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Review Article

Application of Geotechnical Synthetic Materials in Sponge City Construction

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Abstract: Along with the overall progress and development of market economy, Sponge City has received extensive attention, in order to establish a more compatible with the market development trend and environmental protection requirements of the control mechanism, it is necessary to scientifically plan synthetic materials, to a certain extent, to maintain the basic level of sponge city supervision work. In this paper, the research background of Geosynthetics applied in Sponge City construction is briefly analyzed, and the basic principles and specific application paths are discussed, which are for reference only.

Keywords: *geosynthetics; sponge city; background; principle; application path*

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0 Introduction

In order to further improve the management level of sponge city construction, we should actively establish and perfect a complete control mechanism to ensure that geosynthetics can truly exert its practical value, maintain the comprehensive effect of the sustainable development of Sponge City, and realize the overall progress of the city.

1 Sponge City overview

In the sponge City construction system, we should take the overall orderly construction, improve the implementation effect of the organization as the key, to ensure that on the basis of perfecting the scientific planning system, to establish and improve a more complete operation and maintenance project, and to construct a regional rainwater discharge management mechanism, effectively strengthen the implementation of planning on the basis of Ensure that the standard specification can be assisted to supervise the corresponding sponge urban planning and construction projects, so as to give full play to the reserve system and the advantages of rainwater/sewage diversion management.

First of all, to clarify the basic conditions, in the sponge City construction system, in order to improve the large-scale management level and basic quality of sponge, we must establish a complete supervision and control measures to ensure that the technical guidance of sponge city construction can be combined to effectively ensure that the corresponding resource system will not be affected, for the overall progress of sponge application management to lay a solid foundation [1]. The most important thing is to combine physical mechanism, biological control mechanism, ecological project and so on to carry on the spatial management, and combine the Sponge City Construction Technical Guide to perfect the construction work, effectively realize the goal of energy saving and emission reduction, and play the sponge city to reduce the heat island effect of the comprehensive level, maintain the actual efficiency of the management work.

Second, it is necessary to combine sponge city regulatory needs and control standards to effectively improve supporting facilities, of which the application and management of Geosynthetics is also very critical [2]. For sponge city, Sponge is very critical, the general urban sponge body mainly includes rivers and lakes

and other water systems, and also to green space, gardens and some permeable pavement and other urban supporting facilities as a basic project, the application of geosynthetics can optimize its operation and management level on the basis of optimizing the level of urban drainage system standardization, Effectively relieves the pressure of urban waterlogging.

2 Research background of geotechnical synthesis materials applied in sponge city construction

In recent years, the process of urbanization development has been accelerating, in order to effectively achieve sustainable urban development, it is necessary to enhance the management mechanism of urban drainage system, with the help of natural forces to improve the drainage process, so as to establish a more complete urban supervision mechanism, effective formation of natural accumulation, natural penetration and natural purification of the Sponge City [3]. In order to deeply implement General Secretary Xi Jin Ping's speech, cities in the process of urban construction are actively implementing urban infrastructure control methods, and reasonable to improve the development of sponge city planning.

2.1 Connotation of geotechnical synthetic materials

The raw material of geosynthetics is polymers, mainly made of chemicals extracted from coal, oil, natural gas or limestone, on the basis of which two processes are carried out, effectively forming fibers or synthetic materials, and finally making the corresponding materials into a variety of products. The more common raw materials of geosynthetics mainly include polyethylene, polyester, polyamide, chlorinated polyethylene and so on. At present, the commonly used geosynthetics are geotextile, Geomembrane, PE composite geomembrane and geotechnical grille.

2.2 Advantages of Geosynthetics applied in Sponge city construction

The application of differentiated projects in different urban environments ensures that the sponge city supervision structure can truly establish and improve the storage system, penetration system, regulation system, circulation system and release system, and establish and improve the regulatory model to meet its own development characteristics, so as to effectively play the application value of sponge body, and improve the urban ecological environment, To achieve the optimization of the quality of life of the people. In particular, the application of geosynthetics in the construction of Sponge city, to give full play to the application value of materials, the establishment of a complete implementation plan, in order to enhance the specific situation of specific analysis of the control objectives, to achieve the comprehensive utilization of rainwater technology and urban planning system fit goals, but also can truly create a sustainable development for the purpose of Sponge city.

Another side, it should be noted that within the sponge City system, the urban planning Department should combine the current situation of urban development, the drainage waterlogging as the safety premise, establish a complete urban supervision mechanism, effectively adapt to environmental changes, and also be able to better respond to natural disasters, and form a flexible management structure [4]. It also means in the process of rain effectively form water absorption, storage, seepage management mode, and scientific application of accumulated water, to ensure that the use of rainwater resources and ecological environmental protection coordinated development of layout planning. One of the highlight is that in the process of sponge city construction, we should make use of the supervision mechanism of source reduction, midway transportation and end renewal, so as to give full play to the management advantages and promote the overall progress of sponge City with the help of the water treatment method of the natural environment.

3 Principles of geotechnical synthesis materials applied in sponge city construction

In the sponge City construction system, in order to really improve the management effect, it is necessary to establish corresponding control mechanism and management plan for different regions. For example, for arid areas in the northwest, rainwater utilization should be the key; For some rainy cities in the south, it is necessary to take the total runoff and peak runoff as the key to ensure that the level of specific analysis of specific problems can be improved. At the current moment, the application of geosynthetics can be combined with the use of seepage treatment and anti-filtration treatment to ensure that a more complete control mechanism can be implemented for practical work [5]. In the construction of Sponge city, in order to give full play to the advantages of geosynthetics, it is necessary to uphold the principle of ecological priority, improve the comprehensive level of natural

path and man-made project measures, and ensure that the city in the drainage waterlogging management system to effectively achieve the accumulation of water in urban areas and the parallel management of water purification, Effectively improve the utilization efficiency of rainwater resources and the comprehensive protection level of ecological environment, and lay a solid foundation for the overall progress of sponge city supervision work.

Firstly, For water storage and purification work, we should give full play to the corresponding functions of geosynthetics to ensure that effective retention can be achieved on the basis of the joint action of gravel, to ensure that the effect of water purification can be improved, to a certain extent to achieve storage water management work [6]. In addition, in order to effectively improve the application level of geosynthetics, it is necessary to pay attention to the amount and utilization rate of precipitation in sponge city, so as to ensure that the management structure and control requirements can be perfected after the specific target is clearly defined, so as to enhance the design effect and comprehensive management concept.

Secondly, For water and drainage work, geosynthetics should smoothly assist the smooth drainage process, effectively consolidate the hydraulic conditions and anti-filtration conditions, to ensure that the goal of comprehensive utilization of rainwater can be achieved, and lay a solid foundation for the smooth development of management work.

4 Path analysis of geotechnical synthesis materials applied in sponge city construction

In the process of sponge city construction, the effective application of geosynthetics should fully integrate the requirements of sponge city construction number, ensure that the control effect of sponge city construction planning can be improved from a macroscopic point of view, maintain the total runoff control work, runoff peak control work, runoff pollution control work and rainwater resource utilization level to a certain extent, Effectively establish a complete planning layout, so as to avoid factors affecting the operational efficiency of the development system, to achieve the urban municipal road, urban Green Square and urban water system supervision project overall development goals, but also for the overall optimization of Sponge city construction comprehensive level to lay a solid foundation.

4.1 Geotechnical synthesis materials applied in Sponge City Green Roof Project

Geosynthetics have very important application value in the green roof construction project of Sponge city. In the traditional roof design system, the green roof structure is mainly composed of vegetation layer, improved soil layer, geotextile filter layer and concave type drainage plate, among which, the improved soil layer is 100mm to 150mm, concave and convex drainage plate 15mm to 20mm. In addition, it is necessary to use polystyrene foam plates between 30mm and 60mm for treatment, as shown in figure 1:

Figure 1: Schematic diagram of traditional green roof effect

In order to further improve the control effect of specific analysis of specific problems, the use of geosynthetics to complete the treatment of the filter layer, can effectively control the process of rainwater seepage, effectively improve the loss of microparticles in the soil, and with the help of the corresponding material structure to improve the vertical and downward infiltration capacity of management, Ensure that the drainage plate can be used for the surface drainage collection and treatment of rainwater seepage, maintain the world-class level and effect of rainwater transmission [7]. In addition, the waterproof layer can also effectively avoid excessive moisture on the overall structure of the structural layer poses a threat, to a certain extent, improve the safety level of the roof. It is also based on this, can effectively use the filtration process, anti-seepage process and so on to achieve green roof rainwater runoff real-time supervision and management of the goal.

In addition, in the process of analysis and quality supervision and management of geosynthetics, it is also necessary to fully consider the sensitivity of the roof to the load, and to establish the corresponding anti-filtration process with the help of gravel materials, effectively improve the load level of the roof, especially in the process of green roof design work, It is necessary to use geotextile with small

load and convenient laying process to complete the reverse filtration process and perfect the control level of the specific application.

4.2 Geotechnical synthesis materials applied in Sponge City Municipal Road project

For sponge City Supervision system, effective management mode and urban supervision standards are also more critical, in the sponge city system, to uphold the fine management structure, in accordance with the standardized process of the specific situation of systematic analysis and determination.

First, the green belt should be lower than the road, effectively achieve the monitoring structure of moisture, the specific situation is shown in Figure 2:

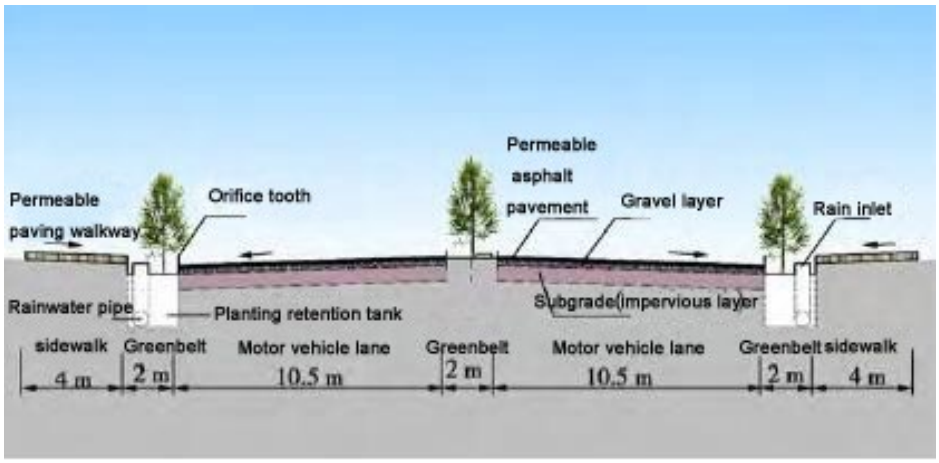

Figure 2: Low impact development of the cross-sectional diagram of municipal roads

Second, to ensure that the concave green belt under linear drainage can play its practical value and application advantages, effectively form a good water storage process, and ensure the integrity of the control mode and application process, so as to improve the processing efficiency of the specific situation [8].

Third, it is necessary to ensure that the rainwater inlet on the road surface can be effectively set in the green Belt area, so as to ensure that the elevation parameters of the rainwater port can be above the green space, and lower than the whole pavement structure.

Fourth, in the road structure design and management work, to ensure that the orifice roadstones can effectively replace the strip edge stone, effectively form the tree pool structure (see figure 3), and improve the basic level of municipal road management work, not only to enhance the control effect of total runoff, can also achieve a certain degree of net flow supervision and maintenance of municipal road development projects of the comprehensive level and application value.

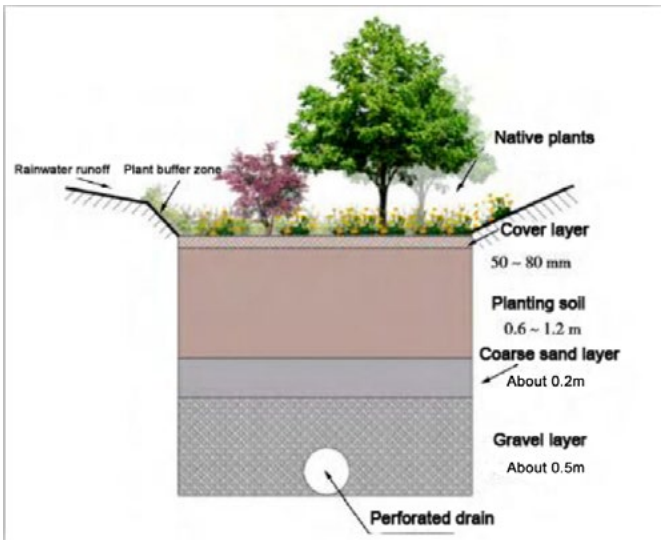

Figure 3: Tree Pool diagram

It is good to mention that in the low impact of the development of road structure, it is with the help of tree pool, plant retention tank and other infrastructure can effectively achieve the green belt of rainwater to undertake, and can improve the basic management level and greening control effect, but also for the subsequent improvement of the overall application effect to lay the foundation. The main components include 50mm to 80mm mulch, 0.6m to 1.2m planting soil, 0.2m coarse sand layer, etc., to ensure that after the occurrence of heavy rains in the tree pool or plant retention layer to stay part of the water and ensure that it can effectively seep into the perforated drainage pipe, so as to achieve hysteresis treatment. In addition, in the application management structure of perforated drainage pipe and gravel layer, it is necessary to supervise the anti-seepage geosynthetics, as far as possible to avoid the problem of improper application of granular impermeable geosynthetics in the process of rainwater seepage, and effectively improve the treatment effect of geosynthetics [9].

In the process of sponge city construction work, we should focus on optimizing the management level of anti-siltation blockage, and analyze the specific problems, and adapt to the needs of environmental protection management to a certain extent, so as to realize the sustainable development of Sponge city.

4.3 Geosynthetics applied in Sponge City Municipal Green and Plaza project

In the process of the construction of Sponge city, in order to further enhance the process of urban development, we should actively establish and perfect a complete development plan, ensure that we can play the regulatory requirements of low impact development facilities, and effectively construct a complete management model and comprehensive supervision system [10]. Combined with the analysis results of the corresponding management work, it can be seen that rainwater Garden project, sinking Green project and so on are effective ways to reduce the total amount of runoff and improve the management level of runoff.

In recent years, the research on rainwater garden has been increasing, which can realize the basic goal of ecological environment supervision and control on the basis of effectively reducing impurities, and, in the design work system of rainwater garden, we should supervise and manage plants and shrubs centrally according to the need of configuration, and effectively improve the basic level of control work. On the one hand, because the rainwater garden system itself is not conducive to the growth of trees, which makes the area is small, therefore, can establish decentralized steps of the management structure, in the true sense of the realization of tall plants and low shrubs hierarchical collocation treatment, can effectively improve the specific problem of specific analysis of the basic level [11]. As a solid foundation was laid for the full implementation of subsequent regulatory work. In the rainwater garden, geosynthetics can also be used in aquifers and mulch, can improve the level of water storage material supervision, to ensure that the water storage effect can meet the practical application requirements, and to ensure that the perforation tube and when the application of anti-filtration geosynthetics is effective, for the smooth development of drainage work to lay a solid foundation. Details are shown in Figure 4:

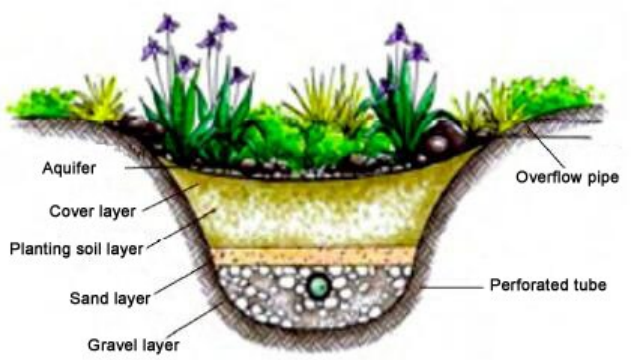

Figure 4: Rainwater Park diagram

Combined with the corresponding parameter analysis process, it can be seen that the sinking green structure should ensure that more than 50% of the residual rainwater under the concave green space, the basic depth of the lower concave to maintain between 10cm and 15cm, green environment system should try to choose some flood-resistant varieties, to ensure that the basic green structure parameters for the turf structure, 200mm to 300mm planting soil structure, 100mm to 200mm gravel structure, geotextile structure, vegetarian soil compaction structure and so on. It should be noted that geotextile can effectively form a reverse filtration effect and can form a good treatment process between gravel and vegetarian soil, effectively improve the drainage effect and the management efficiency of the lower seepage [12].

4.4 Application of Geosynthetics in Sponge City water System project

In order to further comply with the needs of

environmental protection management, we should actively establish and improve a complete control mode to ensure that the application and management level of geosynthetics can be fundamentally improved, effectively promote the comprehensive effect of sponge city construction, and maintain the actual efficiency of urban water system supervision mechanism. In the development process of sponge city, in the Low Impact Development facility project, the urban water system can provide the guarantee for the initial pollution of runoff rainwater, establish a complete control mode in the true sense, and ensure that the slope protection structure can adopt the ecological slope protection treatment method, effectively maintain the stability of the slope, and also provide a guarantee for the management of geotechnical synthesis effect.

Generally speaking, geosynthetics mainly choose reinforced materials, to knot geotechnical mesh pad application needs, the establishment of a complete control mechanism for slope protection, and in addition to geotextile materials can also be effective quantity of high-quality polyamide as the basic raw materials, effectively form the corresponding materials for soil and water conservation, replacing the traditional slope protection structure, To ensure that the peak runoff can be fully controlled.

5 Conclusion

In a nutshell, in the process of comprehensive analysis of sponge city, we should combine the present situation of urban development and the corresponding national policy system, establish a sound and complete supervision system, ensure that we can fundamentally promote the development and progress of sponge city, effectively realize the management mechanism of natural accumulation, natural penetration and natural purification, To a certain extent to achieve the overall progress and upgrading of management level, but also for the optimization of rainwater control concept to lay a solid foundation, give full play to the advantages of geosynthetics, promote the development of sponge city.

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