

Research on the defense of military settlements along the "Southern Great Wall" in Fenghuang County-- A case study of Huangsiqiao Ancient City

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Abstract. The "Southern Great Wall" also known as the Border wall of Miao Jiang, as a means of the Ming and Qing dynasties government management of Miao Jiang, the "Southern Great Wall" boundary is divided into "raw seedlings" and "ripe seedlings", the Great Wall for the "ripe seedlings", the Great Wall is not sinicized "raw seedlings". In order to prevent the "Sheng Miao" rebellion, the Ming and Qing governments sent a large number of troops stationed here, so there were many military settlements along the "Southern Great Wall". Taking Huangsiqiao Ancient City as an example, the "Southern Great Wall" studies the spatial form of huangsiqiao ancient City from macro, meso and micro perspectives, and analyzes the external defensive, internal defensive and architectural defensive aspects of huangsiqiao ancient City.

Key words: Southern Great Wall, military settlement, defensive

1. .Historical evolution of Huangsiqiao Ancient City

Huangsiqiao ancient City built in the qing dynasty emperor kangxi 43 years (AD 1704), it is also called nutrient-laden Yang Tang Cheng, history was built in the tang dynasty in the early drop arch two years (AD 686), when basic for passengers, here in nutrient-laden Yang county seat, mouth to commemorate the thought that the wang women in nutrient-laden three stone bridge built on the elements, also known as "the wang bridge". Qing Dynasty Qianlong eighteen years (AD 1753) rebuilt here as a stone city. Qing Dynasty Qianlong fifty years (AD 1785), here for the "Southern Great Wall" along the military camp, named the new Phoenix camp. Two years of the Republic of China (1913 AD) renamed Huangsiqiao ancient City, still in use..

2. Macro level -- Huangsiqiao ancient City external defensive

The wall of Huangsiqiao ancient City is the most intact part of the whole settlement, with a perimeter of about 620 meters, a north-south length of about 170 meters, a east-west width of about 153 meters, a height of about 5.6 meters, a thickness of about 3 meters, and more than 300 archers of different sizes. The wall is piled with a large number of local blue rock. According to the description of local villagers, the wall is made of glutinous rice paste and mixed with lime, and then the mixture is used to fill the gaps formed by the wall. For thousands of years, the wall has been hard and solid, and it is integrated. The upper part of the wall is in the shape of a saw, and there are four gates on the wall, each with a gate tower of more than 10 meters, and two forts protruding outwards, which significantly highlights the defensive performance of the settlement [1].

Walls as the ancient city of Huangsiqiao defensive settlements outside the only barrier, it must first consider is the height of the wall, due to its need arrow, 2 m, for officers and soldiers riding for quick transfer information, between the wall and the internal building settlements have a luck BingDao, in war, is at the core of power source in the wall, also is the one of the core defence function in the settlement. (Figure 1)

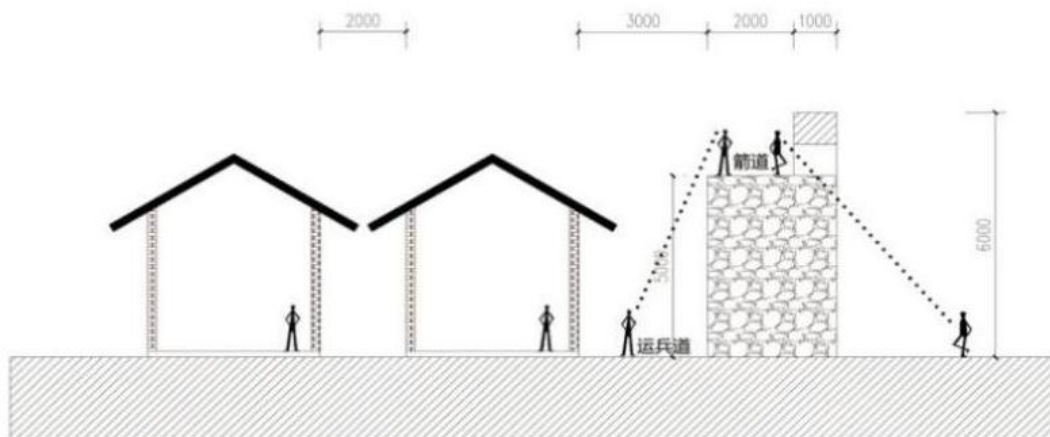


Figure 1. Defensive analysis of huangsiqiao Ancient City wall.

Walls as the ancient city of Huangsiqiao defensive settlements outside the only barrier, it must first consider is the height of the wall, because of its need to defense foreign invasion, better surveillance and shooting foreign enemy, settlement within the officers and soldiers requires great vision, the arrow in the wall 2 m, for officers and soldiers riding for quick transfer information, between the wall and the internal building settlements have a luck BingDao, In time of war, troops and supplies can be dispatched quickly. The combined use of archway and troop transport road [2] is the core power source of the wall and one of the core defense functions of the whole settlement.

3. Meso level -- Defensive space inside huangsiqiao Ancient City

Huangsiqiao ancient city streets belong to the spine, the layout from the north gate to enter a main streets throughout the middle, directly to the settlement center, two road extending to the east, west two doors, the south gate is more than secondary lanes connection, the internal street distribution basic flat, it is in the form of a right-angle intersection more, overall layout is "T word", The width of the first level street lane and the second level street lane is different, the first level street lane is about 3-5 meters wide, the second level street lane is about 2-3 meters, its narrower is less than 1 meter, it is also the channel to enter the entrance of residents, the floor is made of local materials, local bluestone paving, its paving form is free, thickness is different. (Figure 2).

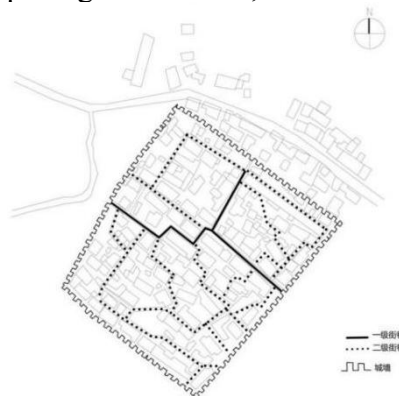


Figure 2. Analysis diagram of Huangsiqiao Ancient City's internal space composition form

Based on the analysis of the form of spatial connection and line of sight, on the basis of the T-shaped connection of streets and lanes in Huangsiqiao Ancient City, there will be line of sight barrier and a series of illusion caused by line of sight obstruction [3]. The distribution of streets and lanes in Huangsiqiao Ancient City is numerous and dense. Through the transformation of space, the

line of sight is transferred from the public space to the private internal space with occlusion and segmentation on the line of sight. By increasing the number of streets and lanes, the effect of occlusion on the line of sight can be increased as much as possible. In this way, the confusion inside the settlement is effectively increased, which is full of uncertainty for outsiders, so as to further improve the defensive performance of streets and lanes [4]. (Figure 3)

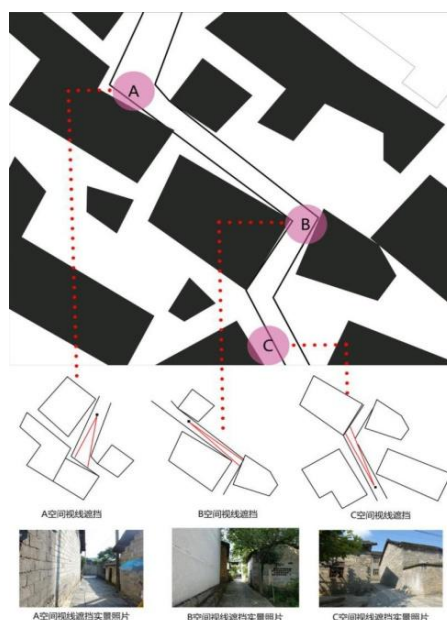


Figure 3. Analysis diagram of vision occlusion of Huangsiqiao Ancient City

3.1 The defensiveness of the settlement entrance space

Ancient city walls built around the central Huangsiqiao ancient City as a gate entrance space, the city gate equipped with towers, gates and each has a special meaning and purpose, the east gate of known as the xi door, as a wedding to marry, to deal with a special door red wedding, and that men and women after marriage, parenthood, good moral and grandchildren; The north gate for the sun Gate, said the war gate, as the city's old people funeral and foreign guests as entrance; The west gate is the Shicheng Gate, known as the Triumphal Gate, as the exit of the army to fight, but the battle victory can return from the gate, once defeated, can only enter through the northern gate of sunlight; Now the south gate has been removed blockade, legend has it that the Qing Dynasty Qianlong, Jiaqing, Daoguang years in this area often fire phenomenon, local officials invited feng shui master said that the south of the ancient city five lines of fire, so finally converted into a watchtower, now only some of the base part.

The gate of Huangsiqiao ancient City possesses extremely strong domain capability and is located in the position most closely connected with the outside world. Its defensive performance is the key node to consolidate the defensive performance of the city wall, and the gate and tower have the functions of annexing defense, surveillance, shooting and so on [5]. As an example, the gate to the north is the main entrance and exit for outsiders and the one with the strongest ability to communicate with the outside world. The corridor on the first floor is narrow in width, so as to monitor and inquire the motives and trends of visitors [6]. Above the gate towers, soldiers use height advantage, observation of peripheral flow trend and abnormal phenomenon occurs, once happened, and immediately notify a layer of the strict screening, and can at any time to alarm in the city, notice the well preparation for the city state, soldiers in the second and third floors available design intact enemy shot hole, The height of the gate also gives outsiders a strong sense of psychological pressure and further strengthens the defensive performance of the wall [7]. (Figure 4)

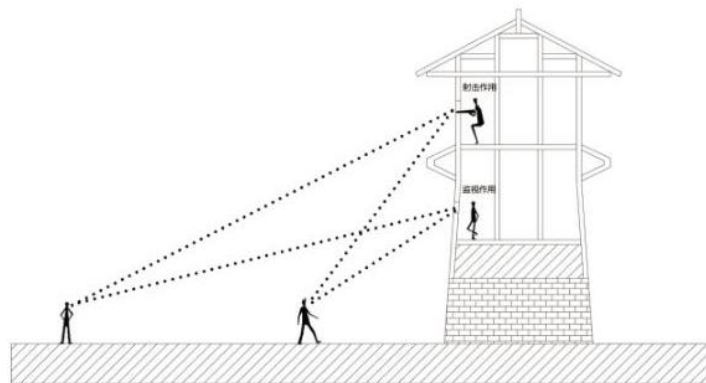


Figure 4. Defense function analysis diagram of Huangsiqiao ancient city gate

4. Micro level -- The internal architecture of Huangsiqiao Ancient City is defensive

4.1 Huangsiqiao ancient city military architecture defensive

Ancient city of Huangsiqiao ancient City tower door as inward and outward direct contact with the outside world, on the performance of its defence of reasonable design can ensure the safety of the settlement of exchange with normal [8], door and door and sun is settlement of personnel of two gates, on the plane layout, three-layer plane in the part of the contact with the outside decorated specialized monitoring platform, Since shicheng Gate is mainly used as the entrance for troops to go to war and return in triumph, it has been adjusted appropriately on the three-floor plane, and the corresponding monitoring platform has been cancelled, and it has been merged into one floor.

In terms of facade design, there are 4 monitoring holes and 3 shooting holes on the second floor of Kazuyoshi Gate and Nikko Gate, 5 monitoring holes and 4 shooting holes on the third floor, and the same layout on the second floor of Shicheng Gate, only 4 monitoring holes on the third floor. In wartime, the two types of holes could switch functionally. The size of the monitoring hole is 600mm*300mm, and the shooting hole is 200mm*180mm, both of which adopt the design mode of large inside and small outside. Such setting can bring a broad field of view for the internal monitoring and shooting space. The facade has many and small holes, which can confuse the sight of external personnel, and the surprise attack can hit the fire instantly and hit the enemy. Greatly improve the defense performance of gate [9]. (Figure 5, Figure 6)

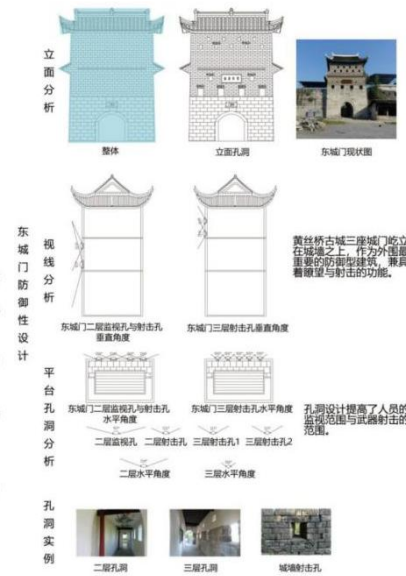
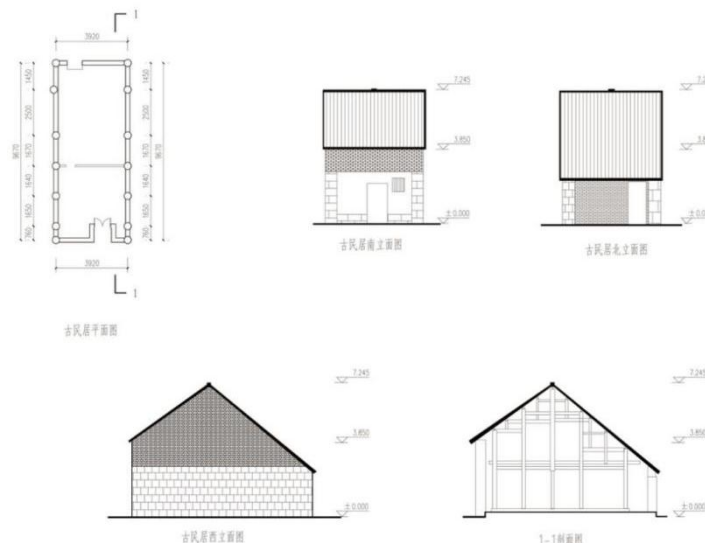


Figure 6. Huangsiqiao ancient city gate defensive design analysis



The building materials are stone, adobe and wood, and the interior of the building is built with a tubular structure, which maximizes space for the interior. The local stone has high hardness and low tensile strength, and the combination with the local traditional adobe bricks solves the problem of external defensive firmness. The combination of wood, stone and adobe meets the requirements of defensive settlement construction. Most of the stone materials are made from local materials, and its thickness is generally in the range of 40mm-250mm. The shape and size are irregular, but it still ensures the neat and smooth of the whole building. The thickness of the wall formed by the stone reaches 700mm. The roof of the building is double-pitched and double-roofed. The underground floor is timber and the upper floor is stone. The weight of the roof can be shared by the stone walls and the internal wooden frame structure. The double overlay of wood and stone meets the requirements of function and defense. From the functional point of view, it meets the daily living requirements of the building's daily life; From the defensive point of view, the use of stone, adobe for the outer envelope of the building to meet the ability to resist foreign invaders attack. (Figure 11)

4.3 The material defensive character of residential buildings

4.3.1 Window to ground ratio

According to the requirement of the defensive and illicit close sex, yellow silk hole to open doors and Windows in the ancient city of bridge construction, daylighting is insufficient, but the data size does not meet to the daily needs, according to the above two groups, the size of the defensive settlements than data basically less than 1/7 of the window, the ancient city of Huangsiqiao ancient City local-style dwelling houses building window ratio of 1/8-1/20, and can't meet the requirements of and everyday life, The light environment of the room is poor, in other words, it meets the needs of a defensive settlement. (Table 1)

Table 1 Window to floor ratio of traditional dwellings in Huangsiqiao Ancient City

Residents number	Bedroom1 Window to ground ratio	Bedroom2 Window to ground ratio	Kitchen Window to ground ratio	Storage room Window to ground ratio	Wing room1 Window to ground ratio	Wing room 2 Window to ground ratio
1	1/10.8	1/8.5	1/18.5	1/14.3	1/13.7	1/11.2
2	1/12.5	1/9.5	1/12.3	1/9.6	1/10.2	1/9.7
3	1/9	1/12.5	1/21.2	1/16.5	1/14.5	1/10.2
4	1/12.4	1/12.5	1/20.8	1/15.6	1/13.5	1/9.8
5	1/8.9	1/18.7	1/18.5	1/18.3	1/16.5	1/18.2
6	1/8.5	1/10.4	1/18	1/18.5	1/15.6	1/19.3
7	1/13	1/10.5	1/9.8	1/13.6	1/15.2	1/20.6
8	1/9.5	1/16.4	1/13.5	1/19.8	1/15.7	1/18.65
9	1/8.6	1/15.6	1/21.4	1/16.23	1/14.65	1/18.54
10	1/11.3	1/16.2	1/20.8	1/15.9	1/15.8	1/19.4

4.3.2 Space interface

Although the residential buildings in Huangsiqiao ancient City have different materials and techniques in terms of spatial interface, they all have the characteristics of high degree of external closure. The existing reconstructed residential buildings in Huangsiqiao ancient City have hard and thick external walls, which are basically one-story buildings with small Windows on the facades. According to the described above, it shall, in accordance with the crime prevention study, closed the external interface of crime target have the function of the protection and reinforcement, by measuring the local-style dwelling houses building 10, according to the state of the street, are classified into resident facade and side facades, measured data statistics analysis, found the local-style dwelling houses building space interface sealing ability is extremely high, The

proportion of the area of doors and Windows to the whole facade is controlled between 0.05 and 0.15. (Table 2)

Table 2 Facade closure degree of traditional dwellings in Huangsiqiao Ancient City

Residents number	Facade			Door			Window				Closed degrees	
	Wide (m)	High (m)	Area (m ²)	Wide (m)	High (m)	Area (m ²)	1F Quantity	2F Quantity	Total sum	Area (m ²)	(Door + Window/facade)	Door + Window/facade
1	8.16	5.21	42.51	2.46	1.58	3.88	2	2	4	2.31	6.19	0.145
2	8.57	4.52	38.74	1.58	2.13	3.37	1	2	3	2.25	5.62	0.145
3	6.54	4.56	29.82	0.46	1.85	0.85	3	1	4	1.85	2.70	0.091
4	8.67	5.36	46.47	0.56	1.68	0.94	2	3	5	0.63	1.58	0.034
5	8.65	5.34	46.19	0.72	1.86	1.34	2	2	4	1.26	2.60	0.056
6	8.75	5.76	50.40	0.65	1.46	0.95	2	1	3	1.85	2.80	0.056
7	7.23	5.64	40.78	1.58	2.14	3.38	0	2	3	1.45	4.83	0.118
8	11.53	6.54	75.41	1.86	2.15	4.00	1	2	3	5.24	9.24	0.123
9	6.54	6.85	44.80	1.23	2.57	3.16	1	3	4	3.73	6.30	0.141
10	8.31	6.35	52.77	1.28	2.46	3.15	2	1	3	4.32	7.47	0.142

Table 5 Side facade closure of traditional dwellings in Huangsiqiao Ancient City

Residents number	The side of the facade				window				Closed degrees
	Eaves high (m)	The roof is high (m)	Gable wide (m)	Area (m ²)	1F Quantity	2F Quantity	Total sum	Area (m ²)	The window/facade
1	4.13	4.25	5.65	36.25	2	1	3	1.55	0.04
2	5.68	7.65	6.57	48.56	1	1	2	1.65	0.04
3	5.84	6.53	6.53	46.52	2	0	2	2.43	0.05
4	6.21	6.54	7.26	51.24	1	2	3	1.25	0.02
5	5.65	6.25	6.34	44.65	2	1	3	5.25	0.12
6	5.46	6.13	7.15	40.26	0	3	3	1.46	0.04
7	6.05	7.13	7.05	45.28	2	2	4	0.82	0.02
8	6.25	7.34	6.55	44.75	2	1	3	1.28	0.03
9	6.72	7.24	6.52	46.57	1	2	3	1.56	0.03
10	5.55	7.27	7.54	47.65	0	2	2	1.69	0.03

5. Conclusion

1) This paper introduces the origin of Huangsiqiao Ancient City and systematically expounds lahao Yingpan village's three-level defense system of "external space defense -- internal space defense -- internal architecture defense" from three levels of macro, meso and micro, through field mapping and corresponding data calculation and drawing relevant drawings.

2) The defensiveness of Huangsiqiao Ancient City from outside to inside is reflected in the city walls, streets, nodes and military buildings, forming a hierarchical defense system. Externally, it relies on the city wall for defense. Internally, it builds complex streets and corresponding node space, and then strengthens the defense performance of the building through the stone paving outside the building. The arrangement of monitoring holes and shooting holes also plays a role in monitoring and designing the whole stream of people.

3) By studying the plane, elevation and closure degree of internal military buildings and residential buildings, extract the data of corresponding nodes, find relevant corresponding data support, form a table for analysis, conform to the relevant characteristics of ancient buildings to resist foreign enemies, and summarize the specific characteristics of relevant defensive.

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