regarded as the most attractive (at present 50% of all such projects in Poland are being implemented there), followed by Pomorskie voivodeship (33% of national investments of this type) [8].

5. CHARACTERISTICS OF OVERSIZE CARGO TRANSPORT ORDERERS

Companies ordering oversize transport services include various firms, operators and government institutions. However, it should be borne in mind that places where oversize cargo is sent and received differ from the headquarters locations of the OC transport orderer or recipient. Transport operations are usually carried out between the place of production and destination.

The area of Northern Poland was examined in view of OC transport under the Oversize Baltic program. Besides, the transport corridor linking Berlin and Moscow was reviewed on the grounds that it is the main east-west link that has proper infrastructure capable of accommodating OC transport.

The following factors were taken into consideration in determining places of production and reception of oversize cargoes:

- existing and planned wind farms,
- special economic zones,
- presently executed and planned investment projects.

Example locations of currently executed and future investment projects, and OC manufacturing sites are shown in Fig. 2.

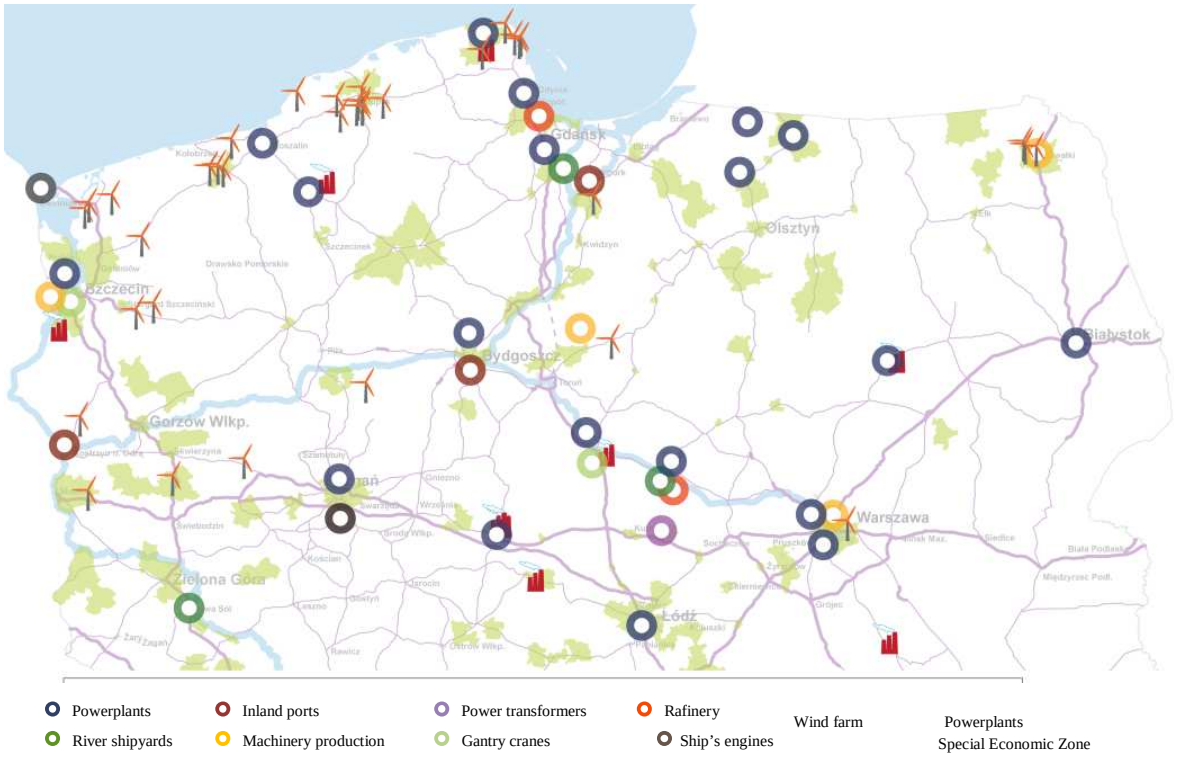

Fig. 2. Potential sites of manufacturing and reception of oversize cargoes

6. OVERSIZE CARGO TRANSPORT CORRIDORS

In 2006 the European Commission issued guidelines on good practices for oversized vehicle transit in Europe. These guidelines, jointly developed by European sector experts, member states and EU Commission, are aimed at facilitating effective performance of OC transport within the territory of the EU, enhancement of operations relating to this kind of activities and introduction of greater transparency in the area of OC transport. One of the main issues emphasized in the guidelines is the designation of transport corridors for oversize cargo. These corridors should comprise economically important roads e.g. paid motorways included in the E-way programme, other motorways, roads leading to industrial areas, ports, container terminals etc. Information on such corridors should be available for all parties dealing with oversize transport: carriers, police, permission issuing authorities, bodies responsible for bridges, roads, tunnels etc. Then the oversized vehicle operations could be carried out on roads best suited for the purpose, belonging to the road corridor network where simplified application procedures are used [9].

OC transport in Poland uses mainly public transport infrastructure. While issuing a permission for OC transport, decision makers in the first place take into account the infrastructure located along the east-west and north-south transport corridors.

In case of road network, priority is given to motorways, express roads, other national roads, then voivodeship, country and rural roads. In rail transport, recommended routes are mainly the lines indicated in consultation with AGC and AGTC.

Planners of OC transit routes seldom consider intermodal transport, combining more than one mode, if there is a possibility of OC carriage by one, rail or road transport all the way from the sender to the recipient. In other cases the transport by sea or river is used, where the basic un/loading locations are sea and river ports. Air transport is occasionally used.

Analyses indicate that practically there is no cargo transhipment between rail and road vehicles. Rail transport is considered as a worse alternative to road transport (even if such possibility exists), as this incurs additional costs. Obviously, OC transport by road is for carriers the easiest and the cheapest method of carriage of this type of goods. This is due to the fact that road carriers do not incur any costs of the replacement of that requires more frequent modernization as a consequence of greater loads. In this connection, introducing any changes in OC transport aimed at shifting part of the freight to the railway is a difficult task.

7. METHODOLOGY OF DESIGNATING TRANSPORT CORRIDORS

The EU transport strategy recomends increasing the share of maritime, river and rail carriage in oversize transport. For this reason the infrastructure of all modes of transport has been taken into account in preparing the concept of transport corridors. Besides, it has been assumed that corridors for OC transport should mainly make use of the existing TEN-T – Trans-European Transport Network. However, it has turned out that in the area under consideration, these corridors run only along the north-south direction. Therefore, the examined area has been extended to include the Berlin-Moscow corridor.

The process of determining transport corridors began with collecting the maps of the existing roads, rail tracks and inland waterways that are adjusted to accommodate oversize transport, then the point infrastructure was mapped, e.g. sea and inland ports that may become major reloading sites for OC carriage. Later the maps were supplemented with infrastructure to be built or modernized till 2020 and which will be adequate for OC transport (Fig. 3). The next stage was the mapping of potential points of sending and reception of oversize cargo [1].

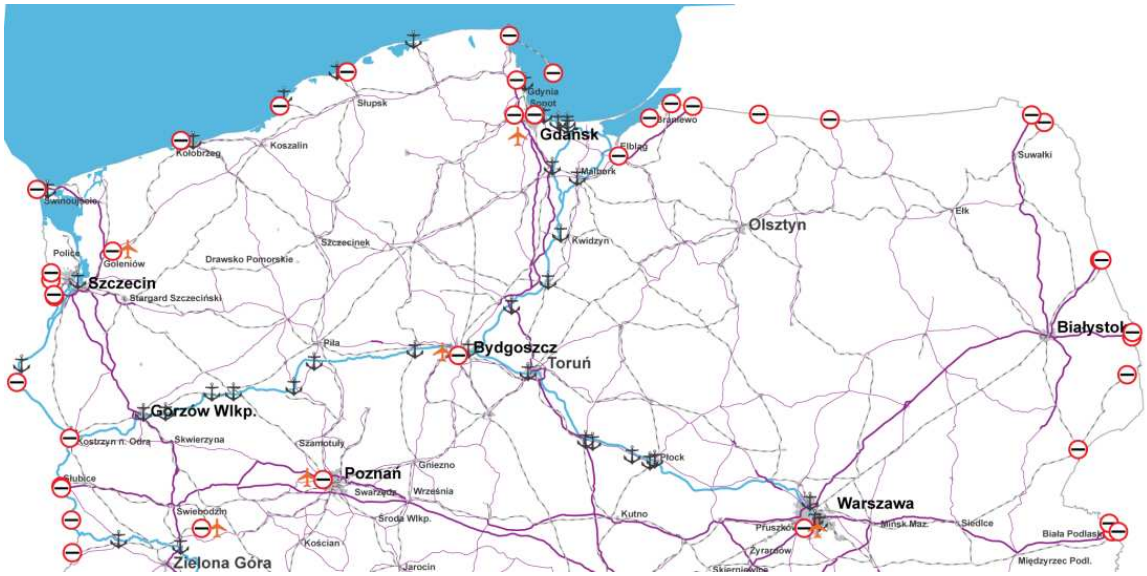

Fig. 3. Transport infrastructure adjusted to OC transport

Fig. 4. Intermodal transport corridors for OC transport

OC transport corridors (Fig. 4) were determined by taking into account places where oversize goods are manufactured, places in Northern Poland to which such goods may be sent, the road, rail and waterway networks, potential points of transshipment to other modes of transport [8].

The corridors indicate OC alternatives to road routes and potential sites of intermodal OC transshipment.

8. CONCLUSIONS

Main barriers of oversize transport development in inland shipping are associated with waterway parameters (draft, air draft, breadth of canals and bridges, etc.). Therefore, the physical limits of the ship and waterway are playing effective role in ensuring the security of oversize transport. To create conditions for the development of OC transport in Poland, new investment and modernization projects should account for this type of transport.

To restrict the road transit of oversize and redirect it to the other modes of transport, it would be advantageous:

- to promote water transport as safer, energy sparing and environment friendly,
- to promote water transport as the alternative for oversize transport, where the limits, at least the weight limits, are easier to follow,
- to award the carriers shifting their cargo from the road to the water, e.g. with tax deductions (for CO2 reduction, environment protection, etc.).

Another very important aspect of OC carriage intermodality is that permission-issuing bodies should enforce the use of waterways and railways on carriers in order to relieve congested roads.

Poland has a unique potential to transport OC in the most effective way due to the extensive network of waterways. Waterways are an excellent extension of the maritime connections with node role of Polish sea ports. With the use of EU funds Poland can improve inland waterway transport infrastructure so that it is possible to have year-round transportation of cargo. This will allow redirecting much of the OC loads of roads, which currently seem the only possible alternative for transport OC in our country. The investment horizon for 2020 seems to be realistic in this context.

MIEJSCE ŻEGLUGI ŚRÓDLĄDOWEJ W KORYTARZACH TRANSPORTOWYCH DLA ŁADUNKÓW PONADNORMATYWNYCH

Streszczenie

W artykule przedstawiona zostanie koncepcja korytarzy transportowych dla ładunków ponadnormatywnych (ŁPN) w regionie Południowego Bałtyku i miejsce żeglugi śródlądowej w obsłudze tego typu przewozów na obszarze Polski. W artykule przedstawiona została metodologia wyznaczania korytarzy tego typu, a także ich planowany przebieg dla obszaru Polski.

Słowa kluczowe: transport ponadnormatywny, korytarze transportowe, żegluga śródlądowa

THE PLACE OF INLAND SHIPPING IN TRANSPORT CORRIDORS FOR OVERSIZE CARGO

Abstract

The paper presents a concept of transport corridors for oversize cargo in the Southern Baltic Sea Region. The paper presents a methodology for designation of oversize transport corridors and place of inland shipping in oversize cargo service.

Key words: oversize transport, transport corridors, inland shipping

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