Research on "Showing Mountains" Planning Strategy Based on Mountain Landscape Protection in Urban Central District

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Abstract. Making rationally use of natural resources of mountain could effectively enhance the landscape character and the skyline of urban central district. In the background of the natural resources of mountain in the city are paid attention to the protection, it's especially important and urgent to make use of mountains and enhance the extent of watching mountain in the urban central district by the guidance control strategy of space planning. The analysis of the strategy of showing mountain in the central district of Zhonghuan in Hong Kong consists of the macro, mesoscopic and micro three levels, aiming to make some exploration and thinking of the landscape in urban central district.

1. Introduction
The mountain landscape, as a widely distributed natural landform, is closely related to the development of most cities, or is obscured, utilized or prevented. It is China's traditional urban planning idea to consider it as a cultural substance and to form important ornamental values. For example, Longshouyuan in Chang'an in Tang Dynasty, Wushan Mountain in Feng'an in Song Dynasty, Jingshan Mountain in Beijing in Ming and Qing Dynasties, etc. are all perfectly arranged in the construction of the city center. A series of work has also been carried out in the field of contemporary urban planning. Since the 1980s, Wu Liangyong has explored the protection and development of traditional landscape patterns through the analysis of the “Shanshui City” model of cities [1]. In the early 1990s, Qian Xuesen proposed that "China should build a landscape city, which is an organic combination of Chinese and foreign cultures " to actively promote the integration of mountain landscapes and cities [2]. Throughout the ancient and modern urban planning, the mountain landscape is closely related to the urban pattern, and even determines the macroscopic landscape quality of the city. Currently, the high-density urban sprawl brought about by rapid urbanization has caused huge landscape damage to the mountain landscape. How to protect and utilize the natural mountain landscape and highlight the urban spatial characteristics in the high-density urban center area has become a prominent topic of urban planning.

2. Mountain landscape control in the central area of the city
The mountain landscape forms an important part of the city skyline and complements the city's architectural contours, creating a horizontal and vertical landscape. Although many cities have a natural
element of mountains, they do not show mountains especially in the central areas where high-rise buildings are densely populated, which will give people a feeling of dull and congested. Therefore, in the landscape planning of the urban central area, the valuable mountain resources in the city should be fully explored, and the active “showing mountain” strategy should be adopted to improve the visibility of the mountain landscape and achieve a high degree of convergence between the urban environment and the natural environment in the central area.

As an important financial, service and shipping center in Asia, Hong Kong is famous for its beautiful mountain scenery, natural civilization and urban civilization. At the present stage, it presents the urban center system of “two main centers and one secondary center” (figure 1). This paper takes Hong Kong as a case to analyze the landscape planning strategy of "showing moutains" in urban central area from different levels.

Figure 1. The central system of Hong Kong and the central district interwoven with landscape

3. The “showing mountains” strategy at the macro level: the combination of the central skyline and the mountain

3.1. Control of the urban skyline with mountain city blending
There are 45 buildings with a height of over 200 meters in Hong Kong, most of which in central. Looking south from Tsim Sha Tsui to the skyline of Central district, the fluctuations in the contours of the high-rise buildings are ups and downs, neither parallel nor excessively crossed with the fluctuation of the contour line of Taiping mountain ridge, reflecting a kind of dynamic melody beauty. The buildings in the central area of Central are backed by mountains, and the blue plaques in the close view (Victoria Bay) provide an open visual and blue water surface, as well as a beautiful reflection of the buildings. The middle view is dominated by artificial buildings and the foreground is rolling green patches of Victoria Peak, with the artificial elements and natural elements interpenetrating each other to form a mutual contrast. As can be seen from the facade analysis of the central Hong Kong skyline (figure 2), the proportion of natural patches is more important than the proportion of artificial patches (the area of natural patches/the area of artificial patches =0.25), resulting in a coordinated landscape feeling.
3.2. Control of the central area of the multi-view

To get a good view of the city's skyline, the skyline itself of tall buildings and rolling mountains is not enough and there also need to have Angle and distance appropriate scenic spots. In addition to the common horizontal view, diversified appreciation experience includes looking up, overlooking, overlapping and combination of viewing angles, etc., which is one of the important contents of the human-oriented "display mountain" strategy[3].

According to the "Hong Kong Urban Design Guide", in order to preserve the ridgeline, mountain landscape and beautifully designed seaside development blueprint, a central observation system consisting of seven classic viewpoints (figure 3) have been developed. The design of the view and gallery is based on the classic view of ridgeline from both sides of Victoria harbour and the peak of the hill overlooking Victoria harbour, where people view the rhythm of the central area.

Figure 2. Analysis of the relationship between the skyline and the mountain in central area of Hong Kong

Figure 3a. Distribution of 7 lookout points on both sides of Victoria Harbour

Figure 3b. Looking at the core buildings in Central from point 1

Figure 3c. Overlooking Victoria Harbour from point 3
3.3. Control of the urban central area layout fitting mountains
The relationship between the layout of the central area and mountain is also very important. If the core area of the central area is far away from the mountain, it is difficult to use the mountain to become the characteristic landscape of the central, making the flow of people in the central area hard to appreciate the natural mountain. Usually the public buildings in the central area run along the mountains, and there should be enough semi-open spaces as transitions to avoid dense high-rise buildings becoming “high-rise building walls” that obstruct the mountain landscape.

The central area of Central and the Taiping Mountain in the south are highly compatible. Although the intensity of land development within the central area is very high, the natural elements such as mountains in the city have not been artificially damaged, and still retain a good natural landscape.

The central area stands on the mountain and expands linearly in the horizontal direction, geographically close to the mountains and even partially overlap. The total land area of the central area of Central is 6.1 square kilometers, and the overlapping area between the central area and the low mountain gentle slope of the Taiping Mountain is 0.4 square kilometers (figure 4), which played a very good transition. This kind of matching relationship between lips and teeth determines that the central area of Central can achieve good mountain landscape and ecological effects.

![Figure 4. Transition zone between the central area of Central and the Taipingshan mountain](image)

4. The “showing mountains” strategy at the mesoscopic level: the combination of open space layout and mountain in the central area

4.1. Distribution along the mountain of open space
The open space distribution in the central area of the city is closely related to the behavioral activities of the ornamental mountain landscape. The location, scale and layout of the open space determine the quality of the landscape that is viewed, which also constitute the basic elements of the “showing mountains” strategy in the central area. The central area of Central in Hong Kong is full of high-rise buildings, where the feeling of walking is very depressed and the line of sight is short. Therefore, the open spaces distributed in the central area are highly popular with the public because of their quiet environment and the visibility of mountain view. According to the spatial analysis, there are more than 210 open spaces along the mountain in the central area of Central, the largest of which is 10 hectares (figure 5). These open spaces not only make the contour of the Central become "likely to break", but also pay attention to the alignment with the mountain in the layout, so that people can see the undulating ridge line in all open spaces.
4.2. The shape of the visual corridor to the mountain
In addition to distributing a large number of open spaces for observation of mountain nodes in the central area of Central, many visual corridors for appreciating mountain are also reserved, forming "opposite scenery" [4]. "Hong Kong Urban Design Guide" requires "retaining and adding a viewing gallery to allow pedestrians to see the beautiful scenery of the waterfront area from the urban area, as well as the irritating scene of the urban area from the waterfront area." Through the control of the height of the building and the control of the open space, a number of visual corridors facing the mountain are constructed so that the beautiful ridgeline of the mountain can still be seen inside the central area with high development intensity. On the other hand, in some central areas of some cities, although the geographical conditions are very good and the development intensity of the central area is not very high, but it is difficult to enjoy the beautiful mountain landscape in the central area (figure 6), which is because it neglects the shaping of the visual corridor and lacks comprehensive consideration of the combination of natural elements and human landscapes in the central area landscape.

5. The “showing mountains” Strategy at the Micro Level: the combination of landscape appreciation points and mountain areas in the central area
At the micro level, the “showing mountains” strategy mainly considers the landscape control of the public activities close to the human scale, the interaction between the mass material of the public building and the interaction of the mountains.

5.1. Layout of the close-up viewing point
The best “showing mountains” effect in the central area not only meets the overall visual perception of the city skyline from a distance, but also allows people to stop and enjoy the mountain landscape in as many places as possible in the central area, which requires a reasonable layout of the appreciation points of the mountain landscape including the analysis of the human observation angle and the mountain height analysis. The core appreciation point is generally more suitable for open space because open space is more open in area and has better spatial transparency. At the same time, appreciating mountains can obtain a wide view and a good prospect atmosphere.

5.2. Morphological control of tall buildings
The continuous visual corridor allows people to enjoy the beautiful mountain landscape in the distance, and the shape of the high-rise buildings surrounding the corridor often directly affects the transparency of the visual corridor [5]. Many high-rise buildings in the central area of the city lack the overall control of the shape of the corridor, and as a whole, they become the “high-rise wall” that blocks the mountain landscape. Even if there are mountains behind, people can not appreciate the mountain landscape, thus reducing the quality of the landscape of the urban central area.

The mountain viewing corridor of the Standard Chartered Garden in Central Hong Kong is an example of the architectural design reserved viewing gallery. The gallery is located between the Bank...
of China Building and the Citibank Tower. As can be seen from the plan, the distance between the red lines of the buildings is not too large, only about 40 meters. From the perspective of efficiency, the building form adopts the standard layer and the volume close to the red line is the most economical, but the effect after the completion is shown in figure 7, completely obscuring the Taiping Mountain. In this case, the mountain landscape cannot be enjoyed. Therefore, in order to reserve the view of the mountain, the designer has dealt with the control of the building form. The plane of the Citibank building is a circular arc of the corner, and the Bank of China Building is the amount of bamboo shoots that are consigned. There is enough space for sight, and a gap is reserved for the visual corridor of the people in the building volume (figure 8), which forms the effect of the borrowing and seeping effect of central area and Taiping mountain. From the combination of the architectural groups around the Standard Chartered Garden in Central, almost all of the surrounding buildings are point-like high-rise office buildings. These high-rise buildings are arranged on the plane around the center of the Standard Chartered Garden, and there is a certain misalignment between the buildings. It can clearly see the Taiping Mountain in the south, the high-rise buildings in the vicinity and the verdant mountains in the distance form a beautiful landscape where the artificial and natural scenery blend together.

![Figure 7](image1.png) Analysis of the plane layout and perspective not considering the visual corridor

![Figure 8](image2.png) Analysis of the plane layout and perspective considering the visual corridor

5.3. Color material coordination of buildings

In the landscape where the “mountain-city” blends with each other, the contrast of the colors, materials and mountains of the complex are also the key elements in the landscape planning.

The materials used in the core buildings in the central area of Central are similar, basically glass curtain walls, metal aluminum plates and stone, which have a good uniformity and harmony from a visual point of view(figure 9). Among the blue-green and cool colors caused by the area glass curtain wall, the warm and neutral colors of slightly different colors and brightness brought by local stone materials and aluminum plates form a simple and unified, clean and lively color landscape, which is consistent with the CBD function positioning of central district business finance. From the perspective of light and dark relationship, the dark-toned mountain and the light-colored buildings can produce a strong visual contrast, and the front and back landscapes are better. From the color point of view, the colors exhibited by architectural stone, aluminum panels and curtain walls belong to the category of modern and light artificial colors, while the colors exhibited by the mountains belong to the category of natural colors, such as the green of plants and the golden of autumn leaves, which meets the requirements of the human eye for the "comfortable" color because of its diverse and rich composition. People not only accept them but also love them, eager to be in the urban environment. In the central district of the central district, this kind of "mountain" landscape is conducive to the coordination and collocation of artificial and natural colors, which better reflects the integrated space atmosphere of urban landscape and landscape in the central district.
Figure 9. Comparison of building materials and colors between Bank of China Tower and Citibank Building

6. Exploration and thinking
The central area of the city is a place where urban modern civilization is concentrated [6]. The high-rise buildings represent the typical urban features of the central area, but at the same time, it is easy to cause the central area landscape to be the same. Therefore, the central area should focus on the display and respect of the existing mountain landscape. Relevant departments should closely combine the mountain landscape in the process of landscape planning and construction to make overall considerations, and adjust and control the spatial structure, the architectural form and open space system of the central area accordingly through the development of macro-meso-micro-level “showing mountains” strategy, so that the interior of the central area can be seen everywhere, forming a landscape interaction that reflects the natural environment and the urban environment, thus creating a distinctive urban center landscape.

References
[1] Wu L Y 1996 Wu Liangyong Urban Research Proceedings (1986-1995): Meeting the coming of the new century (Beijing: China Building Industry Press). 337-342
[2] Bao S X, Gu M C 1994 Distinguished scientist Qian Xuesen: Urban Studies and Shanshui City (Beijing: China Building Industry Press). 316-321
[3] Yang Y D, Wang F and Jiang J Y 2012 Study on Mountain Protection and Utilization Strategy in the Process of Urban Space Expansion--Taking Xiaoshan Urban Area Comprehensive Protection Planning as an Example 2012 Annual Conf. of Urban Planning (Kunming: Urban planning society of China).
[4] Niu X Y, Song X D and Chen C 2014 Developing Building Height Restriction for Preserving Views to Mountain Backdrop Shanghai Urban Planning. 5 92-97
[5] Su D B, Nie Z Y 2007 How to Build an Appreciative Urban Landscape Through the Height Control on Construction Urban Planning International. 2 104-108
[6] Wang J G 2011 Modern urban design theory and method (Nanjing: Southeast university press). 119-121