



Extended summary

History, Typology and Communication Research on Dong-gou Great Wall in Beijing

Curriculum: Analisi e Progetto dell'architettura e del Territorio

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Abstract. The dissertation concentrates on the research of knowledge and communication of Dong-gou Great Wall, as well as the typology research on the towers in Yan-qing County. It focuses on three parts: history research and analysis of Dong-gou Great Wall, typology research of the towers, and institution of tourism of Great Wall in Yan-qing County. Dong-gou Ming Great Wall is located in Yan-qing County of Beijing Municipality. It is covered about 4 kilometers and joins Ba-da-ling Great Wall to east. It is also opened as a tourist destination in 2000 known as “Ancient Great Wall of Ba-da-ling”. The name is supposed to emphasize the original condition of the Wall and the relationship with Ba-da-ling Great Wall. However that is different with history. The studies of Yan-qing Ming Great Wall’s knowledge are served as peripheral research. That involves morphology, formation and transformation, influential factors, and regular patterns of Ming Great Wall in Yan-qing County. They will construct a board knowledge background for the further research. History research is the crux research of the knowledge of Dong-gou Great Wall. It concentrates on the system and organization of Dong-gou Ming Great Wall and trying to propose the hypothesis and definition of original name and organization. The typology research of the towers of Yan-qing Great Wall is another part of the research. It includes the origins, the archetype, and the typology of the towers as well. It is also contribute to explanation of the



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original coverage of Dong-gou and other parts of Great Wall. Communication research is intending to institute a route and a system, through which to communicate knowledge based on the research achievements.

Keywords: Dong-gou Great Wall, Knowledge, History Research, Typology, Communication,

1 Background

The research is concentrating on the original identity and coverage of Dong-gou Great Wall. Due to the elapse of time, the original name and coverage of Dong-gou Great Wall is vanished and unrecognizable.

1.1 Dong-gou Great Wall

Dong-gou Ming Great Wall is located in Yan-qing County of Beijing Municipality. It is covered about four kilometers and joins the famous Ba-da-ling Great Wall to east, Shi-xia Pass to west. It is also opened as a tourist destination since 2000¹ which known as “Ancient Ba-da-ling Great Wall” to divert the crowded tourists, but not so successfully. The name itself is to emphasize the original condition and the relationship with Ba-da-ling Great Wall, but also makes misunderstandings of the original system as well.

Dong-gou Great Wall has been located in a valley with collapsed wall-fortress (N40°19'59.88", E115°58'36.71"), six watching towers to west, and four watching towers and one breach to east. In the breach, mountain rocks as natural barrier had been employed into the Wall. The total length is about 3700 m (Figure 1).



Figure 1. Morphology and Elements of Dong-gou Great Wall

¹ <http://www.badaling.gov.cn/NewsShow.asp?id=525>. On May 23rd 2000, a press briefing about the local tourism development was held in Beijing; June 1st, the first group of international tourists from Japan visited the Great Wall.

² The name is also known as “Ba-da-ling Remnant Great Wall” or “Ba-da-ling Residual Wall” as the official website shows: http://www.badaling.gov.cn/language/info_en.asp?id=29

Dong-gou Great Wall has located between Ba-da-ling Great Wall and Shi-xia Great Wall (Figure 2).

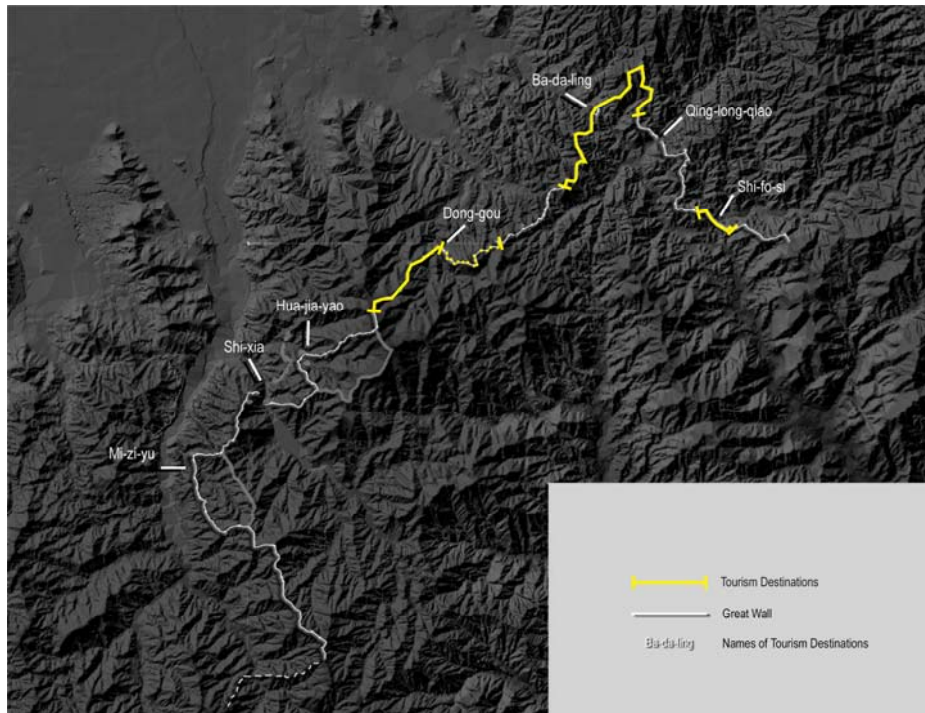


Figure 2. Morphology of Ba-da-ling—Shi-xia Great Wall

History research of Dong-gou Great Wall is the key of the historical research. To recover the history information and identity of Dong-gou Great Wall is the task of the knowledge research, which is also the research question.

1.2 Yan-qing Great Wall

Ba-da-ling—Shi-xia Great Wall is the southern line of Great Wall in Yan-qing County of Beijing Municipality. Due to *Ming* Great Wall was not simply the composition of the Wall with bastions and watching towers, but a complicated military defense system and an organization as well. The military defense system of *Ming* Great Wall include fortresses and garrisons, beacon towers, stone pits, brick kilns, passes, watching towers and the Wall.

The morphology of Yang-qing *Ming* Great Wall has showed linear and point structures with the Wall and entrenchments, fortresses and garrisons. They formed a network structure with the effective connections among the respective elements (Figure 3).

There were three lines of the walls in Yan-qing County. They are southern line, northern line, and the middle line according to their relative locations. They are almost joined in one intersectional point near the south-east border of Yan-qing County and Huai-rou District, where named Jiu-shui-keng Village. Northern line and Southern line of Great wall were located on the mountains; and middle line of Great Wall is laid on plains which linked garrisons and fortresses. Point structure was mainly composed by the garrisons, fortresses and beacon towers. They had been located in the small flatland where in-between the

northern line and middle line of the Wall. According to the investigation in July 2007, there are 47 fortresses remains in Yan-qing County.

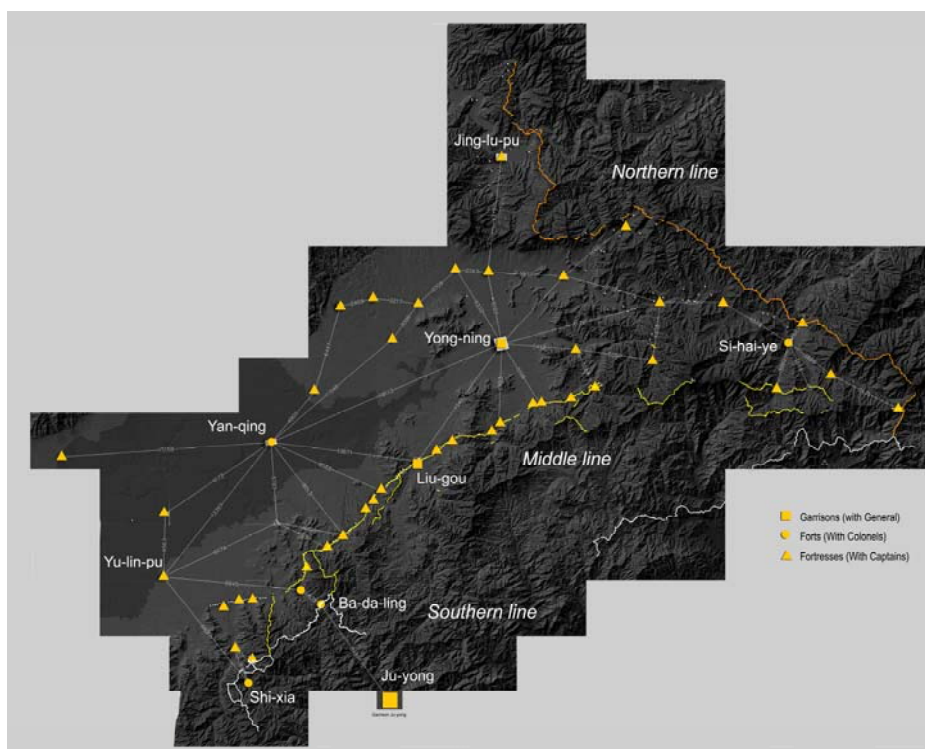


Figure 3. Morphology of Yan-qing Great Wall System

2 History Survey

According to the historical documentaries, there were two sections of Ming Great Wall had located in Yan-qing County. They were Chang or Chang-zhen Section and Xüan-fu Section (Figure 4). The sections, which actually served as military defense regions, had in charge of administration and military issues in their territories. There had been gradually formed *nine sections and thirteen garrisons*³ of Ming Great Wall during the long history around 150 years.

Xüan-fu Section had been founded in 1409, but the garrisoning of the region was started in 1369 with many forts. It was the eastern Subsection of Xüan-fu Great Wall had located in Yan-qing County. The northern line and middle were subordinated in Xüan-fu Section. The northern line had been constructed during 1455 to 1457. The middle line, also known as row towers, had been built after a hundred years later in 1555. The important forts and

3 The Nine Sections and thirteen Garrisons of Ming Great Wall were “Liao-dong”, “Shan-hai”, “ji-zhou”, “Chang-zhen”, “Xüan-fu”, “Da-tong”, “Tai-yuan”, “Shan-xi”(or “San-guan”), “Yan-sui”(or “Yu-lin”), “Shaan-xi”, “Ning-xia”, and “Gan-su”. The connecting parts and points were developed and changed according to different situation and period. Researches combined historical documents and archeology have achieved and defined each sections of Ming Great Wall (Ai Chong, 1993).

fortresses were included Yan-qing, Yong-ning, Liu-gou, Si-hai-ye, Hei-hai-ling, Zhou-si-gou, Jing-lu-pu, as well as Yü-lin post station.



Figure 4. Sections of Great Wall in Yan-qing and Beijing the Capital

The Chang-zhen Section was founded in 1551, separated from Ji-zhen Section, to specially security the Ming Royal Tombs and Beijing the Capital, after one year when Beijing was siege by *Wala* tribes. It was part of Jü-yong Subsection of the Wall and fortresses located in Yan-qing County. Ba-da-ling Pass and Shi-xia Pass was the most important two passes among that part of the Wall, which protected Jü-yong Pass to south. The forts and fortresses included Cha-dao and Shi-xia. The middle line and the forts around were integrated into Chang-zhen to reinforce the region.

In short, the Yan-qing Ming Great Wall have included the east part of Xuan-fu Section, and middle part of Chang-zhen Section of Ming Great Wall (Figure 5).



Figure 5. Historical Map of Great Wall in Yan-qing, around 1535 AD. (Chinese History Museum of Liao-ning Province).

3 Methodology

Comparison research with the historical documentaries and field investigation is the employed methodology. There were plenty of historical documentaries during Ming Dynasty (1368 – 1644 AD). Dangerous situation on the northern borders, as well as south-east borders along the sea, had contributed the boom of intense works on frontier historiography. The concentration of the documentaries presented both in times and in numbers. Plenty of books had been written in a short time as Emperor Jia-jing and Wan-li Reign (1522-1620), or shortly after (XIANG Yan-nan, 2000), coincide the period when the Ming Great Wall was totally constructed and linked as a permanent and remarkable defense facility.

According to the historical documentaries and notes, Dong-gou Great Wall was subordinated in Chang-zhen Section, which was one of nine sections of Ming Great Wall. Chang-zhen had included three subsections as Jü-yong, Huang-hua, and Heng-ling. And there were three parts of Wall within Jü-yong Subsection. They are Ba-da-ling, Shi-xia, and

Hui-ling⁴. There were seven wall-fortresses within Ba-da-ling Great Wall. They were Yu-jia-chong, Hua-mu-liang, Hei-dou-yu, Ba-da-ling, Wang-gua-gu, Qing-long-qiao-dong, and Shi-fo-shi, from west to east. And three parts of Wall in Shi-xia as Mi-zi-yu, Shi-xia, and Hua-jia-yao. Some names have been still used nowadays and some of them are vanished. Dong-gou is one of them without original names.

3.1 Distance of the Wall-fortresses

The Dong-gou Great Wall is located between Pass Ba-da-ling and Shi-xia. According to the history book *Annals of Four Sections and Three Garrisons* (1576 AD), there were seven wall-fortresses within Ba-da-ling Great Wall. They were Yü-jia-chong, Hua-mu-liang, Hei-dou-yü, Ba-da-ling, Wang-gua-gu, Qing-long-qiao-dong, and Shi-fo-shi, from west to east. The length of the Wall was 24.5 *Li* and 47 watching-towers. And three wall-fortresses had been located within Shi-xia Great Wall as Mi-zi-yü, Shi-xia, and Hua-jia-yao. It was covered 16 *Li* with 35 watching towers. The total length was 40.5 *Li*.

The distance between the wall-fortresses was 3 *Li* (about 1728 meters) except from Yü-jia-chong and Hua-mu-liang was 2 *Li*. Added the Wall of 3 *Li* from the Shi-fo-si to south end point, the total length was about 29 *Li*.

The records of the Wall's length were quite different. However, they could offer reference and ratio of the wall-fortresses within the paragraph Great Wall. The distances both could be referred to the crow-fly distance, and the actual distance. Before scientific land surveying technology was adapted, the traditional Chinese maps had been drawn with sketch images of information as mountains, rivers and roads. Intuitive and visualized are the notable characters of the traditional Chinese maps, and with precise distances. But the distances were quite hard to transfer to modern measures. Both because the distance measures were different from that of nowadays, and the survey techniques were rough.

Based on the investigation, the distance data along the paragraph of Wall has been measured (Figure 6).

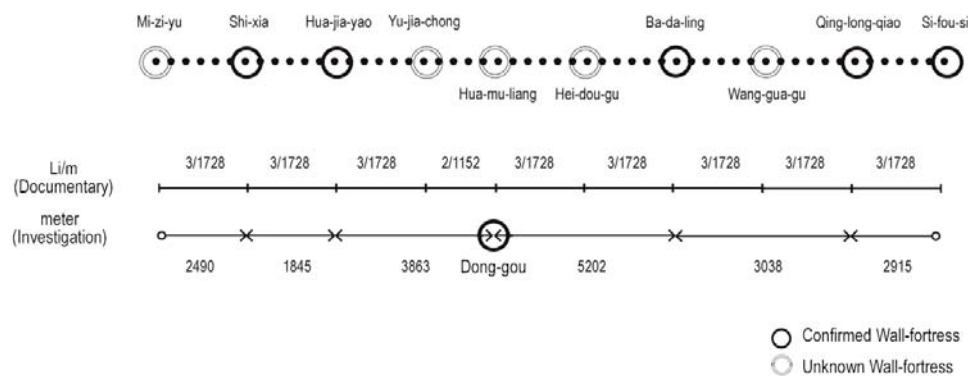


Figure 6. Diagram of Wall-fortresses in Ba-da-ling—Shi-xia Great Wall

The Dong-gou Wall-fortress has been located between Ba-da-ling Pass and Hua-jia-yao Wall-fortress. There were three wall-fortresses had been located in that paragraph. According to the investigation, the ratio of Dong-gou's location is 0.426 when the total

⁴ LIU Xiaozhu [Ming Dynasty], *Annals of Four Sections and Three Passes*, 1576 AD.

length, from Ba-da-ling to Hua-ji-yao, was supposed as 1. It is most approximately equal to Hua-mu-liang, whose ratio is 0.455.

The conclusion could be drawn primarily that the Dong-gou Great Wall is Hua-mu-liang in the history.

3.2 Towers' Density and Locations of Wall-fortresses

According to the investigation, there are 94 watching towers located in the brick-stone Great Wall which corresponding the Ba-da-ling and Shi-xia Great Wall. We named the south-west tower as No.1 and the north-east as No.94. The location of wall-fortresses had strong related with landforms. To be more specific, wall-fortresses had located to barrier valleys and paths. Roads and routes were guarded with passes, and small paths were by forts⁵.

On the other hand, the density of watching towers had also reflected the location of wall-fortresses. *Where the density has been high, the position would be placed with wall-fortresses. Hollow watching towers are placed every 100 Bu (160 meters) or 30 to 50 Bu (48-80 meters) in emergent area.*⁶

According to the statistics of Table 1, the walls less than 70 meters could be located (Figure 7). These walls, as well as high density of towers, are highly related with the passes and wall-fortresses which had already known. No. 89-91 had located in Shi-fo-si Wall-fortress; No. 77-78 had located in Qing-long-qiao Wall-fortress; No. 63-66 had located in Ba-da-ling Pass.

As we known, the wall-fortresses were combined with high density towers. Then, the unknown wall-fortresses could be located according to the distribution and the discipline.

Table 1. Statistics Short-distance Wall of Yan-qing Brick-stone Great Wall

	Location of Wall (Between towers)	Length of the Wall	Location
1	9-10	64.20	
2	14-15	54.74	Wall-fortress Mi-zi-yü
3	16-17	56.86	
4	36-37	46.50	Wall-fortress Dong-gou
5	49-50	55.00	
6	57-58	63.10	
7	63-64	61.20	
8	64-65	33.80	Pass Ba-da-ling
9	65-66	45.20	
10	74-75	35.00	
11	78-79	62.80	Wall-fortress Qing-long-qiao
12	89-90	25.00	Wall-fortress Shi-fo-si
13	90-91	19.80	

⁵ GU Zhu-yu [Qing Dynasty,], *Essentials of Geography for Reading History.1690s. Dushi Fangyu Jiyao* .Volume 152,pp 2431. Beijing: Zhong Hua Press. 2005

⁶ TU bing-yi, ZHANG Chun-de, *Annals of Yan-qing* [1881, Qing Dynasty]. Tai-bei: Cheng-wen Press. 1968. pp 47.

There is only one wall within 10 Zhang, or 64 meters between Qing-long-qiao and Ba-da-ling, Wang-gua-gou Wall-fortress had been located near No. 74-75 towers. And Mi-zi-yü Wall-fortress should be located between the towers No. 9-10, 14-16.

The density of towers in that paragraph is not even. The eastern part of towers is more intensive than western part. Tower 44 is the tuning point. The average length of walls from Tower 27 to 63 is 218 meters, and 147 meters from Tower 44 to 63. The eastern part has been near to Ba-da-ling Pass, and the landform is flat as well.

And there were three wall-fortresses had located between Ba-da-ling and Hua-jia-yao, includes Dong-gou Great Wall. And the walls less than 64 meters are between No. 36-37, No. 49-50, and No. 57-58; and the length of Wall which between Tower 24 to 25 is 74.70 meters.

Then, it could be assumed that Wang-gua-gu Wall-fortress had been located Near Tower 74-75; Hei-dou-gu had been located near Tower 57-58; Hua-mu-liang Wall-fortress had been located near Tower 49-50; Yu-jia-chong Wall-fortress had been located near Tower 36-37, where is Dong-gou Great Wall nowadays; Mi-zi-yü Wall-fortress had been located near Tower 9-10, 13-15.

A conflict is happened, then, of the definition of Dong-gou Great Wall. It could be Hua-mu-liang Wall-fortress according to the distance and orient analysis; and Yu-jia-chong Wall-fortress according to the density of towers.

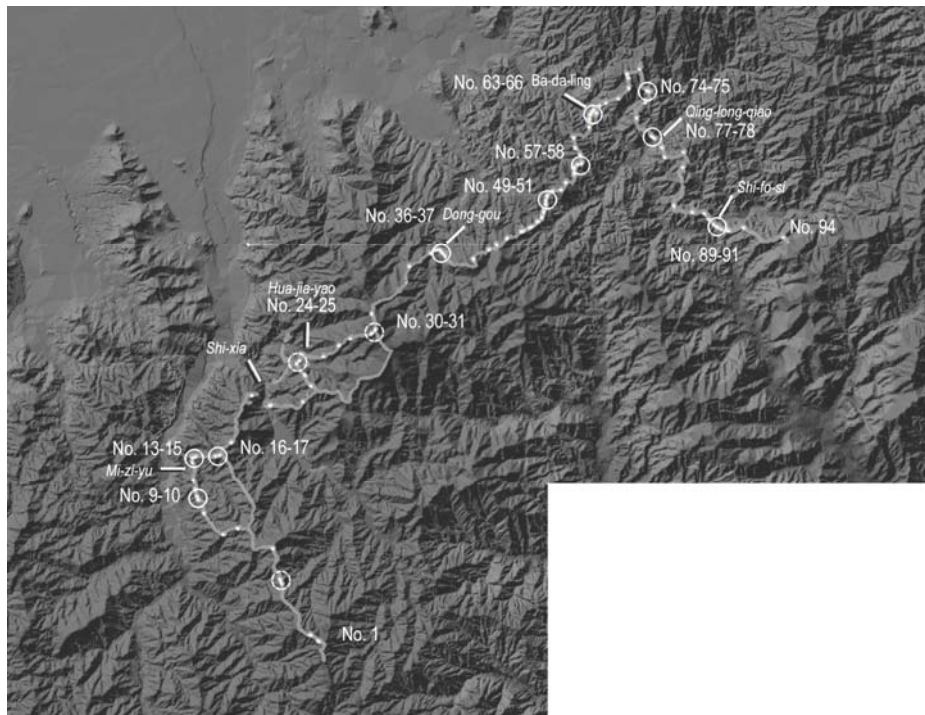


Figure 7. Towers' in High Density in Ba-da-ling—Shi-xia Great Wall

3.3 Valleys and Locations of Wall-fortresses

Considering the landform, especially the valleys, there have been several valleys except Pass Valley, and mountain peaks as well (Figure 8).

As mentioned above, the wall-fortresses had been positioned along valleys and linked peaks. The coverage of wall-fortresses, as Ba-da-ling Great Wall, had been from peak to peak and passed through valleys. The passes of mountains peaks have been counted and studied.

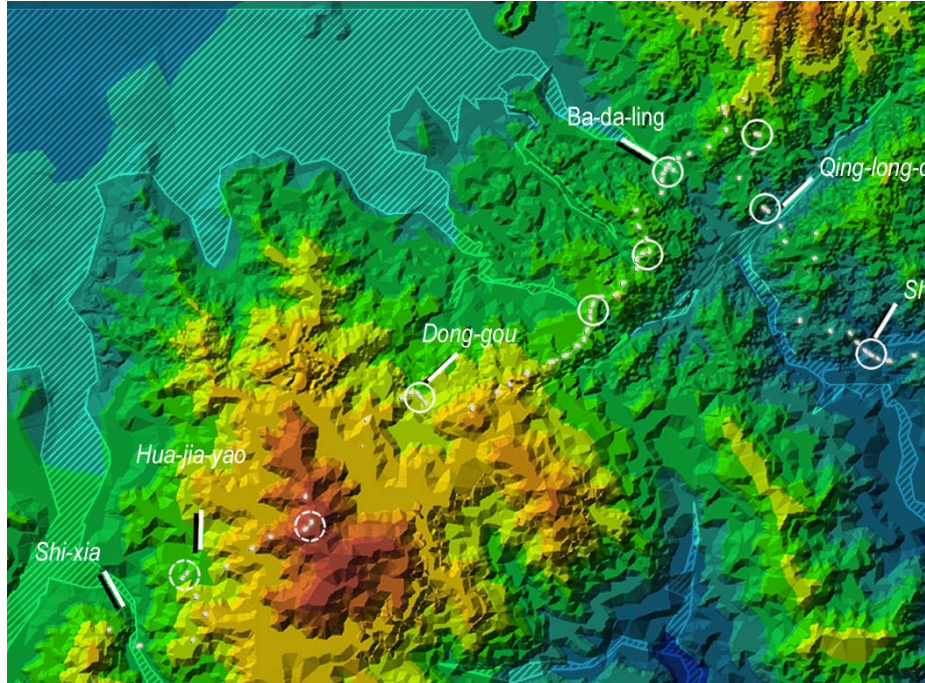


Figure 8. Elevation maps along the brick-stone Yan-qing Great Wall

Three peaks and two major valleys had been involved. About the two valleys, one is located in Shi-xia, the other is Guan-gou which located in Ba-da-ling. The Guan-gou Valley is a cross form; and most of minor valleys are connected with Guan-gou Valleys. Then, the function of wall-fortresses around Ba-da-ling Pass was to block entering Guan-gou Valley.

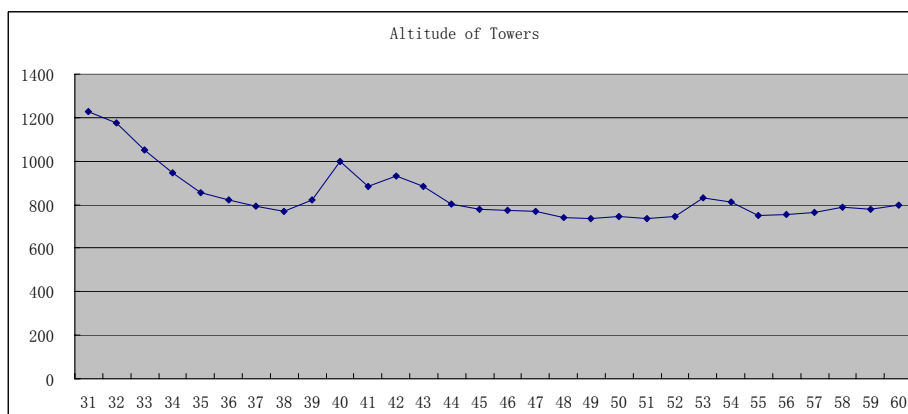


Figure 9. Statistics of Altitude from Tower 31 to 60.

The Altitudes of Towers are marked from Tower 33 to 60 (Figure 9). Tower 33 has located on Peak Qing-shui-ding, and Tower 60 is located near Ba-da-ling Pass. Based on Figure 28 which serves as a section of the mountains, there are four lowlands or valleys. They located in Tower 38 (Dong-gou Great Wall), Tower 41, Tower 48-52, and Tower 55. Among the four valleys, three of them are lower than 800 m. As the wall-fortresses had been put in valleys to block paths, those points could be assumed as location of wall-fortresses. It could be assumed that those three points were the locations of the wall-fortresses.

Then, Tower 38 was Yü-jia-chong, Tower 53 was Hua-mu-liang, and Tower 55 was Hei-dou-yü.

4 Hypothesis

Dong-gou Great Wall is Yü-jia-chong Wall-fortress. The coverage and the characters could be further proved with the historical documentaries and typology research on the towers.

Mi-zi-yü Wall-fortress had been located near Tower 9-10, 13-15. Shi-xia has located between Tower 19 and 20; Hua-jia-yao has located between Tower 25 and 27; Yu-jia-chong Wall-fortress had been located near Tower 36-37, where is Dong-gou Great Wall nowadays; Hua-mu-liang Wall-fortress had been located near Tower 49-50; Hei-dou-gu had been located near Tower 57-58; Ba-da-ling Pass located between Tower 64-66; Wang-gua-gu Wall-fortress had been located Near Tower 74-75; Qing-long-qiao has located between Tower 78 and 79; Shi-fo-si Wall-fortress has located near Tower 92.

4.1 Historical Records of Yü-jia-chong and Hua-mu-liang Wall-fortress

The historical records of the two wall-fortresses had been only showed in Ming documentaries as military notes. Then, nether the names of Yü-jia-chong, Hua-mu-liang had showed up again, nor the names of their environment. On the contrary, there have been many villages have inherited the original names.

The reasons could be assumed that these names were particularly used in Ming Dynasty. And theses areas were really near to Ba-da-ling the Pass and Guan-guo the Valley. There were no villages and residents as that time due to its important military position.

The records of the wall-fortresses have been quite few. Only the constructions and the characters were described.

In *Annals of Four Sections and Three Garrisons* (1576 AD), the records were as following:

Hua-mu-liang Wall-fortress, constructed since Yong-le reign (1402-24), the Middle 3 Towers and the voids in-between were accessible with large troops. It is extremely important of the military strategy.

Yü-jia-chong Wall-fortress, constructed since Yong-le reign (1402-24). First east void of the wall-fortress is accessible with small troops; Tower Xi-shan to west to Tower Qing-shui-ding are accessible to Valley Yü-jia-gou with large troops.⁷

Qing-shui-ding was the only the name which are still used nowadays. It is the peak where Tower 31 has been standing. Then, the Yü-jia-chong Wall-fortress was the first wall-fortress to Peak Qing-shui-ding. And there were two voids, between three towers, were accessible with large troops in Hua-mu-liang. The voids which could accommodate passing large troops should be flat enough or connected with paths. There was only one void could

⁷ LIU Xiaozhu [Ming Dynasty, 1576 AD], *Annals of Four Sections and Three Passes*, pp. 71.

be passed by small troops in Yü-jia-chong Wall-fortress to east. The wall-fortress's west to Tower Qing-shui-ding had connected to a valley named Yü-jia-gou.

The Dong-gou Great Wall has satisfied that condition.

In another historical book, *Annals of Western Garrisons of Beijing the Capital* (1548 AD), more details were available.

Hua-mu-liang, contains one wall-fortress and four watching towers, one east protecting wall and a west minor wall;

*Yü-jiang-chong, contains one wall-fortress and a Watergate, one east protecting wall and a minor wall.*⁸

Four watching towers were specifically mentioned here, which had drawn the most notable characters of Hua-mu-liang Wall-fortress. According the investigation in 2007, there are three watching towers have standing paralleled out of the Wall from Tower 49 to Tower 52 (Figure 10).

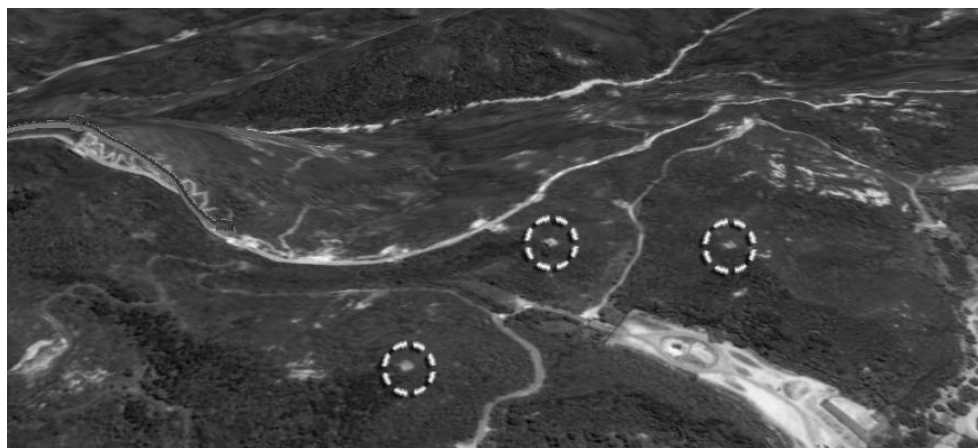


Figure 10. Three independent Watching Towers near Tower 49

The wall-fortresses from Ba-da-ling Pass to Shi-xia Pass could be located and represented according to the research.

4.2 Typology of the Towers along Ba-da-ling and Shi-xia Great Wall

As mentioned above, there have been two types of watching towers in the Ming Great Wall: hollow watching towers, and solid watching towers. The difference lies in the spatial form. The solid watching towers had longer history than the hollow ones. While the hollow towers large-scaled constructed since 1560s, some of the solid towers also reconstructed and reconsolidation.

The typology of solid towers is quite simple. There are four solid towers as No. 27, 30, 56, 85 (Figure 11).

⁸ WANG Shi-qiao, *Annals of Western Passes of Beijing the Capital*, Beijing: Beijing Ancient Books Publ. 1990. pp.23.

windows to each direction; and only a door way to the horizontal direction, as Tower 1 shows. The floor plan of Tower 34 could be regarded as a development of Tower 1, two accessorial bays have been added to achieve arrow windows in horizontal directions.

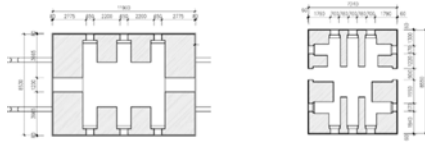


Figure 12. Typology 1-3: Floor Plan of No.1 and 34

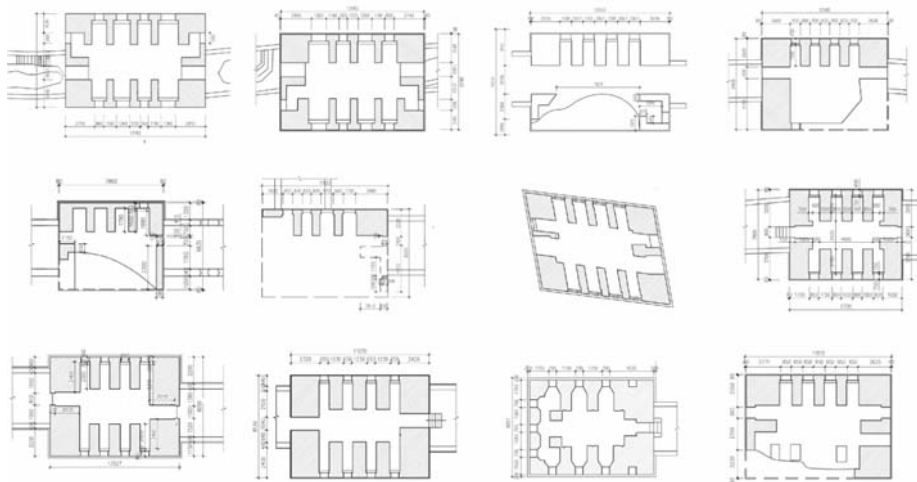


Figure 13. Typology 1-4: Floor Plan of No. 3, 4, 8, 16, 23, 24, 26, 29, 31, 32, 42, 49

The type 1-4 is the expansion to horizontal direction of type 1-3, one more bay has been added to achieve more interior spaces to accommodate defense force (Figure 13). One door way, or one door plus one arrow window had been the formula of this type of towers. What should be pointed out is that the bays with brick galleries had been the basic pattern which employed many arches and galleries. There were multiplied varieties of typology. Another example is the type 1-5 of towers (Figure 14).



Figure 14. Typology 1-5: Floor Plan of No. 22, 35

The type 1-6 could be recognized as transformation of type 1-4 (Figure 15). They have shared a common character that they have 6 arrow windows to outside of the Wall, and 4 windows to the other side.

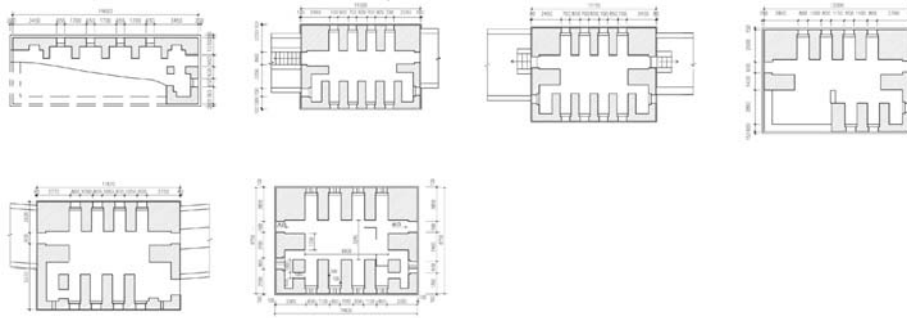


Figure 15. Typology 1-6: Floor Plan of No. 37, 40, 44, 47, 48, 53, 55

The Type 3-3 has been mostly similar to the archetype of hollow towers. But it is quite strange that there have been very limited numbers of that type of hollow towers in field investigation.

The type 3-3 or 3-4 could be recognized as another transformation of type 1-3 and 1-4 in vertical direction (Figure 16). Two allays were supplied in horizontal direction between main bay and the outer walls.

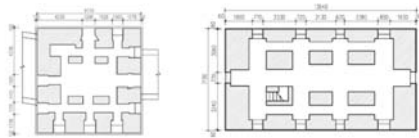


Figure 16. Typology 3-3, 3-4: Floor Plan of No. 39, 19



Figure 17. Typology 3-5: Floor Plan of No. 25, 36

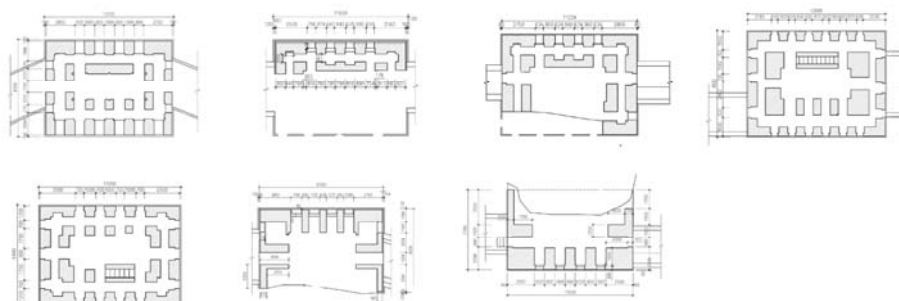


Figure 18. Typology 3-6: Floor Plan of No. 5, 21, 28, 33, 43, 82, 94

The Type 3-5 and Type 3-6 were the most complicated towers with circuit galleries (Figure 17, 18). Studied these floor plans, some are quite hard to distinguish from 1-6, due to the galleries' directions have been hard to tell.

4.3 Towers' Typology of Dong-gou Great Wall

As mentioned above, there are ten towers in Dong-gou Great Wall (Figure 19). Seven towers are belong to the type of single senior bay, while the other three are belong to the three-senior bay towers.

Most of the single-senior bay towers had been involved more junior bays as three, four, five and six. The type of towers was excellent at fighting due to the length. The three-senior bay's towers were good at storage as well as defense.

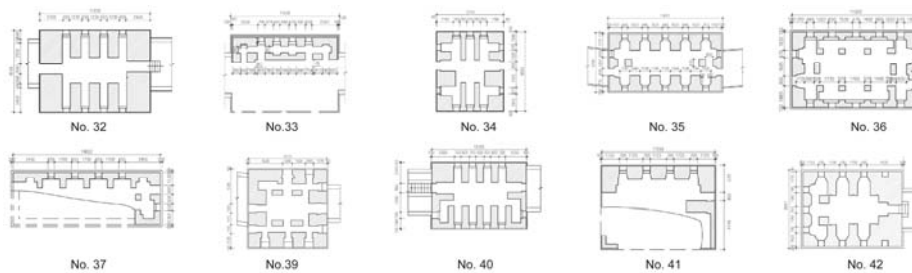


Figure 19. Floor Plans of Towers in Dong-gou Great Wall

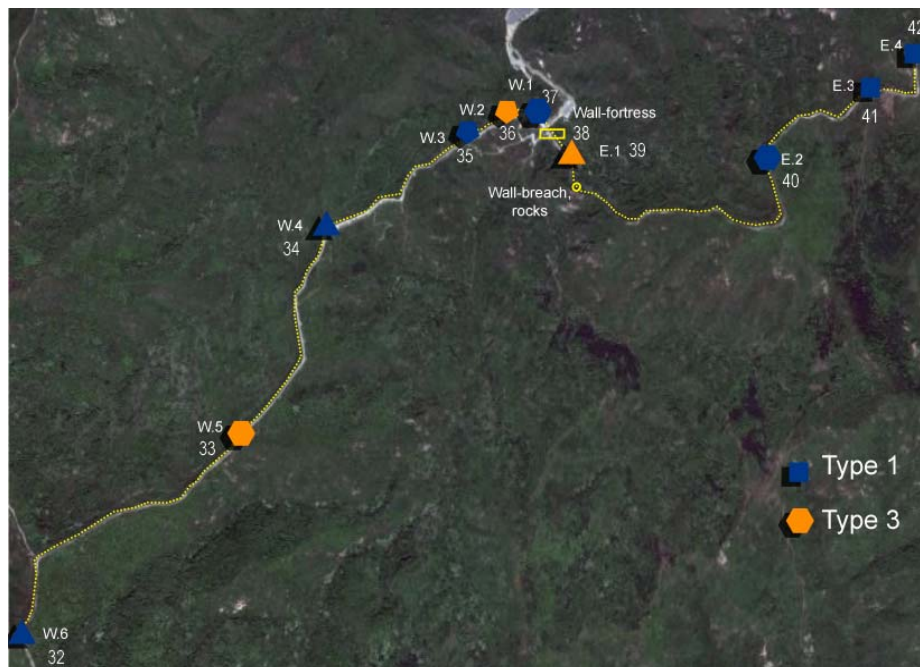


Figure 20. Distribution of the towers in Dong-gou Great Wall

The nearer the wall-fortress, the longer are the towers with horizontal direction. The type-3 (towers with 3 senior-galleries) apparently has lower frequency than type-1 (Figure 20). The master plan has also proved the principle (Figure 21). The Type-3 has been located every 4 or 5 towers. It could be assumed that the type-3 was functioned as basic-level command-centers on the Wall.

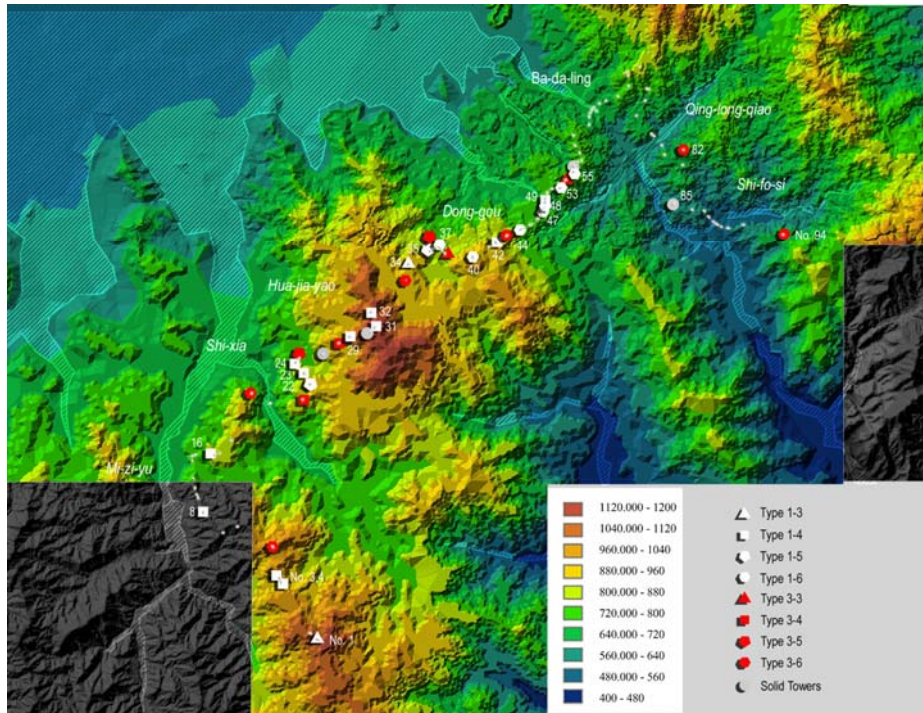


Figure 20. Distribution of the towers in Ba-da-ling—Shi-xia Great Wall

5 Conclusions

Dong-gou Great Wall has been Yü-jia-chong Wall-fortress. It had belonged to Chang-zhen Section of Ming Great Wall and under subordinated in Ba-da-ling Pass and in the Sunsection of Jü-yong Pass.

The formation of Dong-gou Great Wall, as well as the other parts, could be divided into three stages, consistent with the construction time of Ming Great Wall. The wall-fortress was constructed in Emperor Yong-le reign (1402-23); the towers had been built in 1550 of Emperor Jia-jing reign; and the hollow watching towers had been built in 1569-1572. The Wall had been consolidated and reconstructed even until 1587, Emperor Wan-li reign. The entire situation has also proved that the Wall and the towers were constructed in different period. The Wall could be built late than the towers.

All the wall-fortresses could be located. Shi-fu-si Wall-fortress has located in the Tower 89-91; Qing-long-qiao Wall-fortress has located in Tower 78-79; Wang-gua-gu Wall-fortress has located in Tower 74-75; Ba-da-ling Pass has located in Tower 65; Hei-dou-gu Wall-fortress has located in Tower 56-57; Hua-mu-liang Wall-fortress has located in Tower 48-50; Yü-jia-chong Wall-fortress has located in Tower 38; Hua-jia-yao Wall-fortress has

located in Tower 25-27; Shi-xia Pass Wall-fortress has located in Tower 19-20; Mi-zi-yü Wall-fortress has located in Tower 10-12.

Dong-gou Great Wall had had served as a wall-fortress near Ba-da-ling Great Wall. It was covered by Row towers and middle lines of rammed earth Great Wall; and Northern lines of Xüan-fu Great Wall. It offered protecting to Jü-yong Pass. Three levels of garrisons and fortresses had been located on its northern flatland.

They had formed a organization of Ming Great Wall military defense system.

References

- [1] WANG Shi-qiao [Ming Dynasty], *Xi Guan Zhi (Annals of Garrisons and Passes to the West of Beijing the Capital)* 西関志, Beijing: Press of historical books of Beijing, 1990.
- [2] Hua Xiazi, *On-the-spot Investigation of Ming Great Wall. Ming Chang Cheng Kao*. Beijing: The Archives Press, 1988.
- [3] WANG Guo-liang. *Research on the Transformation of Chinese Great Wall*. Beijing: The Commercial Press. 1928.
- [4] ZHANG Shao-qui [Ming Dynasty]. *Jü-yong Guan Zhi. Annals of Jü-yong Pass (1586 AD)*. Tai-bei: Cheng-wen Publish Co. 1967.
- [5] YÜ Min-zhong [Qing Dynasty]. *Research on the Beijing History. Rixia Jiuwen Kao*. Beijing: Beijing Ancient Books Publ. 2001.
- [6] LUO Zhewen, Dong Yaohui. *Basic Theoretical Issues of the Science of Great Wall. Proceedings of International Symposium of Great Wall*. 1994
- [7] HUO Ji, Ministry of War [Ming Dynasty]. *Illustrated Book of Nine Sections*. Tai-bei: Cheng Chong Book Company. 1981.
- [8] LUO Kun, ZHANG Yong-shan, *The Military History of Ming Dynasty. Chinese Military History. Vol. 15*. Beijing: Military Science Press. 1998. I Version.
- [9] MOTE, F. W and TWITCHETT, D. *The Cambridge History of China. Volume 7. The Ming Dynasty, 1368—1644, Part I*. First published 1998, Reprinted 2007. [New York]: Cambridge University Press.
- [10] Liang Fangzhong, *The Transformation and Characters of Chinese Weights and Measure*, Guang-zhou: Journal of Zhong Shan University. 1980.
- [11] SUN Shi-fang, LUAN Shang-yue, *Annals of Xuan-fu (1561)*. Tai-bei: Cheng-wen Publ Co. 1969
- [12] DONG Yao-hui, *Column of Chinese Great Wall*. Beijing: People's Education Press. 2004
- [13] TU bing-yi, ZHANG Chun-de, *Annals of Yan-qing [1881, Qing Dynasty]*. Tai-bei: Cheng-wen Press. 1968
- [14] GU Zhu-yu [Qing Dynasty], *Essentials of Geography for Reading History. 1690s. Dushi Fangyu Jiyao*. Beijing: Zhong Hua Press. 2005
- [15] Zhang Ting-yu [Qing Dynasty]. *History of Ming Dynasty. 1739 AD*. Beijing: Zhong Hua Press. 1974.
- [16] LIU Xiaozhu [Ming Dynasty], *Annals of Four Sections and Three Passes*,
- [17] LI Shi-xuan [Qing Dynasty]. *Annals of Fort Yan-qing*. Tai-pe: Cheng Wen Press. 1969.
- [18] TU bing-yi, ZHANG Chun-de, *Annals of Yan-qing [1881, Qing Dynasty]*. Tai-bei: Cheng-wen Press. 1968. pp 47.
- [19] QIU Xin-tian. Qi Ji-guang [Ming Dynasty], *Records of troops' training*. Beijing: Zhong Hua Publ. 2001.
- [20] CAO Wan-ru. *Atlas of Ancient Chinese. Ming Dynasty*. Beijing: Cultural Heritage Press. Version I. 1995.
- [21] GUO Zao-qing [Ming Dynasty]. *Annals of Fort Lu-long. 1602*. Tai-pe: Xue Sheng Press. 1987.
- [22] AI Chong, *Starting Points and Joint Points of Nine Sections and Thirteen Garrisons of Ming Great Wall*.

- Xi'an: Journal of Shaanxi Normal University (Social Science). May. 1993. No.2
- [23] MENG Guang-chen, *Beacon Fire of the Great Wall*. Beijing: Cultural Heritage Press. Version I. 2004
- [24] MU Yuan, XUE jun, *Building Units of Great Wall*. Spring and Autumn of Cultural Heritage [Magazine]. 1998. No. 2.
- [25] WAN xue, WANG Xing-ming, *Preliminary Research on the Types of Watching Towers*. Spring and autumn of Cultural Heritage [Magazine]. 1998. No. 2.
- [26] Ba-da-ling DC office, *Ba-da-ling Great Wall*. Beijing: Beijing Tourism Press. 1988
- [27] *Annals of Ming Regime (1505)*. Tai-pei: Xue Sheng Press. 1965.
- [28] ZHU Yan-ting. GUO Yin-qiang, LIU Shu-guang, *Ancient Great Wall, Ties of War and Peace*. Shenyang: Liaoning Normal University. 1996.
- [29] FENG Yong-qian, HE Pu-ying, *Ancient Great Wall in Liao-ning*, Shen-yang: Liaoning People Publ. 1986.
- [30] LUO Zhe-wen, *The Great Wall*. Beijing: Beijing Press. 1982.
- [31] GAO Wang, *Visiting and Exploring the Great Wall*. Beijing: China Radio Press. 1991.
- [32] China Great Wall Society. *International Symposium on the Great Wall*, Shen-yang: Liaoning People Publ. 1995.
- [33] TANG Yuyang, HU pingping, *Preliminary Research on conservation of Great Wall's Geographic Environments and Historical Characters*. Journal of Beijing University of Civil Engineering and Architecture. 2007. No.3.
- [34] JING Ai, *History of Chinese Great Wall*. Shanghai: Shanghai People Publ. 2006.
- [35] WANG Guo-liang, *Transformation of Chinese Great Wall*. Beijing: The Commercial Press. 1935.
- [36] LI Shao-wen, LIANG Rong, *Illustration Book of Great Wall: Shanxi Section*. Beijing: Beijing Tourism Press. 2006
- [37] LIU Jin-zhu, *Ten Thousand Li of Great Wall*. Ha'er-bin: Heilongjiang Science and Technology Press.
- [38] Aldo Rossi. *The Architecture of the City*. Cambridge: The MIT Press. 1982
- [39] Giovanni Carbonara. *Avvicinamento Al Restauro: Teoria, Storia, Monumenti*. Napoli: Liguori Editore. 1997.
- [40] Bernard M Feilden, *Conservation of Historical Buildings*. Oxford: Reed Educational and Professional Publishing LTD. 1996. New Ed.
- [41] John Warren. *Conservation of Brick*. Oxford: Reed Educational and Professional Publishing LTD. 1999
- [42] Giovanni Carbonara. *Restauro Architettonico II. Trattato di Restauro Architettonico*. Torino: Unione Tipografico-Editrice Torinese. 2007. Ristampa.
- [43] Mario Docci, Diego Maestri. *Storia del Rilevamento Architettonico e Urbano*. 1993. Gius. Laterza & Figli. Prima Edizione.