

# Study on the Design Forms of Bath and Wellness Spaces in the Frigid Zone

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**Abstract:** Followed the steadily advance of the society and the enhance of people's life, the number of people investing in health is increasing while the popularity of bath is also ascending. Wit surveys, it has been found that the existing problems in the development of domestic bath industry are as follows. Firstly, the aimless development and chaotic plagiarism have given rise to the similarity of various bath centers, which have no own characteristics, not to mention the combination with regional culture and other factors. The void of cultural atmosphere in bath and rest area will lead to the failure in attracting consumers. Therefore, to design bath spaces with reasonable space functions, sleek space line and cultural atmosphere becomes an orientation in the market. By acquiring both excellent domestic and foreign bath center designs, it is feasible to improve the deficiencies in the design of bath centers in China. It is suggested to create ecological environmental protection sustainable Tangquan (hot spring) leisure and entertainment spaces, and bath centers with cultural atmosphere by means of making use of space organization to configure, grasp the internal logic of spatial organization, meet the psychological needs of the type of physical elements and the environment<sup>[1]</sup>, and combine the natural environment, folk culture, etc.

**Keywords:** Bath; regional culture; function; space organization

## 1. Introduction

By virtue of combing the cultural characteristics and living habits of the north, and integrating space and functions, while drawing lessons from the cultural designs of various countries in the world, the space design containing the cultural characteristics of northern China is outputted. As a result, when conducting space designs, it is of necessity to organically combine architectural space and function, rationally apply materials with prominent cultural characteristics, and well manage detail design, so as to effectively apply northern culture in space design and realize the improvement of space culture<sup>[2]</sup>.

## 2. Research significance and methodology

### 2.1. Research significance

In ancient China, there are many documents recording Tangquan. In terms of the records of the public bathhouse, the *Shouyang Records* is the earliest work found at present. There are also other records including the record of "The bathhouse is the perfume hall" in the *Attractive Views in the Capital: Travels* by Nai Deweng in the southern Song Dynasty and the "The bathhouse is named perfume center" in the *A Fond Dream-Group Travel* by Wu Zimu<sup>[3]</sup>. It can be said that China's bath culture has an extensive historical and cultural heritage. However, the current domestic bath centers have not been developed well. Representative by Japan and some European countries, their bath center have been developed relatively well. Most of domestic Tangquan of the bath centers exist in the form of hotel and entertainment industry, while the space design research is relatively blank and lacks theoretical guidance. There are few perfect and systematic academic theories. Meanwhile, the related theories of domestic bath centers are mostly marketing strategies, short of in-depth researches on space construction.

The bath center space is the environment most directly perceived by consumers. The space design of a bath center determines people's cognition of it. A bath center, instead of merely a place to take a bath, can achieve the purpose of health preservation and entertainment. In the study, the analysis and research is targeted at the bath centers, combined with the relevant excellent practical cases. Starting from the

academic perspective, the relevant definition and people's psychology in the space activities, analysis of the space of the bath, the atmosphere and other aspects are elaborated. After exploring the combination and composition of the bath space, the streamline of the bath center, and the design integrating regional culture and nature, the design method, design concept and design principle are generalized. Besides, some theoretical suggestions are proposed for the future construction of hot spring hotels.

Applying the research methods like analyzing and comparing the relevant data of the bath centers at home and abroad, and the effective cases, the space composition, spatial streamline, spatial function of the bath space, as well as the bubble pool area and leisure area are studied. In addition, focusing on the insufficient space atmosphere construction of bath centers, the hot spring hotel space atmosphere creation is explored. Finally, the bath center with a reasonable space layout, and streamline overall arrangement, elegant environment as well as bath atmosphere is designed.

### **3. Theoretical basis and definition related to bath center**

#### ***3.1. Overview and form of the bath center***

There are 4 most common forms of bath centers. The first one is the traditional Japanese hot spring center, which is in a relatively small building volume and classical architectural style. Generally, the bosses manage it generation after generation. In terms of the indoor style, there is the traditional tatami. Many of the scenes are traditional Japanese landscapes. The served food is traditional Japanese food. People in it dress in bathrobe. Hot spring hotel is another kind. The scale of traditional hot spring tavern is relatively small, concentrated in scenic spots. The building volume of hot spring tavern is small while the building volume of hot spring hotel is relatively large, and some are located in the hub of the city. It is run in the ordinary hotel model management mode, mostly in the form of clubs and hotels, adding Tangquan as a selling point. The third one is the characteristic Tangquan center, which is different from the ordinary hot spring center. It has its own characteristics, with some reflected in the pool, in which red wine is added, electric therapy is prepared and so on to from the characteristic hot spring.

#### ***3.2. Problems existing in domestic bath centers***

At present, there are relatively few researches on bath centers. Meanwhile, the investigation and analysis on the psychological needs and behavior rules of tourists are not in place, while the needs and psychology of people in the bath space are ignored. There is the failure to start from the perspective of users, leading to a series of problems. For example, the pool space is too small, people are too crowded, and there is no difference between the pools. As a result, people will not go to other pools to feel other hot springs. Some bath centers have some awareness of design, but many of them directly use foreign cases, instead of exploring the local cultural connotation according to local conditions nor applying them to hot spring hotels, thus giving rise to the high similarity of many places in modern bath centers.

#### ***3.3. Development direction and design positioning***

Combined with excellent cases and design experience at home and abroad, and grasping the correct development direction, the common problems in the development and difficulties in the construction process are summarized. If you want to make the bath center stand out from other center and present a new appearance in front of people, the most important thing is to have the characteristics of your own style, apply culture and combine regional features. The seven principles of general design advocate Equitable Use, Flexibility in Use, Simple and Intuitive Use, Perceptible Information, Tolerance for Error, Low Physical Effort, and Size and Space for Approach and Use<sup>[4]</sup>. Perfecting the functional space, and foiling the cultural atmosphere of the bath hall are to enable people to not only soak in the hot spring, but also feel the cultural connotation, and create a cultural space.

### **4. Analysis and research of the bath center space**

The so-called space is the continuity and order of objects in the process of their own movement. From a philosophical point of view, it is the basic form of matter itself, and any matter is moving<sup>[5]</sup>. Space belongs to the material medium, the form is people's visual feeling, and the space is also the environment on which various substances depend for survival, with objectivity. The indoor space form of environmental art is mainly the display of visual art in the space. The form and space are the environment

of various things and activities, which are interrelated and closely related to each other.

#### 4.1. The basic spatial composition and spatial relationship of the bath center

##### 4.1.1 Functional space

The two most important spaces of the bath space are the bubble pool area and the leisure area. The bubble pool area and the leisure space are relatively independent but interrelated. In addition to the purpose of taking a bath, many people come to the bathhouse to enjoy the services other than the bath, such as scraping, rubbing, hairdressing and other services. Some people want to enjoy the comfortable and lazy time in the bathhouse, taking the bath as a way to spend the idle time<sup>[6]</sup>. This functional space and this spatial streamline are studied specifically. The bubble pool area is the main feature of the bath center, as well as its special place. As shown in Figure 1, the bath center mainly has guest room space, hot spring pool space, indoor pool, outdoor pool, rest area, reception service area, outdoor landscape space and auxiliary space.

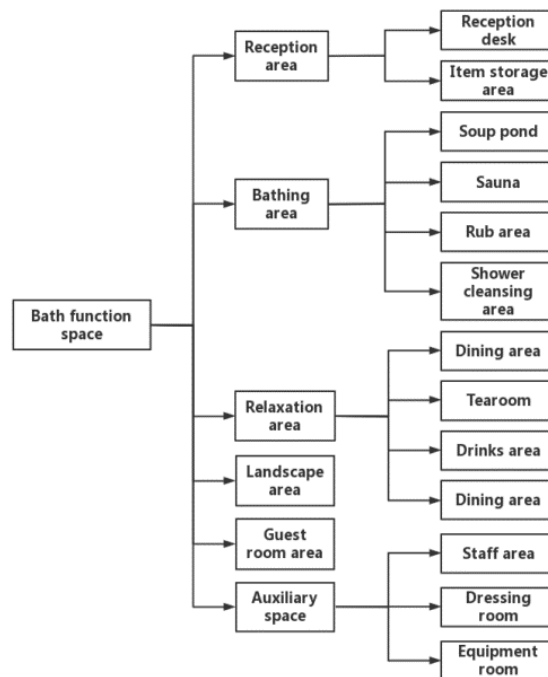


Figure 1: Functional space of the bath center

The hot spring bubble pool area is the most important space in designing the hot spring tavern, and it is also the key to attract people. The bubble pool area of the hot spring tavern distinguishes between indoor and outdoor, and there will be private pools in some rooms. Part of the spa hotel also has a spa swimming pool. The hot spring bubble pool is the most anticipated and used functional space for tourists, and is the most core functional space of the hot spring hotel, which is the focus of this design research.

The leisure space is of equal importance with the bubble pool area. The design of leisure space is also a significant condition to attract tourists, while the design of wonderful leisure space has become particularly crucial. Generally, the leisure area is provided for guests to sit down and chat after bathing. Some rest areas will be equipped with some simple entertainment facilities, as well as a series of entertainment activities such as water park, gym and beauty salon.

The auxiliary space is the dressing room storage room and shower space connecting the corridor and the hot spring, which serves as a transportation hub in the hot spring tavern. There are also work and rest space for the staff and space to store goods.

The construction of landscape space is also vital. Some hot spring taverns without the atmosphere of landscape space make people face rough scenery when bathing, which will also leave bad impression of hot spring hotels on them. When the functional space is dispersed, the landscape space can coordinate and connect the two indoor spaces. And the indoor space can be implanted with landscape to enrich the

visual effect and rich space.

#### 4.1.2 Space relation

As shown in Figure 2, the plane expression of the relationship between space and space is generally the bath diagram in the design diagram, which concisely shows the connection between space and space, and predicts the spatial effect based on experience and investigation and research. The space organization of the bath center is designed to better cater to the public and provide convenience for tourists.

There are independent streamline and functional area in the bubble pool area and the guest room. For the reason of the public space and private space, the two spaces are relatively independent. There is also a pace connecting the two to ensure the integrity of the space of the hot spring tavern. The bath area and guest rooms are connected to this rest area, reducing unnecessary space mobility.

The hall is connected with guest rooms and dressing rooms, and is divided at the entrance of the reception place, facilitating passengers with different needs to cause unnecessary interference, because some customers have accommodation needs, and some customers just bath in hot springs with no accommodation needs. The staff of the bath center also has the corresponding separate entrance and exit, making it convenient for the staff to get in and out. Meanwhile, in the work area, there is also a route to connect the guest room, the rest area and the bubble pool area, which is convenient to provide help to tourists.

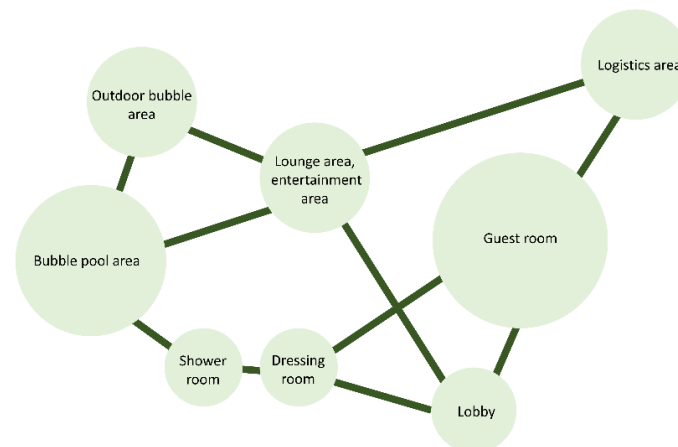


Figure 2: Schematic diagram of the bath space relationship

#### 4.1.3 Combination mode of the bath center volume

As shown in Figure 3, the architectural space combination forms of bath centers are generally divided into: centralized combined layout, grouped layout, radial combined layout, and linear space combination layout.

1) Centralized combined layout. All the functional spaces are concentrated in a building. In our country, the most used one is also such a concentrated combination. It is suitable for downtown with relatively tense site area, which can maximize the land area. Generally, the layout of the hot spring tavern has a lot of layers and the height is relatively high, adopting three-dimensional traffic layout.

2) Radial combined layout. The radiation space combination form breaks up the building volume, and separates each functional space. With the central hub space as the center, the space diverges outward. To reach another space, it is necessary to return to the central hub space and then enter another space. Although the radiation layout distributes the functional spaces, the building is still relatively overall and also suitable for areas with cold weather.

3) Grouped layout. The layout around the central functional area or landscape environment, is seemingly closed. However, it is actually an open space with various functional space relatively independent, distributed in their respective buildings. It is generally applicable to the venue with a wide site area and a beautiful natural environment.

4) Linear space combination layout. The separate functional spaces are distributed in separate buildings, which are connected by linear mobility spaces and remain connected as a whole. In general, hot spring taverns with such a layout have a smaller vertical height. Due to its interspersed courtyard and

scattered functional spaces, the area covers a much larger area than other space layout, which is suitable for the large area and beautiful surrounding environment, but with small temperature difference in the four seasons.

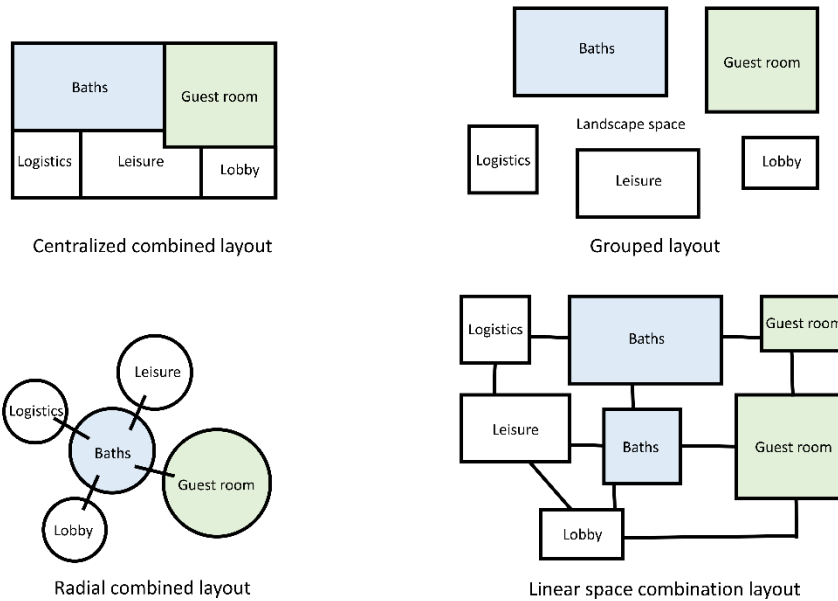


Figure 3: Schematic diagram of the architectural space combination form of the bath building

**4.2. Space layout combination of the spring area**

The spring area is the most core space in the hot spring tavern, as well as the space where people have the strongest sense of experience. The quality of the spring space determines the quality of the bath center. Before designing the bath center, many designers are not particularly familiar with it. They only use the way of hot spring bubble pool, separating the architectural design and interior design landscape courtyard design, which fails to achieve coordination and unity. Many bubble pool areas in China generate the same feelings in people, lacking variations and culture.

**4.2.1 Functional space combination and sequence of the spring area**

As early as in the ancient Roman times, the public bath had combined the body cleaning with leisure and entertainment, and became a place for the Roman public activities. It was a unique cultural phenomenon at that time. [7]The spring area is basically divided into the following spaces, including front desk service area, locker room, shower area, indoor soaking pool, foot soaking pool, toilet, leisure area and outdoor bubble pool. The two major functions of the space are function and culture, among which the function is to maintain health and relax the body and mind. The cultural role is to perceive the excellent traditional culture and the hot spring culture.

**4.2.2 Specification and type of the spring pool**

1) Specifications are as described in (Table 4).

Table 4: (Code for Water Supply and Drainage of Swimming Pool and Water CECS14:2002)

Bubble pool depth(m)	Bubble pool thickness(m)	Hot spring depth of water(m)	Common type
0.8m-1.4m	0.4m	0.4m-1m	Conventional hot spring bubble pool, swimming pool
0.7m-1.2m	0.3m	0.2m-0.8m	Foot therapy pool

2) Type

- (1)The types of the spring pool divided by temperature are: high hot spring, and low hot spring.
- (2)The shape of the spring pool: rectangular, square, round, oval, polygon, and natural form.
- (3)According to the size of the pool, there are: single bubble pool, double bubble pool, multiple

bubble pool.

(4)According to the functions of the pool, there are: full-body soaking pool and foot therapy pool.

#### 4.2.3 The combination way of the spring pool

The combination form of the spring pool is divided into two categories: one is separated form, and the other is combined form. The former one is divided into square spring pool, polygon spring pool, round spring pool and natural spring pool. Usually, the square spring pool is used for indoor bath, for its regular shape and easy combination. The spring pool of natural form is generally open-air spring pool and indoor soup pool, which is combined with the landscape, and the natural form is better combined with the surrounding natural scenery. Meanwhile, the combined spring pool consists of three forms, namely, cascading style, adjacent style and built-in style, as shown in Figure 4.

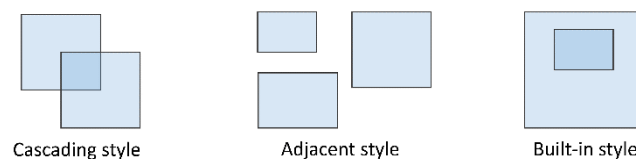


Figure 4: Combination style of the spring pool

### 5. The construction technique of the perceptual space in the bath center

The creation of the space atmosphere will create different cultural themes [8]. In allusion to the perception space of the hot spring tavern, the analysis and research are carried out from the aspects of cultural space, the application of cultural elements, the experience of guest room space and the design techniques of the atmosphere of the pool area, so as to discuss the construction techniques of the spatial atmosphere of the bath center.

#### 5.1. The use of cultural elements in the bath center space

In China, hot spring culture is influenced by traditional imperial culture. It has long been recorded in China that people use Tangquan, the hot spring, and called "soup", "spring" and so on in ancient times. China enjoys a long history in hot spring culture, which can be traced back to the era of "Lord Fuqiu and Emperor Huang".

In the Han Dynasty, line describing Tangquan appeared in the in the ancient poem *Dongjing Fu* by Zhang Heng, " Tangquan with warm spring, like a soup bath, can remove disease."At the same time, he mentioned in the *Hot Spring Fu* that "Diseases can be removed by the hot spring", which stated that the hot spring had the effect of treating diseases. Wang Anshi in the Song Dynasty mentioned in *Tangquan* that "What can be sung for the Hanquan Temple, only the spring boiling with steam. With qi coming no winter nor summer, all Yang rises and falls naturally". At the same time, the poet Su Shi mention in his *On Tangquan*:" The volcano cracks, boiling spring rises." In the Han Dynasty, there were written recording that hot springs could treat diseases. For example, Xin's Records of Sanqin recorded it had the effect to eliminate the diseases as "When the Qin Shi Huang and the Goddess took a tour, the emperor did not perform courtesy, the goddess spit, and sore appeared. The emperor thanked the Goddess for removing it with the hot spring. Later generations tested it to be true." It also shows that some people in the Qin Dynasty had mastered that hot springs could treat diseases.

Japan is a country focusing on hot springs. Japanese hot springs become a bath in "soup". The saying that "every three steps meet a small soup, and five a large soup" is enough to highlight the Japanese enthusiasm for hot springs. Japanese hot spring has its own culture, known as Tangzhi culture. In Japan, people are concerned about the atmosphere of the hot spring culture and the etiquette of hot spring. People wear Japanese bathing suits and clogs in hot spring hotels, which also demonstrates Japan's emphasis on hot spring culture<sup>[9]</sup>.

To bath in Japan, Japanese go collectively, or go organized by the company, family or school. When they take a bath, they will forget their position at home or in the company. They will face each other in equality and discuss the happy and unhappy affairs in life or work together, so as to achieve the purpose of relaxation. Only in the bathhouse, there is no stratum, no leadership, neither rules and regulations, so

that everyone can speak freely, and express feeling. Therefore, the Japanese are in favour of taking a bath together, and the bath culture is accompanied by the Japanese "Yamato" culture.

The purpose of the basking in the hot spring is to keep good health and recreation, but also to experience and feel the hot spring culture. Different bath centers should present different characteristic styles. As different regions, different historical and cultural accumulation and local customs have influences on the bath culture, the design of baths should also pay attention to the cultural connotation and create a cultural atmosphere to highlight the cultural connotation.

1) The architectural style draws on the traditional architectural form, the combination of spatial design techniques and modern design, gives people a different feeling from that in the city. Drawing on the ancient lifestyle can generate a different experience in people. In the architectural appearance design, it is feasible to learn from the ancient traditional buildings for renovation and design, retain the essence and then add the modern design, which is more suitable for people to live and use.

2) Apply the traditional elements to the bath space to generate a sense of historical inheritance and rich culture in people, extract the traditional decorative elements from the north, and improve them into the bath space, making it distinctive. The traditional decorative elements have "shape" and "spirit" and are more in line with the aesthetic of most modern people<sup>[10]</sup>. We can draw lessons from the ancient architectural patterns to extract and redesign, and the leisure area furnishings can use the furniture with regional characteristics in the north.

3) Since ancient times, people have the characteristics of near water design, many poetic scenes are set off by the waterscape, the courtyard design of the bath can refer to the design of classical gardens or Suzhou gardens, adding waterscape can enrich the spatial level, water can also adjust the temperature, wet air.

## **5.2. The atmosphere of the bubble pool area**

Bath culture refers to the various cultural phenomena and cultural forms and their "materialization" embodiment with Tangquan as the carrier. In addition to feeling the hot spring, people in the soup pool area can build the experience of the soup pool area through the five senses of taste, hearing, touch, vision and smell in the design of the bubble pool area.

1) Use of vision. Visual sense is the most sensitive sense of human beings, and the visual impact is the largest in human perception. The design of the architectural space can be borrowed from the traditional elements to simplify and redesign, which not only gives people a visual sense of history and culture, but also is more suitable for tourists to live and use. For example, adding water mist can make the whole environment look like a fairyland. The color adjustment of lighting and the color use of decorative materials give people a warm feeling. The courtyard of the Hakone Mikawayaya Ryokan in Japan is planted with cherry trees to create a pink atmosphere. In terms of lighting, it is necessary to avoid direct light or reflected light into the eyes, and also to avoid shadow. Soft diffuse light has better effect than high illumination of direct light<sup>[11]</sup>.

2) Use of tactile materials. The texture structure of the material directly affects our perception. The material selected by the bath center is mainly wood, which can give people a sense of belonging to get close to nature. The material of the pool is mainly warm color and natural stone, which can create a better atmosphere. The cane tatami of rest area is given priority to generate a texture sense of staying close to the nature. The tatami cloth is pure cotton with stronger dry skin nature, so as to avoid sticking the skin in entertainment. In choosing wood, we need to pay attention to the temperature and humidity of space. We can use Finland spruce, which can be used in the sauna and soup pool corridor for its waterproof and high temperature resistance characteristics. The wood is growing long through hundreds of years. It has excellent wood fiber density. Meanwhile, its corrosion resistance and compressive effect is better than other wood. However, it is also very costly. In contrast, *Pinus sylvestris* is more common and can replace Finnish spruce, because it is cheap and produced domestically. It is more cost-effective without the need of import.

3) Use of olfactory sensation. It is not that easy to present olfactory sensation in the space design. In addition to the smell of some material itself such as wood, natural hot spring water, it is also applicable to plant a few fragrant flowers or put a few fresh incenses indoor to make people relaxed, and create atmosphere with smell. The courtyard of Sumiyosikan in Japan is full of osmanthus flowers, which will be fragrant in August, bringing different enjoyment to people's sense of smell.

4) Use of sound. Sound is an element easy to be overlooked in space. Bath center requires most to

get close to nature leisurely and quietly. Silent space is sometimes more influential. For example, a church, in addition to being solemn and sacred, creates a pure and ethereal space. Its towering and emptiness echo people's voices, which reduces the volume of people's communication. In the design of hot spring hotel bubble pool area, we should reduce artificial sound and introduce more natural sound into the auditory system, leaving only water slow sound to people, so that they can have the feeling of staying in the nature and fusing into the nature, feel the atmosphere here, enjoy the quiet peace, and spontaneously guard the calm atmosphere. Meanwhile, it is suggested to distinguish between private space and public space, and balance the private and public atmosphere.

5) Use of gustation. When soaking in the soup spring, the body will lose a lot of water and inorganic salt. So we can prepare special drinks for customers to replenish the water, adding a unique experience in the soup spring.

## **6. Basic principles of hot spring hotel design**

### ***6.1. Principle of leisure and recreation***

Leisure and entertainment is the purpose of the bath center, which is also an important principle. It is necessary to center on consumers' leisure needs, optimize the functional space, increase the culture, and increase chess, tea and music, so as to achieve the effect of leisure and entertainment.

### ***6.2. Principle of culture***

It should be combined with cultural characteristics. Baths in European countries and Japan have been developed well. One of the most important factors to attract tourists is to attach importance to cultural construction. The space design of Japanese baths basically reflects the traditional Japanese culture, and the design of leisure areas often adopts Yamato design techniques, which is worth learning by Chinese designers. While meeting the basic entertainment needs, it is suggested to increase the national culture, feel the cultural edification, and provide ideological pleasure. To excavate the excellent culture and national style, we can also combine myths and legends and regional characteristics, or create a hot spring functional cultural marketing as a decorative slogan that can be transformed into ideology to give people a subtle psychological effect.

### ***6.3. Principle of suitability***

It is not only necessary to consider the beauty of the space. More importantly, we should stand in the shoes of the users to consider whether they will be comfortable in the space. There should be a reasonable size, so that people can feel comfortable in the space. Reasonable layout and design should be based upon the practical problems such as the local situation, people's needs, and local customer flow. It is of necessity to reasonably configure the number of rooms and leisure area tatami, avoiding excessively increasing the cost but having little affect on experience. If the bubble pool is small, when people are bathing, it will be very crowded, and expel the bath atmosphere.

### ***6.4. Principle of privacy***

The bath center is relatively special. Although people face each other with sincerity in the bubble pool area of the bath is sincere, in the psychological needs of customers, their privacy should be considered. Thus, how to implant the private space into the public space is also a key point of the design of the bath. How to ensure the privacy in the bubble pool area to bring a sense of security? It will be possible to design closed or half closed bubble pool space to ensure that people's privacy and security in the bath, like increasing the number of bubble pool, reducing bath area or using screen, baffle, green plant to form space, increasing spring bubbles to make spring less calm and visual transparency low, or coloring the soup spring to make it more private, or referring to Japanese hot spring hotel's time bubble bath operation to make the public bath space more private, thus ensuring the privacy.

### ***6.5. Principle of space integration***

Integrity: It is an important symbol in the space design. In the design, indoor and outdoor space organization, traffic organization and cultural construction are an integral whole. Integrity is also a key point in the bath design.



**Permeability:** The wall of the bath completely divides the indoor and outdoor spaces, but such design techniques fail to meet the needs of modern people. Tourists wish to enjoy the beautiful scenery around in the process of bath. The interaction between indoor and outdoor and each space has been an important condition for space design.

**Smoothness:** It refers to the smooth transition between the indoor and outdoor. It should not be stiff. The facade of the building can be extended to form a space, realizing the slow indoor and outdoor transition. In terms of visual effects and cultural aspects of the the bubble pool area, guest room space and other functional spaces, the transition should be smooth but not sudden, keeping in line with the needs of tourists.

**Continuity:** It is the premise of maintaining space integrity. In the bath center with functional spaces, the connection of spaces can fasten the guest recognition in function selectivity. For instance, when the guest bathing in the flowing spring pool bubble bath see there are few people in the near milk pool, they may choose to go over. The wonderful space continuity can also better fuse indoor and outdoor spaces, forming a closer cohesion between the indoor and outdoor spaces.

## 7. Conclusion

The bath center, as a place for human activities with a long history, not only need to meet the basic functions of the bath, but also pay attention to the transition between indoor space and natural space as well as the creation of cultural atmosphere, often the places most easy to be ignored and the two aspects that can add user experience most, in the space design of the bath. The application of northern regional elements, in addition to meet the most basic needs of local customers in the north, can satisfy the spiritual needs of people, and create new factors to attract consumers, so as to turn the bath house more promising in the market.

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