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METHODOLOGY OF CREATING MASTER PLANS FOR THE PORT INDUSTRIAL AREAS ON THE EXAMPLE OF THE PORT OF GDAŃSK

Abstract

The Port of Gdańsk is situated at the intersection of the principal European transport routes, being the most convenient connection both between Central and Eastern Europe and Scandinavia and between Western and Eastern Europe. Additionally, for countries such as the Czech Republic, Slovakia, the Ukraine, Belorussia and Hungary.

Following a brief examination of the role of port of Gdańsk as factor for industrial and urban development and taking into consideration the port strategy activity this paper presents the methodology of creating Master Plans for port industrial areas.

1. The Port of Gdańsk over the last twenty years

The Gdańsk Port complex, like the City itself, has a thousand-year-old tradition. Being bound up with its tradition, the Port of Gdańsk takes now a leading place among the Baltic Sea ports, and is simultaneously the largest Polish port handling over 40 per cent of all the goods transported by sea during the recent years. Owing to a developed cargo handling and storage function stabilized by the Northern Port (Port Północny) built in the 1970 s, as well as a significant shipbuilding and processing industry, the port complex of Gdańsk has also become the main economic centre on the Polish coast, and the centre of the Polish marine economy.

Today's layout of the Port of Gdańsk was formed in two periods: the internal port, on the turn of the 19th century, and the Northern Port in the 1970 s. Because of the Northern Port the cargo handling of Gdańsk rose from 10 million tons in 1970 to 28,3 million tons in 1978, to become stabilized over the next 20 years reaching 18,2 million tons. The last 20 years were also a time of investment regression in the Gdańsk Harbour. It was also a difficult time for the harbour industry.

Despite a deterioration in economic activity, the problem of natural environmental pollution rising in harbour area is gaining wide significance. The protection of the natural environment is particularly significant due to the necessity to protect some unique historical objects situated in the harbour and its close proximity, which are exposed to harmful activity of numerous pollutants.

Table 1. Cargo handling in the Port of Gdańsk in the years 1978-1996

SPECIFICATION	1978	1991	1994	1996
	in millions of tons			
Total	28,3	16,7	22,1	16,8
Coal	11,7	5,2	9,7	6,1
Ore	1,2	-	-	0,2
Other goods in bulk	4,5	3,2	2,5	2,9
Cereals	1,5	0,2	0,1	0,4
Timber	0,5	0,2	0,2	0,1
General cargo	2,2	2,1	2,3	1,9
Liquid fuels	6,8	5,8	7,4	5,2

S o u r c e: Restructuring process of the Port of Gdańsk in 1991-1994, Gdańsk, February 1995.

Taking into account the general tendencies in trade and marine transport the Port of Gdańsk has some advantages over other Polish sea ports. Among them are, first of all, deep sea areas enabling to service the largest ships which can enter the Baltic Sea and the adjacent large development regions. The shortest connections via Gdańsk by motor roads and railway lines are possible from Northern Europe to the entire economic background area covering both Poland and Central Europe, as well as Belorussia and Western Ukraine. The Port of Gdańsk situated in the Vistula estuary possesses potential conditions for the development of inland water transport. Even now it is possible to send barges loaded with freight from Gdańsk via the Vistula Bay to various port in the Kaliningrad region and to Lithuania. In the further future the Port of Gdańsk can find its place in the European system of East-West midland water ways.

2. Master Plan for the Gdańsk port industrial areas

The setting up of a new Board of Directors of the Port of Gdańsk landlord type participated by the city, the development of trade by Poland with overseas countries, and the rising environmental protection requirements have given new challenges to the Port of Gdańsk connected particularly with a complex development of the harbour-industrial areas.

It has been necessary to take into consideration in the town and country planning all the aspects related to the management of the integrated harbour area covering both the terrain in use at present and the sea areas, as well as prospective terrains.

The new concept of harbour development planning should take into account not only all the functions required by a port, like, cargo handling and storage, commerce and distribution, industrial and administration, and service functions, tourism but also town and country planning, economy and social policy of the local authorities, and the environmental protection requirements which must be satisfied in the area of the port. Such a formulation of the harbour subject-matter is presented by the Master Plan for the Gdańsk Port Industrial Areas elaborated in 1994-1996. The Plan integrates the town and country planning, the economic and the social elements into one whole, with a simultaneous emphasis on the links between the area under analysis and the harbour town and the region. The Master Plan consists of three parts comprised by 14 volumes. The first part deals with some preliminary subjects, such as identification of the area, delineation criteria and the determination of the boundaries of the region included in the plan, and physical characteristics of the grounds and the sea areas and their use. The Plan also refers to the investments made related to the natural

environment protection in those areas. Also an engineering-operational assessment has been made with regard to the shipment links from the harbour-industrial complex to the economic background area.

The second part refers to prognostic factors determining the development of the Gdańsk port industrial complex. There have been prepared some scenarios for external and internal circumstances, and prognoses relevant to the harbour market and cargo handling turnover, passenger traffic, development of harbour industry logistic and distribution functions, size and type of ships and new technologies in use.

Part three deals with the development strategy the Gdańsk Port industrial complex, tendency towards prospective shipment connections with the economic background area and the foreground, the principle and design of the spatial layout for the economic activation of the Gdańsk port industrial complex.

The project includes propositions for the layout of cargo handling – storage, ferry and passenger terminals and sailing-boats haven, and harbour industry centres (shipbuilding and processing industry), distribution logistic, and harbour administration centres, etc.

The project includes also the harbour internal vehicular, railway, midland water, and pipeline transport system.

The financial investment estimations for the engineering infrastructure of the harbour and the preparation of terrains for economic activity have also been made. The basic data related to the concept of the plan and the solutions are in the synthesis of the Plan.

It has been assumed that the primary scale of the graphic part of the plan will be 1:10 000. The links with the environment will be given in a scale of 1:25 000, while some selected studies of details, in scale 1:5 000, or 1:2 000.

3. Strategy for the development of the Port of Gdańsk

To achieve a strong and stable position on the Baltic harbour market by the Gdańsk Port it is necessary for the Harbour Board of Directors to accept a competence strategy whose main feature is its attitude to the surroundings with which the Port competes, that is, its economic background area and the foreground, as well as its land transport systems. The mission of the Gdańsk Harbour Board of Directors is to link tradition with modern deepharbour engineering, ensuring fast, safe and effective stevedoring of the largest ships that can enter the Baltic Sea, and a gradual transformation of the Gdańsk Port to an international distribution centre of marine trade service.

In the strategy of the Gdańsk harbour economic development, priority was given to:

- strategic investments for the country's economy (ensuring capabilities for handling and storing imported oil, and ore, or for the export of Polish coal) and such investments that:
 - increase the freight and passenger turnover responsible for the rise of the value added acquired by the ports;
 - implement modern technologies in the harbour, integrated with sea and land transport;
 - are friendly to the natural environment which limit the pollution and improve the safety requirements for ships and cargo;
 - increase the accessibility to the harbour from the sea and the land;
 - modernize and build up the harbour engineering infrastructure, including the hydro-engineerings system;

- assist in the rise of the harbour compatibility determined by such factors as, quality, cost, delivery time, safety, speed, reliability.

Taking into consideration the above tasks, the strategic activity of the Board of Directors of the Gdańsk Port on the turn of the XXIth century will concentrate attention on:

- finding investors to ensure that the areas of the Northern Port will be used effectively. This undertaking will make it necessary not only to do an active investment marketing but also to prepare the harbour infrastructure inclusive of the hydro-engineering and the transport system necessary for the projects;
- restructuring of the general cargo port to adapt it to fulfil its function as duty-free area, with effective service for multimodal transport, and with logistic-distribution competence;
- undertakings intended for increasing general cargo turnover, and also winning navigation companies servicing the Baltic and the North Sea;
- variation of function of some industrial areas adjacent to the urbanized quarters, e.g. some shipyard areas close to the centre of Gdańsk;
- improvement of communication links of the Port with its town and the economic background area accompanied by cooperation with the municipality and the central administration;
- taking advantage of the midland navigation system, including the harbour water regions situated in the centre of the town to create sailing-boat havens;
- investment projects aimed for industrial waste product development, primarily phosphates and ashes from the heating power station, as well as undertakings limiting the harmful effect of the harbour on the natural environment;
- initiatives intended for an extension of the economic background area of the Gdańsk Port to the East-European countries, particularly, Russia and Belorussia for the purpose of gaining transit freight on the way from the East to the West.

4. Prognosis of the port traffic development

The Gdańsk Port cargo handling prognosis is based on the assumption that during the next fifteen years no significant recession in the world's economy will take place.

There will be created some advantageous conditions for economic development of Poland and other Mid-European countries. The mean annual rise in the dynamics of the Polish foreign trade turnover will be higher by 2-4% in relation to PNB dynamics.

The modernization of Polish transport will be followed by combined transportation and a significant marine carriage as a communication system friendly to the environment, whereas the ferry and ro-ro short distance lines will become an integral part of the European transport system within the North-South transportation channel.

However, a strong competition of Germany and the Netherlands connected by effective transport system with the economic background area of the harbour, as well as other Polish ports, will be a factor limiting the growth of the cargo handling dynamics of the Port of Gdańsk.

The prognosis of the Gdańsk Port cargo handling turnover elaborated within the Master Plan for the Gdańsk Port Industrial Areas anticipates that in 2010 the goods traffic can reach 41-62 million tons, that is, it will be higher by 120-240% in comparison to the turnover of 1997.

The cargo traffic of the Gdańsk Port will be dominated by oil and its products whose share in the total turnover will amount to about 50%. The share of coal will reach 15-17%.

It is estimated that in the nearest 15 years, large quantities of ro-ro and container general cargo will pass through the Port of Gdańsk as a result of Polish maritime commerce and the transit system.

The handling of cereals is expected to rise a dozen times. Some large loads of ore handling are anticipated to take place and new cargoes, like, liquid gas, cars, fluid chemicals, and others, will appear to be transported.

The growth dynamics of the goods traffic of the Gdańsk Port will be determined in the next 15 years by transit orders, mainly from the eastern economic background territories. It has been assumed that the transit cargo traffic in the year 2010 can reach 10-24% of the Gdańsk Port total cargo handling capacity.

5. Directions of development in cargo handling, storage, and processing terminals and in distribution

With regard to the development directions related to the handling-storage function of the Gdańsk Port priority will be given to terminals handling bulk commodities, such as liquid fuels, cereals, ore, and with respect to general cargo, mainly ro-ro and container type of handling. The basic investment will be centred in the Northern Port, where special deep-water terminals will find their place, particularly for goods in bulk. The terminals will be connected with each other by technological systems with distribution and processing centers.

The estimated rise in the general cargo traffic, variation of displacement technology, and maritime trade make it necessary to carry out a reconstruction of the current general cargo potential of the inner port, aimed at its preparation for bigger cargo traffic in containers and by using ro-ro system, as well as for servicing passenger and car ferries, and railway ferries.

The modernization process and the development of harbour objects and cargo handling equipment in the internal Port of Gdańsk will concentrate attention on modernizing the cargo handling technology together with higher safety assurance and protection of the natural environment, and construction of new wharfs, mainly for ro-ro ships and ferry boats. It has been decided that the wharfs currently used for handling bulk commodity located in the internal port will not change in an evident way their functioning in the nearest 15 years, apart from diversified forms of cargo handling.

Promotion of taking advantage of general cargo conventional wharfs of the Gdańsk Port will mainly depend on the free-duty zone activity and the development of the distribution-logistic function.

A natural direction of great significance for the development of the Gdańsk Port is the passenger service of ferry-boat traffic, passenger ships, and yachts, as well as other means of water sports.

6. Development trends in harbour industry

The harbour industry of Gdańsk covers an area of about 720 ha. In the Master Plan a reserve of another 330 ha is made for the development needs. The industrial subject-matter of the Plan deals with two spheres: the development of the existing industrial enterprises and preparation of new areas for industrial needs.

According to the Plan it is estimated that by the year 2010 the industrial plants currently in use will have been modernized and developed, putting into effect modern proecological technologies and thereby increasing the productivity and consequently use the terrain more effectively. The development of the plants will have a strong effect on the stevedoring technology of the harbour. There is not anticipated any significant rise in the shipyard output. The investment activity will concentrate on reconstructing and updating the current production potential. The spatial rationalization of the technological processes in shipbuilding industry will result in reducing the area taken up by the shipyards and returning part of the regained areas, mainly the ones that border the centre of the town, to the municipality. The new industrial areas are situated in the region of the Northern Port and are classified in the second harbour zone. In the development programme of this area priority is given to construction of cargo handling-storing-processing complexes, with a simultaneous strict limitation laid on location, due to regulations required by natural environment protection.

7. Siting project

The Master Plan covers an area of approximately 5,6 thousand ha including about 3,9 thousand ha of land (2 000 ha being actively utilized) and about 1,7 thousand ha of water area.

The adopted philosophy for further development of the complex, first of all, emphasizes - the utilization of reserves situated within the complex and in consequence an intensification of the use of space and its subordination by modernization, restructuring and revitalization of some specified sites, a reduction of the environmental results connected with the development of the harbour and the marine industry to a minimum, which can successfully be achieved provided that the decision related to spatial planning are consequently undertaken and put into effect.

The functional - spatial structure of the internal port is dominated by terrains of intensive investments which have already been partly decapitalized. The development processes in this part of the harbour will mainly deal with restructuring and modernization of the port-industrial potential. At this place the problems necessitating the protection of the cultural heritage, revitalization of the historical monuments, and old wharfs focus.

Here also one is aware of the necessity to extend the links of the harbour with the town. Some negative effects of the harbour and industry on the surroundings are found here as well. It is estimated that the restructuring processes in this part of the harbour will comprise an area reaching 400 ha.

The Northern Port is an area which is incompletely invested, capable of accomplishing investments adequate to the latest word's tendencies. The parameters of the hydro-engineering infrastructure enable to service the largest ships entering the Baltic Sea. This part of the harbour has at its disposal the major terrain reserves designed for the nearest future for the construction of a harbour-industrial complex to satisfy the highest siting requirements with respect to both the depths and widths of the water areas. The total area of the terrain which reaches 350-400 ha.

The main problem conditioning the activity of the Northern Port reserves is the quality of the communication connections with the economic background area, particularly with respect to motor-road transport. The development processes in the Northern Port will be focused on the construction of new cargo handling terminals and handling-processing complexes, as well as the development of some auxiliary functions accompanying them, in the farther background area of the terminal, along the main communication system.

The development of the areas belonging to the Northern Port, which are situated farther east, comprise an area amounting to over 400 ha. It is possible that a social conflict can arise due to the necessity of cutting down a forest on the dunes and a limitation and liquidation of some municipal beaches. The conflict can be by preparing new terrains that can take over the recreation functions prior to execution of the harbour investments.

8. Development of harbour areas adjacent to the town and solutions to communication systems

The existence of the centrally controlled economy that was in force for almost half a century has led to the disappearance of natural social- economic links binding the port with the town. The contacts between the port and the town, which have recently been rebuilt, favour to initiate transformation in developing the bordering areas. This refers mainly to the residential quarters situated within the Master Plan. These areas should be withdrawn from civilized collapse and fed up with functions typical of harbour quarters all over the world, i.e. a network of service firms, insurance offices, banks, hotels, etc.

The harbour area bordering the downtown of Gdańsk will also be subject to some historical transformations. Part of the shipyard areas taken over by the town will make it possible to regain contact with the wharfs and berths by the region of the midtown of Gdańsk, and to create a chance to expose the thousand-year-old connections of the town with the port and the sea.

The Master Plan assumes to build in the newly -gained areas a well-equipped complex to service the passenger traffic, as well as to develop other service functions favouring the integration of the port with the town.

The activation of the economic functions of the harbour (particularly, the cargo handling and storing services, containers and ro-ro freights, distribution and logistic service, and servicing passenger liners and ferry-boats) integration with the municipal organism, intensification of the harbour space utilization, and also creating facilities for access to the reserve terrains and their development is associated with a necessity to improve the communication system from the harbour-industrial areas to the close surroundings and the economic background in the country and abroad. Of course, this also calls for development of the harbour internal transport infrastructure.

9. Protection of the natural environment

Protection of the natural environment is one of the strategic objectives of managing the industrial areas. The concentration of the economic activity in these areas presents a serious hazard to the natural environment of the harbour and the agglomeration of Gdańsk, which consequently leads to the deterioration of the living conditions of its residents. The Master Plan specifies the following priority directions of activity related to the protection of the natural environment of the harbour and its close proximity:

- Protection of recreational and natural areas, and terrains of cultural heritage;
- Limitation of industrial wastes produced in the region comprised by the Gdańsk Port-Industrial Areas and aid offered to undertakings connected with the waste utilization;

- Protection of the atmosphere against pollution originating from the harbour-industrial activity;
- Protection of harbour water areas against contamination by adapting the harbour equipment according to IMO and HELCOM conventions;
- Protection of the environment of the residents living in the Gdańsk agglomeration by cooperation with the Municipal Council, through creation of protection zones around the harbour, noise fighting, and the like.