Research and Application on Typology in the Historical District Renewal

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Abstract

As an important constituent part during the urban development, the historical district has very important historical and cultural values. At present, with the accelerate develop ment of the whole city, the problem of how to preserve the historical environment and continue the historical essence while make the district adapt to the modern society at the same time became more and more seriously. Therefore, the topic about historical district renewal is well worth researching.

This paper starts with issues standing in front of the historical district in the background of quick city booming and then points out the most important problem during the renewal process of historical district in China. After that, this paper introduces typology as a new perspective to solve the problem. The main theories and application methods are both researched in this paper. Based on the sum-up experiences from the example studies, the paper tries to research the concrete process of historical district renewal by using typology as tools, which is mainly from classification, type abstraction and construction to type embodiment. And some basic ways of typology application would be summarized after the case study. These theoretical tools and example experiences are all taken into the case study for practice.

Key words: historical district, renewal, typology
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Chapter 1 Introduction

1.1 The background of the topic

Since China adopted the reform and opening-up policy in late 1978, the city construction in China entered a new era. On one hand, the quantity of cities developed from 223 in 1980 to the present number which is 661 (Report of National Bureau of Statistics, 2010). On the other hand, the scale of the original cities has been continuously enlarged. With the improvement of city modernization, the old cities were really difficult to totally bear the important task of city or district center. As a result, the problem which old cities faced was urban renewal. While many historical districts were kept in the old city, how to preserve and reform them in the urban renewal is an unavoidable task.

The widespread urban renewal took a large number of economic benefits and improved the urban environment to some extent. At the same time, access to the positive effect, the continuation of urban history and culture which the old city represented were accompanied by an incalculable risk.

Although there are many projects of urban renewal have been carried out in China, certainly including lots of historical districts. The sharp contrast to the widespread projects was the deficiency of proper theory and method which can be used to instruct these projects. In my opinion, the proper theory and design method that historical district renewal needed have to respect history and also apply to the development of the whole city.

1.2 Problems and Possibilities

1.2.1 Problems

In the issue of conservation and renewal of the historical district, we have two extreme states in China (Guijun Wu, 2006). One is constructive destruction which means rebuild the historical architecture or environment by breaking all the original ones. In this situation, the obsolete image of the historical district was adjudged out of line with the urban new feature and the burden in the urban development. So the government and developers fulfill the work of renewal by constructing new environment to copy the historical ones. In this way, the historical districts lose the culture and historical meaning totally; many historical buildings with high antique value were also destroyed completely. The other one is isolated protection which means protect the historical architecture or
environment without the entire awareness. In this situation, to protect the original feature of historical district was considered as the most important work in the renewal of old city. The construction only can be carried on in the new districts of the city. The historical districts must keep the original feature instead of any change. In this way, the historical districts lose the historical environment which they relied for existence.

How to find a way out of these two? How to renew the historical district under the protection of the urban characteristic? These problems are of great urgency.

1.2.2 Possibilities

There are some useful methods that can be researched to solve the problem and also some good examples which showed the opportunity and dawn of the district renewal.

The process of conservation and renewal of the historical district need a method system of classification which is used to classify the forms with similar structure and resume the particular traditional image of the historical district. Typology is a theory developed from 1950s as above stated. It is also a reasonable method which can be used to achieve the renewal of the historical district, not only can help the district to save the traditional value but also adapt to the modern lifestyle.

By applying the method of typology, the deep structure of city which is the "collective memory" would represent on the surface structure which is the organization form of buildings and spaces in the district. The essence of typology is that solves the relation between history and modern (Li Jun Wang, 2005). Typology can treat the history and traditions rationally, after the screening and criticizing process; the beneficial historical and culture contents would be taken into the modern society and redesigned with the connection of the specific needs.

The theory and design method of typology will be expounded in the second chapter.

1.3 Objective and methods

In order to provide a proper solution to solve the problems mentioned above, this paper tries to introduce the typology as a new perspective to analyze the problem, including the theoretical background and design methods. And based on the example study, this paper also tries to analyze and make a design proposal for a typical project in China by making use of typology as method.
1.4 The main contents of the thesis

This paper starts with issues standing in front of the historical district in the background of urbanization. Then the paper introduces typology and clarifies its effect and meaning to city history and culture. It also studies the correlation between typology and historical district renewal, and tries to summarize the application steps during the renewal process by using typology. After that, this paper chooses two typical examples in China and Sweden respectively to summarize the different experiences on the historical district renewal. On the basis of theoretical and example study, the methods and good experiences will be taken into practice in the case of Shuangdong district in Yangzhou of China. Through the analysis and implement process, the typology theories and methods would implicate in the detailed and reality renewal process.

This paper is mainly divided into six parts. The main frame of the thesis is that firstly the introduction part to show the problems, the possibilities, the objectives of the thesis and so on. Then from the theoretical study and example study, the theoretical background and the practical experience would be summarized. At last based on the above study, this paper will choose a typical project in China to apply the theories and methods in the aim of forming more useful theoretical and practical system to instruct the following projects in the historical district renewal.

After the introduction chapter, the second chapter would firstly introduce the concept of historical district and renewal which is the key words in this paper. And then research on the typology, typology is the angle which is chosen to solve the problem in this paper. Through summarizing the major theories and methods of typology, the third chapter tries to find the correlation between typology and historical district renewal which is introducing typology theory and methods into historical district renewal and summarizing the application steps to instruct the following case study.

The forth chapter is mainly about example study, two cases which have fulfilled would be chosen to analyze the renewal process. These two examples are Xintiandi plaza in Shanghai of China and HAGA in Gothenburg of Sweden. The example study would focus on the renewal activities which these two districts applied on. From the analysis, the good experience and insufficient places within the two cases both would be summarized finally.

The fifth chapter is the case study part. The chosen case is the Shuangdong district in Yangzhou of China. The whole application steps of typology in historical district renewal
will be applied in the case. That is from the description of the whole city and district to the design proposal for the district by using typology. At the same time, the good experiences which have been summarized in the example study would be referenced in the case study. The purpose of case study is not only try to solve the renewal problem in Shuangdong district of Yangzhou, but also try to form a reasonable system by using the methods of typology for reference to the similar projects in historical district in China.

The last chapter is conclusion. It will not only summarize the achievements of the whole thesis, but also point out the insufficient parts of the thesis.
Chapter 2 Theoretical study

2.1 Definitions of related concepts

2.1.1 Historical district

From Charter of Athens in 1933 to Venice Charter in 1964, the scope of building conservation extended from the single building to the whole environment which contains a special kind of culture, meaningful development or witnessed by the events in history. The concept of historical district has not been put forward specifically until Washington Charter in 1987, which argued that the historical district was the districts which have a historical significance in the city, including the ancient center of the city and other districts which saved the historical scene (Barry Goodchild, 1997).

In China, the concept of historical district was advanced from 1986, which was associated with the historical and cultural city. The historical district is an indispensable element and core composition of the city's history and culture (GB50357-2005). Historical district means the district which preserved a certain scale and number of historical heritages and built environment. And it can reflect the feature of the city in a certain development period truly and completely.

The historical district is always composed of building complex with historical characteristic, traditional streets and squares. And there are three main characteristics of the historical district (Xinli Guo, 2007). The first one is the continuation of history that means the district can reflect the process of development and evolution. The second one is the truth of life, which means the historical district not only as a museum, but also undertakes some social function of the modern society. The last one is the integrity of historical feature that means it saved abundant historical heritage which can reflect the city feature in a certain historical stage, at the same time, the district needs to have a defined boundary and scope without serious destroy to show a comparatively complete architectural space, landscape scene and historical atmosphere.

The concept of historical district is different from old city and historical relics or buildings. Firstly, on the scope, the area of historical district is smaller than the old city, and also not means the single building. District is a very limited area which contains some morphological unity, these units are always established by the street-system, standardized buildings and so on (M.R.G. ONZEN, 1969). On the function, the improved traffic system and functional zoning have not been demanded in historical district which is the same as the old city, while the complete historical life and feature
can be found in it. Thirdly, on the historical value, the historical district pays more attention on the whole culture feature and street system, which is different from the unalterable historical relics. In other words, the historical district means the continuous area which has the same or similar historical character in the city.

In his book the image of the city, Kevin Lynch argued that the contents of the city images which refer to physical forms can be classified into five types of elements: paths, edges, districts, nodes and landmarks. Districts are the medium-to-large sections of the city, and the physical characteristics that determine districts are thematic continuities. The continuous themes include the space, form, function, details and so on. The historical character of the whole city comes from the superposition and present of the historical district in the city (Kevin Lynch, 1960). For example, the Duolun Road historical district in Shanghai saved lots of historical architecture and streets of 1930s, the inner environment kept a more integrated subject character with continuous historical feature while the outer environment had been combined with the new city function (Image2-1).

2.1.2 Renewal

In view of the historical district, renewal means replacing the elements of the historical district with the contents that adapt to the development of city culture. It also means adapting the historical contents including the architecture, space and environment to the development of the whole city by using the appropriate design methodology.
In western countries, the renewal activities of historical district had changed into the small-scale and gradual developing mode after the massive reconstruction during the postwar period. The rational small-scale mode was mainly represented by the respect and perfection for the social structure and spatial texture of old city. The historical scale of the district needs to recover as well as perfecting the public activity space. Then the concept of sustainable development which introduced into the historical district renewal made the activities became more and more reasonable (congxiao Liu, 2005).

The renewal activities in China started after the reform. Although until the 1990s, the preserving regulations and renewal modes of the old city had been established, the situation of constructive destruction and isolated protection were both existed during the renewal process. Then the scholars started to consider the inheriting of culture and the continuous of historical form such as the space and buildings. The renewal activities were summarized as two main following aspects which are redevelopment and rehabilitation (Liangyong Wu, 1994). Redevelopment means eliminating the historical contents completely, in order to enlarge the space, add some new contents or improve the quality of environment. While rehabilitation means adjusting the existing environment reasonably, as of partial adjust or smaller change.

In a word, the essence of renewal is to make the historical district not only save the historical value but also receive the city function and supply the needs of modern citizens.

2.2 The research on typology

Typology is first a theory of classification and combination, which is used to describe a group of objects according to similarity of form and structure. And then it is a kind of design method (Li jun Wang, 2005). Through seeking the type of city space and architecture, the continuous and harmonious city form would be obtained by the type choice and transition.

2.2.1 Relevant theories of typology

2.2.1.1 Aldo Rossi: Neo-rationalism typology

The Italian architect, Aldo Rossi carried out a thorough study on the type and archetype. He used typology as an important and effective way of urban architectural design and put out the most important book *the architecture of the city* in 1966. There are two major theories of his study (Lijun Wang, 2005). One is rationalistic and historical typology, which is used to explain the relationship between the form and meaning of architecture. The other one is analogue city, this theory stressed on the collective memory of urban
sites and architecture, and transformed people’s psychological state into the real city with the help of collective memory.

The typology theory of Rossi treated the architecture from the city perspective and analyzed the city from architecture. He treated city as the site of elements gathering and the root of new form generation. The city constituted the site for the existing of buildings, while the buildings constituted the segments of city. Any architectural design could not apart from the city. Rossi found a morphological relationship between city and architecture, the architecture is actually a small city, while the city is a large building (Aldo Rossi, 1966). The architectural type would determine the morphological structure of the whole city finally. This kind of typology theory constituted the main part of his architectural theory and the premise of architectural practice. The concept of type is similar with archetype. Archetype was the universal psychology of the generations of people, while the architectural type was the inherent rule of typical architecture. Rossi tried to reflect the collective psychological experience on the surface structure of the architecture through the research of type which is the deep structure of architecture.

Rossi divided the city and architecture into two layers which are entity and image. The entity of the city existed really, either historical or functional. While the image of the city consisted with the place feeling and type, that is a kind of psychological exist and the site of collective memory. The image of the city is the analogy city. Specifically, the collective memory was used to describe the memory states of human life in city. When the form apart from the function and only the form can keep the vitality of architecture, the history would convert to the memory. And Rossi put forward the design method of analogue city which proceeded from the archetype theory of memory restoration. The analogue method means reclassifying and reconfirming the existing architectural type through abstraction in order to create some new types. And the type still can be simplified into much simpler geometrical forms. Consequently, all the existing buildings change into the permanent condense in this way, that’s the archetype of architecture (Aldo Rossi, 1966).

Different with other architects, Rossi was not interested in creating new types and he thought that the types which were abstracted from the history have strong vitality. In Rossi’s opinion, type is the essence of architecture, and the simplest geometrical form is the best way to express the essence. So we can find that in Rossi’s works, the types can be used for essence and outward appearance at the same time. And his works always appeared to have a collage of symbolic significance on the form.
Taking Teatro Carlo Felice for example, Rossi took the architectural technology which is a collage of styles in several historical stages to repair the old theatre (William Higgins, 1997). The architectural design makes a harmony between the left structures of the building and the technical needs of theatre in twentieth century. The continuity in vision has been kept and the image of public theatre also has been reestablished in the city environment through designing (Image2-2). Specifically, some structures were built on the old building in order to satisfy the new function, the designer adapted the transformation of history and function by means of matching the material of the outer wall. Rossi also decorated the inner space by the technique which used in the outer space. He connected the elements of city segments in different historical periods and revealed the memory of the history through the repetition of basic elements.

Image2-2 the outer appearance of theater
(Source: http://farm4.static.flickr.com/3497/3932454783_ca99903616.jpg)

2. 2.1.2 Krier brothers: the development of typology in urban design

Rob Krier has made a systematic and deep study on the composing elements and principle of the European city and its architecture. In his book *urban space*, the relationship between main squares and streets in European cities was recorded by the author. And they were concluded to a large variety of types which can be used as the basis of urban design (Rob Krier, 1979) (Image2-3, 4).

Kirchsteigfeld in Berlin was the practice of Rob Krier’s city ideal. That is renewing the public space which lost in the modern city based on the traditional city in 19th century (Xudong Chen, 1999). The emphasis in the design of Kirchsteigfeld was restoring and reconstructing the street and square which is the main type of public space in the traditional European city. The city structure of Kirchsteigfeld was composed of street and square with accurate spatial pattern. Most buildings had an enclosed yard as semi-public space. Because of this kind of space, Rob reached the transition from the
public space to the private space. And Kirshsteigfeld was not only a residential city with single function, but also mixed different functions with separate and homogeneous distribution. Both mixed land use and aggregation of central squares promoted communication among citizens and the generation of community spirit.

Leon Krier put forward the strategy of "urban renewal", he divided the city into three elements which are the district, street and square (Lijun Wang, 2005). And in his opinion, the district is the most important element of the city where related to typology. The district could decide the forms of street and square, the urban space could be generated through the combination of districts.

The recognition of type and form by Leon Krier came from the dissatisfaction on the similarity of modern architecture. In his opinion, the classical architecture has accordance between the form and function on type. The regular names achieved from the history gradually and they are the archetype kept in people’s memory. While the influence of archetype always neglected by people in the modern architecture. Under this situation, Krier’s strategy was that dividing the architectural elements into two categories, one is private elements including houses and so on, the other one is public elements which determines the major value of urban morphology (Leon Krier, 1978) (Image2-5).

Krier brothers introduced typology into urban renewal, their research and practice
established the conceptual framework from the perspective of public space, and enriched the application theory of typology.

2.2.1.3 Rafael Moneo: site typology

On the basis of inherit and summarize of the previous typology theory, Moneo criticized and developed the theories of typology.

In Moneo’s opinion, type is constructed on the basis of culture, lifestyle and continuity of form (Fan g Wu, 2004). For the application of typology, he argued that the design process was a process which leads the typological elements into the real state. In other words, the current state would act on the type transition under the demand of current site.

The National Museum of Roman Art could be taken as an example. The museum is a typical work of Moneo to show the design connected with the real site (Nan Wang, 2006). The museum is located in the small city of Mérida in Spain. The city had the most Roman architectural relics in Spain, and at the same time, most exhibits in the museum were the relics in ancient Rome. So Moneo made a deep study of the Roman architecture and extended the architectural tradition through his design (Image 2-6). Besides that, many innovations had been done by connecting the demands of modern museum design. For example, the main space of the museum expressed in serious compartments with vast arches connected with each other. And the lighting in the museum mostly came from the natural light of top. This is the variant shape of the multi-post hall. And it also shows the typology process with the choice of basilica type and the transition in the real site.

Image 2-6 the extend and innovation of major alleyway in National Museum of Roman Art
(Source: http://farm1.static.flickr.com/58/186056358_236010e597.jpg)
In comparison with Rossi, Moneo paid more attention to the type itself which under change of times and in the call of site spirit. Different with Rossi’s abstract geometry, much more sequences of historical structure were integrated with modern architecture after the reengineering and revision of site.

2.2.1.4 Steven Holl: generalization of typology

Holl is a famous architect who succeeds in using typology in America (Lijun Wang, 2005). He was dissatisfied with the too concrete structural expression and stressed the elusive essence of architecture. The reason for his success is that he researched the type of local traditional architecture in America deeply and devoted himself to apply the spirit and design logic which got from the traditional architecture into modern design.

Holl combined the phenomenology of architecture with typology as method, and tried to grasp the spirit of architecture and site through the analysis of spatial relationship, function, structure and so on. The architectures need to design based on the spatial essence, and then combined with the sites to reach the demands beyond function.

The method of typology of Holl broke through the limitation of form and focused more on the society, culture and tradition. Besides that, he also paid more attention to the architectural phenomenon of site and experience. He took the development of typology into the generalized era.

The Berkowitz House, for instance, was a typical project of Steven Hall which reflects the constituted elements of the coast building. All these elements can be changed and chosen, while the spirit of the building would be still existed (Lijun Wang, 2005). In this project, he researched the particular geographical environment of the architecture. One side is the sea, and the other side is wilderness. In order to keep the traditional type of coast building, the wood-frame roof had been maintained at the same horizontal plane, at the same time, the floor of the building had been suspended upon the surface of the earth. While the floor down from stage to stage with the beach slope and a platform was constructed finally. Thus, the building had been related to the geography. Besides that, the building located in the particular site with two different geographic characteristics. The building divided the original natural geography to two directions which facing the sea and land respectively. Holl adopted different approaches with the two directions, the entrance mode of urbanization had been constructed which is different with the northern platform (Image2-7).
2.2.1.5 Summary

From Rossi to Holl, the concept of typology became more and more generalized. And the theoretical background of typological application in the renewal of historical district has formed in this thesis.

Firstly, the research of the collective memory and the abstraction of types which were researched by Aldo Rossi are the precondition of the combination of design and history. Secondly, the research mode of step by step downward from the public space structure which was researched by Krier brothers provided the references of typology application steps in the historical district. Thirdly, the transition of types need the flexible application under the request of site, Moneo makes an illustration for the site typology through his practice. Finally, typology is not only a design theory of historical correlation, but also the reading and thinking modes of architecture which used to convey the historical information. To enrich the theory of typology through practice is the enlightenment taken by Holl.

2.2.2 Design methods of typology

2.2.2.1 Classification

Classification is the first step of typology methods. It is not a detailed operation but a kind of thinking way. Firstly, classification also has categories, each category may continue to classify. Secondly, classification can be done according to different methods and criterions. The classified mode not limited to just one kind. Thirdly, although the objects can be classified different categories, the similar contents also existed among them. After classification, two major steps of typology methods could be followed.
2.2.2.2 Abstraction and construction of type

This step means make a summary of various forms and elements of the historical models on different layers firstly, then by abstracting and simplifying these elements, we can construct the meta-design finally.

Specifically, the step is a process of cognition from the history and cultural perspective. And the final purpose of abstraction is that obtain the continuous of urban morphology by type disposition. Above all, the process of abstraction from a lot of similar historical models is the process of meta-design, the constructed type become the tools which used to describe the models. Under the guidance of type, the typology methods can enter into the next step of object design which would generate some new different forms.

2.2.2.3 Transition of type

In order to get the transformation of types, we need to restore the types which were abstracted and constructed on the previous step under the combination of the concrete site.

Specifically, the types seemed as intangible framework. When we put the types in the specific historical environment and give the real elements to the types, the architecture which is similar also different to the original one would be created out. The new architecture not only can keep the visual consistency which people needed but also get the emotional identity. That is the reductive process of types (Lijun Wang, 2005). Type transition is always based on two points. One is the deep structure which means the collective memory, the other one is the combination with the concrete site. That’s the process of object design. The process of type choice has extracted the deep structure from the history, type transition need to research the site spirit sufficiently. In a word, type transition is a combination with type and site experience together.

2.2.2.4 Summary

The above steps are the design process which from form to type and then to the new form. That is also an application of typology in the constitution of architectural morphology. The most important steps during the process are the abstraction and transition.
Chapter 3 The correlation research

3.1 Introducing typology theory into historical district renewal

From the previous study of the representatives of typology, there are three main characteristics of typology which can be summarized not only to correlate with but also instruct the renewal process of historical district.

3.1.1 The collective theory

Typology emphasizes the collective theory and pays more attention to the integration of architecture and city. From Rossi’s theory about the relationship between architecture and city and Krier brothers’ practice, we can find that on typology, buildings are the fragments of the city, any design of single building should not break away from the whole city and need to combine with the existent historical and spatial morphology of city. On the other hand, the architectural type determines the morphological structure of the whole city.

Through the collective theory, the historical district type would be researched on the basis of building type. The situation of over-emphasizing the single building while ignoring the wholeness of historical district would be avoided during the renewal process.

3.1.2 The deep structure

Typology theories emphasize that the architectural type correlates closely to the life form and convention of the local residents. The analogical city theory shows that people’s concern about the city not only stays in the surface of construction and urban image which could be seen and touched by people, but also based on the memory of events which occurred in the city sites. The meaning of the architecture and sites could be expressed by the relation and structure which formed with the history. And the typology theories also emphasize that the cultural and historical meaning was overlapped during every historical stage. The existence of architectural form was not the process of the preceding stage replaced by the later stage. That is the coexistence of all historical architectural forms.

Consequently, in the renewal process of historical district, all buildings and environment should be considered as the raw material. The essence of history and culture which represented by the existing buildings and environment need to be researched strictly. That is in order to avoid the situation that all architecture bodies are only the symbol of
tradition and history, while they fail to adapt the local culture and life conventions.

3.1.3 The site spirit

Typology theories emphasize the site spirit from the human angle. Cities are the collective memory of the citizens who live in, while they need to adapt the modern life finally. From Moneo and Holl’s practice, we can learn that the historical district renewal is a combination of extension and innovation. The renewal process not only need to choose the historical type, but more significant is the attention of site spirit and time change. That means to take the historical type into the real state and attach the special characters of them.

3.2 Introducing typology method into historical district renewal

By introducing typology methods into the historical district renewal, the theoretical research could be combined with the application research.

3.2.1 The analogy design

Typology design is a kind of analogy design. For the historical district renewal, the process is classifying and summarizing the existing buildings and spaces firstly, finding the fixed elements from the changeable elements, then abstracting and constructing the types on the base of the fixed elements, finally transiting the types by combining with the modern environment and function or redesigning according to the essence of the types. Through the whole process, the new form of the district could relate to the history, environment and culture.

In short, the whole design process is abstracting the type “a” from the basic form “A”, and then obtaining the new form $A^1$, $A^2$, $A^3$ and so on by combining with the different sites and through different methods of transition (Image3-1).

![Image3-1 the analogy design of typology](source: made by author)
3.2.2 Application layers

Typology can be researched on different layers. For the analysis and disposition of types, we can draw on the experience of Giulio Carlo Argan's opinion which illustrated on the *on the typology of architecture* (Kate Nesbitt, 1996). The first one is the urban scale and a complete configuration of buildings; examples of the first category are centrally or longitudinally planned buildings. It can also be exemplified in the research of street space and so on. The second category concerned with the architecture scale and its major structural elements. Such as flat, domed roofs, yard space and so on. The third one concerned with the detail construction of single building and its decorative elements. And of the third, orders of columns, ornamental details, etc.

According to the opinion of G.C. Argan which is based on the architectural typology, we can deduce that the research themes of historical district renewal can be divided into three categories as follows (Wei Xu, Juan Li, 2007).

1. **Macro-scale: district**
   
The complex structure of the city is composed of sites with different characteristics. Every site has its own independent system and reflects its characteristic among the whole urban structure. Function and morphological characteristics are both existed in the site. The characteristic of macro-scale is mainly exemplified in its independence and subjectivity within the urban system.

2. **Middle-scale: block**
   
The district environment is composed of building complex. The street and public space system are the element accumulates which are added on the building complex. The character of middle-scale is mainly exemplified in the spatial organization relationship and the combined mode of architectural form.

3. **Micro-scale: building**
   
The single building is the basic constituent element of the city, the buildings with different feature and types would form different city image. The characteristic of micro-scale is mainly exemplified in the single building form and outer spatial relationship.

3.2.3 Summary

From city to single building, the spatial scale has changed enormously. The contents which exemplified in different scales also have obvious differences. In *design methods and typology* which published in 1967, the architectural theorist Alan Colquhoun argues that type is not only a classification system, but also a creative process (Wei Xu, Juan Li,
So not only the definition and abstraction of type need to be researched deeply, but the pointed design and application are even more necessary. For the elements of different scales in the continuous chain of typology, different design strategies need to be adopted based on the different characters of scales. That would be beneficial to the historical district to form orderly spatial morphology in the complex structure of city and also adapt the change of environment and cultural characteristics.

3.3 The application steps of typology in historical district renewal

To synthesize the researcher’s opinions on typology, we find that typology design always takes history into reality by an improved and moderate style. In terms of the application process, typology reflects the relationship between the transition of historical type and the real site. For the different scales, type can be abstracted and constructed on the basis of classification on every scale, the micro-scale type was formed in the larger outer environment, while the macro-scale also abstracted from the composition of smaller scales.

According to the correlation research of typology in historical district renewal, the analogy design during the renewal process of historical district could be summarized as follows (Image 3-2).

![Image3-2 the analogy design in historical district renewal](Source: made by author)

Specifically, from the perspective of typology, there are several steps could be followed during the renewal process in the historical district.

1. Investigation and description

Firstly, the basic situation of the city where the historical district located should be investigated and described. The investigated contents include the development history, natural geographical conditions, historical and cultural traditions, architectural features and so on.
The next investigated object is the district. The location and history of the district, the present status such as the outer environment, function and other situational elements all need to be described.

2. Classification

Classification means using the layer method to conclude and classify the components according to different criterions. For example, on the district layer, the street structure could be classified according to function, layers and other criterions. And on the block layer, plot structure could be classified to reflect the historical feature. The same method still fit to the building layer.

3. Abstraction and construction of type

On the basis of classification, the deep structure and historical character of the whole district could be abstracted from all the components. Then the types which represent the historical character also could be constructed then.

4. Assessment and objective position

The values such as historical value, social value and cultural value of the components and constructed types of the district could be assessed on the base of previous steps. Besides that, by combining with some potential values of the district, the renewal objective could be obtained to instruct the next design work. This step would affect the followed type transition directly. Because the expressive forms would different if the objective positions are different.

5. Type transition

On the type transition stage, the corresponding transition mode could be chosen on the basis of objective position. The transition not only needs to continue the historical feature and reflect the deep structure of the district, but also have to adapt the modern life of citizens.
Chapter 4 Example study

4.1 An example study of Xintiandi plaza in Shanghai of China

4.1.1 Background information of the project

Xintiandi plaza is a renewal project that located in Taipingqiao area of Luwan district, covers an area of 4 hectares.

The whole Taipingqiao area was a congregate residential area with old Shikumen Lilong base (Image 4-1). Shikumen Lilong is always used to describe a kind of historical district in China which is combined with regular alley network and low-rise row houses. The main characteristic of Shikumen Lilong is adopting the unit with strong spatial characteristic of southern traditional housing in China to carry out the overall layout which according to western row dwelling way (Xiaowei Luo, 2001).

Shikumen Lilong always has a similar street structure which from the outer street to secondary alleys (Image 4-2). The main alley generally runs north to south with 4-7 meters to connect with the outer environment. And the secondary alleys could be defined as semi-public space with the arcade constructed at the entrance. This kind of space always used as the public living room for the residents. From the secondary alley to the courtyard which belongs to every house, residents always needed to pass a decorated door which used to define the semi-private space from public space.
Most buildings in this area constructed in 1920s which have a history about 100 years. Because of the early developers are the western businessmen, the buildings in Shikumen Lilong had the characteristics that combined Chinese and Western contents together. For example, the entrance gate and courtyard both follow the basic form of traditional southern dwelling in China. While the components of the gate, column and the decorations on the gable wall are mainly follows the western style. Besides the mixed facade design, another unique architectural form is the harmonious sloping roof which is a keynote of the whole Shikumen Lilong.

With the continuous improvement of the urban population, the per-capita living area in Taipingqiao area became less than 5 square meters. At the same time, the public service facilities were in severe shortage until the implementation of the renewal project in 1990s (Xiaowei Luo, 2001).

History gave the old buildings unique flavor, and every single alley kept the full-bodied life breath of old Shanghai. Although the living standard in the whole area declined seriously, some well-preserved buildings with elegant construction also existed in the area. So how to preserve and reflect the historical feature of Shikumen Lilong became the main core during the renewal design.

4.1.2 Introduction of the renewal activities

With the development of city, the residential function of Shikumen Lilong became hard to satisfy day by day. And because of the special location of this area which is near the city center today and the particular historical value of the Shikumen Lilong. The renewal objective of this area was located as an international leisure and cultural center which called Xintiandi plaza to combine restaurants, shopping and entertainment places together. Under this objective, the designers tried to compromise the historical structure of the alley network, building patterns and the new function of this area in order to make the Xintiandi plaza became a new landmark of Shanghai.

4.1.2.1 The renewal activities on the spatial structure

Image 4-3 shows that how the renewal activities affect the whole area by comparing the original and new plan together. These reconfigurations could be summarized as follows.

Firstly, in order to satisfy the new function of this area, the original western main alley was widened to an inner street which is 10 to 20 meters wide. The inner street was used to afford wider scale for the leisure activates which could be carried out on both sides. At the same time, the designers tried to replace the western disorder alley network with the straight street which also formed a parallel structure with the eastern main alley.
Secondly, a square was introduced into the district which used to gather the stream of people and afford a center for the whole district. As a kind of added structure, the square was constructed at the end of the inner street which has a larger scale. The designers tried to reduce the damage to the original alley structure. Besides that, a main entrance was also widened on the basis of the original one.

Thirdly, the typical network of Shikumen Lilong was kept partially which is in the eastern part of the district. That makes the renewal district related to the history not only on the transited type but also on the direct form. In addition, most courtyards which are the unique space of the original residential houses were also kept in the district although they have been chosen to afford some new functions in the public buildings.

In a word, the most characteristic Shikumen Lilong which including the main alley, secondary alley, Shikumen entrance and the courtyard space in the eastern district were kept completely, while the spatial sequence has been changed because of the disappearing of residential function. In addition, the pleasant scale of original alleys was also kept in the eastern part. The narrowest secondary alley is only 3 meters wide. In the middle part of the district, some old buildings with lower preserving value were removed for the inner street. The main stream of people was introduced from the main entrance to the inner small square, and then separated to the surrounded alleys and buildings respectively. The renewal spatial texture of Xintiandi plaza is external closed.
4.1.2.2 The renewal activities on the buildings

On the building layer, the designers mainly emphasized on the continuing of combined characteristic of buildings in order to awake the deep memory of the citizens. Some buildings with higher preserving value were kept completely, in order to avoid these buildings being overwhelmed in the inconsistent environment during the renewal process. The characteristic and style of surrounding buildings were also controlled strictly.

Besides that, many buildings which adjacent to the original western main alley were suffered different degree of damage in order to form the inner street, while the designers tried their best to reduce the damage to the historical buildings. The inner street was hollowed out from the original buildings, so the widths of the inner street are different which could be used to form the public space with different scales (Image 4-6, 7). The same processing mode of public space was also adopted in other secondary alleys.
Because of the poor quality of old buildings, nearly all buildings in the district need to repair for reuse. The designers protected the outer appearance to the greatest degree and redesigned the inner structure and layout to satisfy the new function (Image4-8). Besides that, the traditional components and material which could reflect the historical feature were kept and repaired according to the historical type. Taking the arcade for example, this kind of entrance not only has the obvious dividing function of the space, but also has the unique characteristic as a product of particular historical times. The historical entrance with mixed characteristic of Chinese and western contents were kept or rebuilt to recall the historical memory of citizens (Image4-9). Some other detailed dispositions make the buildings still have the historical architectural texture on the basis of satisfying the modern functions (Image4-10).

In addition, some building materials with good quality were under careful protection during the destructive process. And they had been reused for the new environment. For example, some pavements on the secondary alleys are the blocks which removed from the old buildings. Some new materials which have the metallic sense were combined
with the traditional components (Image4-11). The designers didn’t restore and continue the old scenes simply, but injected the spirit of modern society.

4.1.3 Summary

In a word, the whole renewal design is a process of combining the history and modern together, not only on the spatial design but also on the design of buildings and components. On the basis of preserving some historical elements, some new elements were still introduced into the historical district as well as removing some old ones. At the same time, strengthen and weaken were also applied on the current elements. For instance, the inner street was the result of strengthen for the western main alley. And the small square was the new element which introduced into the historical district to adapt the new public function.
4.2 An example study of Haga in Gothenburg of Sweden

4.2.1 Background information of the project

The district of Haga firstly established in the mid-17th century. In the 1840s, the new industries were established in Gothenburg, the increasing industrial activity led to an increased need for housing which had its impact on the number of inhabitants of the Haga district. Although Haga was the first worker’s district in the area, it didn’t have a good reputation because of the messy environment and unsafe factors. In the 1920s, because of the close of public works in the area, the district became a primary residential area. In order to give the old district a face-lift, a major renovation of the area was made in the 1980s.

4.2.2 Introduction of renewal activities

The main objective of renew in Haga was to change the backward image of the district by repairing or demolishing the original old buildings which were replaced by post-modernistic replicas. In addition, the residential function was still kept in this district and at the same time, some new functions could be injected to enhance the vitality of the whole district.

4.2.2.1 The renewal activities on the spatial structure

Since the original residential function had not been changed in the district, the original spatial structure still could be used to satisfy the inhabitants’ needs. So the street structure was kept during the renewal process. Although some small retailing had been introduced into the district, the shopping street and the plots which adjacent to the street still kept the original spatial form and scale which is helped to reflect the historical feature of the whole district (Image4-12).
4.2.2.2 The renewal activities on the buildings

The renewal activities on the buildings were the most important renewal manners which were adopted in Haga. Some buildings were improved, while others with poor quality were demolished and replaced by the buildings in old style.

Most buildings were repaired in the same way which is keep the outer appearance to the greatest degree while change the inner constructed structure to afford different functions. The residential houses were repaired to improve the resident’s life standards, while the shops and cafes which are along the shopping street were repaired by enlarging the inner space and opening large windows on the outer walls (Image4-13).

Besides that, many architectural details were also considered during the renewal process. Although these details are very small components of the buildings, they are the typical symbols to represent the historical feature of the whole district. For example, the low height of the buildings, typical red roofs and the lack of balconies were all represented during the renewal process which could be helped to reflect the historical atmosphere of the Haga district.
4.2.3 Summary

In a word, the renewal process in Haga was mainly adopted the preserving methods. The spatial structure and most historical buildings were kept during the renewal process. Although there are some new elements were introduced into the district, for example, the cafes, boutiques as well as the impressive H agabadet which is a public leisure center all could be found in Haga today, the street network and building patterns have not been affected seriously. The pleasant scale of the street was still kept, and the outer appearances of the buildings also haven’t suffered large changes (Image4-14~15).

4.3 Conclusion

These two examples are both the renewal projects which were considered as the successful cases in each country. By comparing with the examples, the differences of the renewal concept could be found and verified to some extent. In western countries, the renewal activities were always represented as a kind of small-scale and gradual developing model. The main aim of renewal was to recover the spatial scale of the historical district and perfect the public spaces on the basis of respecting the historical texture and social structure of the district even the old city. While in china, the concept
of renewal as represented more flexible. Except for the areas which need the special protection, more renewal activities are aimed at improving the situational standard of the environment and exploiting more space by removing the old contents and adding some new contents which would adapt the modern society. So the renewal activities with large-scale still could be found in China.

Under the instruction of these two different renewal concepts, we found different renewal modes had been chosen in the two historical districts and also led to different results.

In the first place, as a kind of business mode of renewal, the project of Xintiandi plaza is successful. The renewal activity not only kept the historical district but also propelled the economical development of the whole city. The original run-down district had been changed into a popular place which is full of capability and energy. While the original inhabitants all had moved out, that made the district became an empty container without deep structure. Because the development process of historical district was an interactive process between the inhabitants and the physical environment, so the needs of local residents are the basic force for the development of historical district even the whole city. Besides that, as a leisure and cultural center in Shanghai, the famous restaurants, entertainment and shopping places attracted many people with high classes come to this district. While the ordinary citizens even the original inhabitants were kept out. The social structure of this area had been cut by the renewal activities. This is the insufficient places in the renewal project of Xintiandi plaza.

The renewal project of Haga kept the residential function and introduced some small retailing to improve the attraction of the whole district. It became an attractive place with a laid-back atmosphere which compared with the modern and hectic environment of downtown in Gothenburg. The cafes, traditional shops and bookshops with small-scale in Haga are popular with the ordinary inhabitants and citizens. Everyone could come to this district to enjoy the quite atmosphere. The deep memory and social structure had been kept in Haga. On this point, the renewal project in Haga is successful.

In the second place, both projects had paid close attention to the protection of historical buildings. Many buildings were repaired to satisfy the new function. While for the spatial structure, Haga kept all the original street and plot structure because the spatial scale and patterns were still adapted to the modern life of inhabitants and citizens. But in Xintiandi plaza, because of the historical narrow alleys could not satisfy more public activities, the designers adopted new methods to continue the history. Except for few
secondary alleys which were kept completely, the spatial structure of more alleys especially the main alley were continued by keeping the location and trend of the original ones. In this way, the historical spatial structure still could be recognized by people while the public spaces were satisfied at the same time (Image4-16).

From the previous analysis, we can’t say which project is more successful, because both of them were implemented according to different urban overall planning, urban economic development and renewal objective of the district. While some experiences still could be learned in the case study. Firstly, the original residential function needs to be kept by repairing the buildings to improve the life standard of the inhabitants. Secondly, some new functions could be introduced into the historical district on the basis of preserving the spatial structure and historical feature of the district as much as possible. Thirdly, the social structure could not be destroyed during the renewal process. These experiences showed that how to respect and continue the deep structure as well as the historical feature of the district is the most important problem during the renewal process. These real examples further proved that typology would be a kind of useful theory and design method to instruct the renewal project. So these experiences would be used in the case study by combining with typology together.
Chapter 5 Case study

5.1 Brief introduction

Yangzhou is a famous historical and cultural city in China with the history of more than 2400 years. In history, there were two flourishing periods of the Tang dynasty and Qing dynasty which were more than 1000 years and 100 years ago respectively. Nowadays, the historical feature of the old city in Yangzhou was mainly left from Qing dynasty (committee of Yangzhou chorography, 1997). These historical heritages not only could reflect the antique history and culture, but also enriched the modern people’s substantial and spiritual life in Yangzhou. Many historical districts with extremely local characteristics were formed by the historical buildings and spaces which connected by small alleys.

In the several decades after liberation of China, the historical districts in southeastern corner of old city in Yangzhou suffered important demolitions. While because the main development of Yangzhou faced west, the overall layout of the districts were mainly in good condition. But the isolated protection which means protecting single building or partial spaces couldn’t solve the problems of the old city. And another extreme situation also existed in the development process of Yangzhou. Taking the extension of Dingjiawan Street for example, the traffic problem and the life standard of local residents were improved through new constructions, while the neighborhood structures of the old city were destroyed. In addition, the newly built street was away from the original city feature and cut the inherent sequence of city development.

The Shuangdong district which was chosen in this paper for case study is a part of Dongguan historical district. Most alleys and buildings of this district were developed in Qing dynasty with the history of more than 100 years.

The reasons for my choice are as follows. Firstly Yangzhou has a long history of great socio-physical values, so there are many historical streets and buildings with high historical values which have been saved, the extant old city of Yangzhou is the most important area to show the history and antique culture of the whole city. Secondly, in recent years, Yangzhou was in a new phase of development, the conflict between the historical and modern district became serious, although there are many projects of historical district renewal have been finished, the problem which I have mentioned above still have not been solved. Thirdly, the case I have chosen in Yangzhou is in progress, so there is a broad space to analyze by making use of typology.
Using the concept of topology to study the historical district will mainly focus on the value of historical buildings and streets in the traditional environment and the connection between the historical and the new issues. The fragments of the physical space are the various spatial textures composed by the buildings and alleys. The design methods based on topology include description, classification, abstraction, type transition and recombination. The previous phases are the processes of analysis while the last phase is the process of creation.

5.2 Description

5.2.1 Description of the whole city

The main development structure of Yangzhou can be divided into two different phases. The first phase is from Tang dynasty (618-907) to Ming and Qing dynasty (1368-1911). Because of the different predominant industry and economic development mode, the process of spatial configuration went from broad to narrow. The spatial characteristic of this development phase was developed beside the river and overlaid with every dynasty (Image5-1). The new Yangzhou was developed on the base of the old city in Ming and Qing dynasty which was about 5 square kilometers (Image5-2) (Wen Yin, 2001). The development process represented a typical concentric expanded form, which means that the evolution process of the city space was developed from the internal layer to the external layer and expanded at each layer (Image5-3). The broader plain geomorphology provided the condition for the concentric expanded form. The strong city axis and the upright street structure are the concrete representations of the historical continuity.

![Image5-1 the existing area of ancient Yangzhou (source: made by author)](image1)

![Image5-2 the existing area of modern Yangzhou (source: made by author)](image2)
In history, Yangzhou was a center meeting place in China, especially from Tang to Qing Dynasty. Because of the effect of the location, the architectural style in Yangzhou absorbed the northern building style as well as the southern building in China. For example, the upright layout of building group in northern area and the high architectural density in southern area both appeared in Yangzhou. Besides that, the slope of roof, the height of eaves and many other constructions of the buildings in Yangzhou all showed the compromised architectural style (Lichang Zhao, 2008). In addition, the city of Yangzhou could not develop without gardens, especially the private gardens. Until now, there are more than thirty gardens have been saved completely in Yangzhou which are the valuable heritages of the architectural and cultural environment.

5.2.2 Description of the district

Because of the different historical development periods, the districts have different characteristics. There are five historical and cultural districts that have been identified by the government as important cultural heritage (committee of Yangzhou chorography, 1997). These districts represent the particular historical evolution process especially the ancient development period of Yangzhou and they are the most valuable historical heritages of the whole city.

Dongguan historical district is one of the five historical and cultural districts in Yangzhou. And it is located in the key preserved area of the old city which is developed from Ming and Qing dynasty (Image5-4). The site chosen for the case study in this paper is an important part of Dongguan historical district (Image5-5). In addition, it is the area with the most abundant historical buildings and spaces in the old city of Yangzhou.
Image 5-4 the location of old city which is developed from Ming and Qing dynasty  
(source: made by author)

Image 5-5 the location of old city and the site in modern Yangzhou  
(source: made by author)

Image 5-5 shows the area of Shuangdong historical district, the site includes most ancient buildings, alleys and heritage conservation units adjacent to the two horizontal axes: the Dongguan Street and Dongquan Gate.

The existing alleys in Shuangdong historical district are based on the streets formed in Ming and Qing dynasty and partial alleys’ history could be tracked back to Song dynasty (Jinjia Huang, 2000). The distributional characteristic of the district space is that the secondary alleys were perpendicular to the main alley with the direction of east-west. And the secondary alleys were all extended to form a complicated street structure and
spatial form (Image5-6). With the development of the city in the recent years, the existing alleys of Shuangdong district are mostly distributed between the Dongguan Street and Dongquan Gate. In the south side of Dongguan Street, the alleys are still connected with each other, while in the north side the left alleys only could be joined by Dongguan Street (Image5-7). Besides that, the outer spatial environment had been destroyed gradually. The whole urban fabric of spatial environment was a traditional fabric surrounded by the modern fabric (Image5-8).

Image5-6 the distributional characteristic of the district space
(source: made by author)

Image5-7 the situational alleys in the district
(source: made by author)

Image5-8 the whole urban fabric
(source: photographed by author)
There was a suburb where many wealthy merchants lived with less retail business. Nowadays, residences are still the main function of the district. Except for the modern residential clusters which are near the outer street, a great quantity of residential area with traditional features were kept and mainly distributed in the southern part of Dongguan Street. This kind of area always has high population density and small housing area. So many self constructions appeared in recent years. And with the development of modern Yangzhou, the modern city functions have surrounded the district. The residents’ modern needs such as medical care, education and so on could be solved outside the district. While inside the district, there are many small businesses along the Dongguan Street which serving for the daily life of residents. This kind of function always appeared with residence together as the form of mixed use in one building. In addition, some offices, factories, school have been moved into the district in recent years and affected the ancient district texture to some extent (Image5-9).

![Image5-9 the function of the district](source: made by author)

Dongguan Street was the main axis of transportation and commercial development. With the expansion of the modern city, the main status of Dongguan Street was disappeared slowly. The roads which encircled the district were all undertaken major traffic of the whole city (Image5-10), while the streets of the inner district were mainly used by pedestrians.
Although many changes have been done around Shuangdong historical district, the district still has the relatively complete spatial structure of commercial and residential street in Ming and Qing dynasty. The scale of the alleys is pleasant and the interface of some alleys still kept the traditional feature which formed by the architectural feature (Image5-11). The major portion of buildings was “courtyard style” with 1-2 floors. The special form, space and decorations of the traditional buildings were all have high historical value.

5.3 Classification of the components

The previous description of the development process of the whole city and the current situation of Shuangdong historical district is given in the first above. The deep structure of the district needs to be abstracted on the basis of classification from the street structure, plot structure and building patterns according to different criteria as following.

5.3.1 Classification of the street structure

On one hand, the street structure represents the order of the city composition. On the other hand, as the public activity space, the street also holds lots of urban activities. The alleys in Shuangdong district have connected many elements such as houses, gardens, commercial spaces and so on. They are the representative of the alley space in historical district of Yangzhou. And they could be classified and analyzed in three ways: layer, construction era, and function.

Image5-12 shows that there are three main layers of the street network of the district.
Firstly main alleys are the most important channels to connect the external environment and the internal district. The width of main alley is about 4 to 6 meters and they always undertake the largest traffic of the whole district. Then, the secondary alleys are the major connections adjacent to the two horizontal axes. They are mostly used to distinguish different blocks within the district which are about 3 to 4 meters width. Within the block, there still existed much more minor alleys which are about 1 to 2 meters width to connect different houses.

Image 5-12 different layers of alleys in Shuangdong district
(source: made by author)

Image 5-13 shows the relationship among the different layers of alleys. The order of the district composition was represented which is a kind of traditional feature of the historical district.
Secondly, the whole history of the alleys in Shuangdong historical district could be divided into five phases. Dongguan Street has the longest history with about 1000 years which could be dated back to Song dynasty. Then in Ming dynasty with the history of about 600 years, only two alleys constructed to connect with the Dongguan Street. Most secondary alleys were constructed in Qing dynasty, and after 1912, some secondary alleys were constructed to extend the original ones. For the minor alleys, most of them were constructed in the republican period of China which is after 1912. While after 1980s, few minor alleys were constructed in the district (Image5-14).

![Image5-14](source: made by author)

Thirdly, the main function of different alleys is another criterion to classify the street network of Shuangdong district. Although all alleys need to undertake the basic function which is transportation, they still have difference on other functions. The alleys in Shuangdong historical district could be divided into two parts: commercial alley and residential alley. For example, Dongguan Street is the largest commercial alley because of the width and the amount of shops located on both sides. Besides that, Qiananji alley was another commercial alley with less detailing business which is located in the northern part of Dongguan Street. Other alleys such as Xuejia alley, Majia alley and so on are all the residential alleys which mostly used as living space.
5.3.2 Classification of the plot structure

Below the block level, plot is another classification criterion to divide the area. From the existing block feature in Shuangdong historical district. There are two kinds of spatial configurations could be found. One is the regular form which composed by the buildings and yards arranged in the same line. While the other situation is that because of the deficiency of the throughout minor alleys in some blocks, the regular plots could not be found to some extent (Image5-15).

Image5-15 the spatial configuration of plot
(source: made by author)

The image5-16 shows that the first pattern of the plot structure mainly distributed in the northern part of Dongquan Gate. In addition, there are very few residential blocks kept the traditional regular structure of the plot. While more plot structures of the second pattern existed in the historical district.

Image5-16 distribution of the two kinds of plot forms
(source: made by author)
5.3.3 Classification of the building patterns

Though the study of the building forms, we found that the spatial relationship of buildings has a kind of composition order which forms a sequence of different spaces that relate the street to the inner courtyard. The buildings could be used to enclose the courtyard space which is the second layer. The third layer of the building space is the courtyard group which is composed by the courtyard space.
As the image 5-17 showed, there are several buildings with different forms existed in the block as well as the whole district. The single building is the simplest form. For the courtyard space, they always composed by buildings with different quantities. One building just could be existed with a parallel courtyard space, while two buildings could form a courtyard space with the shape of “L”. The same situation also could be analogized to three or more buildings. There is a change of the courtyard space from open to close. The courtyard group always composed by the regular courtyard space which enclosed by the buildings in three or four directions (Image5-18). The whole building complex showed a magnificent scale and the rigorous layout with an axis.

On the basis of the building form classification, we found that different forms are closely related to different functions and construction era of the buildings in Shuangdong historical district. At first, the main functions of the buildings could be divided into commerce and residence. And the residential buildings still could be divided into ordinary houses and high standard houses which are used by people with different classes in history. Secondly, the historical evolution of the district also could be represented on the building patterns. That means the buildings may have different patterns in different times.

As image 5-19 showed, the high standard houses in Shuangdong historical district was the courtyard group composed by the courtyard spaces which located in one middle axis. This kind of house always covers a big area and has a clear spatial order. Some richer families may not only lived in one line of the courtyard group, but owed two, three even five paratactic courtyard groups which connected with minor alleys. The longitudinal groups always composed by three, five or seven rows of buildings which were faced south. The east-west buildings which would be helped to form the courtyard space were always constructed by bilateral symmetrical. Taking a big house for example, the spatial texture was represented by the interval organization of building and courtyard.

The ordinary house was the major composition part in Shuangdong historical district, the basic form of the ordinary house is the courtyard space enclosed by buildings, the front and the side façade are both closed. The scale of the whole house generally not exceed three rows of buildings, that means most ordinary houses only have one or two courtyards, and the extra courtyard always used as a entrance hall. Although the scale of the living space is much smaller than the big and high standard house and this kind of house was always owed by the poorer people in history, the houses still has reasonable and clear layout (Image5-20).
Another major building pattern is the mixed use house with residence and commerce together. These houses with mixed function generally have two kinds in Dongguan historical district. One is the two-story buildings with commerce downstairs and living upstairs. The other kind is one-story buildings with front commerce and back living. These two kinds of buildings always constructed without courtyard space and only composed by the room space (Image5-21). The commercial spaces always open to the commercial alley completely with a gate closed to the back minor alley.
Except for the classification criterion of function, the building patterns in Dongguan historical district still could be classified according to the construction era, floors and construction styles. As Image 5-22 shows, the buildings constructed before Qing dynasty always existed in the form of courtyard group except the commercial buildings which were located along Dongguan Street. From this situation, we could deduce that Shuangdong historical district was one of the most prosperous areas of Yangzhou until Qing dynasty, the whole district was occupied by the people of upper classes. While to the republican period (1912~1949), many ordinary citizens moved into this district and lived in the ordinary houses. Then with the development of the whole city, some offices and factories moved into the district and constructed many large and modern buildings instead of the traditional ones. While in general, the buildings in Shuangdong historical district were still based on the one floor building and the traditional construction style (Image 5-23, 24).
Image 5-23 The floors of buildings in Shuangdong historical district
(source: made by author)

Image 5-24 The construction styles of buildings in Shuangdong historical district
(source: made by author)
5.3.4 The spatial configuration of the district

On the basis of classification of the spatial texture which including the street structure, plot structure and building patterns in the historical district, the spatial sequence could be summarized as follows.

Firstly, the main alley and secondary alley are public space which means they are the most important corridors to connect the historical district with the outer environment. And they have carried the heaviest traffic not only in history but also in the modern time.

Then for the minor alley which is the next level of the traffic network, they were always located within the block and carried less traffic compared with the main and secondary alley, the largest number of passengers are the residents who live in the residential block. So they could be confirmed as the semi-public space.

For the high standard houses, they were always located adjacent to the main or secondary alleys which could afford the convenient transportation. And besides that they always have a clear spatial order inside the courtyard group. From the main alley to the entrance area, the space has been changed from public to semi-public. And then when people go deeply into the courtyards, the space was gradually changed into private (Image5-25).

For the commercial buildings, because of their special function, they need to distribute along the commercial street and form the particular spatial sequence. The single building always faces the main commercial alley and back to the minor alley. The commercial space is certainly a kind of public space, and the living space is the private space. For the lack of transition by the courtyard space, the spatial sequence is always changed from public to private directly (Image5-25).

Because ordinary houses are the most building patterns in Shuandong historical district and they were always located inside the residential blocks, so this kind of house has the most representative relationship with the street network. The typical characteristic of the historical buildings was the courtyard space. They courtyard in ordinary houses were the connection between buildings and alleys. From the courtyard to the inside of the buildings, the space achieved the transfer from semi-private to private (Image5-26).
In brief, the spatial sequence from public to private space represents the particular characteristic of different kinds of buildings and also expresses the essence of the historical district.
5.4 Construction of types

On the basis of classification for the individual component in the district, the deep structure and characters of the whole district could be mainly abstracted from the spatial configurations, such as the spatial form, spatial interface and spatial nodes. And these spatial configurations could be represented as the basic types on the block, street and detail level.

5.4.1 The spatial form of the district

The district space was composed by the blocks which are connected with the main and secondary alleys. While below the block level, we found that there are two kinds of inherent composition mode of space from the analysis of building for m and plot structure. These two types of block structure are formed by one-way and two-way composition mode respectively from building level to block level. As the image 5-27 showed, the one-way composition mode has a clear composition order which means the following layer of space was always composed by the previous space. For the two-way composition mode, the relationship of juxtaposition and hierarchy of spaces were both existed. Compared with the one-way composition mode, the block structure was always composed different building patterns directly with the deficiency of plot layer.

![Image5-27 two types on block level](source: made by author)
In the whole district, the two-way composed space was superiority to the one-way composed space not only on the quantity but also on the distribution. And the one-way composed space is only distributed in the residential area now. Most blocks with two-way composed space all have a mixed function. That shows the transition process of space in the district was from one-way to two-way. Because of the new offices and factories moved into the district and occupied the original residential area in history, the one-way composed space was transformed by people on purpose. These constructions result in the spatial form of the whole district became complicated.

5.4.2 The spatial interface of the district

Because of the different functions of alleys and the locations of buildings with different patterns, the spatial interface which mainly composed by the alley space and the buildings along alleys also represented different historical characters and types.

Dongguan Street is a representative commercial alley in Shuangdong historical district. The spatial interface could be analyzed for vertical and horizontal interface respectively, both of the vertical interface represented the continuous characteristic. For the vertical interface, the continuous characteristic mainly formed by the typical commercial buildings along the commercial alley. They always have the similar type with clear spatial division, similar floors and traditional construction styles. Besides that, the straight alley with unified width helped the rhythmic arrange of the building segments (Image 5-28). The continuous horizontal interface includes the continuity of floor and roof. The continuity of floor is a kind of strict continuation with the same paving material, while the continuity of roofs has the interval of different heights, even so, the similar roof slope and material still represented the unification in the change.

![Image 5-28](source: made by author)
This kind of continuous interface was the typical characteristic and type of commercial alleys. Lots of repeat elements of the spatial interface could be used to strengthen the commercial atmosphere of the whole alley and make people pay more attention to the commodities in the shops.

Compared with the commercial alleys, the spatial interface especially the horizontal interface of residential alleys has been showed little continuity. The main reason is that the residential alleys were always not as straight as the commercial alleys. In history, there were two meanings of winding alleys, one is that this kind of spatial interface could be used to hide and accumulate the fortune and wealth in residents’ opinion. The other one is that the winding alleys would against the passing of invaders and improve security of the whole district. In addition, because of the two different kinds of residential houses both located along the residential alleys especially the secondary alleys, the differences between the facades would also affect the continuity of the vertical interface of residential alleys (Image 5-29). This kind of interface was the characteristic and type of residential alleys.

When the alleys distinguished from different layers, we could find the changeable spatial interface from the main alley to minor alley. In view of the different width of alleys and the different height of buildings which were constructed along alleys, the spatial scale could be presented by the ratio of width to height. According to the table 5-1, we could find the relationship between different senses of people and the ratio of horizontal interface to vertical interface. For the main alley, the ratio generally changed from 1 to 2. When the height of buildings up to two floors, the space would cause a kind of pleasant
closure sense, while when the building only have one floor which is about 3 meters high, the sense would become more open. For the secondary alley, the highest ratio is one. That means people always get a closure sense when they passed the secondary alleys. And because of the smallest width of the minor alleys which are 1 to 2 meters, the strong closure sense was always accompanied by the residents. In a word, different layers of the alleys in Shuangdong historical district all have a pleasant spatial scale to afford the different functions.

Table 5-1 the relationship between the spatial scale and the sense of people

<table>
<thead>
<tr>
<th>Spatial scale</th>
<th>Ratio</th>
<th>The feeling of people</th>
</tr>
</thead>
<tbody>
<tr>
<td>The ratio of width to height (W/H)</td>
<td>W/H &lt; 1</td>
<td>Strong closure feeling</td>
</tr>
<tr>
<td></td>
<td>W/H = 1</td>
<td>Comfortable closure feeling</td>
</tr>
<tr>
<td></td>
<td>W/H = 2~3</td>
<td>Comfortable open feeling</td>
</tr>
<tr>
<td></td>
<td>W/H &gt; 4</td>
<td>Strong open feeling</td>
</tr>
</tbody>
</table>

Besides that, another horizontal interface which is the skyline of different alleys still shows the change from weak to strong (Image 5-30).

![Image 5-30 the changeable skyline from main alley to minor alley](source: made by author)

5.4.3 The spatial nodes of the district

As the previous analysis of the spatial form showed, the one-way composed space had been changed to the two-way composed space gradually in history. The most fundamental change was the recombination of the alleys. The spatial form became more and more complicated and the nodes of alleys had emerged during the change process. This is also a spatial type of the whole district on the detail level.
Image 5-31 showed the nodes in the alley space, they are mainly represented as the turning corners which could undertake the strong changes of the alley spaces, such as transition, turning or guiding. And they are the connection nodes of different segments of the alleys. Because of the expand space taken by the turning corners, the residents always use them as the activity area to do some static activities such as chatting, playing chess and so on. From another perspective, this situation showed the lacking of the public activity spaces in the whole district especially in the residential blocks.

The other kind of spatial node in the district is the entrance of the alleys. The arch doors were often constructed to divide the different alley spaces. From commercial alley to residential alley, the arches were used to distinguish the two kinds of spaces. And from secondary to the minor alleys, the transition of space from public to semi-public also could be confirmed by the arch doors. Besides that, a kind of arcade with the buildings on the top and both sides was another entrance handling mode in history. Both two kinds of entrance generally connected with the buildings on both sides which made the arch doors integrated with the surrounding environment together (Image5-32).
5.4 Assessments and objectives

5.4.1 Assessment of the existing and potential value

The old city which is Shuangdong historical district located in was the base of the development for modern Yangzhou. The profound historical and humanistic traditions have been accumulated in this area. So the feature and characteristics which the district owed represented the historical figures of Yangzhou and also embodied lots of information such as the culture, economy, architectural art, life style of residents and so on. These preserved historical proofs which could be seen and touched today all have high values to arouse the resident’s memory and continue the history and culture of the whole city.

From the previous analysis, the conclusion could be obtained that Shuangdong historical district kept a relatively complete historical feature of the alleys, buildings and some traditional constructions. The alley system which is formed from Song dynasty was kept completely. And the transition process was also reflected clearly. The pleasant spatial scale of alleys with different layers and the particular spatial interface of alleys with different functions both represented high historical values. For the buildings in the district, different spatial forms, locations and construction skills of the three kinds of houses not only represented the value of historical architectural art, but also reflected the deep social structure of the whole society. Image5-33 showed that most buildings along the main alley and in the residential blocks have good historical feature. They have increased plenty historical wealth for the whole district.
In addition, although the spatial composition mode of the whole district had been transited from one-way to two-way in history and the most historical regular plot structure was replaced by the random structure, the process still reflected the change of resident's lifestyle and social structure. Many new spaces have been appeared to adapt the development of the district such as the turning corner in minor alleys. On one hand, these spaces have been affect the historical spatial feature, in the other hand, these spaces still kept the memory of residents in a certain historical stage. So some new spaces or constructions in the district still have historical value for keeping of modifying.

Except for the existing historical and social values of the alleys and buildings in the district, the potential cultural values still could be extracted from the history of the district. Shuangdong historical district undertook a lot of the material cultural heritages, such as the protection areas and other valuable historical environment elements. At the same time, lots of invisible non-material cultural heritages also kept in the district. Although some areas have lost the traditional function and occupied by some modern working places, while there still left the invisible value which could be rebuilt to reflect some...
tourist value. For example, some honored brands are the carriers for people to recognize the history and experience the additional culture. Besides that, the left preserving areas play an important role in the connection between the history and the modern life of people which also have great significance in the inheritance of history in Yangzhou (Image5-34).

5.4.2 Objective position

Based on the previous assessment for the values of Shuangdong historical district and the experiences which learned from the example study, the renewal objective could be obtained which would affect the design stage directly.

Although many working places have been moved into the district during recent years, residence is still the main function of the whole district, so how to improve the life quality of the residents as well as protect the historical feature is the main task of renewal. Firstly, the alley network and buildings with good historical features need to be kept to reflect the historical characteristic of the whole district. For the minor alleys in the residential block, in order to facilitate the residents, some blind alleys could be connected and some turning corners could be enlarged to afford more public activities by removed some buildings with poor quality and weak historical features. Besides that, because lots of ordinary houses still kept the traditional feature, the main renewal mode we
could be adopted for the residential houses is keeping the outer image and remodeling the inner structure to afford the modern needs of residents. For some newly built houses, the historical characteristic including the courtyard space and traditional construction style are both need to adopt.

Except for the residential blocks, Dongguan Street was the most important commercial alley. It always undertook the heaviest traffic of the district, and many mixed used buildings have been located along the alley which continues the commercial function in history. By learning the good experiences of HAGA district in Sweden, more small detailing business could be introduced into Shuangdong historical district which would not destroy the historical scale and texture of the main alley while improve the activity of the whole district. The continuous spatial interface and the traditional characteristic of commercial buildings would become the most important elements during the renewal process.

In view of the potential cultural values, many places could be repaired as the scenic spots by recombining and transiting the historical types. They were mainly represented as the courtyard group and the one-way composition mode of the space. At the same time, some new functions such as tourism facilities also could be introduced into the district under the precondition which is the extension of historical spatial texture.

In a word, the main renewal objective of Shuangdong historical district are giving maximum protection to the historical feature, and reflecting the values through combining the outer image and inner characteristic together at the same time.

5.5 Implement of the principles

5.5.1 Situational analysis

One small piece of the district has been chosen in this design part (Image5-35). The reasons for my choice are as follows. Firstly, this block is adjacent to a commercial alley and residential alleys at the same time. Most historical characters of the district all could be reflected in this block. So it is a representative area in Shuangdong historical district which could be chosen to show the process of type transition. In addition, this area is a complete block which has a mixed function with factory and residence. The historical residential feature of this block had been destroyed by the factory seriously. So during the renewal process of the whole district, the improvement of the principles which summarized before would be represented clearly in this area.
Image5-36 ~ 37 shows the street and plot structure of the chosen area. Except for the Dongguan Street which is the main alley, other surrounded alleys are secondary alleys and also the residential alleys. Inside the block, the residential area was organized by minor alleys. In addition, because of the specific location of the factory, another kind of special street had been constructed to serve the factory. The width, interface and other characteristics of this kind of street are all different with other alleys in the alley structure of historical district. For the plot structure, we can find few regular plot structures in the residential area although some plots were destroyed by the irregular plots in the factory.
From image5-38~41, the existing building patterns could be summarized as follows. Firstly, except for the mixed function with residence and commerce of buildings along the commercial street. Residence and industry are the other main functions in this block. Secondly, in residential area, most buildings only have one story and are in the traditional style with longer history which could be compared with the factory area. And most buildings in the factory are higher than the surrounding residential buildings. In view of the building qualities, most buildings which constructed in modern style with a shorter history always have poorer quality on the contrary.

5.5.2 Design concept

In view of the objective position of the whole district and the previous analysis of design area, the concept of how to renew this area could be represented through the following respects.
In the first place, since the factory had been affected the historical features of the whole district and the residents’ daily life seriously, the working places of the factory should be moved out this district. While taking account of the honored brand of this factory which is Xiefuchun makeup with a long history in China, the cultural and social value of this brand should be kept and represented in the original site. For example, the specific shop of Xiefuchun makeup could be set up along the commercial street. And some museums which can be used to show the traditional and modern manufacture process of Xiefuchun makeup as well as the makeup culture in China all could be constructed in the original site of the factory. Since this area has a potential value to be a scenic spot, the tourism facilities such as traditional hotels, tea houses and more commercial functions also could be introduced into this block. Other areas were suggested to be the residences need to integrate into the original residential environment (Image5-42).

In the second place, keeping the outer alley network which is the main and secondary alleys to protect the traffic network and reflect the historical characteristic of the whole district. While for the special alley which mainly served for the factory could be reformed to a commercial alley since the new objective of this area and the original form of the street. The minor alleys in the residential area need to be extended to throughout the whole block (Image5-42).
In the last place, from the previous situational analysis of the buildings in the design area, three treatment manners could be chosen. One is keeping the residential houses as more as possible since they are an important historical component in the district to show the historical feature. And on the premise of protection principle, many buildings in the factory could be modified to afford the modern function in traditional style. Even so, the design area especially the factory area still has some buildings without the existing value. They mainly including that the modern buildings with poor quality which is hard to reuse and the original form of buildings are hard to integrate into the surroundings as well as can’t afford the new function (Image5-43).

5.5.3 Implement of the principles

Under the direction of the design concept, the final plan of the chosen block could be designed as follows (Image5-44).
The implementation of the constructed types which based on the principles related to the street network, plot structure and spatial configuration of buildings could be showed by comparing with the original plan,

The previous analysis has constructed two basic types of the spatial form in the district. They are the one-way and two-way composition mode of the block space. And the one-way composition mode of the historical residential area was replaced by the two-way composition mode gradually in recent years because of the moving of some working places. This situation still could be found in the design area. So during the design process, some new residential space was formed under the one-way mode to combine with the original residential area which has the same organized mode of space. While since the historical space of residence had been destroyed by the factory seriously. The one-way composition mode could not be reformed within the whole block. So the two kinds of spatial composition mode need to exist in the same block to adapt the change and reflect the historical feature at the same time (Image5-45).
The types of spatial interface also have been adopted during the design process. Firstly, the pleasant scale of alleys on different layers all have been followed in the new designed area. And the different spatial interfaces of commercial and residential alleys both have been represented in the design. Taking commercial alley for instance, the modified façade of Dongguan Street shows the continuous vertical interface because of the similar height, construction style and spatial division of the buildings for mixed-use. And although the newly designed commercial alley was composed with the mixed-use buildings, museums and few residences together, some manners still could be adopted to keep the continuous character of the commercial alley. Such as controlling the height, material, modified style of the buildings, and for the original industrial buildings, the big scale and flat roof both need to transformed into the continuous buildings with small scales and slope roofs. Besides that, the minor alleys which used to run through the whole block also continued the original alleys to keep the winding horizontal interface in residential area (Image5-46).
In view of the detail types in the historical district, some open spaces have been constructed at the turning corners by demolishing some temporary buildings in the residential area. In the commercial area, the public square was transited from the basic type in the residential area which used to satisfy the greater flows of people. In addition, some construction pieces were constructed in the entrance of the alleys to distinguish different spaces which were mainly transited from the basic type of arch doors.

The basic type of historical buildings which is the courtyard space was still kept and transited not only in the residential buildings but also in the public buildings such as the museums, hotels and tea houses. These courtyards of public spaces were mainly constructed on the base of the forms which from reserved or modified buildings. The courtyard space and the specific spatial sequence in historical district could be felt and realized by more tourists during this transition process.

5.6 Summary

The whole case study was researched from typology perspective which is mainly from the description step to the construction and implementation of the types finally. During this process, some principles could be summarized as follows.
Firstly, the abstraction of characters and construction of types need to be established on the basis of careful research about the historical and existing environment. The base and fundamental principle of typology design is the type which was abstracted and constructed from the historical prototypes. Otherwise, the random combination of historical components which lost the support from historical prototypes is a kind of unsuccessful renewal for historical district.

Secondly, the transition of the types which is the design process needs to be combined with the real environment. The renewal objective, current situation of buildings and surrounding district texture are all the factors which would affect the design process. So the demand of real site is an important element during the renewal process.

Thirdly, the design of the historical components such as the buildings, spaces and other constructions is also very important. These components are generally formed under the evolution of the long history. They are the best elements to represent the historical feature of the district directly.

These principles are identical with the theoretical framework of typology. The deep structure and historical features of Shuangdong historical district have been reflected in the renewal process. Besides that, the experiences from example studies also have been applied during this process. Lots of existing and potential values could be reflected under the premise of protecting the historical structure and feature as much as possible. In other words, this kind of theoretical tools and applied experiences of renewal process not only could be used in this case but also suitable for other similar renewal projects in China.
Chapter 6 Conclusion

Historical district renewal is not only a kind of renewal for the physical environment, but also related to the society, culture and other elements. On the basis of learning experiences from previous examples, we need to find a kind of useful theory and method to instruct the development of historical district.

This paper chose typology as a useful perspective to solve the problems which had happened during the renewal process in China. And the real renewal case in Yangzhou has been researched on the basis of combining the typology and the previous experiences together. The theoretical tool of typology has been verified through the case study. The deep structure of the historical district has been represented on the surface structure which is the organization form of buildings and spaces.

Generally speaking, historical district renewal is a complicated task which involves many sides. The whole research structure needs to implement from city layer to the building layer. And the whole process also related to many subjects, such as history, society, culture and so on. It’s hard to research historical district renewal from all aspects deeply. This paper only tried to solve the common problems in China by introducing a new perspective. The work of this paper is just a start for the historical district renewal by using typology. The main aim is to afford a kind of new framework and idea to solve the renewal problem in China. There still have a long way to research the application of typology deeply and other methods which could be used to help the renewal process still need to research in the future studies.
Reference


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Image source

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Image 2-1 the continuous historical feature of Duolun Road
http://www.quanjing.com/ImgDetail.aspx?pic_id=1y-0576&CEFlag=1

Image 2-2 the outer appearance of theater
http://farm4.static.flickr.com/3497/3932454783_ca99903616.jpg

Image2-3 the type of squares summarized by Rob Krier
Image2-4 the archetype analysis of squares by Rob Krier
Image2-5 the division of architectural elements by Leon Krier


Image2-6 the extension and innovation of major alleyway in National Museum of Roman Art
http://farm1.static.flickr.com/58/186056358_236010e597.jpg

Image2-7 the design which based on the constituted elements on typology