Study on the Construction Value and Development Strategy of Ecological Sports Park under the Background of Sponge City

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Abstract: In recent years, with the acceleration of urbanization construction, the “seeing the sea” of the city that is raining and flooding has been solved in the “sponge city” strategy of “breathing”. Guizhou Province actively develops the strategic arrangement of sponge city, putting forward the harmonious symbiosis of public fitness and ecological environment as the carrier. Integrating sports competition and tourism, the "sponge type" ecological sports park is planned and built with "sports" to promote "tourism". This paper uses literature, field research and other research methods, combined with the topographical characteristics of "mountain, water, forest" in Guizhou Province, taking ecological sports park as the research object, in order to provide advice and suggestions for the scientific and rational construction of green ecological sports park.

1. Introduction
Guizhou, which has a unique geographical environment, is located in the Yunnan-Guizhou Plateau with the altitude of about 1,100 meters. With the typical karst landform, Guizhou is difficult to drain away water in the rainy season, so it is easy to accumulate water and cause a flood. In the dry season, water shortage often occurs. In March 2017, the Guizhou Provincial Sports Bureau announced that, during the “13th Five-Year Plan,” it would invest 3.5 billion yuan in the construction of 100 ecological sports parks in Guizhou to build a strong sports province with strong national characteristics.

Ecological park is not only a main component of the urban green land, but also an important part of the construction of the sponge city. 100 sponge-type demonstration park green lands will be built in the response of implementing the General Office of the State Council's Instruction on Promotion of the Construction of Sponge City, accelerate the construction of sponge city in Guizhou Province, improve urban water ecology, conserve water resources, enhance urban flood control capacity, improve the city’s sustainable development capacity, and promote the harmonious development of people and nature.

2. Background of the Construction of Sponge City
With the development of the urbanization and industrialization of provinces and cities around the country, “urban disease” has become common.[1] When a heavy rain comes, the urban water environment will be seriously polluted. Many cities adopt the system of rain and waste water management. And the rainwater enters the waste water pipe and, so that the waste water level will be higher and the natural water will be polluted; the recovery rate of urban domestic waste water is low,
so the waste water flows with the rainwater to the natural water, and the natural water will be also polluted; the waste water which has not been purified flows into the rivers and lakes, causing serious pollution and even black foul water. As the urban population increases, the construction area for urbanization is expanded, the urban burden of flood drainage at the underlying surface increases, and the water discharge capacity is weak, so the water logging is serious. Guizhou has unique karst landform. The landform is tattered, the soil layer is thin, water cannot be kept, and the stability of the water ecology is bad. [2]The construction concept of the sponge city aims to repair the water ecology through improving the water ecology and water environment. As a national ecological environment demonstration area, Guizhou positively responded to the General Office of the State Council`s Instruction on Promotion of the Construction of Sponge City by comprehensively taking “leakage, stagnation, conservation, clearance, usage, drainage” and other measures and combining with Guizhou’s features to positively promote the construction of the sponge city.

3. Meaning of Sponge-Type Ecological Sports Park

Ecological sports means physical exercise, or sports cultural activity carried out in the ecological environment which takes the integration, inter-coordination and harmonious development of “human—sports—environment” as the premise, the sporting event as the carrier, physical exercise as the form of the sports participation and the green, civilized and healthy lifestyle as the target. [3]“Ecological sports park” provides an environmental place for the development of ecological sports. It is an important carrier for the realization of ecological sports and has important strategic value and significance. The Ecological Sports Park is a complex modern park with the main purpose of national fitness. It takes the sports as its main feature, and integrate sports and recreation, sightseeing tour, event undertaking and ecological protection into one. Sponge-type ecological sports park is to conduct the sponge-type construction of park road construction, landscape configuration and green sightseeing based on ecological sports park. It is more conducive to the ecological sustainable development of ecological sports park.

4. The Construction Value of Sponge-Type Ecological Sports Park

4.1. The Ecological and Humanistic Value of Careful Site Selection

The location of the sponge-type ecological sports park is quite special. In the planning process, it involves factors such as convenient transportation, close proximity to the crowd, and good ecological environment. The urban residents are the main participants of the sponge-type ecological sports park. The convenient transportation for residents can improve the participation degree of the park; the sponge-type ecological sports park has a large demand for land area, so it is better to choose the land which is cheap.[4] With the development of social economy, urban pollution is becoming increasingly more serious, and physical exercise requires “green” requirements for the surrounding environment. It inevitably concerns the soil, water environment, green coverage, biodiversity and others in the evaluation form of the ecological environment. In addition, the adjustment of the surrounding areas by a certain humanistic cultivation as well as the economic and social benefits. The sponge city technology of the High-tech Zone Sun Lakeside River Ecological Sports Park reflects that the park’s anti-water gathering construction of the healthy footpaths, water conservation of the green landscape plants and the water quality adjustment of the draught and flood of the water environment within the whole park make a balance between ecology and humanity.

4.2. Green Aesthetic Value of Waterscape Plant Configuration

According to the ecological habits, the plants in the sponge-type ecological sports park are roughly classified into two types: land plant and aquatic plant. In the process of planting, the localization principle, the economy principle, the profitability principle, the green principle, the adaptability principle, the multiple-type principle and the seasonality principle need to be considered. Guizhou Zhenfeng Ecological Sports Park is built by the mountain. Relying on the natural advantages of
mountains, lawns, lakes, forests and villages, the park is built into a national outdoor sports base. The planting in the scenic spot is conducted based on the rules and regulations. The principles of planting are considered. The water area should reflect the continuity and multi-layered planting concept. The upstream is full of multi-layered aquatic plants, which can guard not only the aesthetic effect and the downstream water quality. The park uses the advantages of soil topography, so the planting has high and low levels. The low elevation greenbelt is more suitable for plants with local characteristics and high survival rate. During the rainy season these plants can help save water resources. During the dry period, they can release water to ensure the surrounding water supply. Most of the flowers are local ones with low maintenance cost. Well-bedded, bright and colorful shrubs and trees are extended outward in turn. Therefore, the whole ecology of the sponge city can be guarded, and the plants which are suitable to be planted in four seasons are contained in the park to show the beauty of vitality.

4.3. Scientific and Practical Value of Hard Landscape

Due to the topography, there is a saying that “there is no three sunny days in a year” in Guizhou. The annual precipitation is leading the whole country. Waterproof floor tiles are paved in the floor of most traditional parks, causing that the natural infiltration of surface rainwater is obstructed, and the overland runoff is influenced. Overland runoff will only occur when heavy rains occur, and excessive surface runoff will impact the urban flood discharge. In order to solve this problem, it is necessary to build more greenbelts, permeable pavements, bricks with holes for grass growth and others in the parking lots, life squares and pedestrian ways to effectively control the excessive surface water. The masses’ interest to participate in the physical exercise will be increased, and the sport injury can be avoided.

4.4. Economic Value of Improving “Tourism” by “Sports”

Guizhou has rich forest resources. Based on mountains, karst caves, valleys, rivers and the characteristics of local sports with minority characteristics, the sponge ecological sports park is used to undertake big sports events which can be competition ones or experience ones. The advocate is national fitness, national participation and establishment of green living.[5] The Huanfanjing Mountain International Road Cycling Invitational Tournament held in November 2017 attracts a multitude of tourists and competitors at home and abroad. Sinan County, which is the host place, is awarded the China’s Top Ten Tourism Counties, the Hometown of Chinese Folk Art, the China’s Top Ten Eco-Civilized Cities, the Rural Tourism Destination City with the Most Beautiful Chinese Cultural Charm, one of the first batch of China’s Forest Health Care Pilot Bases. The Huanfanjing Mountain Ecological Sports (National) Park, which is not far from here, uses sponge city technology to protect the originality of the ecological environment. At the same time, the excessive water caused by the heavy rain will not occur in the scenic area because of the heavy rain to affect enjoying the sights. According to the terrain conditions, bicycle tracks, hiking trails, and marathon tracks will be built to create characteristic sports events such as rafting and gliding. During the sports event, the contestants and spectators can enjoy both the excitement of the game and the surrounding natural scenery. And foreign tourists can be attracted to drive the economic development of the whole city. The city image of Guizhou can be publicized and the benefits can be increased for the surrounding residents at the same time.

4.5. Ecological value of water recycling and regeneration system

Guizhou is rich in water resources, with an annual precipitation of 1100 to 1300 mm. However, due to its mountainous terrain and karst landform, most of the rainfall is from surface runoff to groundwater, so it is not suitable for direct use of water resources, resulting in severe water shortage in engineering. Guizhou sponge type ecological sports park in construction design considering the special geographical environment, the province design plan to use their natural geographical advantage to wetland ecological water circulation regeneration system, the rainwater collection in the ecological wetland park or in lakes and rivers, in the summer drought and flood can adjust the water resources,
make the park and ecological wetland purification cycle form a sustainable water supply and drainage, wetland ecosystem along with water circulation regeneration or the transition area, land and waters with education, environmental protection, tourism, multi-functional in a body's comprehensive landscape style. For example, the Lotus Wetland Ecological Sports Park in Longli County, Guizhou Province uses rainwater to form an ecosystem water cycle with wetlands and landscape lakes. The park can irrigate green plants and adjust the ecological function of the natural environment of the park according to the change of seasons. In addition to introducing a variety of plants to improve the biodiversity of the park, the wetland also strengthens the function of purifying rainwater, which reflects the self-recycling ecological value of rainwater resource saving, purification and output.

Table 1. Sports Events Carried out in Ecological Sports Parks in Guizhou

| S/N | Type          | Events                                                                 |
|-----|---------------|------------------------------------------------------------------------|
| 1   | Mountain Sports | Mountain biking, rock climbing, camping, trekking, river tracing,     |
|     |               | orientation movement, outdoor extending, cosplay of CS, grass skiing, |
|     |               | motor racing, motor sports, gas sports, hot air ballooning, paragliding, |
|     |               | canoeing, rafting, snow sports.                                        |
| 2   | Extreme Sports | Bungee jumping, parkour, extreme roller skating, skateboarding, wing    |
|     |               | flight, base jumping                                                  |
| 3   | Mass Sports   | Table tennis, badminton, tennis, basketball, beach volleyball, balloon  |
|     |               | volleyball, bowling, mini golf, bubble football, five-a-side football, |
|     |               | swimming, go, chess, bridge, five-in-a-row, gate ball, rope skipping,  |
|     |               | kite flying, fishing, archery, dart sport                            |
| 4   | Minority Sports| Rafting with a single bamboo, dragon boat sport, shooting with the     |
|     |               | crossbow, gyro sport, wooden ball, shuttlecock, rattan sports, Tai Chi |

5. Development Strategies of Sponge-Type Ecological Sports Park

5.1. “Elastic” Design for Optimization of Sponge-Type Ecological Sports Park
Sponge-type ecological sports park needs to control the circulation function of “absorption” and “release” of rainwater in the whole park.[6] In the flat and hard ground of the park, the surface runoff absorption method of permeable pavement should be fully considered; the parking lot is a relatively larger and flatter public space. Due to the particularity of the parking lot, the pollution caused by the initial rainwater might be relatively more serious. It is necessary to design sunken grass grooves and biological retention zones to improve the pollution. The pollution should be processed before entering the surface runoff or the near green grasslands; the green tops can be designed for tall construction landscapes in the park. The use of green grass or other plants for rainwater collection can increase the interestingness of the participating in the design of the roof garden. The small landscape architecture can use the rainwater storage tanks, reservoirs and others for direct rainwater collection to control the humidity of the surrounding environment; the rainwater drainage can be conducted well by using the conditions of terrain and topography of the park. During the flood season, the rainwater collection can be done, and the collected rainwater can be released to conserve the surrounding plants during the dry season. The "sponge" advantage can be fully played. It plays a role of drought and flood regulation of the whole park’s ecological environment, saves labor costs, and forms a natural ecological regulation cycle.

5.2. Give Full Play to the Ecological Advantage of Recreation Competition in Sponge-Type Ecological Sports Park
In modern society, people’s awareness of physical exercise is increasing, and mass physical fitness has become popular. Sponge-type ecological sports park can be used as a “green lung” around the urban...
area, playing a key role in improving the environment of the whole city. The acceleration of the working pace causes a lack of communications between people. They are busy with the work, so the sub-health is becoming more and more popular. Urban residents can use their leisure time to carry out physical exercises and interpersonal communications, breathe green air, and improve their health through square dancing, minority traditional sports, ball sports, healthy steps and other forms; the park which is generally far away from the urban area has a vast area. The outdoor extension area of the park, such as grasslands, meadows, forests, wetlands and green ways should be no less than 75% of the whole area. According to the regional characteristics, Guizhou can undertake the following big sports events: mountain sports, extreme sports, minority traditional sports and others. The foreign tourists can be attracted through the competitions, and the themes of “sports” and “ecology” can be highlighted. The city image can be publicized through promoting “tourism” by “sports” to increase the popularity of the city and drive the economic development. The sponge-type ecological sports park has become an attractive investment project for the development of the green sports industry.

5.3. Create a Practical and Beautiful Sponge-Type Ecological Sports Park

The greening system of the sponge-type ecological sports park includes important landscape nodes, green ways, modeling, isolation belts, water bodies, bridges and others. The green landscapes and accessorail building of the park can be aesthetically designed under the premise of the “sponge type”. Based on the different road forms in the park, corresponding greening designs can be conducted. Most of the healthy footpaths and parking plazas are zones where the masses walk slowly. It can be designed that the low plants can be mainly planted by the sides of the roads, colorful flowers can be planted to show the beauty of the landscape design, and the crushed stones can be added to form a slow path deserving fine taste. Since the speed of appreciating landscapes is relatively slower if tourists drive on the lanes, it is appropriate to plant large plants. The overall design of the park should consider the principle of seasonality, so that there are landscape plants that can be seen all year round in the park. The plants of different heights are well-arranged to form a scene where the spring is alive, the summer is gorgeous, the autumn is beautiful and the winter is magnificent. The post-management of the landscapes is also very important. Pests and diseases prevention, water and fertilizer management and man-made sabotage and others should be paid attention to. Managers can hang warning signs next to the plants in the scenic spot to indicate the family, genus, species and living habits of the plants. Visitors can also understand the species and habits of the plants when they visit the park and enjoy the sports activities. It is practical and beautiful to combine sponge type with landscape architecture design.

5.4. Sponge-Type Ecological Sports Park can Learn From the “Smart Platform” Development Model

During the “13th Five-Year Plan” period, Guizhou Government aimed to work hard to increase the leisure and fitness area of Guizhou Province from 0.63 square meters per capita to 2 square meters or more, spend 3.5 billion yuan to build 100 ecological sports parks, integrate the sponge city technology into the park, and exploit new ways, new concepts and new methods for comprehensive ecological and green fitness and territorial resource development. In December 2017, Premier Li Keqiang proposed in the government work report that “smart city” could be developed under the background of “Internet +”. The ecological sports park, which is the main public space of the city, has not yet expanded its own network platform, causing external personnel to fail to understand the park development and the carryout of holding sport games and activities in time. It is necessary to establish a comprehensive information management platform for smart parks which can digitally supervise and quantify the statistics of animals, plants and landscape accessories in the park; the membership systems can be added for the stadiums in the park to regularly manage and feedback the activities of members and consumers, and meet the requirement of smart and quality services. The platform can publish invitations for major events on the Internet, and you can learn about the latest changes in the ecological environment of the park and the sports competitions to be carried out without leaving the
home. Registration through the Internet will facilitate the purposeful and targeted participation by the masses and promote the smooth and healthy development of a smart city.

6. Conclusion
Guizhou promotes the construction of sponge-type ecological sports park. It enhances the sponge function of the park to absorb its own rainwater, and provide storage space for the rainwater in the surrounding areas to strengthen protection and restoration of natural forms of water bodies such as urban pit ponds, rivers and lakes and wetlands by adopting measures such as construction of rainwater gardens, the sunken greenbelts and constructed wetlands. The transformation for the ecological sports parks through adding sponge-type facilities can effectively control the surface runoff pollution, reduce the pollution flowing into runoffs of rivers and lakes and improve the water quality of rivers and lakes to protect the urban water environment. Based on the sponge type, the landscapes of the park need to be designed to achieve economic, practical and beautiful effects. The sponge-type ecological sports park optimizes and improves the ecological environment condition and facilities of Guizhou sports industry, sports tourism, sports health care, so that the city can breathe freely in the noise and the park becomes a typical representative of the urban “green lung” of new era.

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