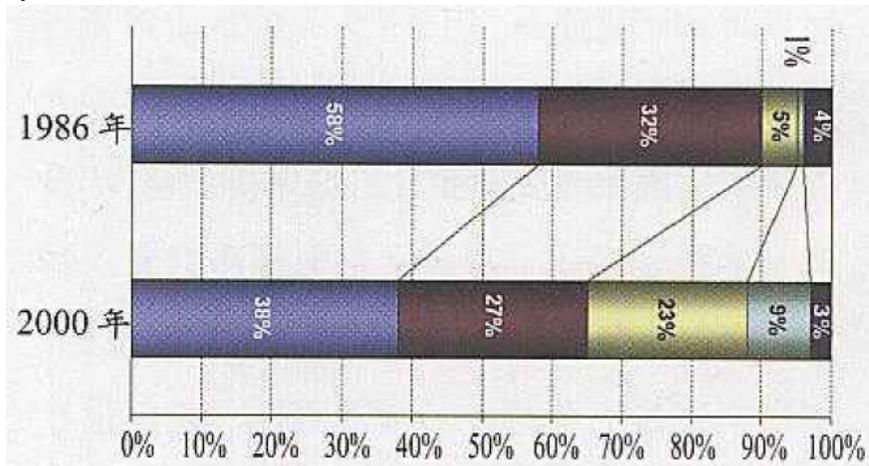


Improving the pedestrian and bicycle transport system in downtown of Beijing

Background

China was once called the kingdom of bicycle. In Beijing, The ownership of bicycles was 4 million in 1989 when the population then was 10.75 million. Since then comes the era of mobility. At the end of 2009, the ownership of vehicles was 4 million while the population in Beijing was 17.55 million. At the end of 2008, the ownership of bicycles was 1.5 million, among which 845 thousand were the electric bicycles. Attentions has been shifted from bicycles to vehicles in the eyes of management organizations and public. More invested on mobility development and bicycle environment has been less attractive than before. Share of bicycle in all trips has dropped dramatically from 58% in 1986 to 38 in 2000. In 2009, the share of bicycle is less than 20%.^[1]



From left to right are: bicycle, public transport, passenger cars, taxi, etc.

Figure 1. Model split in 1986 and 2000.

Source: Beijing Municipal Institute of City Planning and Design

Pedestrian Environment has become worse as well with the development of mobility. Worse air quality and aggressive vehicle driving and parking, along with other negative elements, made pedestrians walking away. Expectation of Safety and Sense of Satisfaction decrease among the remained pedestrians.

Under this background, in order to improve the pedestrian and bicycle environment, the demonstration project has been carried out. The scope is as follows:

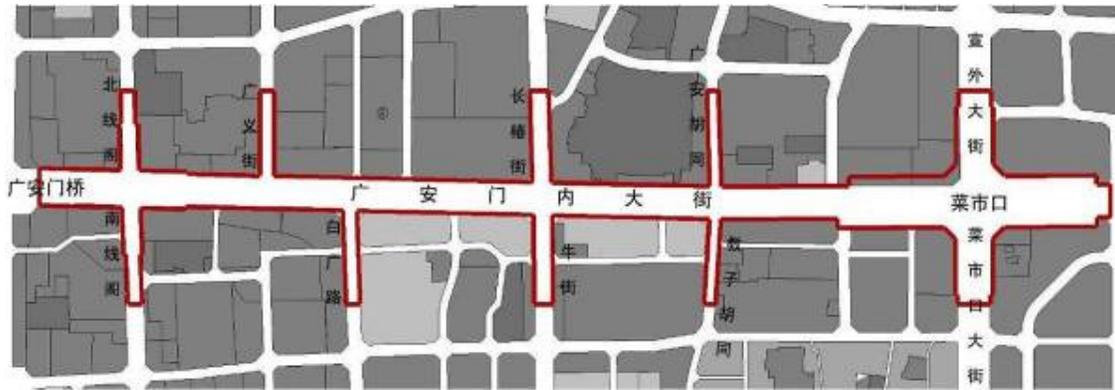


Figure 2. Scope of the Project

The east-west arterial is about 2km long, with which six south-north streets intersect. Around 300-400 meters of these six streets are within the scope of the project.

Problems

In this area, there are typical problems on sidewalk and bicycle lanes as follows.

1 Problems of pedestrian transport

1.1 Width of sidewalk

In some places the sidewalk is not wide enough for walking; In other places there are no sidewalks at all.



Figure 3~4. narrow sidewalk or no sidewalk

Source: Beijing Municipal Institute of City Planning and Design

1.2 Facilities occupied sidewalks

In some places, sidewalks have been occupied by various facilities such as signal poles, signs, book stalls and electric facilities.



Figure 5~6. sidewalk occupied with facilities.

Source: Beijing Municipal Institute of City Planning and Design

1.3 Sidewalk parking

In some places in this area, cars park on sidewalk where should be the space for walking.



Figure7. Sidewalk parking

Source: Beijing Municipal Institute of City Planning and Design

1.4 Pedestrian crossing

One problem is lack of disabled facilities, the other problem is lack of pedestrian island in the middle of the street.



Figure 8~9. Crossings without disabled facilities or pedestrian island
Source: Beijing Municipal Institute of City Planning and Design

1.5 Broken pavement and discontinuous blind lanes

It is ordinary to see broken pavement and discontinuous blind lanes in this area.



Figure 10~11. broken pavement and discontinuous blind lanes
Source: Beijing Municipal Institute of City Planning and Design

2 Problem of bicycle transport

2.1 Right of bicycle lane

Cars run and park on bicycle lane in this area which is illegal but prevail.



Figure 12~13. mix traffic on bicycle lane

Source: Beijing Municipal Institute of City Planning and Design

2.2 Bus stop and bicycle lane

In some places, bus stop is on sidewalk which means buses have to intervene with bicycles while getting in and out of the stop.



Figure14~15. Buses intervene with bicycles

Source: Beijing Municipal Institute of City Planning and Design

2.3 Bicycle parking

Whether it is convenient or not to park the bicycle is important for promoting the bicycle transport. The parking facilities are not well organized in this area, thus the bicycle parking is not in order as well.



Figure 16~17. bicycle parking

Source: Beijing Municipal Institute of City Planning and Design

Driving forces

As shown in the following figures, sidewalk and bike lane have been heavily used in this area. The maximum pedestrian volume exceeds 2000 ppl/h and the maximum bicycle volume exceeds 3000 b/h. These pedestrian and cyclists are the biggest driving force to improve the pedestrian and bicycle transport environment in the demonstration project.^[2]

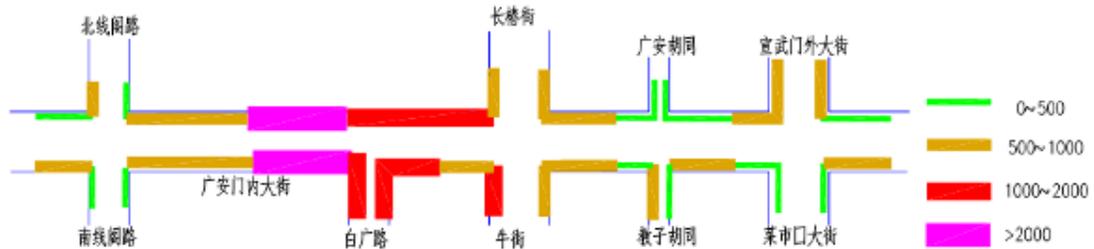


Figure18. pedestrian volume at peak hour

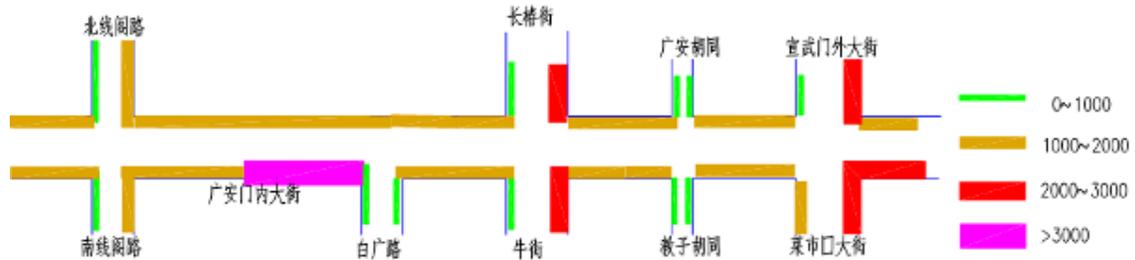


Figure19. bicycle volume at peak hour

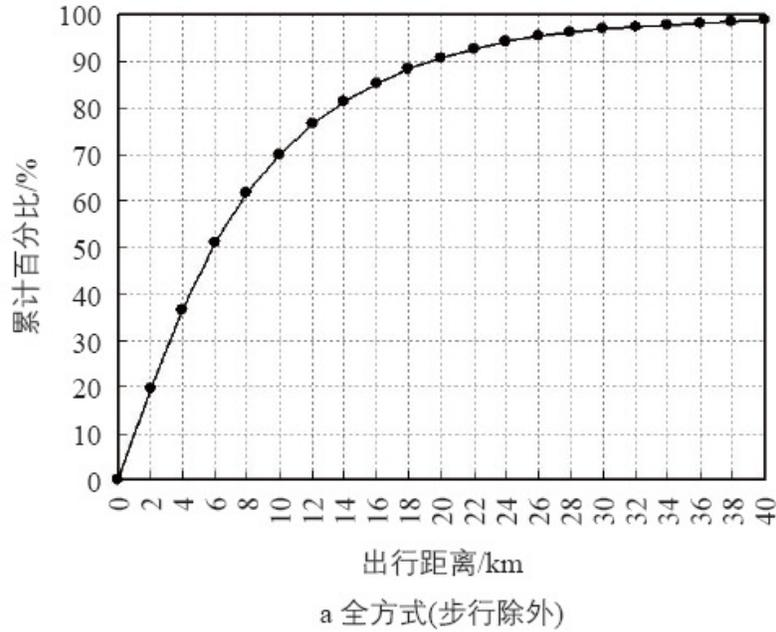


Figure20. distribution of Beijing residents' daily travel distance in 2005
 Source: Beijing Transport Research Center.^[3]

PERSONS GOING TO WORK OR EDUCATION IN COPENHAGEN DISTRIBUTED ACCORDING TO TRANSPORT DISTANCE AND TRANSPORT MODE ROUND NUMBERS

	< 2 km	2-4,9 km	5-9,9 km	10-14,9 km	>15,0 km	Total
Walk	30,000	6,000	0	0	0	36,000
Bicycle	35,000	67,000	43,000	9,000	1,000	155,000
Car	3,000	18,000	27,000	23,000	67,000	138,000
Bus	1,000	9,000	14,000	3,000	1,000	28,000
Train	1,000	4,000	13,000	13,000	43,000	74,000
Other	0	0	1,000	1,000	4,000	6,000
Total	70,000	104,000	98,000	49,000	116,000	437,000

Figure21. persons going to work or education in Copenhagen distributed according to transport distance and transport mode
 Source: Copenhagen City of Cyclists Bicycle Account 2010^[4]

As shown in figure 21, over 40% of the trips are less than 5km and about 70% of the trips are less than 10km. in Copenhagen, most of the trips less than 10km are used by bicycle.

Proposals

1 Pedestrian Transport

1.1 Redefinition of sidewalk

In this project, sidewalk has been divided into three part. One part is walk zone where should be clear without any facilities. The other two parts called facility belt are for different facilities. See figure 22.^[5]

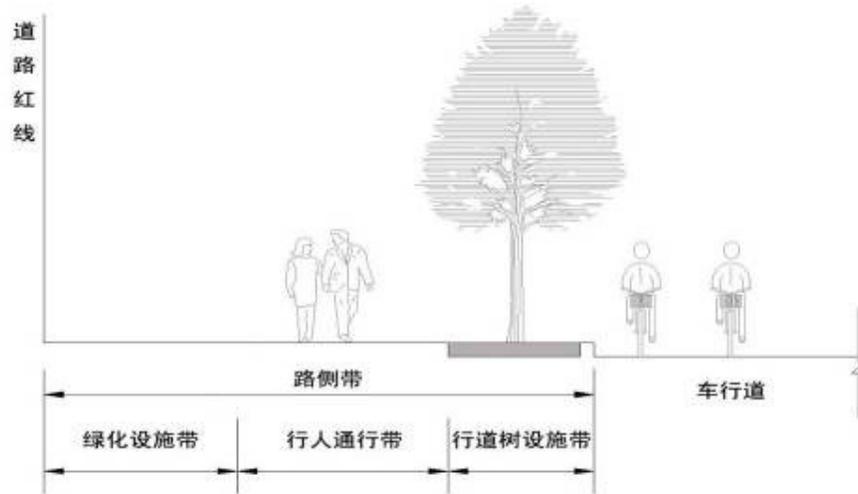


Figure22. Sidewalk Composition

Source: Beijing Municipal Institute of City Planning and Design

1.2 Facilities' arrangement on sidewalk

Various facilities are arranged within facility belt as following figures show.



Figure23~24. facilities' arrangement on sidewalk

Source: Beijing Municipal Institute of City Planning and Design

1.3 pedestrian crossing

level crossings are encouraged in this project. If overpass or underpass is used, disabled facilities such as elevator should be used as well. At level crossings, pedestrian island is required if crossing lanes are over 4.



Figure25~26. Pedestrian Island and elevators
Source: Beijing Municipal Institute of City Planning and Design

2 bicycle transport

2.1 bus stop island

bus stop has moved from sidewalk to the left of bike lane in order to avoid bus and bicycle intervention.



Figure27~28. Bus stop redesign
Source: Beijing Municipal Institute of City Planning and Design

2.2 bicycle parking

in order to encourage bicycle transport, numerous bicycle parking facilities have been installed on the area.



Figure29~30. bicycle parking facilities
Source: Beijing Municipal Institute of City Planning and Design

3 roadside parking

Taking the right of pedestrian and bicycle into consideration, roadside parking has been carefully redesigned or even canceled in this demonstration projects.



Figure31~32. roadside parking

Source: Beijing Municipal Institute of City Planning and Design

Conclusions

As green travel modes, walking and bicycling should gain more attention from the society. In order to encourage these transport modes, comprehensive efforts should be made from engineering, enforcement and education.

Reference:

- [1]Beijing Transport Annual Report 2009[R]. Beijing: Beijing Transport Research Center, 2010.
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