

THE PRESENT SITUATION AND DEVELOPMENT OF GREEN TRANSPORTATION CONSTRUCTION

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ABSTRACT

As is well-known, transportation system plays an irreplaceable role in economic development, improvement of people's livelihood and cultural exchanges. However, with the increasing number of private cars, limitations of transportation planning methods and people's non-environmental friendly travel habits, a series of ecological problems such as continuous increase of carbon emissions and traffic jams have resulted. Therefore, this essay discusses some problems that exist in the ecological and environmental protection of the transportation system and its future development trend from three aspects: carbon emissions, transportation planning and resource allocation, and people's travel habits. Finally, three examples are given respectively from these three aspects, and the application of new planning methods, reuse of waste materials and green travel habits in green transportation construction is analyzed, which provides ideas for the further development of green transportation construction.

1. INTRODUCTION

The impact of the transportation industry on the ecological environment is obvious and self-evident. At present, in many cities, there are often ecological problems such as smog and traffic jams. With the progress of society, people pay more and more attention to ecological issues. The report of the Party's 20th Congress proposed to "Accelerate the green transformation of development mode". Promoting green and low-carbon economic and social development is a key link to achieving high-quality development. Accelerate the adjustment and optimization of industrial structure, energy structure and transportation structure. The Outline of the National Comprehensive Three-dimensional Transportation Network Plan proposes that by 2035, "the intensification and integration of the utilization of comprehensive transportation channel resources will be greatly improved. Basically realize the greening of the whole process and cycle of transportation infrastructure construction (2021). In the current era, new technologies and materials are expected to be applied to the transportation industry to promote the development of green transportation, which is also the future development trend.

2. PROBLEMS

2.1 Carbon Emission

As is well-known, the transportation sector has a huge demand for energy. In addition, it will also emit carbon dioxide and pollutants. According to the National Bureau of Statistics, the transportation sector consumed 413.099 million tons of standard coal in 2020, accounting for 7.88 percent of the country's total energy consumption. In 2020, China's transportation sector will emit 930 million tons of carbon emissions, accounting for about

15% of the country's terminal carbon emissions (Ding Fan et al., 2023). And from the current situation, the transport industry is still in a severe situation in terms of carbon emissions and resource demand. Therefore, it is urgent to develop green transport, reduce carbon emissions and improve resource utilization.

2.2 Transportation Planning and Resource Allocation

At present, the transportation industry is not at the advanced level of development, development limitation and single problem of planning is still applied. On the one hand, the road planning process was relatively simple, which contributed to some problems such as traffic jams. On the other hand, there are some problems in the allocation of resources, which result in the waste of resources and affect the pace of green transportation construction.

2.3 Travel Philosophy and Habits

There are still many people who do not understand the green travel concept and travel habits. They think it is more convenient to travel by private car. Although there are a large number of private cars, which often cause traffic jams in some densely populated places, people's habit of using private cars has not changed due to fixed thinking. Even if the travel distance is not far, they still choose to take private cars. This makes it difficult to apply green technology.

3. FUTURE DEVELOPMENTS

3.1 Carbon Emission

New materials and new processes suitable for transportation infrastructure are available and should be used to reduce carbon emissions. If the reuse of waste materials is encouraged, it is bound to result in the use of new materials, thereby indirectly reducing carbon emissions and directly improving the utilization of resources. Therefore, there are many ways to reduce carbon emissions, which can be carried out from the following perspectives: first, do a good job of recommending the use of low-carbon technologies suitable for transport infrastructure; Second, strengthen the research of new materials and new structures, so as to apply them to transportation; Third, strengthen the reuse of waste materials of transportation infrastructure and improve the utilization of waste materials.

3.2 Transportation Planning and Resource Allocation

In order to avoid the problems caused by unreasonable planning, we should carry out comprehensive overall planning as soon as possible, and rationally plan and design the main and secondary roads and expressways, so as to alleviate the problem of traffic jams and facilitate the travel of residents. For example, in the planning and design, bus lanes should be designed, and there should be corresponding paths for pedestrians and bicycles. Passenger and cargo traffic diversion will improve travel efficiency.

At present, the allocation of resources of our country also has a certain problem, the construction and development of strengthening public transport is unstoppable. In the process of road transport, it is necessary to constantly improve the performance of public transport vehicles, increase the number of public transport vehicles, so that they can reach every corner of the city, reduce the frequency of motor vehicle travel, reduce the emission of pollutants to a certain extent (Zhou Bei, 2023), improve the utilization rate of resources.

3.3 Travel Concept and Habits

The government should strengthen the communication with the public on the basis of vigorously developing bus rapid transit system and rail transit system: at present, it is convenient for people in many places to take subway, bus and other means of transportation, but people still retain the old travel habits and ideas, so they make less use of public transport. Therefore, the government can vigorously promote the use of public transport through public media such as television and Internet, and at the same time use economic means to promote residents to develop a low-carbon life concept, improve the awareness of environmental protection of residents, and take the initiative to use bus, subway and slow travel when the travel distance is not far.

4. CASE STUDY

4.1 Carbon Emission

In the reconstruction and expansion project of the Baomao Expressway (Baodong Section) in Inner Mongolia, the construction personnel used industrial steel slag waste to construct a test section. The results show that the carbon emission of eight-lane road can be reduced by 58.3tCO₂ per kilometer, and the carbon emission reduction rate of steel slag can reach 81%. In the Xingba Expressway (Qingshuihe Reach) project, fly ash is applied to lay the experimental section, and fly ash and lime are combined to replace cement. The carbon emission reduction rate of four-lane road per kilometer is 40tCO₂, and the carbon emission reduction rate of fly ash is 12% (Shi Zhanbin et al., no date).

It can be seen that the application of appropriate new materials in road infrastructure, the adoption of appropriate new processes and strengthening the reuse of waste materials, can reduce carbon emissions to a large extent, which is of great benefit to the development of green transportation.

4.2 Transportation Planning

In the industrial park of Beiliu City, the designer adopted the method of diverting passenger and truck traffic for the local area with a large volume of freight traffic, which improved the efficiency of truck transportation, reduced the interference between passenger and truck, and alleviated the problem of traffic jam. In addition, the designer also makes reasonable planning for roads. Roads of the same grade adopt different section forms according to their different functions, and bus routes are laid in layers and gradually formed into a network, thus improving traffic efficiency (Chen Zhenyu, 2013).

In the eastern New District of Hohhot, the government has made great efforts to develop public transportation, extending the original five rail transit lines and adding a new rail transit line to connect all important functional areas between the old city of Hohhot and the eastern New District. At the same time, the number of buses has been increased, the departure interval has been shortened, and the proportion of clean and environmentally friendly vehicles has been increased. In addition, electric buses have been installed in large parks and residential areas, effectively making up for the gaps in the city's public transport network. Finally, the designers integrated multiple modes of transportation to achieve seamless transfer and improve travel efficiency. The eastern New District has successfully built a chain travel mode composed of rail system, public system, bicycle and walking, which minimizes the time interval of transfer between different travel modes and thus reduces residents' dependence on private cars (Hong Liangping & Guo Ziwei, 2014).

4.3 Travel Habits

If appropriate traffic planning scheme is adopted, people's travel efficiency can be greatly improved. But to change people's travel habits, some economic tools are needed (Chen Caiyuan & Zhou Yang, 2022), but they must be introduced gradually. Common international practices include paying license tax policies, congestion charging policies, stepped parking charging policies and profit and tax incentive policies for clean energy vehicles (Hu Yao & Lv Bin, 2012), so as to achieve the purpose of restricting the use of cars in central areas, ensuring the smooth road in rush hour and improving the travel ratio of green buses, so as to help people change their travel habits to choose green travel options for short distances.

5. CONCLUSIONS

With the continuous development of science and technology, the construction of green transportation has been the general trend. The application of some new materials and waste materials in the construction of transportation infrastructure can reduce carbon emissions to a large extent. In addition, reasonable planning of road traffic system and cultivating people's good green travel habits are also helpful to the construction of green transportation. In the current era, how to study the new materials suitable for transportation, judge which waste materials are helpful to the development of green transportation and how to make people develop good travel habits, will be the top priority of the future work.

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