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WATERFRONT AND URBAN REGENERATION

NEW CHALLENGES FOR GENOA

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ABSTRACT

The purpose of this paper is to understand if the strength of water is so important like in the past and to see like this element can be the driving force for redevelopment and urban regeneration of a city- port.
The waterfront represents those parts of a city develop from the contact with the water until to involve the inner parts, it is a sort of permeable urban surface where the link with water is able to conjugate the different ways to live this special bond. This view permits to look at the waterfront, not only as a simple urban area well defined, but it is a new method to watch the city that draws the inspiration from the water for its future assets, without to forget its identity.
Genoa represents an example of Mediterranean city (such as Marseille, Valencia and Barcelona).
Our research brings from a debate among the different actors (University, Planning Section of the Municipality, Port Authority) to an elaboration of some future proposals which underline the different meanings of the relationship with water in the west of Genoa, Prà-Voltri's area: from walking on different levels, above and below the channel specially designed, the opportunity to live (as in previous years) the beach for swimming, recreational and sporting appearance in a new Channel, in the continuation of activities in the existing Prà Channel. These elaborations are designed to determine the functions that the new Channel could take becoming in turn an urban redevelopment tool: the influence of the Channel, in fact, it should reach the city center reconnecting to historical paths and the promenade to become an integral part of the everyday life.

KEYWORDS:
Waterfront; regeneration; Genoa port-city

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滨水区与城市复兴

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摘要

本文旨在分析水的作用是否依然和以前一样重要，并分析水元素能否成为推动港口城市重建和城市再生的动力。滨水区指的是城市中依托于水发展起来的地区，并不断向内部地区延伸。它是一种城市透水表面，城市与水的联系可通过各种不同途径与这一特殊纽带相连。此观点提供了审视滨水区的新角度，它不仅是简单的界限分明的城市区块，更是一种审视这座城市的新方法，由水获得灵感，以水作为其未来资产，同时不忘其根。热那亚是地中海城市（如马赛、瓦罗西亚和巴塞罗那）的典型代表。本研究先讨论不同参与者（大学、城市规划部门、港务管理局等）之间的矛盾争论，然后详细分析部分未来提议，其强调了热那亚西部 Prà-Voltri 地区与水的关系的不同含义：不同水平上的通行、特殊设计的通道上部和下部、打造可以游泳的（和往年一样）沙滩、新通道的娱乐和体育活动、现有 Prà 通道活动的延续。这些细化计划用于确定新通道可能承担的角色功能，进而成为促进城市再发展的工具：实际上，通道应通达至城市中心，使存在已久的道路与海滨步行大道相连，使其成为日常生活的有机组成部分。

关键词：
滨水区，复兴，热那亚，港口城市

1 THE WATERFRONT AND THE WATER ELEMENT

Nowadays, we used to consider the water as a common resource but it has been, from past until today, a fundamentally element for the human activities and we can realize this when we put in relationship water with the urban surround.

The origin of the first civilizations is conditioned by the water available and the keep it for agriculture. This was the first transformation of the natural landscape.

With technological progress, the populations were able to control the nature elements including water which became an emblem of wealth and prosperity.

The urban settlements which were born around water fonts are made of different features, this is simply visible even in our actual cities. Through time, water becomes always so important to be also a symbol of the society, an instrument to read the way of life. "Today fluidity and liquidity are relevant metaphors when seeking to understand the nature of current circumstances and in many respects represents a new phase in the history of modern times" (Bauman, 2000).

"The fluidity of the city is both a condition and an ideology. This is a condition reflected in the flows of desire for urban waterfronts, in the flows of global capital, and in the flexibility of urban palling regulation. It is an ideology reflected in the state slogan "in the move" and in the architectural images of dynamism and fluidity" (Dovey, 2005).

The purpose of this paper is to understand if the strength of water is so important like in the past and to see like this element can be the driving force for redevelopment and urban regeneration of a city-port. The regeneration of urban waterfronts is one of the key urban design and planning stories of the late twentieth century" (Dovey, 2005). In this paper a specific focus is proposed about the port city of Genoa. Some punctual interventions able to regenerate the waterfront are already done but today some areas still need of specific studies in order to elaborate a masterplan capable to face the entire waterfront and bring the city toward an efficient urban regeneration. About this theme, at the second paragraph some examples of urban and waterfront regeneration are reported mainly around the Mediterranean cities so as to identify the good practices and apply them to the city of Genoa. The third paragraph reports the case of Genoa, here, a particularly focus examines the western waterfront of the city and analyzes the existing channel in the district of Prà. This research proposes the continuation of the present channel as well as the development of a new one able to become an engine for the regeneration of this part of the waterfront. This approach places the water at the core of the regenerative action and represents an innovative solution. In our vision "the waterfront is not only the part of the city surrounded by the sea or a river, but it is a new attitude of the city that interacts with the liquidity, powerful contemporary category" (Carta, Ronsivalle, 2016).

Initially the focus is about on cities which are located on the sea coasts, in particular on the Mediterranean, well represented by the term of contamination.

The Mediterranean Sea has developed a fundamental role to spread the cultures which were born on its coasts, this thanks to the climate conditions, quite water, foreseeable wind, teeming with fish. These reasons put the Mediterranean Sea in the center of the world for many centuries, it has defined the perception of the space and of the continents. Myths and legends are an emblem of the Mediterranean's role and its cultural power that defined it such as a common land.

The Mediterranean coast makes feel a surprising unity, cities and cultures seem so similar and it is impossible to distinguish a nation by another one. The landscape from the sea shows recurring urban models, environmental features such as climate, vegetation and territorial characteristics.

After the post-war period, with the growth of industrialization, the historic and cultural identity of the Mediterranean is afflicted by a crisis which obligates the world to face up to the new model called globalization. In this phase, the traditional relationship with the water had to change. The lands, which confront themselves

with the sea, were exploited in favor of economic reasons. The suitable parts of the territory, first of all those nearest to the sea, are alienated in agreement of world business growth.
Here a new key to translate the challenge of the urban territory born: the waterfront.
"Rising to the challenge of the urban waterfront as "spark of urban regeneration" demands targeted efforts to create the sensation of a waterfront not so much as a physical location but more in the form of a liquid aspect of the city: the Fluid City's identity" (Carta, 2012). In fact "fluid city is fundamentally about a city becoming "unsettled". We generally approach cities as "settlements", a sites or places where forms and identities have become stabilized. While I have a good deal of respect for settled notions of place identity, the focus here is on understanding urban change as a confluence of flows of different forces, both global and local" (Dovey, 2005).
The waterfront represents those parts of a city develop from the contact with the water until to involve the inner parts, it is a sort of permeable urban surface where the link with water is able to conjugate the different ways to live this special bond. This view permits to look at the waterfront not only as a simple urban area well defined, but it is a new method to watch the city that draws the inspiration from the water for its future assets, without to forget its identity.
The urban identity actually forms an important theme around a context signed by loss of historic memory and urban transformations. The Mediterranean cities, in them difference, inherit from water the feature of fleeting. They are complex realities, rich of stratification and cultural phenomena difficult to analyze and define. Here the social dynamics are fundamental but their understanding is strictly connected to their fluidity. "Liquidity provides us with an important interpretative key to understand many aspects of the contemporary city, to plan its relationship with the dynamism and to lead the rapid speed of its transformations" (Carta, Ronsivalle, 2016). The latter reflects the essence of a Mediterranean city but it was in conflict with the functionalism of the modern urban planning that limits the spaces depending on specify and fixed models. The dare of our cities is the care of the common life, in according to the contemporary model of city planning in favor of qualitative values thanks which the public space can positively grow.

2 THE WATERFRONTS IN THE INTERNATIONAL PANORAMA

"Urban waterfronts are today one of the most prolific variants of creative cities: dense and hybrid locations where resources, opportunities, aspirations and ambitions of cities are translated into visions, new relations and projects. The creative port city is capable of reactivating new urban metabolism, of generating new architectural forms, of producing new landscapes and, through the permanent flow of urban culture, of fueling the great relational networks, making them more dynamic, communicative and competitive" (Carta, Ronsivalle, 2016).
Following, four cases study are chosen to understand the regenerative strength of waterfronts and how they are able to involve the entire city. These cases help us to describe the different types of requalification, they give us suggestions and tools to foresee how much a urban redevelopment can be successful and at the same time they underline the critical effects due to the urban transformation following the great events. Among the case studies, Marseille, Valencia, Barcelona are the main interprets of a fast process of development due to great public events. Instead the fourth case, Bilbao, is a different reality. Bilbao is a different case because it is close to the Ocean and it invested in the architecture and tertiary sector to resolve its problems of chronic decline.
"For many years, municipalities and regional governments pursue the way of mega-events (Olympic Games and Expo in the first place) to acquire a new image, reposition itself internationally, diversify its tourist and cultural offer. Sometimes these events are unnecessary, often they are only an intermediate result which let

on the field abandoned structures (too much expensive and difficult to reuse), due to errors and illusions" (Guala, 2015).
From these cases appears as "the waterfront has also been a primary scene of experimentation in architecture, planning and urban governance" (Dovey, 2005).
Nowadays too much times the regenerative strength of the waterfront is deaden because the inaccessibility and decline of the urban areas which transform themselves in break points with the rest of the city, a sort of no man's land between water and urban ground.
This decline is much more negative if the city traditionally identifies itself through the water. The relationship with this element assumes different faces but, at the same time, it shows important kind of similitude such as the requirement to recover a rational continuity along the littoral in way to optimize cohabitation between city and its harbor.
The modern waterfronts are potentially focal points able to drive the development of entire parts of a city and the goal is to put together the many actors involved and their different disciplinary sectors. It is necessary to weave a dense network of contacts to conjugate urban projects, economic strategies in order to defend the cultural and social heritage. It is an hard working to make in practice as we can see a lot of projects remain in stand-by.

2.1 MARSEILLE

"I know the harbor at Marseille well and it is a truly grand space. This project is a great opportunity to enhance it using very simple means, to improve it with small, discreet pavilions for events, for markets, for special occasions. Our approach has been to work with the climate, to create shade, but at the same time to respect the space of the Harbor, just making it better" (Foster, 2012).
Marseille (see fig.1, the blue indicates the areas object of regeneration and the fuchsia underlines the punctual structures) has a strong connection with the sea. Its proximity to Italy makes the city very similar to the Ligurian cities. In particular Marseilles shares with Genoa the linear development along the sea coast built in the time for about 10km of extension with an historic core called Vieux Port. This area, at most closed to the open sea, became indissolubly part of the city thanks to an interested urban integration. The dock is a dynamic business center for the fish market, in fact the most of the darsena hosts a lot of fishermen who are the protagonists of this space together with sailing boats, yachts and motorboats. The Vieux Port so is an hybrid area placed between land and water where the city finds its real essence. The urban asset we can see today originates from the great investments employed thanks to designation of Marseille as European Culture Capital 2013.
Here the goal of the regeneration was to re-emerge the compromised relationship between city and sea. Following this reason the most of financial resources were used for the Vieux Port and its surrounding. In this paper is reported this important urban regeneration because it represents a positive example but who contains some critical sides. Marseille is a model to understand how waterfronts are considered as public spaces where every citizen is a owner so everyone is linked to it, also the simple walker feels the duty to express a personal opinion about this part of the city.
The urban project considers, among the main actions, the expansion of the pedestrian areas working through the alteration of the equilibrium between the public and the private spaces.
The docks have become a simple pedestrian area close to the water without those historic activities of the fishermen who worked before on these docks. The project[1] inserts a new installation that has became the real core of the Vieux Port, the Ombriere.

1 The competition-winning masterplan is designed by London atelier Foster + Partners in 2011-2013. It engaged a large area of about 100.000 m^2.

Fig. 1-2 Marseille waterfront (on the left) and Valencia waterfront (on the right)

Initially it was thought as a platform roof under which to host the traditional fish market but soon it has become a symbol of the Port and the main attraction thanks to its reflectance surface like a mirror. Who passes under the Ombriere is naturally tempted to look up to observe the entire area flipped.

This feature of the Ombiere makes it clear that it is a device which does not research a dialog with the water because it is self-referential.

Another element of forethought is the absence of benches, green spaces and shadow zones, this fact shows that the design choice interprets the Vieux Port as a transition area. So the darsena, only apparently, connects the city with the sea but really the new urban asset does not permit the historic way to interface with the water and the fishing activities, the docks has become a simple passage who seems a wall that divides water and ground.

2.2 VALENCIA

"The temporary mega events are at the fundamental of the most interesting cases of waterfront redevelopments. In the international contest mostly in Europe, the mega events and their effects on the long period have transformed the water-cities as indisputable protagonist of the urban planning and government" (Giovinazzi, 2009).

Today Valencia (see fig. 2, the blue indicates the areas object of regeneration and the fuchsia underlines the punctual structures) is a symbol of a redevelopment process that has been renewed, dealing with the requalification of maritime and cultural heritage of the city. Valencia's new face is constructed through the restauration of its identity, finding a resource in the coastal strip and opportunities for development in economic, environmental and cultural terms. The city lives a cycle of urban transformation which permitted a gradual expansion of approaching the coast. This important evolution is based on the restauration of the ancient port of Valencia in order to cultural and touristic purpose with different application in the relationship between water and city. The year 2007 is a turning point thanks to the nomination of Valencia as the host city of the 32nd edition of the America's Cup. Here, the regeneration of waterfront begins from an international sportive event which becomes part of a wider redevelopment project to mend the relationship between Valencia and its littoral. The port of Valencia is the example of a structure that can be designed again thanks to the economic support justified by an international event that transforms Valencia in one of the most popular city of Spain. Formerly the city was subject to an important change of its urban asset that interested the Turia river.

"The growth of the city and its gradual expansion towards the sea, following the transformation of the old docks, and the diversion of the River Turia are critical for the recovery of its fluvial and maritime features ... In the sixties, the river was diverted and this let the river bed dried up. Its tortuous path, crossed the whole city so this important operation permitted to have an extraordinary element of re-stitching, rehabilitation and integration of the different urban parts" (Campisano and Mason, 1983) (Gaja Díaz, 1993).

This operation left a huge space that went around the historic neighborhoods of the city. This void early become one of the most important part of the urban asset enriched by green spaces, cycle paths, sportive and leisure structures, so the "Jardin de Turia" was born and it influenced the surrounding until to revitalize the historic center. This green park modified the entire urban order increasing the social sharing and building a new imagine of the city with more than one hundred ha.

The Jardin is a sort of "greenfront" around which the modern quarters meet the traditional ones till reaching the waterfront. About the harbor of Valencia, in the 80's, it fell in crisis due to the diffusion of the logistic system of containers and the bigger ships that need deeper seabed and larger spaces. Slowly the mercantile activities moved to other parts located outside so the littoral was ready to host the regeneration of the waterfront.

2.3 BARCELONA

"The waterfront of Barcelona is characterized as an inserted node within an international network which plays a highly important role. Importance conferred by the territory that surrounds it, the complexity that is developed in a restricted area and the different functions that tend to expand more and more to develop a certain degree of competitiveness" (Ridolfi, Valdelvira, 2011). Consider Barcelona (see fig. 3, the blue indicates the areas object of regeneration and the fuchsia underlines the punctual structures) as an excellent example of the requalification of a city is a fact almost discounted. The Catalan capital city used the Olympic events (1992) to consolidate the regeneration strategy starting from the 80's with capillary and diffuse actions on the entire city. The process continues during the following years and in 2004 it ended with the Universal Forum of Cultures sponsored by UNESCO, this moment remarks the ending the long process of urban change.

Initially "the urban regeneration policies, implemented in the city of Barcelona in the last two decades, have led to the disappearance of a large part of the industrial heritage" (Montaner, Alvarez, Muxi, Casanovas, 2014).

Fig. 3-4 Barcelona waterfront (on the left) and Bilbao waterfront (on the right)

In 1992 Barcelona takes the opportunity to modernize the sportive settlements across the waterfront, a lot of new infrastructures are built both in the central areas and in the suburbs. The zones concerned are many (Montjuc, Diagonal, …). The quarter of Barceloneta, close to the best beaches of the city, is involved in important urban designs. Differently from other cities, the strategy of Barcelona is global: it aims to spread many actions on the whole territory balancing the cultural development, the touristic attractions, the private business and the public wellness. These projects are based on the restoring of the touristic accommodations, the expansion of the marketing, the touristic monitoring and the increasing of the museums and cultural offers.

This plan shows a city which is able to transform itself and it knows to use its fame and visibility for an international placement.
Finally in 2004 the Forum tackles a series of urban designs in the Poble Nou quarter involving the Besos river mouth till the closer municipality of Sant Andria. In this way the planning of the city is completed and touches the eastern suburbs till the western parts where the traditional maritime activities remain more integrated than before.

2.4 BILBAO

"At every instant, there is more than the eye can see, more than the ear can hear, a setting or view waiting to be explored. Nothing is experienced by itself, but always in relation to its surroundings, the sequences of events leading up to it, the memory of past experiences" (Lynch, 1960).
Bilbao (see fig. 4, the blue indicates the areas object of regeneration and the fuchsia underlines the punctual structures) represents a considerable case study in terms of relationship between water and urban land. It is not geographically a Mediterranean city but it is reported in this paper because represents a reality which has always coexisted with the Nervion River that links the city with the Ocean.
Here, the regeneration action starts from 90's along the river banks used, in the past, for productive activities, then abounded because the crisis in the sector. This moment leaves on the ground entire degraded areas so the city decides to invest on culture as the engine of the urban development. This choice was not induced by a specify mega-event like the other cities see before, but it is founded on the realization of the Guggenheim museum.
This building is part of a wiser urban planning with the ambitions to begin the transformation from the river banks to the rest of the city.
It is a political choice which wants to change the urban model to initiate an economic changing to face the heavy crisis that involved the Basque country from the second post-war period. The redevelopment strategy aims to the improvement of the urban wellness (accessibility, mobility, environmental quality) and it also includes a social plan for the community giving a great role to the culture and the social identity in order to build a new image of Bilbao. It was a politic and cultural change began with some oppositions from the local communities still tied to the old industrial city model because they feared that the change appears as only a urban restyling.
After the first contact with the Guggenheim Foundation (1991), Bilbao decides for a breakthrough architectural icons which able to become a landmark, a symbol for the city. Thanks to the great success of the museum the whole neighborhood was involved: the banks were modified to host new cycle paths and promenades, a lot of modern structures were built for sport, leisure, and mobility. The transport network was enhanced till the Ocean and the coastal settlements and the historic center was restored. The regeneration of Bilbao is completed in just a little more than 10 years and the city is wholly renewed.

3 THE CASE OF GENOA - THE WESTERN WATERFRONT

Among the Mediterranean sea, cities such as Genoa, Marseille, Valencia and Barcelona, represent a good example of how a city develops an in-depht urban transformation strategy that includes the relation between sea and his surface. The development experience of Genoa is tied to the great events which were been an important stepping stone. The main opportunities are located along that thin strip of land that in some case connects and in other one divides the port from the city. The actions to unify these two entity were different. Many of the interventions lasted until nowadays are concentrated over the Porto Antico (Old Port), leaving principally to the western parts of the city to sustain the heavy burden of the industrial and logistic system,

with their consequences. As it is realized in other industrial cities, also the Ligurian main city is living a phase of reflection about its economic, social and urban asset.

Thanks to different initiatives2, Genoa has faced the recovery of its waterfront, particularly with important projects located at the Porto Antico able to involved the inner historic center. In 2004 a masterplan called Affresco - The Framework (Piano, 2004), provided an overview around the future strategy to applied on Genoa. Renzo Piano's view encourage the develop of several projects a lot and everyone aims to review completely the relation of the city with the sea in order to make Genoa ready to face the future challenges. It was the first time that the creation of a large linear urban park is proposed, which runs along the entire waterfront from east to west, and connects the city to the sea.

"The promotion of the city, as is the catalyst of the energies of all local stakeholders, municipal administrations, businesses, citizens, can play an active role in support of urban regeneration policies, aimed at enhancing the potential of the system local, collective identity and its internal cohesion" (Gastaldi, 2012).

"The 2004, the year of Genoa European City of Culture, was a turning point in the revival and consolidation of the city's role in the panorama of tourist and cultural flows at the national and European levels" (Gabrielli, 2005). One of the merits that must be recognized to the Affresco is to animate a lengthy debate within the city: it has demonstrated how the city and the port, in Genoa, are inextricably linked. The port of Genoa is the hub of an extensive economic system that goes beyond the boundaries of the city itself and around which revolves an induced of considerable proportions. This implies that it should be able to adapt itself following the development forecasts in order to improve and increase the commercial traffic.

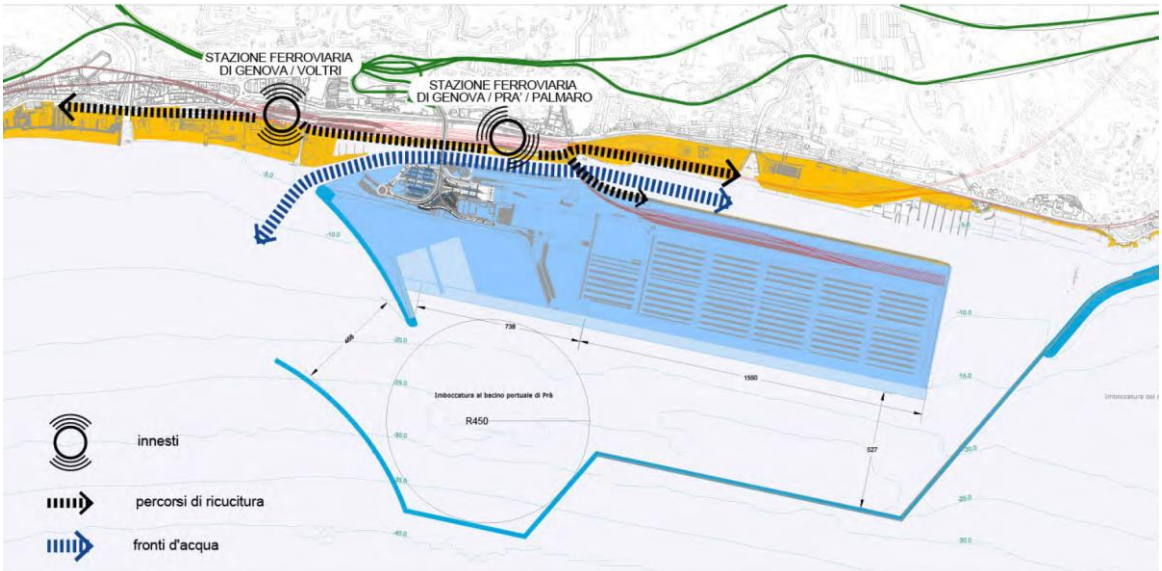

Fig. 5 Port Master Plan 2015

2 Columbus Celebration of 1992, the G8 in 2001 and GeNova (New Genoa) Capital of Culture 2004 are great events that spread an important public debate in the city and several urban transformations lead by public governance that permit to rediscover the importance of its waterfront. In particularly in the 1992, 500th anniversary from the discovery of America, represents the beginning of the regeneration of the urban waterfront with the introduction of new buildings in order to relaunch Genoa in the international touristic contest. In 2001, the event of G8 has brought to new actions in order to improve the historic center and the Old Port. The event of GeNova 2004 - European Capital of Culture has promoted the enhancement of the artistic heritage, with restoration works of the historical and cultural heritage. In addition a series of Urban Projects have been the occasions for social, economic and infrastructural interventions. Actually the new occasion for Genoa is represented by the Blueprint designed by the Renzo Piano Building Workshop, which affronts a specific part of the Genoese waterfront, in order to combine together tourism and industrial activities (ship repairing industry).

In about 15 years, after the approval of the Port Master Plan and in consideration of the forthcoming conclusion of the works contained in it, the Port Authority of Genoa is drafting the proposal for the new Regulation Plan. The main measures foreseen in this territorial area want to be a balanced development of urban and operational functions. From the point of view of the port, the objectives are focused on strengthening the existing container terminal by modifying the current works of protection, along with an extension towards the sea such as to allow greater operational capacity and the optimization of the berths of the terminal in relation to the phenomenon of the naval gigantism.

In this contest the Voltri-Prà area is the unique in which there are some spaces to implement, therefore able to host the great contemporary ships.

The development of the new Port Regulation Plan definitely presents a breakthrough in this regard. From several years, there is a coordinated planning between the Port and the Municipality but it is the first time that the Port Authority spends a large amount of resources in favor of the Urban Port[3].

The Coastal and port area of Genoa Voltri-Prà and the Porto Antico have a parallel development[4]. The constant increase of the port economy, the continued growth required for new areas of expansion and the greatest transformations can be realized.

It all began in 1969 when the landfill at Voltri started. The work going on until 1988, when the fill outlines the perimeter of the current terminal container and the littoral of Prà is forever demolished. In 1994 began the commercial traffic and the port can be said inaugurated. It is important to note, however, that thanks to this fact the Port of Genoa is able to compete with other Mediterranean and Atlantic ports reality, flourishing in the European market. This international position must be maintained for the wellness of Genoa so in prevision of an inevitable new expansion of the docks, in 2012 different future plan scenarios are born. Three of these visions relate precisely to the area Voltri-Prà. The scenario Voltri Isola becomes the favorite area thanks to its innovative idea to subtract ground and not only add it. At this time the analysis, planning and design of this new unique area is fundamentally in order to create an interest area placed between city and port able to fully exploit all the opportunities.

To mend the relationship between city and its littoral we must have a project based on an analytic studio in order to determinate all the parameters which are involved in this territory.

In this situation "waterfront regeneration needs to be disruptive: a paradigm shift and a deeper innovation of methods and tools must be set up in order to act in the changing times we live (Carta, Ronsivalle, 2016)".

"… It is pointless trying to decide whether Zenobia is to be classified among happy cities or among the unhappy. It makes no sense to divide cities into these two species but into another two: those that through the years and changes continue to give their form to desires, and those in which desires either erase the city or are erased by it" (Calvino, 1979).

The scenario Voltri Isola foresees the realization of a new water channel able to divide definitively the container terminal from the mainland. The channel has not only a protective function but it has to become a device that can involve the rest of the city. A so large design must contain more meanings and functions to become a tool

[3] Area foreseen by the new proposal of the PRP Port Master Plan that includes the city-port interaction areas where to place nautical activities and connected to the Port, along with a urban activities such as commercial, administrative, cultural, research, public and private services, declinable in a perspective of port synergy. The aim is to redevelop new parts of the waterfront.

[4] The urban layout of this area has many similarities with most other coastal districts of Genoa, a recognizable historic center and outlined by morphology and human structures that were added over the years. In 1926 the different cities, including Voltri and Prà, are merged in the Great Genoa, losing its autonomy to become part of a larger design. Starting from the metropolitan center peri-urban areas have been urbanized. The shape and the proximity to the sea, typical of this area, oblige the passage of major infrastructure (such as highway or railway line) in the immediate vicinity of the town, sometimes inside and sometimes between the town and the sea, going to affect on the relationship with it. Having saturated the only low-lying parts near the beaches, because of population growth, suburban suburbs are born in the hills.

for the urban requalification. The channel links the Prà's littoral with the Voltri's littoral, two coasts never in contact until now. This two realities have different features but both share some problems about degradation and disorganization.

About the urban area the differences are more manifest. In Prà the efforts of the years are clear and they permitted to realize a buffer zone protecting the city from the great infrastructures through the Dapelo park and a palm grove which runs on the banks of the terminal.

The areas placed in Voltri, close to the port, suffer the neglect state of art and they host some maritime industrial structures. The mutual attention, between Municipality and Port Authority, represent an inversion trend especially in favor of the city which gets some benefits thanks to the realization of the water channel including the urban environment.

The ambitious project is so important for the Municipality than expensive for the Port Authority, in fact the channel will divide nearly 1.5km of logistic activities. It is necessary to identify and optimize the connecting points to the road, motorway and rail network in order to minimize the impact on the new path of water.

The relationships with the water are different; everyone has a different connection with it: for a worker in the port it is an economic factor, for a fisherman it is a font of sustainment and passion, for the citizens it is a place of leisure. All these functions cannot exist in Voltri-Prà without the sea.

We must analyze and consider the importance and the role which the channel will assume here, through the examination the portion of the channel that today already exists in front of Prà. Along the channel everyone finds a relaxing moment and this underline how the water is the main actor of this place. It is necessary to interpret the water like the real engine for urban regeneration and for its efficiency in time. The thinking to the design of the new channel is motive to reflect in order to consider the future users. The actions, over a precious place like this, have to evaluate of all that local factors able to be the better tools for the regeneration of this area. With this regard, in the present paper we have identified few thoughts around the elements considered most sensitive concerning the size of the channel, the form of the paths, the thresholds and the visuals.

3.1 THE SIZING

The channel excavation causes a variation of altitudes that in reference to the observer's position implies some reasoning. The strip of land that works like the border of the channel will have a minimum width to be modeled. The urban side along the railway line represents a limit fixed elevation, this causes an expansion of the surface in contact with it to be able to degrade until the water portion without being perceived as an obstacle. Similar reasoning should be done about the port side that is not accessible to the public but only to insiders, second the prediction.

The port shore, by its nature is variable in time and in shape. It may be composed of stacked containers or sheds for the distripark. To soothe the impact procured by heavy activity, a green band with protective function can be used, creating a screen which will interface with the users first (see fig. 6).

Fig. 6 Sections: a, b, c

With this goal it is necessary to set some limitations in high equipment and buildings that will arise in this area. In order to individuate the limit in high we process in identifying the critical conditions that can verify in the channel, for example the human eye is vertical field can be designed thanks to the navigable limit through which is possible to define the height limits in about 12m (see fig. 7).

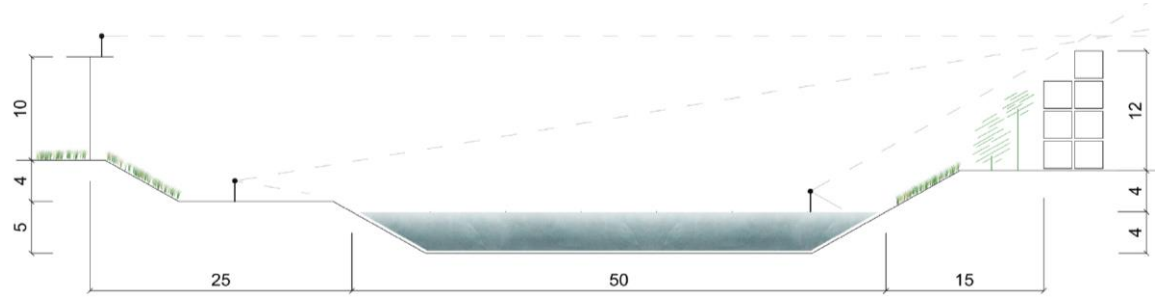

Fig. 7 Planned section of the Channel

On the opposite bank all accommodation for leisure and recreation reside.
We propose a bank with a promenade more dynamic and variable, not only in geometrical definition but mainly in functional and formal terms. The features of this promenade are designed in order to create a new way to relationship with water. It will possible with specify devices able to generate different experiences along the walking. This experiences can be also used to produce variations about the dimensional perceptions of the channel. Like a road seems smaller if you look it from a higher floor respect, the same road looked from the ground floor, so the channel has to take in advantage the different altimetry between the water and walker floor.
The Figure 8 (d) represents the basic situation diffuse now along the existing channel in Prà.
To vary the perception it is possible to make higher or lower the visual axis of the pedestrian. Walk on a floor lower (fig. 8.e) than the sea level allows to enjoy the water while a panoramic view (fig. 8-f) allows to enjoy the panorama and understand the entire plan articulation of the channel.

Fig. 8 Sections: d, e, f

3.2 THE THRESHOLDS

Beyond of the viewer's position respect the water it is necessary to consider the interaction with this element. The relationship with water is variable and the secret of its attraction strength lies on its dynamism and impossibility to contain it. The involvement of the water along the promenade implies to interact with it and to understand the potential features than can have a promenade of this kind. For this reason we have to sketch some drafts to illustrate possible ideal sections along the promenade. For example why the walking edge must be fixed and not free to change by time second the tide like an organism that increases or reduces its surface. In Genoa between the high and low tide there is a spread of about 50cm (fig. 9-g). Another fascinating feature of water is replaced in its capacity to seep in through the soil and emerge in surface (fig. 9-h). From this consideration, the concept of threshold rises and accompanies the pedestrian along whole the promenade and it changes the shape and inclination in order to modify the perceptions. A clear and deep

threshold does not encourage the walkers to get close to the water (fig. 9-i) while a degrading threshold permits to perceive the sea bottom then makes easily and more spontaneous to get near to its limits (fig. 9-l). The figures m and n show the promenade detaches itself from the ground to continue above the water, anchored with the channel bottom or made by floating structures in order to eliminate every kind of intermediates between pedestrian and water or to insert relevant intermediates like vegetation (fig. 9-o).
The vegetation is one of the elements that better works as an intermediary between the observer, the water and the surrounding. It can rule the prospective visuals, disguises the context and shows the right direction to look. Also the plants like the water are variable in time. The trees grow second the seasons and increase or decrease their foliage density and constantly change their color and their odor. It is very interesting to plan the vegetation system but, at the same time, it is complex because we must to consider it is an alive element second an own natural cycle. The channel, as well as underlined before, is placed between two rigid constraints: the railway and the container terminal.

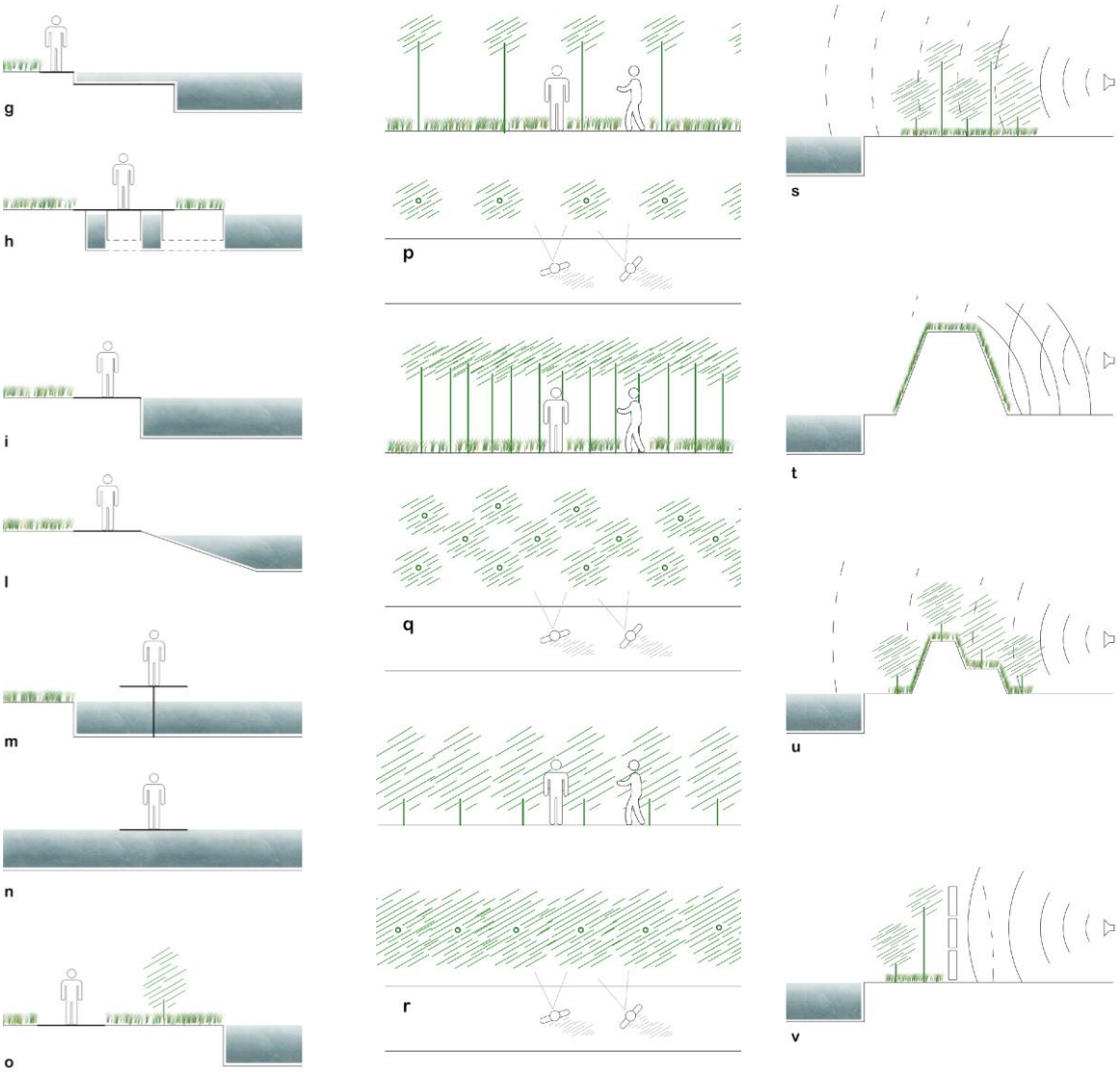

Fig. 9 Sections: g-v

Without adequate protection measures against this two important constraints the risk is to build an unlivable channel. To face this important theme, we have done some considerations about the state of art of the existing

channel in Prà. Here, on the port bank, there is a protective band formed by a linear tall palm grove. The palms are rigidly placed along a line and in the separation between them there are some hedges of low quality, in fact they are felt by the pedestrians like a temporal and occasional solution only to hide the port view. If we analyze the palm groove in perceptional terms it is too much high and dispersive to work like a protective shield for the view and the noise of the terminal. The acoustic problems are very relevant and it has justified the inserting of massive dunes of soil (9m of height) in order to stop the sounding waves and the acoustic pollution. This strategy, without a deep reflection, not resolve the problem and create other ones. In the new channel we think to insert different plants along the various thresholds and paths in order to work like a simple filter or supporting for the walkers (fig. 9-p).

The density foliage and their location can be used to shade the most critical areas only through the regulating the kind of the trees like the figures q and r show. The inserting of the dunes vegetation is efficient but they must be controlled in their extension to respect aesthetic canons without oversized structures. The pollution control by the vegetation systems is made thanks to the foliage and the kind of soil. The foliage work for the absorbing and transforming of the sound waves. The leafs, the branches and the trunk are able to deflect the sound energy of the high frequency thanks to their thickness, dimensions, and surface shape. The soil, instead, has some reducing and reflecting effects on the noise caused by the tangential sound waves. Good results are obtainable with soft soil vegetation that absorbs the waves while sandy soil reflects only. The structure is very important and they are classified second the kind in: vegetation curtains, structures with vegetation covering and reinforced earth.

The vegetation curtains (fig. 9-s) is a fence composed by a brushwood layer placed in linear way. The efficiency of this system stands in the choice of the plant essence used, evergreen trees not shorter than 15m are suggested. These curtains need relevant surfaces that are very difficult to find into the channel so the possible alternative can be the using of structures with vegetation covering and reinforced earth (fig. 9-t and 9-u). This solution is the most efficient both for acoustic reasons and for aesthetic terms in fact it causes a minimum impact for the context and becomes a green ribbon which runs along the channel. The reinforced earth also needs few space and maintenance. An alternative solution that we have thought is to insert made to order acoustic custom panels with the shape and the color of containers to be used to increase the acoustic benefit of the vegetation curtains (fig. 9-v).

4 THE WATERFRONT REGENERATION AS THE ENGINE OF THE URBAN REQUALIFICATION

As the International examples reported in paragraph 2 and the case study of Genoa described and detailed in paragraphs 3-4 show, "the policies about requalification of the waterfront have become the new boundary of the urban regeneration, from the planning until the critical reflecting on the future of cities, into an environment ever more dynamics and competitive. More experiences tend to present it as a place of public policy, an opportunity to compete not only with the new transformation of the city conditions, but also to compete with the most innovative tools for planning and urban design" (Savino, 2010).

In this contest our research brings from a debate among the different actors (University, planning Section of the Municipality, Port Authority) to an elaboration of some future proposals about the urban waterfront. There are several available tools and organizations that have to plan and manage the different areas in a city. For example it is possible to think of the two tools, Urban Plan elaborated by Municipality and the Port Master Plan developed by the Port Authority, different tools characterized by different purposes and interests that often do not communicate with each other but instead should interact to achieve urban projects of waterfront regeneration "addressed as a structural/strategic element on the city as a whole" (Alemany, Bruttomesso, 2011).

The research has been able to create a synergy among the different actors who have faced a specific area, in particularly the Genoa western Waterfront, which today represents an interesting resource for the city of Genoa. In particular, the idea elaborated for the redevelopment of the waterfront has been the creation of a new channel, Voltri Channel, in continuation of the existing Prà Channel.
The project resulted from this research has been defined with the aim to respond to the different meanings of the relationship with water. This is clear in fig.10: from walking on different levels, above and below the channel specifically designed until the opportunity to have available (as in previous years) the beach for swimming and some recreational spaces for leisure and sporting activities.

Fig. 10 Rendering of the planned Channel

In addition, the vision elaborated shows how the waterfront regeneration represents the engine of the urban requalification that is capable to create connections and improvements not only for the benefit of the areas bordering the sea but also for the neighboring inland areas.
The elaborations are designed to determine the functions that the new Channel could take in order to become itself an urban redevelopment tool. The influence of the Channel, in fact, should reach the city center reconnecting to historical paths and the promenade to become an integral part of the everyday life.
Only in this way the Channel ensures that the urban waterfront becomes "a new frontier of the city with opportunities for significant aesthetic, economic, social and environmental benefits" (Dovey, 2005).
That is the right way to make possible to reach a correct governance of urban waterfront "capable of intercepting and transforming the entire city and not be restricted purely to areas along coast" (Carta, Ronsivalle, 2016).

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IMAGE SOURCES

All the images are elaborations by the authors, except for the figure 5 from Port Master Plan of Port Authority of Genoa.

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