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To cite this article: Piotr Lorens 2019 *IOP Conf. Ser.: Mater. Sci. Eng.* **603** 052049

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Reshaping the Gdansk harbor – the continuous process

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Abstract. Gdańsk is the harbor city with a history of more than 1000 years. For many centuries the harbor structures were evolving within the central part of the historic city center, and – as a result – specific urban structures associated with these functions were created. But the evolution of the maritime technology, as well as new needs regarding servicing the ships and cargo-handling activities, affected in the creation of the more modern facilities, within the article, a reflection regarding these issues is presented, which takes into account both the global trends in harbor developments and the local specifics of the city. As a result, the article can serve as the reference paper for the research associated with the evolution of the ports and port cities.

1. Introduction

Gdańsk is the city of a thousand years of rich history. Since the medieval times until the beginning of the XIXth century, it was recognized as the largest Polish city and one of the major centers of trade in the entire Europe. This position was based on the location of the city in the mouth of Vistula river delta, which was used for shipping enormous amounts of grain and other crops from Poland to the western and northern parts of Europe. Gdańsk derived its power also from being one of the most important members of Hanza – the medieval association of trade cities.

Now the city – the capital of Pomerania province and capital of the Tri-City Metropolitan Area – is one of the major business and tourist destinations in Poland and one of the strongest urban centers within the Baltic Sea Region. Its harbor is constantly under expansion and reconstruction, which makes possible interesting new waterfront and waterfront-related development developments.

2. Three generations of the harbor structures

The history of the development of port cities is inseparable from the technological evolution of the sea transport, including the methods for goods reloading and their processing. This evolution has had a great influence over the shape, development and, finally, the degradation of waterfronts in cities, including old and present port structures [1]. The changes in the interrelation between the port and urban structures can be described in different ways; such a model study of the issue, widely accepted and quoted in the literature, has been prepared by B. Hoyle [2]. The above process can also be described in relation to the evolution of port structures, resulting in the appearance of various types of former-port areas, i.e. waterfronts. Using this method, one can indicate three stages of the development of the city-port structure (Table 1):



Table 1. Stages of the development of the city – port structures

Stage	Level of the city – port integration	Type of port structure	Type of waterfront
I	Full integration. Urban and port structures are strictly interrelated. From ancient time to the early 20th century	1st generation of port structures – located in the natural sea or river quays, or on piers – adjusted to small vessels. Organic and spontaneous development of port structures.	Waterfront used as the reloading area.
II	Separation of port and industrial from purely urban structures. The early 19th to the mid-20th century	2nd generation of port structures – located in natural or artificial quays, suitable for various new types of vessels – steam ships. Port development planned by individual (rarely -co-operating) enterprises which build complex wharves, warehouses, docks, etc.	A-type waterfront. The transfer of the main cargo to the ports of 2nd generation caused the abandonment of the 1st-generation ports, derived from the Middle-Ages, and opened possibilities for the adaptation of the area left by the 1st-generation ports for different purposes.
III	Complete separation of port and urban structures with an accompanying return of some port functions onto the waterfront of type A (marine tourism, passenger ships, yachting, etc.) From the mid-20th c. on	3rd generation of port structures – developed as specialized reloading bases, bulk-cargo and container terminals, linked to distribution-logistics centers and specialized industry (e.g. refineries), economically linked with areas outside the city or region. The appearance of "harbor regions".	B-type waterfront The shift in cargo processing and the development of modern types of industry cause the abandonment of the ports of the 2nd generation. The area freed by abandoned ports can be adapted to new functions.

The above specification takes into account the two chief revolutionary changes in the mode of transport and storage of goods, resulting in the development of the 2nd and the 3rd generations of ports, and – as a side effect – the abandonment of former port areas, i.e. waterfronts.

For the first of these changes, i.e. the increase in the significance of maritime transport, during the industrial revolution, appears to have been the most important because there appeared the need for the transport of significant quantities of goods. Water transport proved the most convenient and cheapest means for that, while the railway was not developed sufficiently at that time. Moreover, port cities were also the most convenient location for industrial expansion and, also significantly, the acquisition of colonies by European countries and the need for an efficient transport system counts among development-fostering factors. At that time, the average size of a commercial ship was larger than that of the vessels from pre-industrial era, both in size and capacity, which was from 200% to 300% of the

former quality; while the largest trans-Atlantic passenger ships reached even 600% larger dimensions, compared to those from the beginning of the 19th century [3].

However, the 2nd generation of ports could no longer meet the requirements of developing maritime transport technologies. This especially relates to the development of container transport, ro-ro technology and new technologies of bulk cargo handling. These technologies required large storage areas, linked to relatively short quays, and feasible access for large-draught vessels. Therefore, structures suited to these requirements, called the 3rd generation ports, were located far from existing port areas, in the river deltas or on the open sea. Consequently, the ports of the 3rd generation has entirely lost their romantic ambiance with picturesque canals and docks, instead, they are modern, specialized terminals, where large, self-propelled portal cranes reload containers, where general-cargo processing is almost non-existent, and bulk cargo is transported via pipelines and conveyor belts directly to processing plants or storage yards.

The development of the 3rd-generation of ports has also caused a new phenomenon which has trespassed the boundaries of a single city, namely the appearance "harbor regions". This name denotes the area serviced by a given port. In the time of the 1st and the 2nd generation of ports, a given city/town with its direct background was its "harbor region"; only exceptionally, catchment areas sometimes including industrial centers located within them were related to a given sea port, thus becoming a form of the "harbor region". However, the appearance of the 3rd generation of ports has radically changed the situation. Now, the whole country and, even, a group of countries can form the background for a modern fuel terminal. This means that contrary to the 2nd generation of ports, which were prevalently built in existing port cities, the 3rd generation of ports have appeared only in a few of old ports. A classic example for this is the Gdańsk – Gdynia complex of ports where a modern 3rd-generation port Port Północny (Northern Port) serves both cities as much as its reloading capacity permits to do so. Thus, many cities can be located within a single "harbor region", embracing ports of the 1st and 2nd generations; usually, however, there is a single port of the 3rd generation while different cities have separate terminals of various specialization.

The appearance of the 2nd and the 3rd generations of ports, along with "harbor regions", fostered the abandonment of old structures, now useless for the new technologies of reloading and transport. These areas – the former port and related post-industrial areas, including former shipyards, – are now being restructured and revitalized.

Historically shaped waterfronts, despite similarities in their formation in various cities, have different characteristics which stem from many factors. First, one should mention their historical genesis, including "A" and "B" waterfronts, conditions of the location of a port city, such as the spatial layout of the waterfront area (the result of former technological solutions), and finally – the placement of a waterfront in relation to the original shore line. All these elements determine the possibility of the revitalization of a former port area, including the adapted functional and spatial solutions.

Depending on the time each former-port area appeared, these spaces can be divided into two main categories, resulting from the gradual split between development processes of spatial and port structures throughout centuries, as discussed in the chapter before. These categories are:

- **A-type waterfronts**, of ancient or (more often) Mediaeval origins, which are the remains of the port structures of the 1st generation. Their basic features are: small area strictly linked to a city (its historic center), a small number of large-volume warehouses, and a small number of old re-loading devices. Due to their location, these areas are usually attractive as prospective marinas, commercial, service and accommodation program, along with recreational functions.



- **B-type waterfronts**, created in the 19th (or early 20th) century, which are the remains of port structures of the 2nd generation. Their basic features are: vast area, loosely linked with the historic center of a city, the lack of the uniformity of the area (mixed port and industrial area, including shipyards), a relatively large number of remaining structures and objects, including technical devices, warehouses etc. Therefore, these areas are attractive as prospective housing and commercial areas (however, they rarely have the city-center character), as well as recreational or industrial zones.

Both types of waterfronts can be usually found within the structure of a single harbor city.

The current spatial re-arrangement of the port cities results from the decrease in the significance of mass production based on the so called "fordist model". Therefore, the new types of industrial production are not necessarily linked to the close spatial vicinity to particular factories and are often carried-out in small and medium-sized enterprises using the most advanced technologies [4]. As a result, we obtain a progressing phenomenon of a competition between cities and regions, including the fight for capital and work places. This competition reaches now even further – to the level of not only particular cities but also the "functional regions" which have now become a natural module of development. Often, there is still some competition inside such a module, yet this is a deadly threat to the unity of the whole structure, including its position on the world market.

The processes of metropolitan spreading and differentiation of cities, from the international to regional scale, has certainly influenced the position of port cities and their "harbor regions". Many of them have been losing their significance, because of such reasons as:

- quality changes in the technology of sea transport,
- the decrease in capital turnover related to the turnover of goods and commodities,
- the reduction in the functions of ports to that of cargo re-loading.

Simultaneously, the chief role of the modern sea port has changed in comparison to the structures of the II generation. Now, it is to safeguard conditions for convenient, quick and safe reloading of goods. Consequently, the spatial and economic decisions related to it, inter alia: the building of new terminals, the development of existing structures etc., are no longer the domain of urban planning but, often, economic calculation only.

Thus, the relations between a port city and the port itself have gained new significance on the background of the spreading metropolitan character. This particularly pertains to those canters whose economic development previously relied on the sea transport of goods. Here, one can distinguish three groups of port cities [4]:

- **the city as a territorial port** – the center of developed industry, using services and organically linked to port structures;
- **the port city as techno polis** – the center hosting high technology industry, along with housing and service functions;
- **the "protective port city"** – the center where the conversion of the port-related economic system failed, hence it lost its previous economic significance.

Whether a given port city manages to adapt to its new role and conditions created by international competition depends on many factors. The so called "organizing capacity", is one of the most important, being defined as "the ability to react to changes in external and internal conditions which influence the position of the entire metropolis" [5]. One of the manifestations of such ability is the level of being ready to accept and realize the projects for the revitalization of the urban structure, including the waterfront. In many cases, e.g. in Rotterdam, these projects are the new impulse for city

development and enhance the city's attractiveness on the international market of cities and regions. Consequently, the relations between the port and its city, as well as between the city and its waterfront, have become an important factor, often decisive for the competitiveness of the whole structure, in the time of spreading metropolis.

Notwithstanding economic issues, including regional ones, there is another reason why waterfronts have become important for cities. The end of the 20th century has noted a very strong tendency to heal the situation of cities with regard to the environment. The created concept for **sustainable development of cities**, assumes, among others, the limitation in the expansion of urban development onto open spaces and a parallel re-use of already urbanized areas. At the same time, the necessity for the "recycled" use – the revitalization of former urban areas, now derelict, this category also embraces waterfronts. They are also an important element of the new models for the comprehensive coastal management, the main task of which is to ensure the conditions for economic development with the simultaneous protection of environmental values.

As a result, the shaping of contemporary relations between a port city and its port is not a simple task. Numerous conditions of this process make the scale of possible solutions large; moreover, specific groups of issues can be variously emphasized. Yet, whatever model is adapted, the problem of shaping (or rather – revitalization) of the waterfront in a port city remains one of the chief tasks, instigated by both economic and environmental urges.

3. Three generations of the Gdańsk harbor

For the purpose of developing the cargo handling activities in the middle ages, the large inland harbor was constructed on the embankments of Motława River with famous Granary Island. These structures decayed at the end of XIX-th century – when the maritime transport started to demand larger ships not able to enter this medieval structure. Since then the Motława River Harbor has been gradually abandoned, and the wartime destruction has completed the process of removal of the port activities from this area. Now, this site constitutes the very picturesque tourist-oriented area, which also contributes extensively to the strong identity of Gdańsk as the historic harbor of Poland.

But the abandonment of the original harbor did not mean that the cargo handling activities have vanished from Gdańsk. In the course of the XIXth century, the so-called New Harbor in the mouth of the Vistula River was developed. This was accompanied by the development of the modern shipbuilding industry as well as other maritime-oriented industries.

The situation of the city changed dramatically with the end of the World War II. In conclusion of the siege of Gdańsk in 1945, the majority of the historic urban center of the city was completely destroyed, and almost all population was expelled as the city has become a part of post-war Poland. Therefore, one can say that the city was re-born after WWII, as it got a new community and a new urban structure – rebuilt after the war damages. Also, the plans were made immediately after the World War II to relocate the shipbuilding industry into some other place and to develop the shipyard site as the new city center, but they were never executed.

In the course of the post-war redevelopment and expansion, the modern, deep-water terminals were also created. These structures are being gradually developed until today. These include the specialized bulk cargo, oil and container-handling terminals. Recent investments and developments in this sector contribute to the fact that Gdańsk is gradually regaining its historical importance of the main harbor in the Baltic.

Development of the new infrastructure and logistics connections in this area allows further deliberations on the strategies of urban development. These are associated with substantial urban regeneration opportunities as well as with the further expansion of the port and transportation structures.

First projects are already completed, which allows speculation on the potential future of the other transformation areas. These speculations include possible reversal of the entire urban development policy, as substantial urban regeneration areas may become available in the close future. As a result, the port structures may become reconnected to the proper city, and its maritime identity may become reinforced.

In the case of Gdańsk, one can discuss the full sequence of evolving port structures, as well as the appearance of both possible types of waterfronts. Present transformation of the port and its proposed expansion towards deeper parts of the Gdańsk Bay allow speculation on further advancement of the transformation process.

4. Socio-economic background for present Gdańsk harbor transformations

Polish economic and political transformation after 1989 brought an entirely new situation to our cities, which include also the harbor ones. In specific, the existing Baltic Sea ports had to face significant changes. They were associated both with new development opportunities and threats, emerging – among others – from the new geography of logistics links. These were based on the fact that both north-south and east-west transportation corridors were made available, which brought new development conditions to our cities.

Among others, the large share of cargo was redirected from mainland Poland and other former socialistic countries to the German, Dutch, French and Mediterranean ports. This – to a large extent – diminished the economic situation of the existing ports. At the same time, connections to Scandinavian countries were re-opened, which effected in the large increase of the cargo shipment in this direction. Besides these, the Polish seaports had to face rapid changes in the structure of cargo – which includes the emergence of the new type of goods and vanishing traditional type of cargo – including coal i.e.

In order to secure the position and development of the Polish harbor cities, the massive capital improvements program was prepared, based on infrastructure development. It creates new investment opportunities for other partners, associated with maritime transportation and industries. In practice, the new terminals were developed or are under way, which will significantly change the position of the harbors in the regional and global market. These improvements have created also the new situation of the harbor cities. Among these improvements, one can identify both transportation infrastructure, new road access system to the harbor and new deep-water terminals.

At the same time, in order to stimulate the transformation of the numerous waterfront sites, the improvements associated with waterfront public spaces, reinforcement of the embankments and redevelopment of the underwater infrastructure are taking place. Many of these works have already changed dramatically perception of the waterfront sites, but there is much more to be developed.

5. Sites of transition

As a result of these changes and constant evolution of the port structures, one can identify a number of the redevelopment and transition sites. The key ones include: Granary Island and Motława River Waterfront; Young City development project and – last but not least – Vistula River Waterfront.

Besides these, a number of other sites and projects are under discussion but these three represent the biggest development potential and also can serve as the example of the transformation of the waterfronts type A and B.

5.1. Granary Island and Motława River Waterfront

As described above, Granary Island, along with the entire Motława Waterfront, has lost its importance as the key harbor area in Gdańsk at the beginning of the XIXth century. After wartime destruction, the area was never fully rebuilt and only a few sites were actually subject of the transformation process. But within the entire post-war era, a number of plans and studies were made that were to serve as a

blueprint for the complex redevelopment of the site. The final attempt was developed – on the basis of the results of the urban design workshop – by Fischer Atelier in 2007.

Afterward, this study served as the basis for developing the final version of the planning regulation for the site. Since acceptance of this by the City Council, the proper redevelopment process was started, although it goes piece-by-piece and plot-by-plot. This means that each site owner is dealing with his/her own plot, and as a result, the urban structure of the area starts to be much more diversified than in the initial concept.

But despite these issues, the area is being gradually redeveloped which means that this most important part of the Gdańsk waterfront is currently under real reconstruction process. This is further spurred by the development of the new public waterfront promenades and new transportation and infrastructure systems. In result, the entire area is now considered to be “one huge building site”, although the outcomes so far seem to be a bit chaotic and uncoordinated. But – if analyzing the final plans – it seems that the final result will be of much better quality.

5.2. Young City development project

Young City is a large-scale urban redevelopment project, located on the Gdańsk waterfront, on the site formerly used for shipbuilding purposes. It was formed as the real estate project in 1999, shortly after the bankruptcy of the Gdańsk Shipyard and relocation of the shipbuilding activities to the island of Ostrów (located on the northern bank of the Vistula river) and to the part of the former shipyard land located along the Jana z Kolna street. This allowed freeing the major part of the site from the shipbuilding activities and considering the area as the potential urban development area.

The site remained industrial until 1995, when the first ideas were developed to reurbanize the site of the Gdańsk Shipyard. These plans seemed to be very limited in their reality until when the shipyard went bankrupt in 1997. As the entire company was purchased in 1999 by Gdynia Shipyard along with other partners, the new opportunities for redevelopment of the site were created. The owners decided to create a Synergia 99 Ltd as the land developer for the Young City project. Therefore, the Young City Project was developed as a result of the Gdańsk shipyard bankruptcy.

Located very close to the city center, Gdansk's former shipyard is recognized worldwide as a place of outstanding historic significance. It was here that the Solidarity movement challenged the communist system in Poland and encouraged freedom across Eastern Europe. The Former shipyard is recognized by the public not only as a place of the historical importance but also as a symbol of the greatness and spirit of the city.

In the close future, the Young City will become the urban area of metropolitan importance – which means that the mode of its development will have a severe impact on the development of Tri-City Metropolitan Area. This statement is justified by the unique development potential the Young City possesses – this is the only so large and so well located underdeveloped site, which can become a place of development of metropolitan importance types of land use. This includes various commercial and municipal activities as well as city center type of housing – apartments, lofts etc. The need for development of real center of metropolitan importance for the Tri-City area (which is not existing at the moment – each of the cities includes a regular urban center, but each of them has too little development potential) on the site of the Young City is included not only in the municipal planning documents but also in the regional development strategy. This means that the Young City can and should be planned in a way to become a real center of the entire metropolitan area.

At the same time, the Young City constitutes the major Gdańsk waterfront redevelopment project. It occupies the site of XIX-century shipbuilding facilities, now disused and abandoned by original users. Therefore, as it happened in many cities around the world, the site can become a subject of urban redevelopment with a special focus on waterfront-type projects. At the same time, as it is located on the border of the existing urban center, its structure can become an extension of the existing

Gdańsk central zone. What is important is a fact that there is no spatial, infrastructural or another type of barrier separating the site from the rest of Gdansk city center – on the contrary; the Young City site can host the natural extension of the existing structure, which allows the creation of the synergy growth effect.

Subsequently, Young City – as it includes a large portion of urban land – can be developed in a way that will differ from other parts of the city and become not only a separate “urban project” but the entire urban district. This means that this district will have a different to the rest of the city local identity which will affect the type it is used, the shape of local community etc. At the same time, it can become the home of young and innovative parts of the Gdańsk community. Its members – looking for new spatial offers – are already interested in living and working in the Young City area.

Finally, new developments like European Solidarity Center and Shopping gallery with nearby Road to Freedom-public boulevard will ensure that Young City will play a very important role in the urban structure of the entire city and draw tourists as well as citizens of Gdansk. Successful last years’ public events on the ground of Young City showed already great public interest in this area. This is expected to be even increased in the future, as the site is located in the walking distance from Main Railway station and other service networks. Therefore, it compromises a great place of investment and growth for the existing city. Well-developed road system, as well as new already partially constructed road Nowa Wałowa with a bridge across the train line in the west, ensures an effective link with the City infrastructure.

5.3. Vistula River Waterfront

The final of the key urban projects is located much more to the north, near the mouth of the Vistula River. It occupies a huge site which, to large extent, is still used for various harbor-oriented functions. But at the same time, this area hosts three very important and already completed urban projects: the new stadium which was serving as the venue for Euro2012 football games, the new Expo center (so-called AmberExpo) and redeveloped (as the “flagship regeneration project”) Letnica district. At the same time, the new road going through the main part of this area is being constructed, which includes the tunnel connecting both sides of the Vistula River. Therefore, thanks to these improvements, this area will very soon become extremely attractive for both developers and investors, and should be properly planned in order to maximize the benefits for all partners. At the same time, the owner of the majority of the part of this area – which is the Port of Gdańsk Authority – intends to sell most of the plots it possesses in this area in order to finance further deep-water terminals construction.

Unfortunately, by now the site is not considered in the official planning documents as a potential development site and – in consequence of this – there are no serious studies considering its urban future. Therefore, the only studies which show the potential of this area are students’ works, which can serve as the point of future reference for more advanced studies.

6. Conclusions

Gdańsk harbor can be described as an under major redevelopment. At the same time, also a number of urban redevelopment projects are both under way and planned. Therefore, one can conclude that this is the area “undergoing the major transition”. Moreover, this process will be continued and as a result of the further changes in its structure even more redevelopment sites can become available.

This process can change the entire urban development trend. The amount of the available land, as well as the huge development opportunities within these “brownfield” sites, calls for the major revision of the urban development policy.

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