

WATER AS A HINGE: REVITALIZATION OF THE OLD PORT AREA IN XIANGTAN

ABSTRACT

Xiangtan, as a riverside city located in the south part of China, has been through a long historical period during which some of the most formative moments of Chinese politics and economy happened. As the departure point and cultural core of the city, the old port area, however, is now marginalized by the urban expansion and economical growth which impoverishes the old port area even more. Meanwhile, the old port area of Xiangtan is a urban area suffering from yearly flooding problem. In this paper, the regional spatial characteristics of Xiangtan will be clarified, while the experiences of urban waterfront movements of Venice will be referred for the comparison. At last, the inspired design vision will be yielded as the guiding principle of generating the possible crisis-initiated revitalization of the old port area of Xiangtan in which the yearly flooding acts as a hinge instead of a boundary to the richness of the local lives by the river bay.

KEYWORDS: waterfront, revitalization, flooding, old port area, Xiangtan, Venice

I. INTRODUCTION

1.1. Problem Statement

Xiangtan, as a riverside city located in the south part of China(Figure 1), has been through a long historical period during which some of the most formative moments of Chinese politics and economy happened. As the departure point of the city, the old port area constantly adapted and renewed itself in relation to the outside world. This area, however, is now marginalized by the modern urban expansion and economic growth, which are often characterized by changes in the scale, the speed of urban transformation, and the modification of the original environmental context. This kind of large-scale radical urban change is absolutely a bad thing in regards to preserving the regional identity of the old port area, but still, with a sense of urgency, a far-reaching redistribution of stimulating regional functions and an urban-rooted developing position are needed.

Meanwhile, the old port area of Xiangtan is an urban area suffering from yearly flooding problem(Figure 2). When the flood comes, the existing urban configuration will suddenly come to failure: the roads will be submerged, the electricity will be gone, and so on and so forth. This impoverishes the old port area even more, as no investments and precedence would prefer this area considering its relatively fragile environment. Thus, a restructuring of the available space and urban infrastructure of the area both in dry and flooding seasons are needed as well.

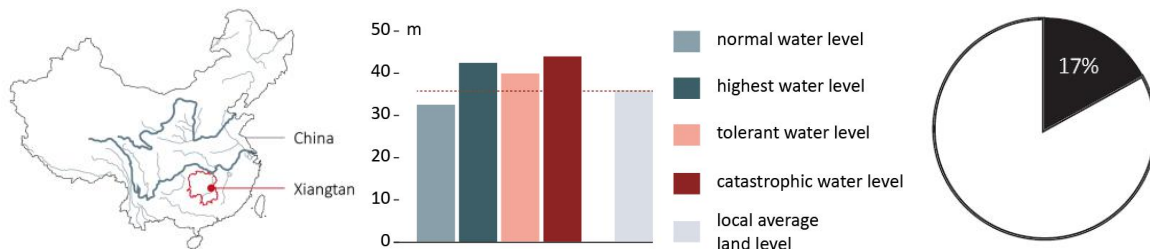


Figure 1. Geographic location of Xiangtan city

Figure 2. The official-recorded absolute water levels of the old port area in Xiangtan¹

¹ Statistical figures from <http://old.xtgh.gov.cn/>

Figure 3. The proportion of the subsistence allowance receivers of the old port area in Xiangtan²

Though the old port area has a glorious past and did bring fortunes to the city thanks to the port tradition, the current genuine perceptions from the local people are the poor living facilities, low monthly income, sense of insecurity brought by flooding, to name but a few (Figure 3). Abandoned by the big background of the urban development, the old port area is now falling into an embarrassing situation about the way it exists.

So here come the questions: How does the old port area retain prosperity facing the non-static natural and built environment? How could we again reach the balance between the urban development and the local landscape? Could citizens live a happy life with water harmoniously as it was? When the flood comes, where should the people go and continue their lives as they are in the normal seasons?

1.2. Background & Methodology

Considering the current wide-ranging global architectural design practices, three methods are situated to confront the water-related context issues according to Seth McDowell: The first one will be described as "Defense", which is to keep rising water levels away from people's life by constructing an artificial mechanism, such as the dike and the dam invented by Dutch people. And the second one "Retreat" means to move people away from rising water levels, which is adopted by many island cities with a danger of disappearance.³ Both methods are not persuasive for Xiangtan to take, since the old port area is filled with cultural relics and traditions which cannot be radically disturbed or discarded.

Opposed to the former two strategies, the third one, "Adapt", tends to accept and celebrate the given hydrological instability. It allows rising water levels to "invade" the inhabited space, prompting people to adapt to the presence of water, to resolve the stress from water or even, turn the stress into opportunities of its development. This sort of adaptable urban strategy is preferred to help solve the dilemma of identity crisis and the poor physical living condition.

In this paper, the urban spatial movements of Xiangtan and Venice will be focused on relatively. Firstly, it will be indicated that how several historical events left their marks on Xiangtan socioeconomically as a series of stage settings, especially on the old port area where the city started from, to get a brief idea about the intrinsic water-related regional identities and the underlying motive force of spatial development in the old port area.

After discussing the spatial characteristics of the old port area of Xiangtan, comparable urban design practices implemented in waterfronts of Venice will be articulated. The vitality and essentiality of water could be perceived by studying the urban interventions happened on the territories which are considered to be sensitive and distinctive in the whole urban setting.

At last, the inspired design vision will be positioned as the guiding principle of generating the possible crisis-initiated revitalization of the old port area of Xiangtan.

II. RESEARCH RESULT

2.1. The History of the Old Port Area in Xiangtan

Early in 221B.C., the firstly united China started to expand its territory. In order to better transport the military supplements to the south, canals were built in Guangxi province.⁴ As one of the intermediate ports, Xiangtan firstly became the threshold between the north and the south on domestic water

² Statistical figures from <http://www.xtggw.com.cn/gzyjs.asp?id=1973>

³ McDowell, S. (2016). *Water index: design strategies for drought, flooding and contamination*. Virginia: University of Virginia School of Architecture, 17

⁴ Liu, L. (2012). *The regional expression base on the protection of dock culture and the construction of Xiangtan city*. Changsha: Hunan University, 11

transport. Later by the end of the third century, there was a huge southward immigration due to the rebel wars launched by the royal members in the north. As a result, the urban population of Xiangtan grew dramatically during this period.⁵

From the seventh till the thirteenth century, due to the big background of the domestic economic thrive, Xiangtan became one of the main platforms of domestic import-and-export commodity business between merchants from different provinces of the country. Those commercial groups started to settle down at the old port area of Xiangtan, occupied different zones and formed their neighborhoods.⁶ From the fourteenth till the nineteenth century, a quite developed domestic commercial system was built in Xiangtan. For the first time, “Zong (总)” prefixed with numbers was used to define the division of the urban districts near the port which were generally formed by those aforementioned commercial groups.⁷

During the World War I and II, Xiangtan was opened as a port city dealing with foreign trades. However, the majority of water-based business were monopolized by foreign vessels with huge tonnage and sailing speed, which the traditional-crafted ships could not compete with. During the Chinese Civil Wars, ironworks, machine factory and electric-power industries were launched one after another due to the large military demands. This marked the shift from trade businesses to heavy industries, considering the economic base of the city.⁸

After the establishment of the People’s Republic of China in 1949, heavy industries developed abnormally in Xiangtan, which caused a devastating blow to many traditional businesses. Meanwhile, water transport gradually degenerated due to low efficiency compared to the fast-growing land transport development. The Bus Station and the factory buildings were erected in the old port area, and the bridges were built over the river near the quays. With traditional houses scattered along the river, the current scene of the old port area echoes the hustle and bustle of the vessels once common along the quays and the river bay of Xiangtan in the heyday of this now impoverished port area(Figure 4).

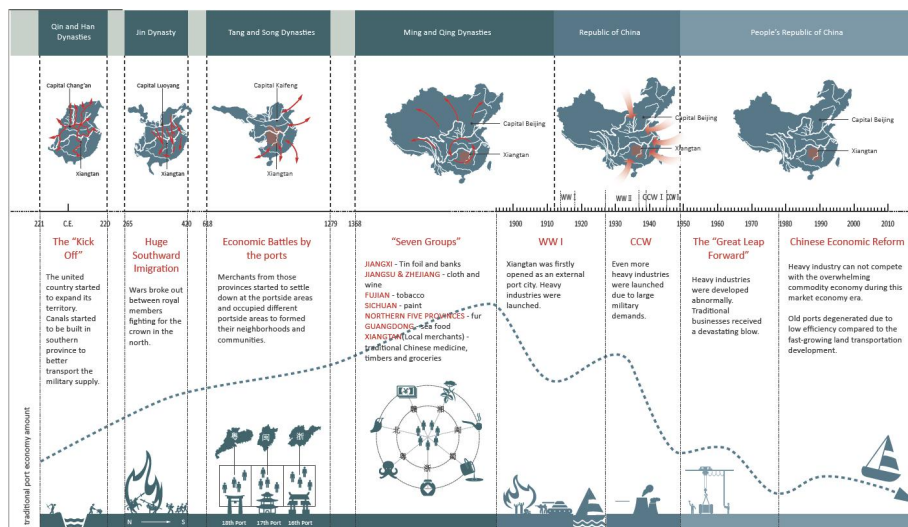


Figure 4. The evolution of the local economy amount of the old port area in Xiangtan

2.2. Regional Spatial Characteristics of the Old Port Area

⁵ <https://zh.wikipedia.org/wiki/湘潭市>

⁶ Liu, L. (2012). *The regional expression base on the protection of dock culture and the construction of Xiangtan city*. Changsha: Hunan University, 12

⁷ Li, X. (2008). *Research of the historical preservation in the planning of Xiangtan's old areas*. Changsha: Central South University, 17

⁸ <https://zh.wikipedia.org/wiki/湘潭市>

The image is quite clear that Xiangtan is a city which comes into existence because of water, which could be represented by its old port area. The spatial characteristics of the area could be summarized as follows:

From the urban aspect, the first idea of the old port area is the fish-bone urban street framework, which is the twofold consequence of both the river-bay terrain and the social-economic activities. Unlike the walled inner city whose restricted layout clearly showed the ideology of the authorities, the street pattern of the old port area has a rather irregular spatial structure, which is shaped gently in compliance with the local lives. The narrow-scaled main street and meandering alleys with no specific axis provide a rather natural and constantly changing perception of the urban views, which can only be formed by a “bottom-up” freedom and nature within the waterfront context of the old port area.

Secondly, It is interesting to notice that each “Zong” - defined port area - has its own landmark architecture(Figure 5). Those landmarks were virtually the showcase of the power of their owners(the commercial group) respectively, meanwhile, they functioned as directional signs and consequently increase the identifiability for the commercial zones that they belong to. For instance, the Bus Station of the old port area, which was erected at the junction of the urban main street and the road from the quay, is in fact, the gathering point of the public lives for the nearby neighborhoods all along the past years.

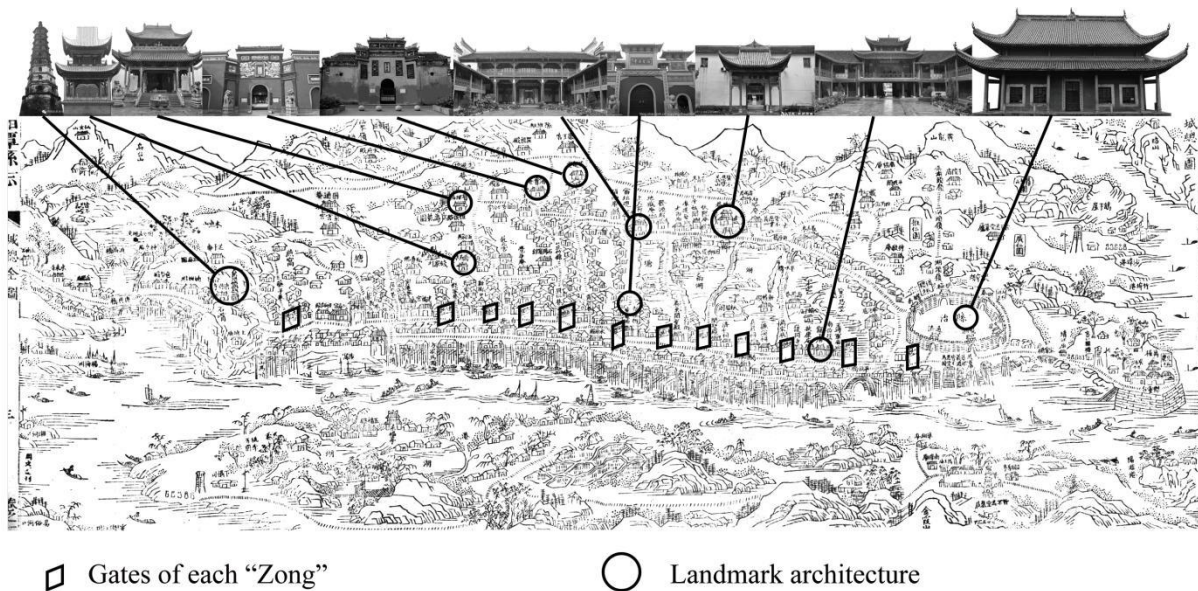


Figure 5. The panorama of the old port area in Xiangtan in 1818 ⁹

From the architectural aspect, besides the black tiles and the slope roofs which can be seen in most of the dwellings in South China, the vernacular dwelling has its ground floor built in masonry structure to resist the pressure and erosion brought by the yearly flooding. The upper floors are applied with the timber structure, with bamboo ribs holding the inter-house walls and the back wall filled with clay. The wall towards the street is closed with timber panels, with log bracing holding the stretched balcony. The horizontal plans were mostly organized in a single bay with huge depth or a middle patio with surrounding chambers. Due to the local small-crafting-based economic nature, the frontier and the ground floor are mainly used for public-related business, while the backside and the upper floors are used for producing and sleeping.

As foreign cultures generally penetrated during the twentieth century, many new architectural typologies emerged in the old port area, such as the bus station and Soviet-style factories which were

⁹http://hollis.harvard.edu/primo_library/libweb/action/dlDisplay.do?vid=HVD&search_scope=default_scope&docId=HVD_ALEPH007466789&fn=permlink

built in 1925 and 1970s respectively.¹⁰ During the construction of those new ones, practicality were valued without sticking to the traditional crafts conventions. Taking the local bus station as an example, it is considered to be the first concrete-structured one of China whose cylindrical shape echoed to the bustling traffic circulation, and the lifted-up platform successfully avoided the harassment brought by the yearly flooding issue.

Thus, The old port area is never static: from the architectural aspect, its spatial pattern grew through time organically and spontaneously in which richness and inclusiveness could be sensed; from the environmental aspect, the yearly flooding is keeping changing the edge between the urban built environment and the water.

2.3. Living Resources – Experiences from Venice Waterfronts

Compare to Xiangtan, Venice may be completely different because the entire city is waterfront as all daily urban transportation relies on water. However, the last hundred years have seen major developments in Venice's production sectors, particularly in relation to the space of the urban waterfront areas.

2.3.1 Revitalization of the Arsenal

Located on the eastern side of Venice, the Arsenal occupies over 40 hectares, whose size is pretty close to the size of the old port area of Xiangtan(Figure 6). As the centre of marine production activities of the Venetian Republic, the Arsenal grew as the whole city developed: It began with several dockyards opened in the thirteenth century, which were enlarged over the centuries till the World War I, since which the Arsenal has been gradually abandoned. In 1957 the Italian navy made part of the Arsenal accessible for civil use, and restoration works were implemented on several selected parts. Today, only limited activities are carried out there.¹¹

The idea of turning the Arsenal into a centre for marine research was shaped in 1987 after a comprehensive assessment of the possible alternative uses,¹² which proposed an integrated system to support the facilities for sea-related technological programmes, laboratories and experiments. For example, it is the place where the management of the “Mose” system happens, which will be introduced in the following paragraphs.

2.3.2 The Southern Edge of Venice - Giudecca

The earliest history of the island Giudecca is quite similar with that of Xiangtan, which started from the thirteenth century with dwellings and fishing settlements there and subsequently became a place full of commercial activities and luxury houses of the nobles.

Driven by the industrial revolution in the nineteenth century, Giudecca became a base camp for military and other related productive industries, most of which later generally vanished in time and made way for the public housing, with some crafts-based factories left operational, and several old shipyards waiting for re-utilization. The challenge of Giudecca now is to both restore the dwellings and revitalize those manufacturing and service sectors by reconnecting them to the city creatively.¹³

2.3.3 Flooding Issue of the Basin of San Marco

The basin of San Marco is considered by all as one of the most magnificent and representative urban frontages of Venice, since the Piazza of San Marco had been the port and the only entrance to the city for a long time until the construction of the bridge to the mainland in the mid-nineteenth century. Today, it has been completely taken over by tourism, for example, the Biennale which attracts a mass

¹⁰ Chen, J. (2012). *The Application research into a plan for historic street's protection and renewal that based on GIS—— Taking Xiangtan Yaowan's historic street for example*. Xiangtan: Hunan University of Science and Technology, 18

¹¹ Mancuso, F. (1991). *The Venice Waterfronts*. Edited by Rino Bruttomesso. *Waterfronts-a new frontier for cities on water*. Venice: International Centre Cities on Water, 178-179

¹² Rossetto, P. (1991). *Thesis: A Pool For Marine Technologies in the Venice Arsenal*. Edited by Rino Bruttomesso. *Waterfronts-a new frontier for cities on water*. Venice: International Centre Cities on Water, 185

¹³ Mancuso, F. (1991). *The Venice Waterfronts*. Edited by Rino Bruttomesso. *Waterfronts-a new frontier for cities on water*. Venice: International Centre Cities on Water, 178

flow of people with yearly fine art exhibitions. However, the spirits of the old port still remain, as the moored boats and steamers can frequently be seen passing through the estuary.

The flooding problem has seriously persecuted the basin of San Marco over the last century due to both the rise in sea level and sinking of the land, which are suffered by Xiangtan as well. With 7 times a year on average, the basin and the surrounding area will be submerged by water entirely. The defensive work is now being implemented by raising the quay along the basin and the pavement behind by 100 cm, with the pavement in the Piazza not being changed.¹⁴

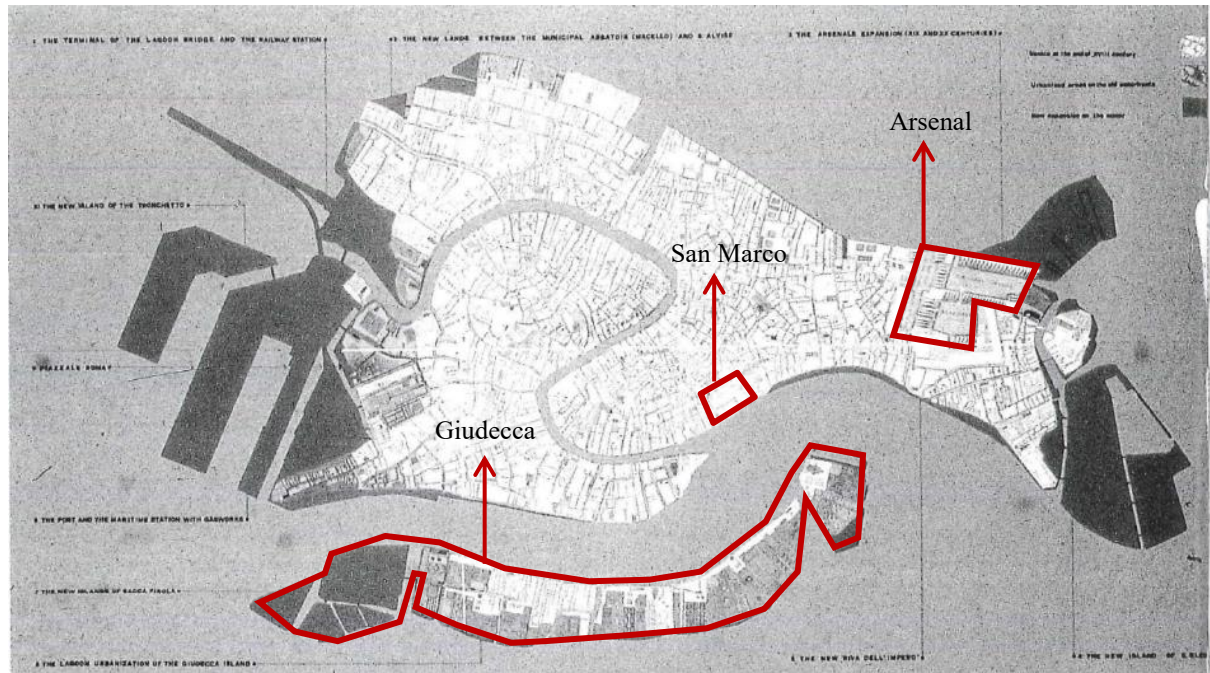


Figure 6. The urbanized area and expansions on the waterfronts of Venice in the late eighteenth century¹⁵

2.3.4 The Lagoon and the Mose project

Venice was geographically embraced by a unique lagoon which functioned as a moat, making the city less accessible from either land or sea, for the safety of the first refugee settlement back in the history (Figure 7). To prevent from being silted up due to the activity of its tributaries, the lagoon area was intervened with several engineering projects including river divisions, seawalls construction, and so on. However, the excessive human activities (canals excavations and intensive extraction of subsurface water) had led to the same, or even higher tides than the Adriatic sea in the lagoon area, which threatened the city Venice with disappearing altogether.¹⁶

The “Mose” project, a massive hydraulic civil work whose name comes from the Bible, aims at protecting the whole lagoon area and its surrounding waterfronts from high-tide flooding. It comprises with several lined-up barriers which were constructed respectively at the three lagoon inlets: Lido, Malamocco and Chioggia. When filled with water, those barriers will rest on the seafloor; when inflated with compressed air, they will be raised to block the high tides (Figure 8). It is worth noticing that there are also local defenses in the city centre of Venice which contribute to the performance of the Mose system, which consists of several raised quaysides and paving and small gates installed in the urban canal system.¹⁷

¹⁴ <http://www.basilicasanmarco.it/basilica/mosaici/i-restauri/?lang=en>

¹⁵ Mancuso, F. (1991). *The Venice Waterfronts*. Edited by Rino Bruttomesso. *Waterfronts-a new frontier for cities on water*. Venice: International Centre Cities on Water, 176

¹⁶ Gambolati, G. and Teatini, P. (2014). *Venice Shall Rise Again: Engineered Uplift of Venice Through Seawater Injection*. S.l.: Elsevier, 32

¹⁷ <https://www.mosevenezia.eu/>

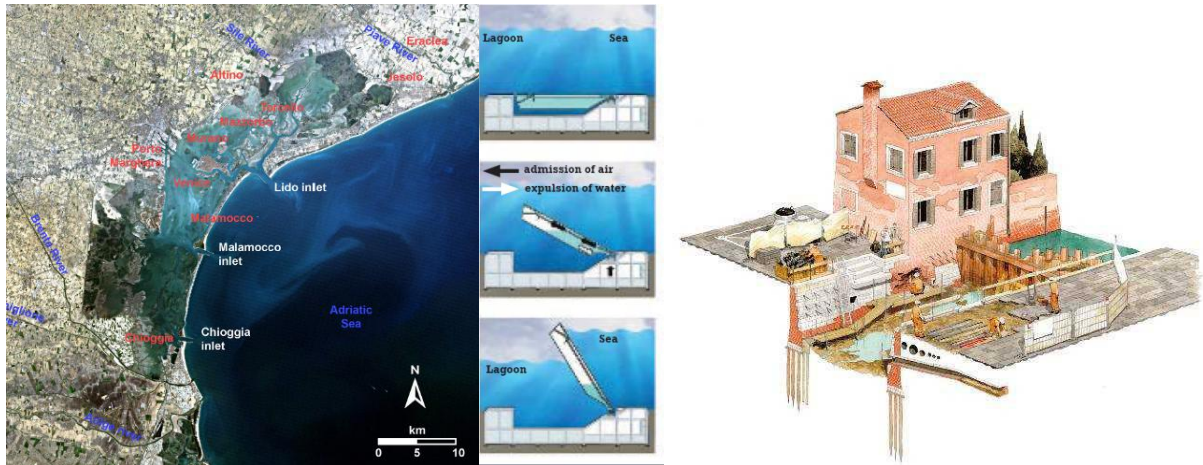


Figure 7. The masterplan of the Mose project in the Lagoon, Venice¹⁸

Figure 8. Working principles of the barriers of the Mose project in the Lagoon, Venice¹⁹

Figure 9. Illustration of the constant maintenance for the urban foundation in the city centre of Venice²⁰

2.4. Comparison of Issues Confronted by Venice and Xiangtan

2.4.1 Water as a Formative Factor

Even though the eternity of the city of Venice is constantly threatened by the rising water level, it is undeniable that Venice's relationship with the water is very intimate, which is supported by the fact of choosing to have the water around instead of turning the lagoon area into a marshland or even hard-land like many other delta cities did.

The way how Venice was built could be considered as uneven and discontinuous from a structural point of view: it is totally artificial - the quays have to be raised higher to resist the flooding, and the wood piles beneath the historical buildings have to be continuously maintained with exorbitant costs (Figure 9).²¹ Yet from a cultural point of view, there is great continuity. The cohabitation with water is exactly one of the unique features of Venice, and one of the factors that have conditioned its shape. This value should be shared by Xiangtan on its water-related context: regarding water as a critical factor in urban formation, be careful with the radical changes of the way how local people perceived the old port area. The tragic case of Bangkok already existed: a land-based urban expansion was carried out during the 20th century which ran against its water-based nature²².

2.4.2 Attitudes towards the Heritage

Additionally, it needs to be reiterated that Venice is a city taken over by tourism who prioritizes cultural and historical respect and continuity on top. This guiding principle is reflected in its waterfront spatial redevelopments which are explicitly implemented with different approaches: The more functional ones were relocated to the periphery of the city and were configured with well-equipped modernized infrastructure to improve its competitiveness, such as the relocation of the port area to the west end of the city; The more monumental ones were filled with new programmes while leaving the original structure untouched, such as the proposed marine research centre in Arsenal.

¹⁸ Gambolati, G. and Teatini, P. (2014). *Venice Shall Rise Again: Engineered Uplift of Venice Through Seawater Injection*. S.l.: Elsevier, 30

¹⁹ Guarino, A. (2014). *Venice: Master of Water. Engineering & Technology Sep*. Stevenage: Institution of Engineering and Technology, 46

²⁰ <https://urpl590resilience.wordpress.com/2016/05/02/venice-italy-rising-sea-levels-and-flood-water-management-and-mitigation-practices/>

²¹ Olthuis, K. and Keining, D. (2010). *Float!: Building on Water to Combat Urban Congestion and Climate Change*. Amsterdam : Frame, 128

²² Jumsai, S. (1991). *The case of Bangkok, Venice of the East*. Edited by Rino Bruttomesso. *Waterfronts-a new frontier for cities on water*. Venice: International Centre Cities on Water, 198

However, it is another scene in the old port area of Xiangtan: the traditional dwellings are getting old which require non-stop maintenance to keep it safe, yet it is not enough during the flooding season due to the lack of functional daily-lives system. As for those built environments for public, it is a normal case to be utilized temporarily, or in a state of comparative abandon, such as the old bus station which is now functioning pitifully as the warehouse of a local air-conditioner factory, not to mention the quays on the river bay which no one cares anymore.²³ Thus, the old port area in Xiangtan is an aging yet poor urban area who needs to be provided better living conditions with the sense of urgency, real informed assessment and re-utilization should be made on the area to avoid the identity crisis caused by underestimation and improper use of the cultural heritage.

2.4.3 Regional Imbalance and Richness

Last but not least, the city of Venice is developing unevenly, considering its surrounding regions which function as several supporting service points for the central tourism, such as the island Giudecca. This sort of regional developing imbalance exists in Xiangtan's economic growth as well, but is another way around, with the potential touristic place - the old port area - left behind. So, an even-stronger connections should be created between the old port area and the city, to help it better function as a significant part of the whole urban settings.

Confronting with this sort of regional imbalance, an approach is provided by Vittorio Gregotti in the case of Venice, to "Reconstruct the central nature of the city within a different urban context".²⁴ This can be interpreted in the case of Xiangtan as a long-term complex goal: stimulate the regional extraordinary environmental and cultural potentials - the richness of the old port area. Mono-economy should be avoided, as the taken strategy should contribute to the conservation of local identities as well as the stimulation of the local economy, such as promoting the local small business and craftsmanship, the exhibiting of the local street culture, integration with tourism, etc.

III. CONCLUSIONS

To conclude, the regional spatial characteristics of the old port area in Xiangtan could be represented by the fish-bone-shaped framework of the urban paths, the Bus Station as the most recognizable local landmark, and the dwelling solution which adapted to the local small business and the unstable water level. Meanwhile, the scenario of the old port area keeps switching between wet and dry modes, as the area is continually visited by yearly flooding. All those factors make the old port area of Xiangtan a complex yet unique landscape which has a lot of spatial potentials.

Staying aware of this, the design strategy of the area should not be limited in a single mode. This unique site condition could be intervened by providing a spatial solution which promotes a close and intimate relationship to the current natural and built environment, and it should offer people different perceptions regarding the dry and flooding seasons.

As for the architectural heritage of the site, the abandoned Bus Station near the quay is part of the invaluable fortune of the old port area which can be brought back to life again. A series of activities with residential purpose and added-values could happen around or be connected with it in a degree, which would transform the current bus station into a real community-rooted landmark enjoyed by the local people.

Back then in the history, the inherent attributes of the old port area in Xiangtan made it a natural stop for the vessels: the access to the deep water, the multicultural inclusiveness, and architectural programmes open to the quay in which people can celebrate. Having the temporary dwelling during the flooding period as the basic programmatic requirement, the openness and the free nature of the old port area should be inherited by tying the local social and economic activities(boat-crafting, street-cultural activities, marketing, etc.) with the architectural heritage(the bus station) and the water

²³ http://news.ifeng.com/gundong/detail_2012_09/11/17504876_0.shtml

²⁴ Gregotti, V. (1991). *Restructuring the 'Marittima' port area*. Edited by Rino Bruttomesso. *Waterfronts-a new frontier for cities on water*. Venice: International Centre Cities on Water, 188

creatively, which could be a new port-space system where the yearly flooding must act as a hinge instead of a boundary to the richness of the local lives by the river bay.

REFERENCES

1. Statistical figures from <http://old.xtgh.gov.cn/>
2. Statistical figures from <http://www.xtggw.com.cn/gzyjs.asp?id=1973>
3. McDowell, S. (2016). *Water index: design strategies for drought, flooding and contamination*. Virginia: University of Virginia School of Architecture, 17
4. Liu, L. (2012). *The regional expression base on the protection of dock culture and the construction of Xiangtan city*. Changsha: Hunan University, 11
5. <https://zh.wikipedia.org/wiki/湘潭市>
6. Liu, L. (2012). *The regional expression base on the protection of dock culture and the construction of Xiangtan city*. Changsha: Hunan University, 12
7. Li, X. (2008). *Research of the historical preservation in the planning of Xiangtan's old areas*. Changsha: Central South University, 17
8. <https://zh.wikipedia.org/wiki/湘潭市>
9. http://hollis.harvard.edu/primo_library/libweb/action/dlDisplay.do?vid=HVD&search_scope=default_scope&docId=HVD_ALEPH007466789&fn=permalink
10. Chen, J. (2012). *The Application research into a plan for historic street's protection and renewal that based on GIS——Taking Xiangtan Yaowan's historic street for example*. Xiangtan: Hunan University of Science and Technology, 18
11. Mancuso, F. (1991). *The Venice Waterfronts*. Edited by Rino Bruttomesso. *Waterfronts-a new frontier for cities on water*. Venice: International Centre Cities on Water, 178-179
12. Rossetto, P. (1991). *Thesis: A Pool For Marine Technologies in the Venice Arsenal*. Edited by Rino Bruttomesso. *Waterfronts-a new frontier for cities on water*. Venice: International Centre Cities on Water, 185
13. Mancuso, F. (1991). *The Venice Waterfronts*. Edited by Rino Bruttomesso. *Waterfronts-a new frontier for cities on water*. Venice: International Centre Cities on Water, 178
14. <http://www.basilicasanmarco.it/basilica/mosaici/i-restauri/?lang=en>
15. Mancuso, F. (1991). *The Venice Waterfronts*. Edited by Rino Bruttomesso. *Waterfronts-a new frontier for cities on water*. Venice: International Centre Cities on Water, 176
16. Gambolati, G. and Teatini, P. (2014). *Venice Shall Rise Again: Engineered Uplift of Venice Through Seawater Injection*. S.l.: Elsevier, 32
17. <https://www.mosevenezia.eu/>
18. Gambolati, G. and Teatini, P. (2014). *Venice Shall Rise Again: Engineered Uplift of Venice Through Seawater Injection*. S.l.: Elsevier, 30
19. Guarino, A. (2014). *Venice: Master of Water. Engineering & Technology Sep*. Stevenage: Institution of Engineering and Technology, 46
20. <https://urpl590resilience.wordpress.com/2016/05/02/venice-italy-rising-sea-levels-and-flood-water-management-and-mitigation-practices/>
21. Olthuis, K. and Keining, D. (2010). *Float!: Building on Water to Combat Urban Congestion and Climate Change*. Amsterdam : Frame, 128
22. Jumsai, S. (1991). *The case of Bangkok, Venice of the East*. Edited by Rino Bruttomesso. *Waterfronts-a new frontier for cities on water*. Venice: International Centre Cities on Water, 198
23. http://news.ifeng.com/gundong/detail_2012_09/11/17504876_0.shtml
24. Gregotti, V. (1991). *Restructuring the 'Marittima' port area*. Edited by Rino Bruttomesso. *Waterfronts-a new frontier for cities on water*. Venice: International Centre Cities on Water, 188

