

Post-industrial Objects and Buildings in the Structure of the Contemporary City

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Abstract. In the second half of the 19th century, provincial Białystok became the largest industrial city in the eastern territories of the former Republic of Poland. The cause of this economic growth was the development of the railway network and changing customs policy in the Russian Empire. Over a dozen or so years, several dozens of textile factories and numerous craft workshops were established in the city. The industrial prosperity of the city development was interrupted by the First and Second World War. The second half of the twentieth century also brought political and economic changes. They resulted from the nationalization of industry and the introduction of a socialist economy. In the following decades, heavy and light industries developed in the city. Metallurgical plants and factories of houses, furniture, carpets, packaging, electronics, glassworks and food processing were established. On the outskirts of the city appeared industrial districts, which except the factories concentrated also storage facilities. Economic changes that took place in Poland after 1989 caused another change in the area of Białystok industry. Many state-owned factories went bankrupt and the remaining facilities and areas had to change their intended use. The conducted research compares the methods of dealing with the currently unnecessary structure. This has taken into account its location value in the city's structure and its cultural characteristics. Analyses allowed to indicate new use of post-industrial facilities. There were selected post-industrial buildings that currently serve residential, office, educational and commercial purposes or house cultural institutions. There are also indicated facilities that have not found their new destination and have been demolished or are not currently in use. In conclusion, the research found that the city's post-industrial legacy is equal to its heritage - it builds the identity of the place and it is also the difficult urban problem of the revitalization of large urban areas. Projects which were evaluated as well as positively as negatively are indicated. Their analysis allowed us to formulate general conclusions.

1. Introduction

The problem of post-industrial land and objects in the theory of architecture and urban planning has been constant since the second half of the last century. Urban spatial transformations, the construction of industrial districts, and the uselessness of hitherto operating industries have caused emerging in the city centre buildings and areas called post-industrial [1], [2]. For decades, discussions have been conducted on the future of these facilities. The problem of new uses of space and buildings is raised, and above all, the principles of their evaluation and protection. Different researchers study the issues of former industrial, train and military areas [3], [4]. It is so difficult because we are touching the construction industry, which has always been just functional and its investors have only occasionally placed importance on the artistic expression of the objects being erected. So we are talking about



buildings that were not supposed to be beautiful but useful. Those which, according to the rules of architecture from the first half of the 20th century, could be demolished as useless and replaced entirely by new ones. The purpose of today's discussions is to formulate rules that make sure that individual objects and its parts, even if they are not functional, should be saved. They should become a witness to the past of places and illustrate them continuously, showing the transformations of jobs and civilizational changes and the achievements of the local community. Their preservation is in line with the principle of building a modern multi-layered landscape of the city, which thanks to architecture shapes its cultural landscape.

2. Industrial Białystok

Białystok - the private town of Jan Klemens Branicki to the Third Partition of Poland (1795) was located within the borders of the Republic of Poland. Then it was incorporated into so-called New East Prussia. At that time, in 1802 the heirs of Branicki - Potocki families sold Białystok domain to the King of Prussia. After the Napoleonic Wars under the treaty of Tilsit (1807) the city was incorporated into the Russian Empire. This state was sanctioned by the Vienna Congress (1815), which introduced a new order in Europe [5]. The geographic location of the city, one of the most remote western cities belonging to the empire, became the primary cause of its development in the first half of the 19th century. The Białystok Industrial District was at that time a natural competition for the Kingdom of Poland, and the textile industry, which developed here, based on numerous handicraft factories, largely met the needs of the Russian market. In the wake of the November Uprising (1830 - 1831), under the economic sanctions imposed on the Kingdom of Poland, very high duties were imposed on goods imported into the Empire. This became another impetus for the economic development of the city and its environs. The manufacturers began to stream Białystok and build their new textile empires here. This process was so dynamic that soon the city began to be called the North Manchester [6], [7]. Constructing the railway from Warsaw to St. Petersburg (1863) through Białystok also contributed to the development of the city in the nineteenth century. Railroad opened up new transport possibilities and thus disposal of manufactured goods [8].

At the beginning of the First World War, there were about 90,000 inhabitants living in the city, most of whom made their living on wage labour in factories. The largest ones, such as Nowik C. and Sons (Figure 1a.) or Białystok Association of Manufacture E. Becker and others (Figure 1b.) employed 300-400 workers. A dozen or so, employed more than one hundred people, and most of the others (from dozens) several dozen. At that time there were factories of cloth baize, woollen goods, plush and paddings, hats or silk ribbons. Steam mills and power plants operated on their needs.

In the interwar period, the city was part of the Republic of Poland, and the change of state borders completely changed its position and economic importance. The industry in the city was rebuilt after the war. The owners of the factories partly changed their profile and the city itself became increasingly important as an administrative centre. In Białystok there were 28 textile factories, 11 spinning mills and 7 weaving factories, while the city was the third largest textile centre in Poland after Łódź and Bielsko. In 1919 the so-called "Big Białystok" and Białystok voivodship were established. At the end of the 1930s efforts were made to develop the reconstruction of the urban spatial structure [8].

In September 1939 German troops entered the city. In the same month, under the Ribentrop-Molotov pact, the city was incorporated into the Belarusian Socialist Soviet Republic and became the capital of the so-called Western Belarus. In 1941 Germans entered the city again. A so-called "Bezirk Białystok" was created, which was incorporated territorially into the area of East Prussia. At that time the city was considered German but in July 1944 the city was again acquired by the Soviet army. On 16 August 1945, under the Border Agreement between Poland and the USSR, Białystok was incorporated into the territorial composition of the re-emerging Poland [10]. As a result of warfare, the city was almost completely destroyed. Devastation and looting of factories was taking place here. It is also important for the economic development of the city that during the war manufacturers of the Jewish and German origins left the city.

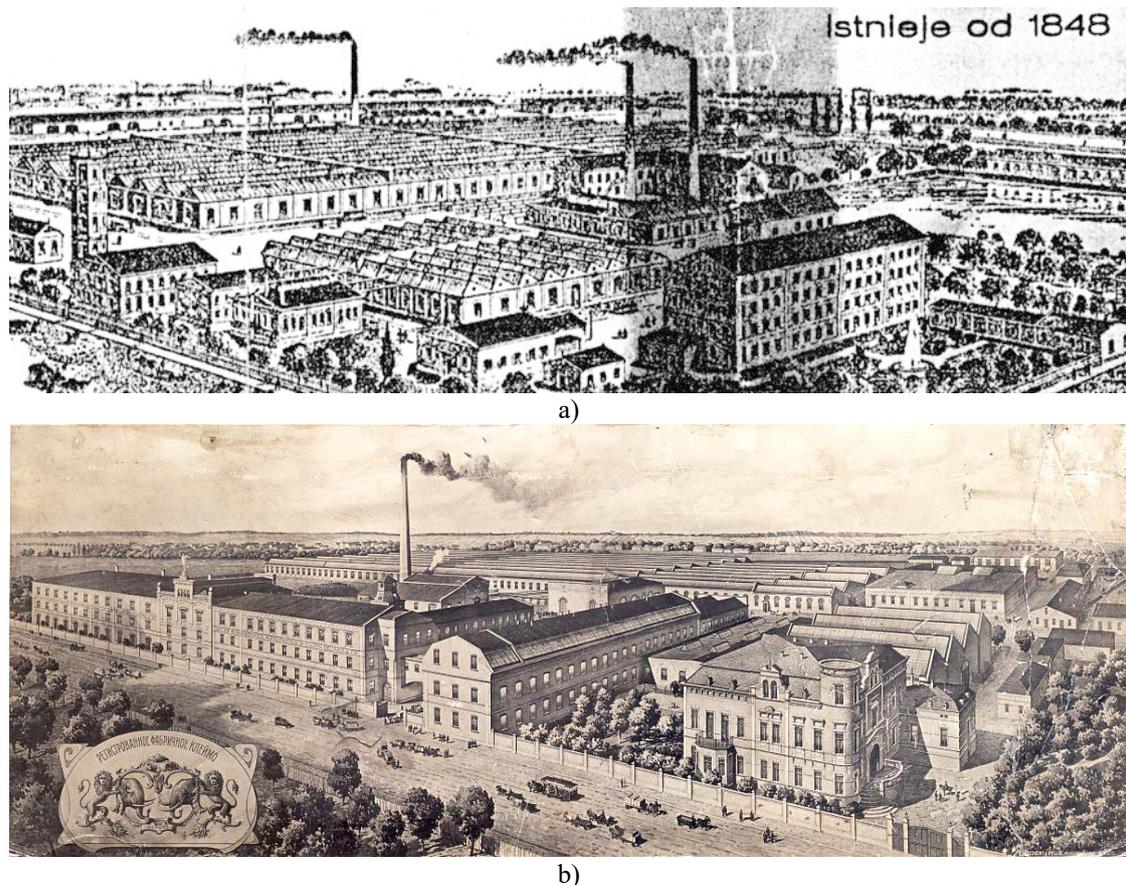


Figure 1. The biggest of the Białystok (Poland) factories. a) C. Nowik and Sons. [11], b) Białystok Association of Manufacture E. Becker and Others [12].

Since the end of war the city administratively belonged to the Republic of Poland (1945 - 1952), the Polish People 's Republic (1952 - 1989) and since 1989 again to the Republic of Poland. In these periods, the city developed under the conditions of the socialist economy (when industrial activity was nationalized) and in subsequent years in terms of systemic transformation (related to re-privatization). The effect of these activities in the cultural, spatial and economic spheres is a mosaic of ideas and spatial activities characteristic for the second half of the 20th century [13], [14]. The importance of the textile industry as a major manufacturing sector in the city constantly deteriorated, and by the end of the 1970s dropped to 7% in the national textile industry. The reason of these changes was the development of other industries in Białystok, but also the strengthening of other industrial centres in the country.

A number of former post-industrial facilities in the post-war period gained new functions. These were factories where the equipment could not be reproduced, and complicated matters of their property were not resolved. These facilities were designed for warehouses and didactic functions (in the post –industrial buildings were located, among others: Textile Technical School, Merchant Technical School, School of Water Melioration, School of Carpentry and Tailoring and many others).

The period of the Polish People's Republic in the history of the city industry can be divided into two main stages: first in the 1950s and the sixties - connected with the so-called industrialization, the rebuilding of factories destroyed by war and the construction of heavy industry and second in the seventies and eighties - building the light industry. In the first period in Białystok were established such companies as: Factory of Instruments and Handles UCHWYTY (Figure 2a.), House Factory FADOM (Figure 2b.), FASTY Textile Combine (Figure 2c.). Each of them at the end of the 1970s prided itself on employing more than a few thousand workers and continued production in a three-shift system. Currently none of them exist. In parallel with them, there were established such factories as:

Glassworks Factory, Plywood Factory, Gasworks, Cold Storage, Meat Processing Plant, Manufacturing Machines and Equipment for Food Industry and many others. In the second of the aforementioned periods, a number of light industry plants were established, including: AGNELA Carpet Factory (Figure 3A). UNITRA Electronic Products Factory (Figure 3B.), PAKPOL Experimental Packaging Factory (Figure 3C.) together with printing house, furniture factory the CHP plant, the bus depot and many other factories. They were located in two industrial districts of the city.

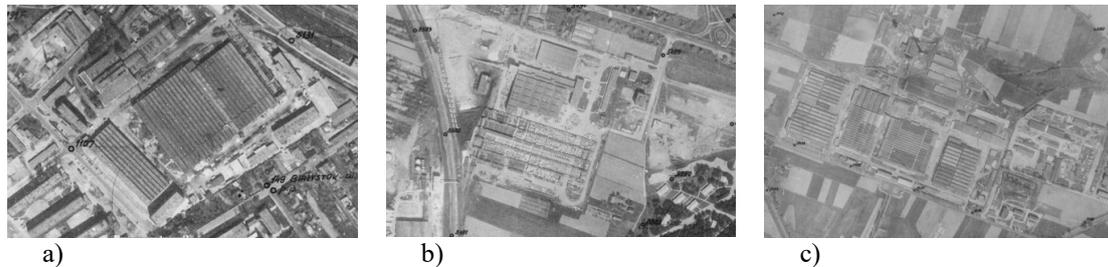


Figure 2. The biggest and the most important shop floors in Białystok (Poland) built in the 50-th and 60-th of the twentieth century (aerial photographs from 1976). a) Factory of Instruments and Handles UCHWYTY, b) House factory FADOM, c) FASTY Textile Combine [15].



Figure 3. The most important shop floor built in Białystok (Poland) in the 70-th and 80-th of the twentieth century (aerial photographs from 2017). a) AGNELA Carpet Factory, b) UNITRA Electronic Products Factory, c) PAKPOL Experimental Packaging Factory [16].

The next stage in the history of industry in Białystok is modern times. It is related to geopolitical transformations that took place in Poland after 1989 and independent changes of the global economy. The effect of these changes is the liquidation of most factories and factories. The place of companies employing several hundreds or thousands of people today is definitely smaller. At the same time new technologies and new competitions are becoming essential. This leads to the diffusion and diversification of the existing work environment. Very often contemporary needs cannot also be realized in existing buildings because their size and spatial layout do not allow for it.

Consequently, both the facilities and the sites involved have become an increasingly important spatial problem and the very important urban planning issue.

3. Legacy

The contemporary industrial heritage of Białystok can be considered in many dimensions. For urban and architectural purposes, the most important are cultural and functional values and an economically viable one. For the purposes of the conducted analyses, Białystok sites (and areas) were divided into three groups related to the periods of their creation. There were distinguished: realizations from the nineteenth century, the 50s and 60s and the 70s and 80s. Their location, spatial size, elevation technology and size of buildings, contemporary assessment of architectural value, contemporary evaluation of functional usefulness of the facility were analysed (Figure 4).

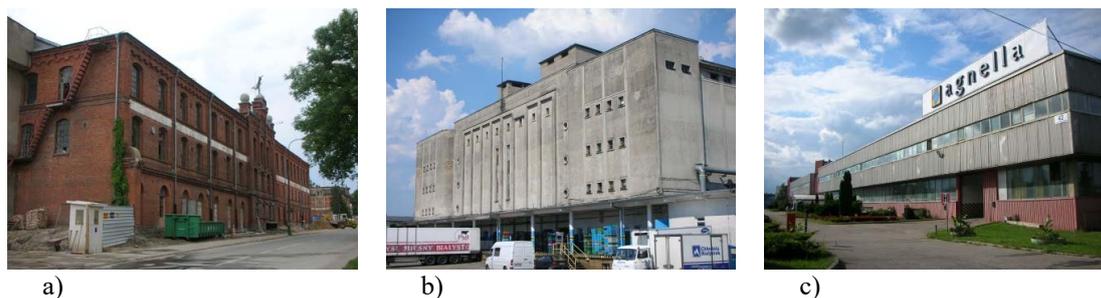


Figure 4. Industrial facilities from Białystok (Poland) area. a) Białystok Association of Manufacture E. Becker and Others (1895), b) Cold Storage (50-th of the twentieth century), c) Carpet Factory AGNELLA (70-th of the twentieth century).

These studies have allowed us to clarify the detailed proposals for individual facilities and general conclusions, which are grouped in the tables below. They show the characteristics of location and size of the site (Table 1), the construction and functional characteristics of the objects (Table 2) and the characteristics of the contemporary evaluation of these objects (Table 3).

The analysis of the features related to the areas where industrial buildings are located in Białystok (Table 1) clearly indicates that the most attractive places are buildings constructed in the nineteenth century. At the same time, the relatively small area of the plots on which these objects are located potentially allows for their various uses now and in the future. The buildings that were built in the middle of the last century were located on relatively large plots, on the outskirts of the then-flourishing city. Then they were absorbed and surrounded by the new structures - often houses. In turn, the realizations from the second half of the 20th century, due to the location in the separated industrial districts, still operate outside strictly urban areas.

Table 1. Features of the location and size of industrial sites.

Period of origin	Location of the objects	Size of the area associated with the object
19-th century	city centre, close to the river, which was necessary to operate, in the vicinity of railway lines (now mostly non-existent)	closely built plots from a few thousand square meters to several hectares
50-th and 60-th of the twentieth century	outskirts of the city centre, in the vicinity of railway lines and roads	areas of the size of several dozen to more than twenty hectares with large areas of reserve area
the 70s and 80s of the 20th century	borders of the cities in the area of separated industrial districts, easily to communicate by roads	several hectares, closely built up in the vicinity of development areas.

The comparative analysis of the features related to the building parameters of these structures (Table 2.) revealed that the most durable one are reinforced concrete works from the mid-twentieth century. At the same time the dimensions of the projections of the objects give primacy to the brick buildings of the nineteenth century. Objects from the second half of the 20th century are considered to be the least durable due to construction and made from the least durable building materials.

Comparison of contemporary architectural values and functional qualities of analyzed objects (Table 3) shows that the most attractive are 19th-century designs. They are also rated as most adaptable to new features.

Conclusions seem to confirm the well-known rules that were in force during the construction of the analysed objects. Industrial architecture was treated as a physical, utilitarian covering of the production. Objects were supposed to serve the production. Temporality of production transfers into the temporality of objects and indirectly to their location. The lack of a basic function makes the object unusable and its precise functional design is unsuitable for adapting to new objectives.

Table 2. Construction and functional characteristics of industrial facilities.

Period of origin	Material and technological solutions	Functional and spatial characteristics of objects
19-th century	buildings built with traditional brick technology, sometimes with iron or steel columns	buildings of several storeys (2,3,4), the width of the buildings is usually several dozen meters, lit additionally by high window openings
50-th and 60-th of the twentieth century	monolithic reinforced concrete technology with prefabricated elements	production buildings - one-storey with "saw tooth roofs", which illuminated interiors, the area of buildings about 1-2 hectares, administrative and auxiliary buildings of 1-4 storeys
the 70s and 80s of the 20th century	production and storage buildings - steel technology (modular) with prefabricated reinforced concrete elements administrative buildings - prefabricated technology reinforced concrete	production buildings - one-storey with flat roofs and interior lighting of skylights, the area of buildings about 1-4 hectares, administrative buildings of the height of several to a dozen storeys

Table 3. Contemporary assessment of architectural value and functional usefulness of industrial objects.

Period of origin	Assessment of the architectural value of objects	Assessment of the functional value of objects
19-th century	brick, unconfined architecture is now considered attractive	due to the small size of the floor plan buildings are considered adaptable to new functions, most often used for: cultural, office, educational, residential
50-th and 60-th of the twentieth century	architecture is not valued, considered heavy and unattractive	due to the specificity of solutions buildings difficult to adapt to today's needs
the 70s and 80s of the 20th century	architecture is not valued, considered impermanent, temporary	because of its durability the greatest value is construction, due to the size of objects difficult to adapt to today's needs

4. Methods of proceeding

Analysis of activities related to the revitalization of buildings and post-industrial sites, which have been conducted since the 1980s in all European countries, allows to indicate five ways of proceeding:

- adaptation of existing objects to new needs (functions). This action involves the reconstruction of the interior of the facility and the new development of its surroundings (Figure 5a.),
- adaptation of post-industrial land to new needs (functions). This action involves the demolition of objects deemed useless and overhauling its most valuable elements and the addition of new objects. Post-industrial sites in such situations are a specific "decoration" of a new investment (Figure 5b.),
- adaptation of fragments of buildings and their construction in order to preserve the identity of the place. This activity is relatively rare and is aimed at preserving the cultural heritage of a place, a district or a city (Figure 5c.),
- adaptation of post-industrial land to new needs (functions) related to the construction of a new facility in the spirit of industrial architecture. Newly added objects are maintained in the style of industrial architecture from a certain period (Figure 5d.),
- the reconstruction of a building in the "new spirit", which is fashionable at the particular moment in a style far removed from the original (Figure 5e)

- change in the function of post-industrial land associated with the demolition of existing facilities and the implementation of new investments there (Figure 5f).

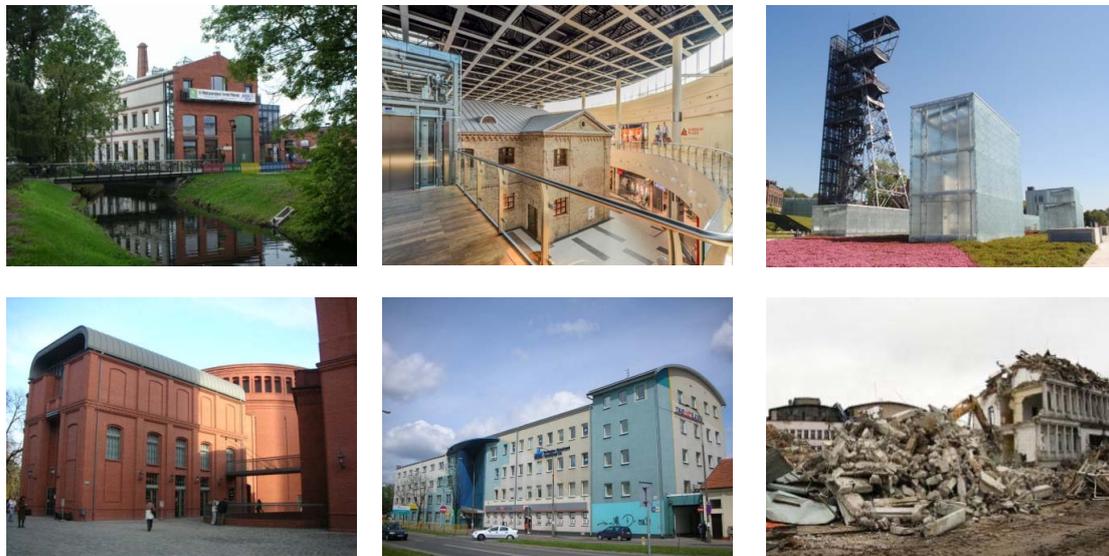


Figure 5. Methods of dealing with revitalized buildings and post-industrial areas. a) Renovated Old Paper Factory in Konstancin Jeziorna (Poland), post-industrial area was rebuilt for an exclusive shopping center, b) Historical building (former prison) incorporated into the shopping gallery in Suwałki (Poland) [17], c) Remnants of industrial identity left in the Silesian Museum in Katowice (Poland), d) Old Brewery in Poznan (Poland) - adding extra construction in the original style e) Remodeling of the former cloth factory of B. Polak and Sons in Bialystok (Poland) executed in the spirit of postmodernism, in the mid 1990's of the twentieth century f) Demolishing of UCHWYTY factory in Bialystok (Poland) [18]

Different methods of dealing with facilities are connected with different types of objects (the period and technology of their creation) and their new purpose. Adaptations mostly apply to 19th century objects and their new uses are objects of culture, office, education and housing. Adaptations of post-industrial areas are connected with 19th century objects and new objects have commercial and residential functions (Figure 6). Adaptations of fragments of objects are usually used in projects of parks and urban gardens, where remnants of walls, chimneys, structures, cranes, etc. give them a specific postindustrial character.



Figure 6. Revitalization of 19th century objects. a) Manufacture Shopping Center in Łódź (Poland) - revitalization of the Izrael Poznański's factory complex, b) Lofts at Scheibler in Łódź (Poland) - revitalization of Poland's largest spinning mill (length-207 m), c) Lofts de Girard in Żyrardów (Poland) - revitalizing one of the oldest (and for many decades the largest) linen factory in Europe

The phenomena cited in the last section - the complete demolition of old factories - are now the most up-to-date and they cover post-industrial areas of a dozen or even several dozen hectares, in

which large industrial plants were located in the 1950s and 1960s. Such actions took place, among others, in the former UCHWYTY factory in Białystok (Figure 5f) where the New Bojary Housing Estate is being built. The largest investment of this type is currently being built in Warsaw, where Ursus Township - a new housing estate planned for approximately 15,000 residential units - is being built on 74 acres where the former URSUS Tractor Plant existed (Figure 7). This implementation is based on a local spatial development plan (Figure 7b.), which assumes complete demolition of the existing post-industrial development.

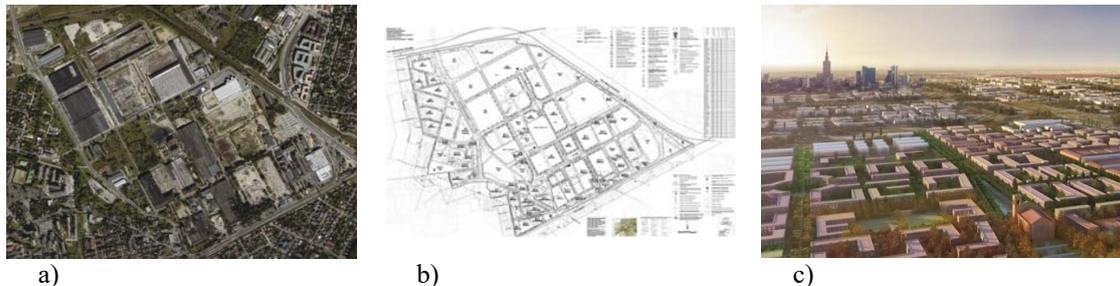


Figure 7. Site of URSUS Tractor Plant, (Warsaw, Poland). a) Aerial photography illustrating the existing state [19], b) Local spatial development plan covering the area of the former factory [20], c) Visualization of the new investment [21]

5. The future of the industrial heritage of Białystok

An analysis of more than fifty former factories and their areas from the Białystok area allowed to assess their contemporary state and usage. In a large part, these are objects in poor technical condition and they still deteriorate. Recognizing the city's industrial heritage as a cultural value that is not only popular in recent years but is widely accepted by its inhabitants, it has been stated that the legal protection of this heritage should be sought. The tool that can make this possible is local law - a local spatial plan and the basis for planning decisions should be the so-called good practices. At the same time, in terms of individual objects, methods of evaluating and identifying the most culturally valued elements of the district and city should be developed. It seems appropriate to leave in the landscape of the city representative buildings reflecting its past. These works must be conducted against the background of economic conditions related to the new use of land (mainly residential). They must be acceptable by investors taking action in this area.

There are already good practices in the area of individual facilities and their units in Poland and nowadays in Białystok - renewed facilities that function individually or are integrated into units of new cubature. At present the former Power Station (1909), currently functioning as the "Arsenal Art Gallery" (2010), Białystok Association of Manufacture E. Becker and Others (1883) incorporated into the Alpha Shopping Gallery (2008) or Fajwel Janowski's Tobacco Factory (built in 1889) converted into the housing complex "Post-industrial Lofts" (2010). These projects refer to objects officially recognized as monuments, relatively small, erected more than a century ago - hence considered attractive by new investors and users but also positively accepted by the city residents.

Implementations from the 20th century are dealt in another way. The standard is their complete demolition. Hence, in order to keep their testimony in the landscape of the city, it is necessary to promote the realization that has taken up such problem (Figure 8). It seems that in view of the significant resources of this kind of industrial cultural heritage in Białystok, their detailed analysis in the environment of decision-makers seems to be all-encompassing.

6. Summary - Rules of proceeding

In conclusion, the current analyses of civilizational and cultural conditions set different tasks for new investments than protection of post-industrial heritage of the past. Its protection must therefore be adapted to economic realities and must not contradict the needs of modern users. Bearing in mind the preservation of industrial heritage sites, it was stated:

- In each case, original post-industrial objects must be retained and adapted to new, contemporary utility functions.

- In the case of inability to retain original post-industrial objects (due to their dimensions, spatial arrangements, technical condition) - they must be evaluated and parts (elements) to be preserved. Selected parts should be incorporated into new buildings or form separate structures,
- In the case of inability to preserve the original fragments of post-industrial buildings, they should be referred to in the plan of development the new investment site.

In every case, it is advisable to seek the so-called "spirit of the place" - a fleeting value that must remain and bear witness to the past of the place by building its present identity.

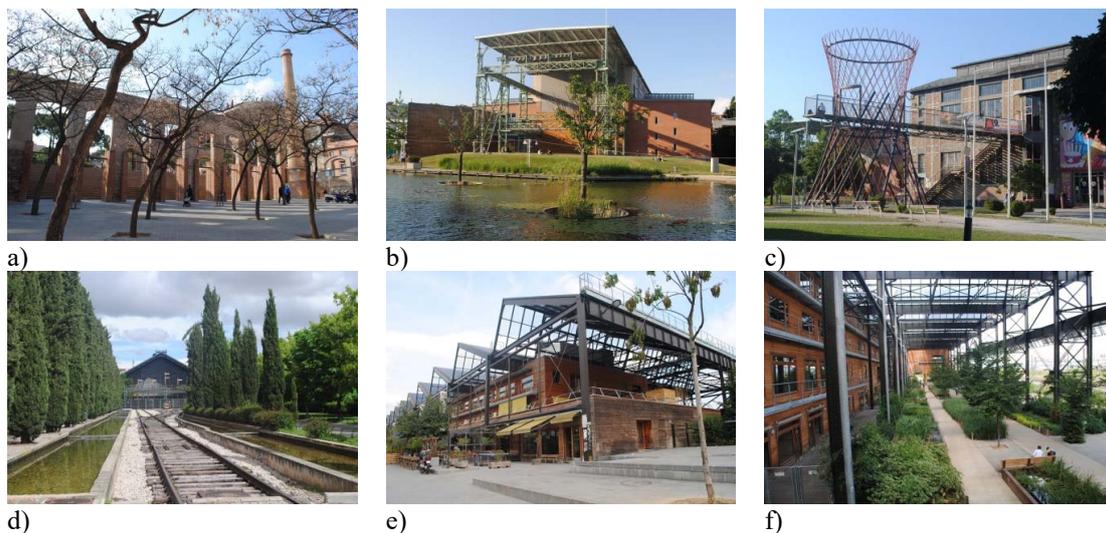


Figure 8. Relics of industrial past in the landscape of modern cities. a) Parc del Clot (Spain, Barcelona), b,c) Millenáris park (Hungary, Budapest), d) Parque Enrique Tierno Galván (Spain, Madrid), e,f) Bibliothèque Vaclav Havel i Jardins Rosa-Luxemburg (France, Paris)

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