

Research on Green Transportation and Transfer System in Urban Areas

Jiang Pan

School of Transportation, Wuhan University of Technology, Wuhan 430070, P.R.China

20173105@qq.com

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Abstract. The green transportation of urban is a need of the society, and it also reflects the advance of city. Moreover, it has played foreshadowing function for the development of tourism industry. Public transport and bicycle/electric bicycle transport are regarded as the main component parts of the green transportation of urban. The paper has studied the positive role of the traffic-tools such as bus and bicycle to development of tourism city. The result of this paper show that takes some counter measures in practice will be of momentous current significance and far-reaching historical significance.

Introduction

The "green transport" aims to reduce traffic congestion, reduce environmental pollution, promote social equity and save construction costs. This new concept has an important role in guiding for transport development in urban. Therefore, following the "Smooth Traffic Project", the Chinese Ministry of Construction & Ministry of Public Security in 2003, launched green transport plan. These positive measures for the protection of urban history, culture and traditional style as well as the development of urban tourism are important.

Green Transportation System and Urban Development

Green transportation is a practical goal. It has three parts, namely, accessibility & order; safety& comfort and low energy consumption. Based on this, Chris Bradshaw, in 1994, pointed that the green transportation system should be contained of walking, cycling, and public transport. Chris Bradshaw prioritizes green transport tools, followed by foot, bicycle, public transport, carpool, single-occupant Automobile. For China, the green transportation mode can be divided into: walking, cycling, public transport (tram, subway, light rail, bus), the electric bicycle.

According to the International Association of Public Transport (UITP)'s survey of 45 cities around the world (see Table 1), In Europe and Asia, the average transport energy consumption in the high proportion of " Foot, Bicycle, Public transport " are much lower than the non-"green transportation". Thus, green transportation is an effective means to achieve the sustainable development of urban transport [1].

Table 1 the urban population density, travel mode, fuel consumption and travel cost

Region	Population Density(p/sq km)	Foot, Bicycle, Public transport share of travel ratio (%)	The average transport energy consumption (J / × 10 ⁶)	Travel costs (% of GDP)
United States, Canada, Oceania	1750	15.5	48000	12.6
Europe	4550	53.0	15500	8.5
Asia (cities in developed countries)	13400	61.5	11000	5.5
Asia (cities in	16600	77.5	5800	12.0

developing countries)				
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Green Transportation and Transfer System

Advocating the public transport priority policy. Give priority to the development of public transport, mainly involving financial, tax support and the support of legislation [2].

Developing low-pollution public vehicles. To develop the urban green transportation, it is necessary to limit motor vehicles, eliminate the high-pollution models and great efforts to build a rail transit system. Many cities have adopted these measures [3].

Establishing the transfer system. In China, walking, bicycling/electric bicycling and by bus are the common ways to travel. As lacking of attention to Bicycles/electric bicycle-Bus transfer system, therefore, this paper focuses on it.

The establishment of bicycle/electric bicycle lanes. Bicycle/electric bicycle lanes should have a good traffic environment. That should be recognized in the development of urban green transportation and overall urban planning. The Planning and design for road network should follow the order: Traffic survey - Analysis - Prediction of Travel Distribution - Initialing planning program - Testing & Adjusting - determining the bicycle lane network planning.

Bus station next to the transfer-parking station. As the foregoing discussion, for "Bicycle/electric bicycle to Bus" transfer mode, we have demonstrated the significance of the bicycle/electric bicycle parking station. However, not only establishing bicycle/electric bicycle parking station to promote the development of urban is need, but also having the appropriate conditions, which contain the following points are shown in Table 2:

Table 2 Recommendations of establishing parking station

Operation	Significance
Priority to meet the storage of transfer bicycle	Convenience for travling.
Ensure that space is large enough	Convenience for transfer
Set rental business	Convenience for renting to one wihtout bicycle
Unified management	Renting and returning in different place
Various colors of bicycle//electric bicycle	convenience for management
Reasonable charges	Control the number of bicycle/electric bicycle
Set the repair operations	Convenience for maintenance
Adequate management personnel	Shorten the transfer time

Other place/station next to the transfer-parking station. With the further development of urban green transportation and the tourist city as well as the number of foreign tourists, bicycle/electric bicycle as a transport tool contacts residential place, railway stations and bus stations is a trend in urban development. In the planning of such establishments, non-motorized vehicles are also very important.

Green Transport Planning for Xi'an City

Xi'an, because of its unique urban layout, the gates is the only way to go to Xi'an city center. The road sections associated each wall-gate have been saturated or nearly saturated. It does not meet the requirements of sustainable urban development.

To solve the problem can be based on "bus priority" policy. The current situation of Xi'an bus network layout is "3 more, 3 less", that is, urban lines are more than suburb lines; lines from east to west are more than north to south; the south district lines are more than the north, and density

distribution of the overall bus lines is uneven. The specific characteristics of urban public transportation network parameters are shown in Table 3 [4].

Table 3 Public transportation network characteristic parameters of Xi'an city

District	Density of road network		Line density (km/km ²)	Coefficient of line repeat
	Area density of the road network (km/km ²)	Population density of the road network (km/10000person)		
Mingchengqiang	3.84	1.03	27.68	7.00
Between 1st and 2nd Ring Road	2.09	1.24	12.8	6.28
Out of 2nd Ring Road	0.18	1.73	1.73	0.57
Overall	0.22	1.56	0.89	3.88

Xi'an has established the "bus priority" policy, which is to establish BRT in Short-medium-term planning, and ordinary bus as a supplement to develop the green transportation.

In addition, as a tourist city to develop green transport, a large number of bicycle/electric bicycle transfer-parking station. According to the existing parking facilities and available open spaces, the design of the parking layout is shown in Figure 1.

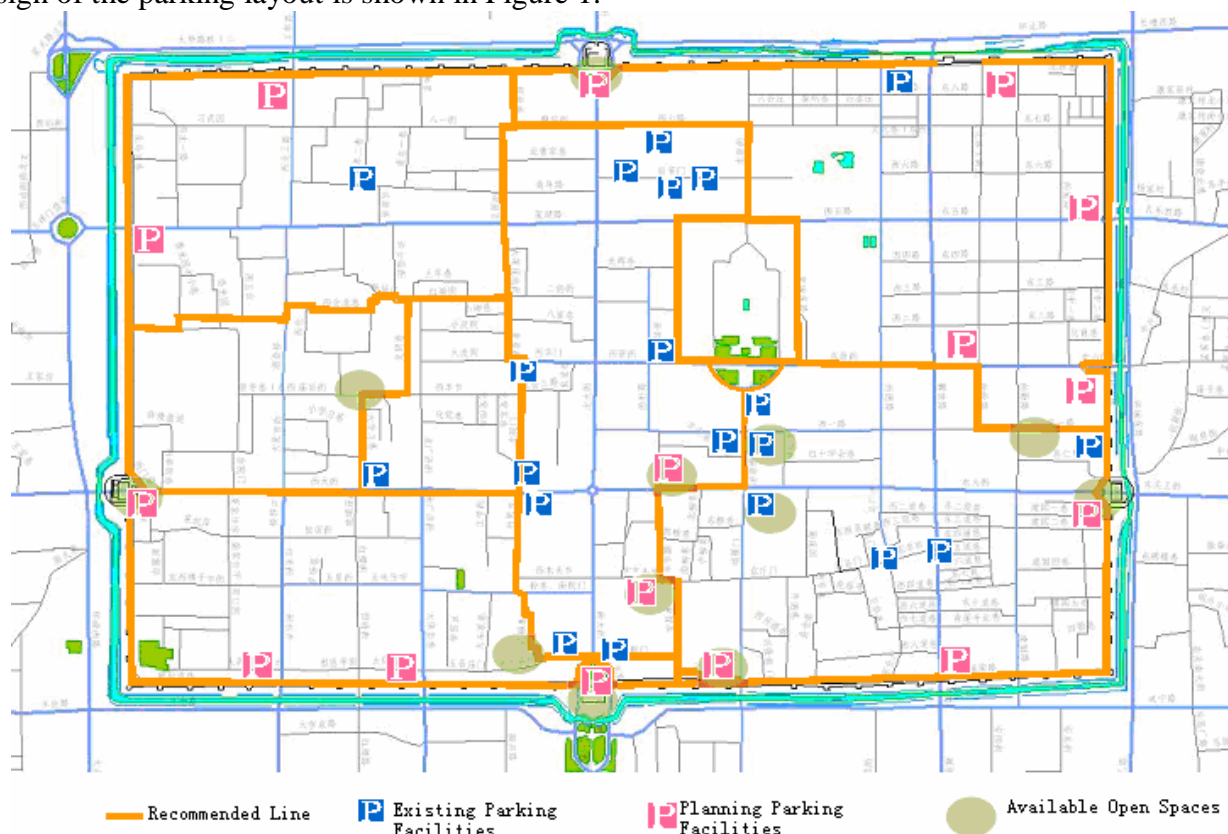


Fig. 1 Design of parking facilities layout

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