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Research on the Management and Countermeasures of Urban Construction Waste: A Case Study of Yiyang

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***Abstract*: The management of construction waste has become one of the major problems in urban management in China. This paper conducts a comparative analysis of the management models of urban construction waste in developed foreign countries, identifies the problems and gaps in the management of construction waste in Yiyang compared with other regions, and thus proposes scientific countermeasures and suggestions for dealing with construction waste in Yiyang.**
***Keywords*: construction waste reduction; resource utilization; recycling**

I. INTRODUCTION

China is in a period of rapid urbanization. The urbanization process has expanded the scale of urban land use, resulting in a year - by - year increase in the output of construction waste, which has become a pain point in the development of major cities. At the same time, a large amount of construction waste is directly disposed of by open - air stacking or landfill, which not only consumes land resources but also requires a large amount of construction funds for waste removal. The environmental pollution caused during the removal and stacking process seriously damages the ecological environment. In order to solve this major problem affecting the urban environment, this paper adopts the methods of comparison and empirical research, trying to find a way of urban construction waste management that is in line with China's national and municipal conditions.

II. DEFINITION OF CONSTRUCTION WASTE

The "Regulations on the Management of Urban Construction Waste" issued by the Ministry of Construction on March 23, 2005, pointed out that construction waste refers to the muck, waste materials, and other waste generated by construction units and construction enterprises during the construction, renovation, expansion, and demolition of various buildings, structures, pipe networks, etc., as well as during the decoration and renovation of houses by residents. Although there is a clear definition in national laws and regulations, in the research field, scholars have different definitions of construction waste[1]. Briefly speaking, construction waste mainly refers to the waste generated during the construction, renovation, expansion, and demolition of structures. Specifically, construction waste refers to solid waste generated during the construction, maintenance, and demolition of buildings (structures), mainly including waste concrete blocks, waste asphalt concrete blocks, and mortar, concrete, and broken brick slag scattered during the construction process[2-4].

III.MANAGEMENT OF URBAN CONSTRUCTION WASTE ABROAD

A. Management of Construction Waste in Developed Countries

1) The United States generates about 800 million tons of urban waste each year, of which construction waste accounts for 325 million tons, accounting for 40% of the total urban waste. After sorting, processing, and transformation, about 70% of the construction waste is recycled, and the remaining 30% is landfilled as needed.

2) Singapore generates about 600,000 tons of construction waste each year. 98% of the construction waste is processed, and 50% - 60% of it is recycled. At the same time, relevant policies for construction waste treatment have been formulated, such as the Environmental Pollution Control Act and the Public Environmental Health Act. When a project is completed and accepted, the disposal of construction waste is included in the scope of the acceptance index system.

3) Japan has a small land area and relatively scarce resources, so it attaches great importance to the recycling of resources and regards construction waste as a by - product of construction. Japan's leading principle is to minimize the discharge of construction waste from the construction site as much as possible, and to reuse it on - site as much as possible. For construction waste that is difficult to reuse, it is properly disposed of in accordance with relevant regulations[5-6].

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B. Enlightenment and Theoretical Reference of Construction Waste Management in Developed Countries to China

1) Focus on recycling and strengthen the source control of construction waste. Developed countries attach great importance to the recycling of waste and have long carried out classified management of waste. Source control of construction waste means reducing it through scientific management and effective measures before it is formed. Actions are unified in terms of industry standard formulation, construction management, and government supervision to minimize waste generation. Enterprises with "zero" construction waste emissions are encouraged and rewarded. For construction waste that cannot be avoided, scientific means are adopted to strengthen recycling and comprehensive utilization, turning it into renewable resources.

2) Strengthen the maintenance of existing buildings and improve the service life of buildings. Try to renovate and transform old buildings to update their functions, avoiding the random demolition of buildings. This can fundamentally reduce the generation of construction waste, lower manufacturing costs, and reduce environmental damage, which is more effective than long - term end - of - pipe treatment.

3) Industrialize the comprehensive utilization of urban construction waste. In developed foreign countries, the resource utilization of urban construction waste has been regarded as an important goal of environmental protection and social development. In these countries, construction waste is a kind of resource, giving rise to a new industry. The recycling of construction waste in China is currently in its infancy. We can learn from the practices of developed countries to promote the healthy development of this emerging industry and let "resources in the wrong place" play their value.

4) The government has a strict supervision system. Developed countries attach great importance to the management of construction waste and have developed management norms and supervision systems in line with their actual situations. There are strict regulations for all links of construction waste generation, utilization, transportation, and landfill. Those who violate the regulations are severely punished.

IV. CURRENT SITUATION AND COUNTERMEASURES OF CONSTRUCTION WASTE MANAGEMENT IN YIYANG

A. Current Situation of Construction Waste Management in Yiyang

1) The quantity of construction waste is increasing rapidly, and the removal pressure is increasing. Yiyang is in an important period of expanding the urban framework and large - scale urban construction. The development zones around the city are the key areas for development and construction in the whole city, while the old city in the urban area faces important construction tasks such as renovation and the relocation of industrial enterprises. According to preliminary estimates, the city generates no less than 30 million cubic meters of construction waste each year, with an average of 82,200 cubic meters per day. The removal of such a large amount of construction waste has a great impact on traffic, the environment, and people's lives.

2) The lack of analysis of the stakeholders in the generation of construction waste has led to a chaotic removal market. Due to the lack of research and judgment on the relevant stakeholders of construction waste, the dominant position of the government is missing, and transportation teams act independently. This not only damages the legitimate rights and interests of construction units but also disrupts the order of the removal market.

3) There is a lack of support for the recycling and "reduction" of construction waste, which has a great impact on the environment. The city has not issued preferential policies to support the recycling of construction waste, and there is no mandatory requirement for construction units to "reduce" construction waste. As a result, the enthusiasm of social forces to participate is not high. At present, there are more than 30 construction waste recycling enterprises in the city, but their scales are generally small. Through comparison, it is found that the treatment of construction waste in Yiyang is linear, mainly relying on direct landfill, while in developed countries, the treatment of construction waste is three - dimensional, with more diverse treatment methods, effectively protecting the environment.

4) The management system is not perfect, the management agencies are not clear, and there are difficulties in supervision and management. From the perspective of the harm of construction waste to the environment, the whole process of its generation, transportation, and disposal should be included in the scope of management. From the perspective of resource and environmental management, it should also include the recycling and resource recovery of construction waste. However, the current management agencies are not clear in these aspects, resulting in ineffective supervision.

B. Countermeasure Suggestions for Construction Waste Management in Yiyang

The management of construction waste in Yiyang should strengthen comprehensive utilization. This is an important measure to solve the problems of "three highs and one low" in the city, namely high energy consumption, high pollution, high emissions, and low efficiency.

It is also an important way to develop a circular economy and build an environment - friendly and resource - saving society. It is an inevitable requirement for the Yiyang Municipal Party Committee and the Municipal Government to implement the scientific outlook on development, achieve sustainable development, and protect the environment.

1) Basic Principles of Construction Waste Management in Yiyang

Reduction of construction waste generation**: Construction waste is "waste" generated by human production and life. It is necessary to strengthen publicity, guide construction enterprises to use new building materials and construction methods from the source, and reasonably allocate interests and responsibilities. In this way, the generation of construction waste can be greatly reduced.

Resource - based management of construction waste**: Construction waste is a renewable resource. Both construction waste residues and excavated soil can be used on - site. Although the cost of utilization is relatively high due to technical reasons, from a long - term and sustainable perspective, the resource - based and comprehensive utilization of construction waste is a trend, and it will ultimately achieve a win - win situation in economic and social benefits, which is beneficial to the country and the people.

Intensive removal of construction waste**: Similar to domestic waste, construction waste should be removed and managed by the government, and the removal costs should be borne by the units that generate the waste.

2) Management Model of Construction Waste in Yiyang

The management model of construction waste in Yiyang should be "a combination of government - led and market - participation" and "whole - process management".

"A combination of government - led and market - participation": Construction waste removal teams should be established in each district. The specific operation mode can refer to the mode of the district's urban appearance department in removing domestic waste. The removal vehicles are purchased by other social forces, and the transportation personnel are uniformly managed and trained. The investors obtain income by settlement according to the removal quantity. For the harmless treatment and recycling of construction waste, social investment and government subsidies can be used to attract social forces to adopt new technologies for treatment.

"Whole - process management": Supervise the whole process of the generation, transportation, and disposal of construction waste. Try to reduce the generation of waste, ensure clean transportation and one - step - in - place dumping and treatment of the generated construction waste, and adopt new technologies to improve the recycling of construction waste.

V. CONCLUSION

In conclusion, the management of urban construction waste in Yiyang should first require construction enterprises to carry out clean production to achieve the goal of "reduction" and reduce the generation of construction waste from the source. For the generated construction waste, adhere to the whole - process management. The government departments, enterprises, and the public should strengthen cooperation to ensure that each link is under strict supervision. Formulate norms for the recycling of construction waste and give certain support to recycling enterprises to increase the proportion of recycling.

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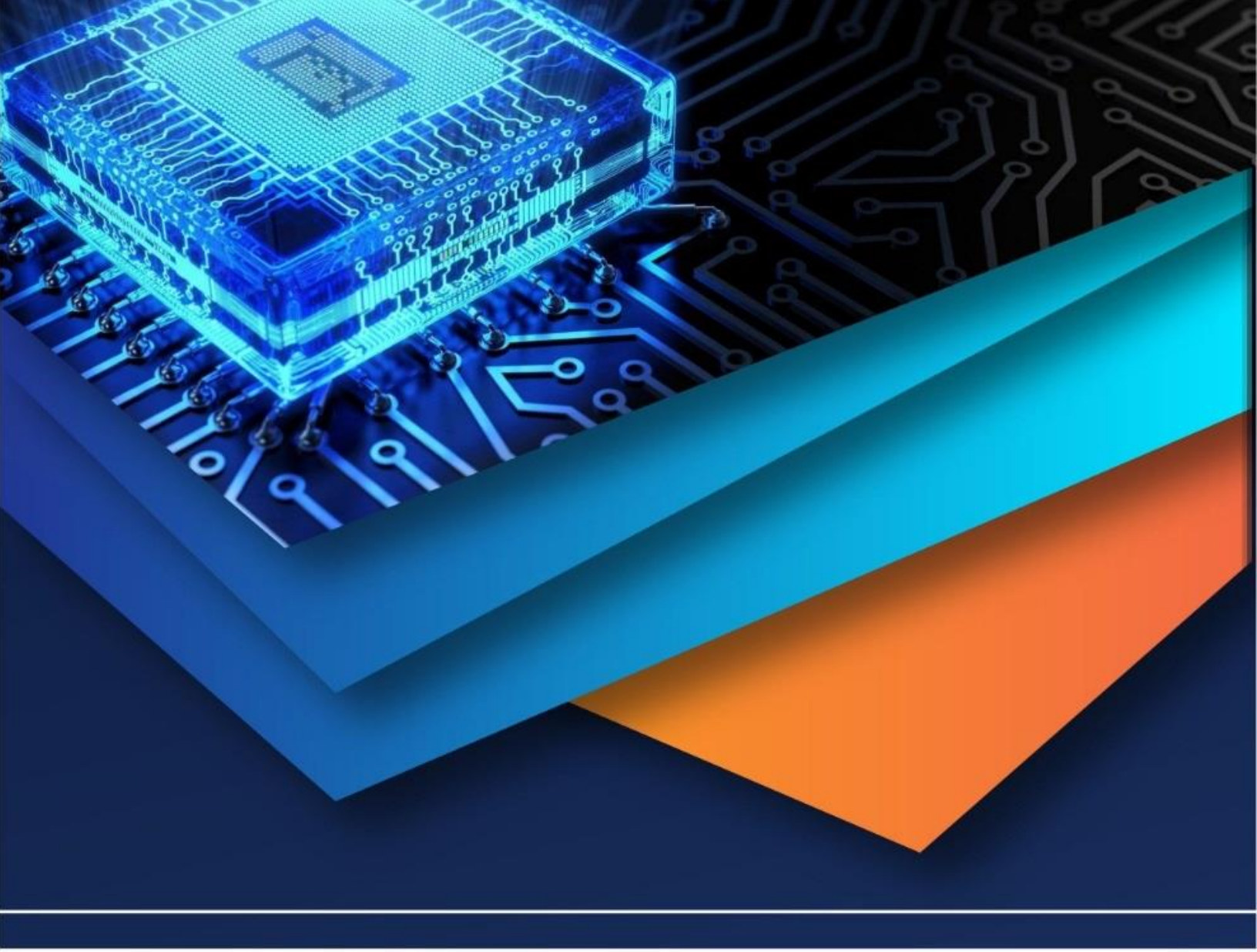

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