

INFLUENCE OF URBAN WATERFRONT APPEARANCE ON PUBLIC SPACE FUNCTIONS

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Received: September 13, 2012

Abstract

HRADILOVÁ, I.: *Influence of urban waterfront appearance on public space functions*. Acta univ. agric. et silvic. Mendel. Brun., 2012, LX, No. 8, pp. 261–268

Although the issue of urban waterfront is not entirely new, it still represents a very vivid topic. Urban waterfronts have for long been standing in the forefront of many architects and organizations, who are aware of their value and the potential a watercourse carries within the urban interior. A watercourse is an interconnecting element between the urban development and the surrounding countryside and urban waterfronts are the intermediaries of communication. It is exactly in their area where the city - a purely human product with an inner structure and order defined by humans - meets the element of water, which is a purely natural component.

What influences the urban structure most is, however, the presence of water in its very basic form i.e. in the form of a river. Its significance and effect on the public space and the inner relations within the body of the settlement vary with the size and the width of the flow, character of the waterfront, architectural layout of the riverbanks and its current utilization. Urban river works as a communication element which meets with the natural features. It seems to be unnatural to define a waterfront space like mono-functional site. This space denies the very essence of the waterfront and the city's inhabitants appear as unattractive. In this case the very attractive element of water is unable to urban residents to attract together. In general, the quality of the public space is determined by the degree of its utilization by a wider group of inhabitants. It is the inhabitants themselves who imprint the concept of a public space to empty urban spaces.

The present form of urban waterfronts is a result of the historical development, attitude and mental state of the society. The architectural appearance of not only the waterfront but also all public spaces is a reflection of the current social values. It gives evidence about the character of the society, the present economic system, the state and thinking of the contemporary era.

waterfront, river, public spaces

Watercourses underlay the development of most significant European cities and up till now they are their inseparable parts. Rivers occupy a specific position within the urban structure determining the urban development structure of the settlement, main compositional axis of the city and often they define the main development backbone of the system of urban greenery. In the course of the urban development water has always been the determining limiting factor defining the construction development and watercourses have become a focal point, a motive that gave rise to other urban spaces. Rivers occupy a significant position as a conceptual part of the urban greenery, where

they take part in formation of the spatially and functionally connected system of greenery. Rivers become an interconnecting element helping to overcome the barriers of the strongly urbanized environment. The lines of watercourses create development axes which provide the precious interconnection between the significant segments of the countryside and the city. Thus they meet the overall sense of the greenery concept and reinforce the inner functioning of an urban organism.

Within the body of the settlement not only the river course itself is implemented but also the adjacent spaces directly dependent on the watercourse – waterfronts. Urban waterfronts

together with streets, squares, parks and other public spaces participate in the formation of the inner urban structure. Urban waterfronts in comparison to other public spaces are unique as the clashing points of two diverse environments – the landscape of the city and the landscape of the river. The very sensitive relationship between the river and the urban settlement culminates exactly in the place of blending of the two elements, in the space of the waterfront. Urban waterfronts represent the magic point where the city as a purely human product meets the element of water as a purely natural component. Waterfronts thus create the boundary between two diverse environments and at the same time serve as an element lining the city with the surrounding landscape.

Even today the majority of European cities have been confronted with the problem of reintegration of the river into the image of the city. The issue of the urban waterfront appearance has constantly been a front burner of many architects, organizations and wider public that seeks to correct their unsatisfactory condition. This opens up many strategies, plans and projects with their focal point being water. All of them have the central concept of water as the most important urban-forming element in common, the element enhancing liveability and aesthetic qualities of the area. They have been striving to find the way to reintegrate urban rivers back into the body of the city and to adapt them to the contemporary needs of the society, so they can strengthen and reinforce the inhabitants' relationship to the river.

Urban waterfronts form an inseparable part of most public spaces and together they complete the overall image of the city. The urban appearance of not only the waterfronts, but all the public spaces is the reflection of the present values revealing the character of the society, the current economic system as well as the state and thinking of the contemporary era.

MATERIAL AND METHODS

At the beginning it is necessary to outline the historical development of urban watercourses. This will help us clarify their importance in past times when rivers as parts of the urban structure served an entirely different purpose and also the society perceived them differently than today. The pivotal part of the work has been dedicated to the development process as the historical role and status of the rivers within the settlement are the key for understanding the whole problem.

Historical development of urban river was studied on the basis literary documents, old maps and period photographs/pictures, which document urban life close to river and the specific spatial and functional organization of waterfront sites. The results were compared with each other, statistically evaluated, and then interpreted.

In the second part of the work the author is reflecting on the relations between using the public

space and architectural appearance of the river waterfront. Has there been any connection between the waterfront form and the public space function? Historical development of urban rivers shows us the change of the riverbed and the adjacent bank, which in fact defines the architectural concept of the embankment. Along with it also specifies the related the river utilization which is gradually changing or remain the same? Therefore it is necessary to define the functions of the public space that can have direct relation with the presence of the watercourse but also those that are located in these areas without a mutual relationship of the river and the city as also those functions are involved in the overall embankment status within the urban structure of the city.

The basis of this part of work was the direct field analysis of selected urban areas which the author visited, studied and compared with each other with the assistance the methodology by Wittmann (2008). This methodology briefly and clearly documents the spatial and functional organization of urban waterfront.

RESULTS

Rivers are an inherent part of the development of the human settlement. They have been fundamentally involved in the process of settlement location and its continuous formation. Over time, with technological and human thinking development the views on rivers had been gradually changing. Today's perception of the appearance and importance of urban watercourses is formed exactly as a result of this complex long-term development. Historical development of urban rivers is thus a very important part of the complex understanding of the significance of rivers and embankments within the settlement.

Historical development of urban watercourses

Water has always played a very important role in urban development. Human settlement was established following the historical and natural processes. Human beings depended on sustenance and had therefore no steady settlement until the time they were capable of growing their own crops and domesticate animals (Koutný, 2004). Only then there was a stimulus to building sustainable human settlements and the presence of watercourse was ideal.

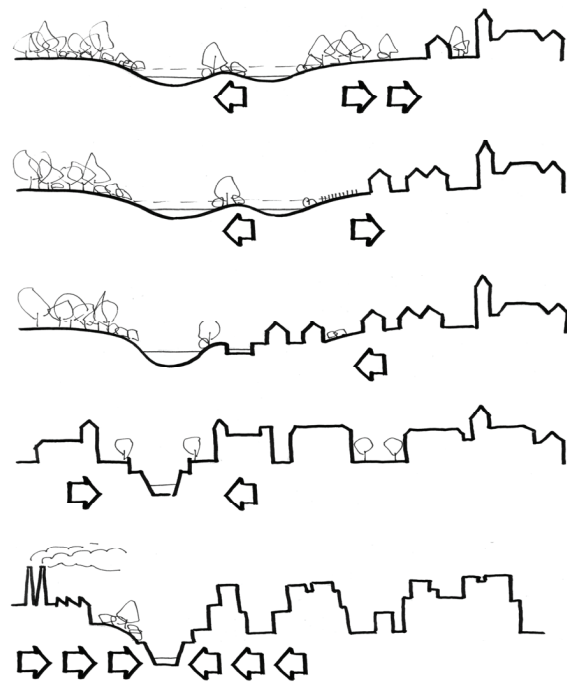
Historically, a river was the only passable line in otherwise impenetrable landscape. It was lined by bustling trade pathways and the current of water offered suitable opportunity for sailing ships with cargo. In the flow direction the strength of the current was used for floating but for transporting cargo against the river current towpaths had to be used. The boats had to be towed on ropes by people or draught animals. Already at that time the towpaths could have taken an appearance of courageous technical works, e.g. in China in gorges

of river Chang Jiang the famous Emperor's path arose, which is carved into the hard rock lining the flow (Kubec, 1996). Flowing water has thus formed the first communication routes through which not only the goods but also information flowed.

Besides the role of transport, water fulfilled other functions, too. Watercourses and water generally were sought for purely practical reasons and their proximity provided -besides the water supplies - fertile soil, suitable space for development and possibility to utilize the strength and power of the watercourse. Watercourses have thus become a magnet attracting tribes, bands and whole nations (Wagner, 1988). The river offered favourable conditions for establishing a steady settlement and that was why also the first urban permanent settlements were concentrated along watercourses. Water itself is only one of the many factors influencing the development of cities. Their foundation and formation is a complex economic and social process, which is determined by a number of other stimuli (Božek, 1985). The source of water is, however, only one of the basic determining components. The oldest great civilizations were formed exactly in the proximity of large rivers that provided convenient conditions for cultural, social and economical development.

In ancient times the immense power of water commanded respect and the threat of floods kept the dwellings and construction development beyond the flood line in a safe distance from the riverbed. At that time already the first irrigation systems appeared referring to the necessity to bring water to places that need e.g. fertilization. First attempts to tame the unbridled element in form of greater interventions into the natural appearance of waterways are not apparent until the Middle Ages. The necessity to bring water closer to the settlement arose together with the need to increase the safety of the town, when the watercourses were distributed along the fortresses and became an inseparable part of the fortification elements and also in connection with extensive development of the crafts that required bringing water closer to the mill houses, sawmills, etc. At that time, the interventions into the watercourses were very sensitive due to the respect and interconnection of man and nature. Gradually, artificially created raceways started to appear bringing some of the water from large rivers deeper into cities. Interesting buildings and crafts needing water most started to centralize along the watercourses (raceways). The tension between the civilization power of the city and natural energy of water started to grow stronger slowly.

For a long time, the river as a part of the settlement maintained its natural character. The riverbeds were wider, the sediment loads and islands were typical at that time and the river consisted of more branches often with strong meandering tendency within the cities. A characteristic feature was also rich accompanying vegetation along the whole river flow. The 19th century became a turning point



1: A diagram of historic development of the CITY x RIVER relation (source: author 2011)

for urban river embankment formation as till that time the embankments had represented rather an unused urban periphery where the warehouses and millhouses were situated.

With industrialization progressing, the process of extensive construction within the cities started and there was an enormous pressure on plots inside of the city. The life of the citizens required a new way of using public spaces. The fortification systems losing their purpose fell and the barrier between the city and the suburb was dissolved. The urban life was newly interconnected with the surrounding landscape and in place of former fortresses new orchard circles and developments arose. So far closed gardens were opened to the public and a new type of the public space appeared – a park. The inner urban structure changed entirely but the locations on the riverbanks were still unoccupied as they had to face the threat of floods. The price of land continued to rise and eventually the rivers and embankments submitted to the pressure of the city. The riverbeds of the urban watercourses were strongly regulated to take water quickly from the city away so that the embankment area could be opened to the new development.

Thanks to the free lots, attractiveness of the water element and flood safety, the opulent and significant buildings moved to the river banks. The construction of stone embankments opened new scenes on the city skyline and its landmarks thereby increased the attractiveness for use of these spaces. Watercourses started to serve their new function intensively. Water became an integral part of the public space of the city and the embankments

became the centres of the social life. Urban locations along watercourses became very attractive and after the example of rich bourgeoisie cities themselves started to construct significant buildings, residences, gardens, parks, and promenades along rivers. The concept of the public was newly formed. A person – inhabitant – citizen was no more hiding behind the walls of their safe garden but came out into the streets (Hrubanová, 2007). A walk through the city started to belong to the public life of the 19th century (“see and be seen”) and for that purpose a special type of a representative route was required – a promenade. The Roman street “Corso” has already prefigured promenades in thousands of European cities in the 19th and the 20th centuries although in its time it was originally a very uncomfortable walkway which has transformed into a communication route through the city only during the last two centuries. Promenades and parks – all of them had already existed since the ancient times but they were a private matter of the higher class, nobles and rulers. The use of public promenades by the wider public occurred in the 19th century when even the working class could afford Sunday walks in selected locations in the city (Halík *et al.*, 1998). The fact that also an ordinary citizen can enjoy the walks in the city and that this kind of recreation is no longer an aristocratic prerogative plays is partially a result of the abolition of serfdom and *corvée* labour (1848).

The 19th century did not bring only the boom of representative urban waterfronts. The regulations also had their drawbacks. They were initiated at the end of the 19th century and lasted till the first half of the 20th century. New technical possibilities met the new demands, human and animal muscles were substituted by machines which allowed not only water constructions but also other buildings to be of a much larger scale than earlier. Besides others, some inappropriate revitalizations of flowing waters were conducted based on an assumption that fast diverting of water away from the town would result into a higher safety of buildings against floods. Many watercourses were pushed out of the picture of the city within the new arrangements. Some rivers were completely buried into the bowels of the sewage system, other waterways were straightened, their accompanying lining destroyed and their beds surrounded by high stone walls and sediments. The watercourse was entirely subjected to the urban civilization power. Urban development was pushed up to the very edge till the dam. A place was left only for little greenery planted in the form of sparse alley just beyond the embankment wall. This impoverished the ground plan layout of the embankment locations and reduced their aesthetical value (Wagner, 1988). The appearance of urban waterfronts was gradually affected by horse transport as well which destroyed many of the promenades and the car transport has completed this destruction.

Also the Communist regime carried its share in massive interventions into the relation between

the river and the organism of the city by non-respecting the laws of nature and by constructing large and huge works at the cost of great changes. The structures needed for industrial development and city infrastructure were transferred to the waterfronts. The industrial facilities used the water source for their needs regardless of ecology or environmental protection. The rivers became important arteries for transporting supplies. All of that contributed to water devastation. The rivers turned into isolated stinky sewers. Even Le Corbusier in his project for reconstruction of Paris “Contemporary city” (1922) pushed the river away from the city. The river is a kind of a liquid rail, cargo station and transshipment point. It is therefore something tasteless, not fitting into the city centre (Maier, 2000).

Harnessing of rivers into regulated riverbeds and transformation of river edges into inaccessible and unattractive spaces caused isolation of the embankment from the rest of the city for a long time.

All the social bonds among the city inhabitants, river and the waterfront were broken. The city turned its face away from the river and ceased to respect the water element as an important town-making element enhancing the value of urban environment. The urban town structure thus lost the element which from the beginning of the city development shaped the complex urban composition and the presence of which had been very natural for centuries.

The second half of the 20th century was indisputably linked with the consequences of two World Wars that marked not only the whole economy and development but also the attitude of the society and its relation to their own land. We interfere into rivers again but in a different way now. In the past we intervened into the image of urban waterfronts hard and disrupted the sensitive symbiosis of water and the city. The waterfronts became cold and gloomy places, but in spite of that the city residents themselves have searched their way back to the river, to its edge and subconsciously they have been attracted by the water element.

The issue of urban waterfronts has been dealt with by many architects, organizations and wider public as many European cities are still struggling with bleak and unattractive waterfront spaces in their centres. Everyone is striving to find the way to restore the watercourse back into the city organism so that it would fulfill new aesthetical and functional requirements of the city and its inhabitants and strengthen the prosperity of these public spaces.

Functions of the waterfront as a public space

Every urban public space is formed by three basic urban features (function, operation and spatial arrangement) and their mutual relations. The spatial arrangement forms the whole urban composition, the operation is represented by urban transport and technical infrastructure and the function is according to J. Gehl (2000) means the public space

ability to meet the conditions for necessary, optional and social activities. The quality of a public space is then determined by whether all the three features are present in the location and whether they can satisfy the demands of the inhabitants.

Should we discuss the urban waterfront we are talking about a space defined by the watercourse (coastline water level) on the one hand and building facades on the other hand (in areas with lower development intensity the embankment space is defined by the first river terrace). Typology and use of urban waterfronts are the topics of the work by Maxmilian Wittmann (2008), who defined the basic functional uses of waterfront areas into the following categories:

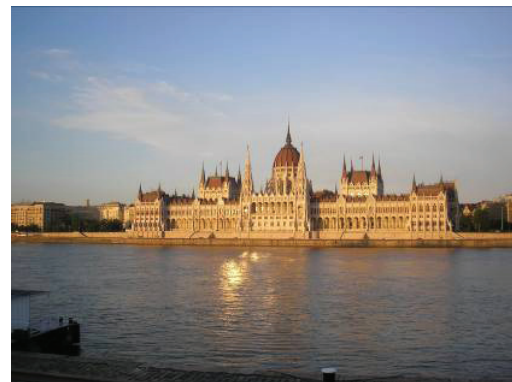
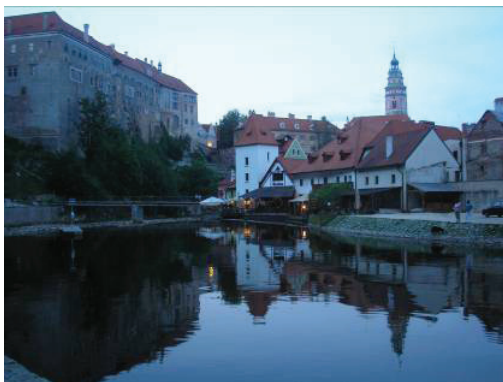
- transport (road transport, rail transport, walking and cycling)
 - social (linked with public facilities)
 - function additional to housing and housing itself
 - recreation
 - industrial use
- and as complementary functions there are:
- junction
 - specific social function.

From the perspective of urban design this functional division is clear. The area of the embankment is, however, characterized by the water element which imprints the environment in which it occurs a distinctive expression and determines

the Genius Loci. The watercourse is thus one of the main factors responsible for the aesthetics of the space creating opportunities for unique views of the city. The water surface (of a river or another water element) expands the urban landscape scenery and opens new changeable bottom views. The city skyline view reflected in water surface enhances the spectator's feelings, be it the stormy sky reflection contrasted with urban development or the reflection of the facades that intensifies the impression of surrounding architecture (Fig. 2, 3).

Form of urban waterfronts and their influence on urban space functions

The urban structure is mostly influenced by the presence of water in the form of a river. Its importance and influence on the public space and the inner relations within the city organism vary with the size and width of the watercourse, the nature of the banks, architectural layout of the waterfront and division of functions. Urban rivers can, however, have more shapes. They can exist in their basic form when the river flow as a linear town-making element holds a dominant position adopting a function of city artery as it happens in most European cities (Fig. 4, 5, 6). Watercourses can also take a form of canals, which are characteristic of Amsterdam, Venice, St. Petersburg, etc. Canals may form a complete network intertwining through the urban development or they can have only



2+3: The ability of water surface to reflect the surrounding scenery adds a unique atmosphere to the place. What would be the picturesque houses in Český Krumlov, were they not standing on the bank of the Vltava?
(photo: author, Český Krumlov 2011 and Budapest 2011)



4 + 5 + 6: Urban watercourses in their basic form as a full-valued part of the urban structure e.g. Frankfurt on Main, Budapest, and an urban river as a part of the urban structure but denied in the picture of the city, drowned under the city avenue (Brno)
(photo: author, Frankfurt 2008, Budapest 2011 and Brno 2011)



7 + 8 + 9: *Urban watercourses in the form of canals in Helsinki (Finland), Delft (Holland) and Mechelen (Belgium)*
(photo: author, Helsinki 2012, Delft 2004 a source: <http://www.landezine.com>)

a complementary character. Then they line the streets of the city due to the earlier need of the crafts to bring water closer to the buildings that used it (Fig. 7, 8, 9).

The current form of urban waterfronts is a result of historical development, attitude and way of thinking of the society. With the time passing, the opinions about rivers in cities change. Their architectural form is something more than just the construction works in the immediate vicinity of the river.

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Should we talk about the architectural form, we mean the final appearance of the building mass that is predominantly formed by aesthetic and ideological concept. Majority of these projects contribute to public space functioning in a deeper sense than just by restoring the external appearance. It is a planned process underlined by the idea to adapt the spaces to the contemporary requirements of the society, through which the total value of the public space is increased.

The architectural appearance of urban waterfronts without doubt directly influences its current use. Generally, the quality of the public space is determined by the level of its use by a wider group of people. The city inhabitants imprint the concept of a public space to empty urban spaces.

DISCUSSION

Historical development denotes the relationship of the society and the settlement to the water element (Fig. 1).

First, the inhabitants' relationship to water was based purely on pragmatic grounds and mutual respect. The watercourse was not and could have not even been an integral part of the settlement as

the threat of floods was hanging above. The river and its floodplain thus maintained their natural character and all their ecological functions.

Gradually, people started to subdue water, regulate it and bring it closer to the buildings through canals and the construction development gradually incorporated the water flows into the hearts of settlements. All urban functions of public spaces newly appeared on the riverbanks, still without a connection to the architectural shape of the space but only as a result of everyday use.

The greatest boom of urban waterfronts came in the 19th century, when the favourable time (huge technological advancement, extensive migration of the population into the towns) gave rise to many representative promenades. The desire of the citizens to have their own bit of nature even in the town brought social urban life to the banks of rivers. River regulation appeared to be the right solution to open the waterfront locations to current needs of the citizens who could engage in everyday activities and satisfy their new needs – recreation. The river locations submitted to new architectural intents and besides utility also the aesthetic aspect started to be considered.

Neither the construction growth, nor even the pressure of the city stopped after the 19th century boom, so the regulation often exceeded an acceptable limit. The riverfront sites were not lined by representative avenues any longer. It was predominantly the car transport which found the river as a convenient continual line pervading through the heart of the city. As a consequence of thus depreciated waterfronts, these spaces were marginalized in people's minds and pushed away from the public life. The embankments lost their presentable face and newly served to the needs of technical infrastructure and industry.

The detachment of the rivers from the life of the citizens has gradually appeared as unsuitable. People themselves are seeking the way back to the river, to its edges. They themselves long to fill the embankments spaces with a range of activities associated not only with the presence of water

but with the human existence generally. Public spaces on the riverbanks thus once again serve many functions – social, recreational, housing and industrial and mainly transport (walking, cycling, road and rail).

All of these functions must be respected and cannot elevate one above the other. Many times we see opinions that urban waterfront is destroyed by transportation. While this is true, but only because it pushed all the right functions and the other alone grew to an unbearable level. Similarly the industry gradually mastered a substantial part of the city and the banks are not allowed to develop other activities. As bad thus appear to function type as those which we might describe as inappropriate but the extent to which in the space occurs.

The river has always functioned as a communication element and has always been a crossroads between many worlds. Perhaps that is why thus excludes the possibility of using waterfront sites only mono-functional. We must find a way to implement all functions in such a sensitive space as to operate in balance and tear but complement each other. The frequency of each function, their continuity and consistency with other urban spaces then it gives rise to a full-fledged space waterfront

where he can find the transport and industry as well as recreation.

The relevance and attractiveness of the issue of the clash between the urban spaces and the watercourse have given rise to many contemporary projects that focus on restoration, revitalization or formation of new urban waterfronts. Whether it is a river drowned under the avenue piped in the sewage system or a river only denied as a full-valued part of the public space, its revitalization always goes the same direction. The main goal is almost always to restore, strengthen and reinforce the original relation between the river and the settlement and to increase the liveability of the adjacent public spaces by blending of various functions.

Today many current cultural events (educative paths, exhibitions, shows, concerts, debates, etc.) are moving toward the urban waterfronts and we are quite naturally and subconsciously seeking them there. Good quality architectural design of these spaces can help to their full-valued integration into the city life. It is necessary to search for new current opportunities to use the waterfronts that fulfill the aesthetic, spacious, operational and functional requirements of the contemporary era.

SUMMARY

Urban waterfronts are an inseparable part of the development of human settlement. Watercourses together with their accompanying edges hold a special position within the urban structure. Together with the streets, squares, parks and other public spaces they participate in forming a complex inner structure of the city organism. Unlike other public places, urban waterfronts are unique as a point where urban land and the landscape meet. They form the border between two worlds and at the same time they are their linkage and thus they influence the mutual relations between the city and the surrounding landscape.

Waterfront locations as a natural part of the urban organism with their architectural design, spatial composition, division of transport and functions directly participate in the inner working of the city. They determine the direction of the development structure, define the inner development axes of the city and serve as a limit in the area.

During the historical development even waterfronts have changed their appearance, importance and function, always depending on the current economic system, status and thinking of the contemporary society. Urban waterfronts are thus in the same way as the other urban spaces a reflection of our current social and cultural values.

Acknowledgement

The paper was supported by project DF11P01OVV019 “Methods and tools of landscape architecture for territorial development”, meeting the topic priority TP 1.4. of the Program of Applied Research and Development of National and Cultural Identity, financed by the Ministry of Culture of the Czech Republic.

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