Design and Application of Environmental Housekeeper System in Highway Engineering

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Abstract: Under the context of the rapid development of green highway construction, it proposed that "green" control is the key to the construction of green highway. In this study, the authors are taking the west freeway around in Hangzhou as the study area. According to characteristics of highway construction and the existing environmental problems, the authors are taking the environmental supervision of highway construction as the research content. They studied the model of environmental housekeeper, and developed the platform.

1. Introduction
Highway and municipal roads, as large construction projects in the field of traffic engineering, are always covered by environmental protection in the process of construction and operation from site selection to operation. Due to the unique nature of highway engineering and other factors, it will be confronted environment problems during the process of engineering construction. The highway construction has a greater impact on the regional ecological environment. If it causes serious environment problem, the project should stop work. Therefore, it is particularly important to carry out environmental protection management in the whole process of highway construction.

In 2016, the Ministry of Environmental Protection of the People's Republic of China (MEP) pointed out in the Guiding Opinions on Actively Exerting the Role of Environmental Protection to Promote supply-side Structural Reform ([2016] No. 45) that "(9) Encouraging the development of environmental service industry. We will adhere to the principle that polluters pay and polluters bear responsibility, and constantly improve the system of socialized environmental governance and specialized service management. Establishment and improvement the third-party operating service standards, and encouraging industrial pollution control third-party operations, "the concept of environmental stewardship came into being.

The paper was taking highway engineering in the field of traffic engineering as an example. The authors put forward and expound the technical service of environmental protection housekeeper, providing one-stop technical service for the construction unit, and effectively solving and controlling
various ecological damage and environmental pollution problems caused by highway engineering construction projects.

2. Methodology and materials

2.1 Study area
This research is relying on round high-speed west extension of double line to Shaoxing section of Hangzhou. The main starting point is located in Deqing and Yuhang border near Jiang Jiashan. The end point is located in the hangzhou jin qu expressway project straight port hub south, into the Hangjinqu expressway. It is total long of the 97.788 km route.

Figure 1, the study area of paper

2.2 Model research
The environment housekeeper concept was introduced in the construction of highway environmental protection, environmental butler service. Real time to follow up, to carry out the whole life cycle of "through-train" type of environmental services, consulting, monitoring, supervision, pollution control. Such as environmental protection solution method, so as to realize from the source to prevent environmental pollution and ecological destruction, the ultimate goal of improving the environment.
2.3 Result and discussion

(1) Combining with the environmental (water) protection and supervision requirements of national and local construction projects, the scope and content of environmental protection control of highway projects are analyzed and determined from the aspects of highway project composition, construction stage division, environmental factors and their characteristics, and environmental protection requirements. Combined with the characteristics of UAV remote sensing technology, this paper forwards the construction process and supervision accuracy requirements of highway engineering which can use remote sensing image for environmental supervision. According to the characteristics of highway engineering, through experimental analysis, construction and development based on high-resolution satellite remote sensing image application, UAV remote sensing platform, GIS, beidou positioning system, Internet of things (environmental monitoring sensor), video monitoring and mobile terminal of the sky to the integration of road construction ring (water) monitoring information extraction method.

(2) Condition according to the project, combined with the research results, the research and development based on the sky to the integration of the "green housekeeping control platform of highway construction, environment control platform has the present situation of environmental monitoring data archive management, data query, properties, modification and intelligent display function, such as for environmental protection and management of the construction unit in engineering construction to provide technical services.

3. Conclusion
China's environmental pollution is characterized by large scope, many types of pollutants, difficulty in
comprehensive treatment, and lack of pollution control technology and talents. The environmental protection butler service model has brought a new concept of development for China's environmental protection. At the same time, the environmental protection standards and requirements of highway construction are gradually increasing with the improvement of people's living standards. Environmental protection steward plays a role in highway construction, deepening scientific management, design, construction, acceptance, maintenance and so on. Many aspects of road construction environmental management level has been greatly improved.

However, despite the rapid development of environmental stewards in recent years, the existing problems cannot be ignored, such as the absence of relevant laws and regulations, imperfect market mechanism and lack of capital and talents, which restrict the sustainable and healthy development of environmental stewards. Therefore, it is necessary for government departments to actively play their leading and normative roles, establish supporting legal, financial and market systems, and correctly guide the development of environmental protection stewards.

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