International Transport Forum
IRTAD
International Traffic Safety Data and Analysis Group
OECD

GRSI – Beijing Project of Improving Vulnerable Road User Safety at Intersections

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4th IRTAD CONFERENCE
Road safety data: collection and analysis
for target setting and monitoring performances and progress

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Background

- A 4 -year project during 2006－2009

- The Chinese Partners include：
  - Beijing Transportation Research Center
  - Beijing University of Technology
  - Beijing Traffic Management Bureau

Background

- Two phases:

➢ phase 1: Situational Survey
data collection/analysis, define the problem and design solutions

➢ phase 2: Solution Implementation and the outcome evaluation

Objectives

- To improve vulnerable road user safety at the urban intersections in Beijing

- To provide the good practice guide for other cities both in China and overseas.

Methods

- Data collection and analysis
  a) collect and analyze the existing crash data during Jan. 2001-March 2006
  b) collect and analyze the on site traffic and behaviour data of the selected intersections.

- Using low cost engineering countermeasures (channelization, barrier, pedestrian island,
  road signs, etc) to improve VRU's safety at the selected intersections.

- Using before/after data comparison to evaluate the effectiveness of the countermeasures used for the project.

Information of the Selected Intersections

Name	Numbers of Casualty Crash	Type of Intersection	Existing Safety Facility	Main Crash Type at Each Intersection
Dawang Bridge Arterial-minor arterial	9	Under bridge	Having Interchange station of bus and subway	Pedestrian
Xidan Intersection Arterial- arterial	12	At-grade interchange	North-south has underpass	Bicycle and pedestrian
Dongsishitiao Arterial--branch	11	Roundabout	Only the east has underpass	Bicycle
Dongdan Arterial- arterial	3	At-grade interchange	North-south has underpass East-west has overbridge	Bicycle and pedestrian
Jiangzhai Intersection Arterial- arterial	6	4-leg	Having Overpass in four directions	Bicycle
South gate of chaoyang park Arterial- minor arterial	2	3-leg	Underpass	Pedestrian

Location of the Selected Intersections

Problems, countermeasures and outcomes at Intersections of Xian and Dongsi Shi Tiao

Xidan

Xidan

Problem:

- Due to lack of channelization, many left turn bicycles crossing the street at one stage, which cause many conflicts between left turn bicycles and motor vehicles at the intersection;

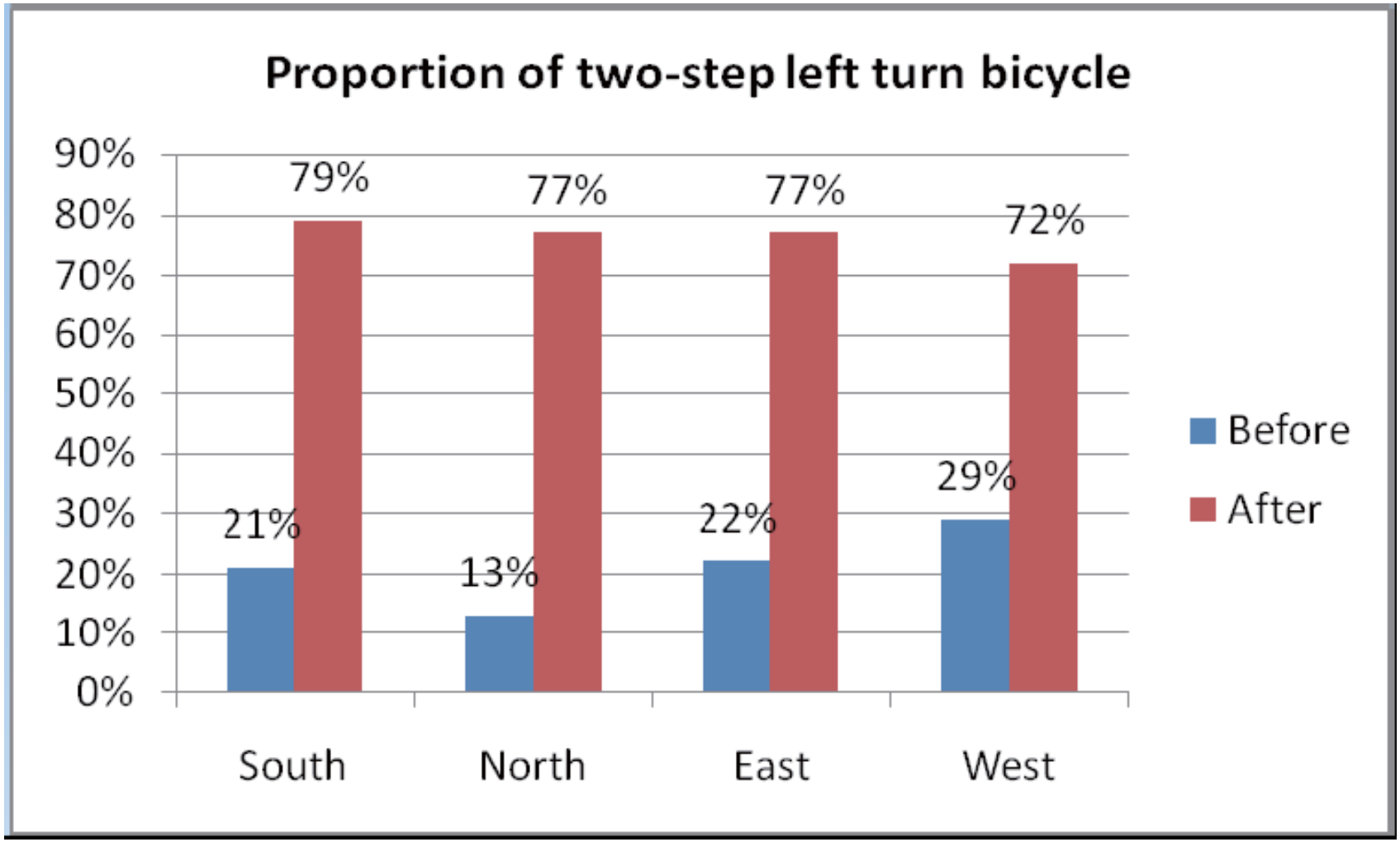
Countermeasure:

- Set up waiting line for left turn bicycles for two-step crossing

Before

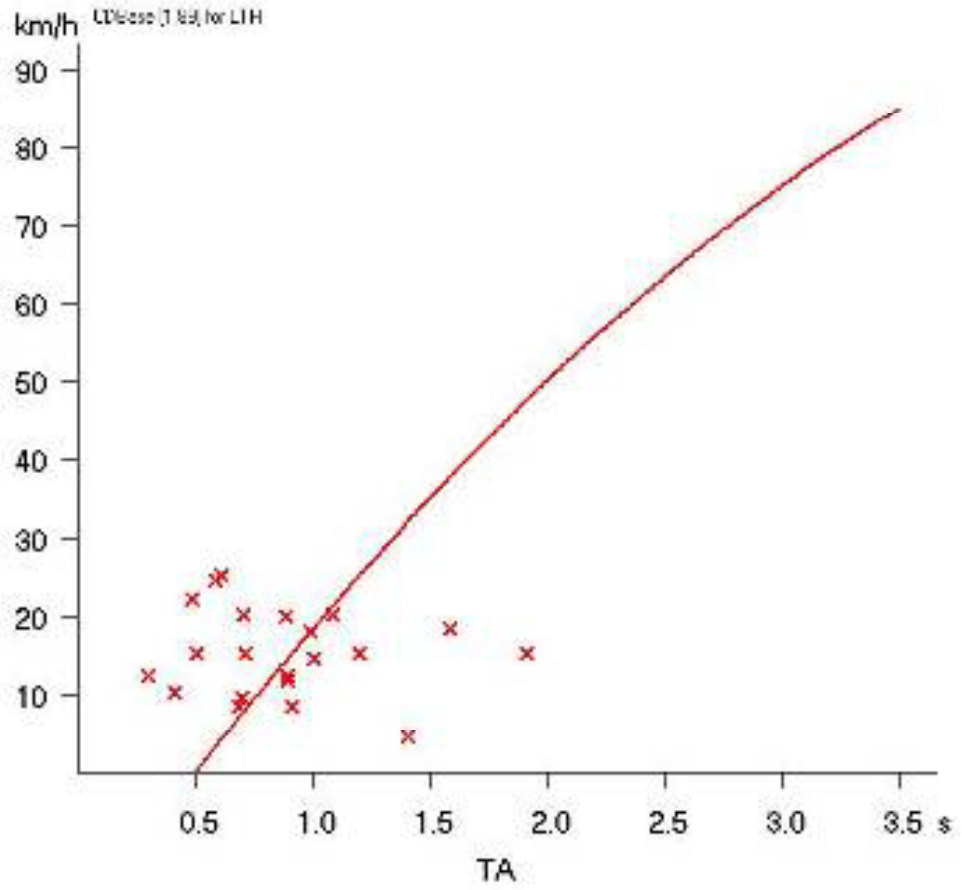
After

Xidan


Proportion of two-step left turn bicycle
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
79%
77%
77%
72%
21%
13%
22%
29%
South
North
East
West
Before
After

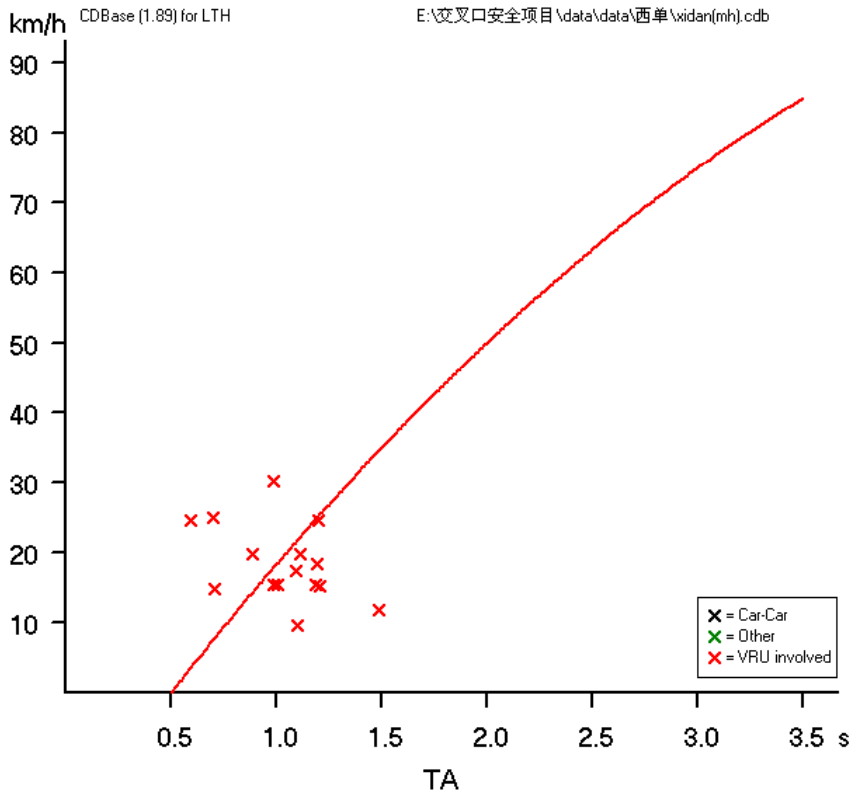
The Conflicts with Left Turning Bicycles

Before：



10 non serious conflicts per hour（45%） 12 serious conflicts per hour（55%）

After



11 non-serious conflicts per hour（69%）　　5 serious conflicts per hour（31%）

Xidan

The mean speed and 85-percentile speed of right turn vehicles

	Before	After
Mean Speed	16.5 km/h	15.4 km/h
V85 Speed	22 km/h	20.7 km/h

Problem 2

- Some pedestrians do not use the underpass as requested when crossing the intersection.

Countermeasure

- Install leading sign and barrier to guide pedestrians using existing underpass

Before

After

After – Barrier

After – Road Signs

Xidan

	Before	After
The number of pedestrians across the street on the ground per hour	27	12

Dongsi Shi Tiao

Dongsi Shi Tiao

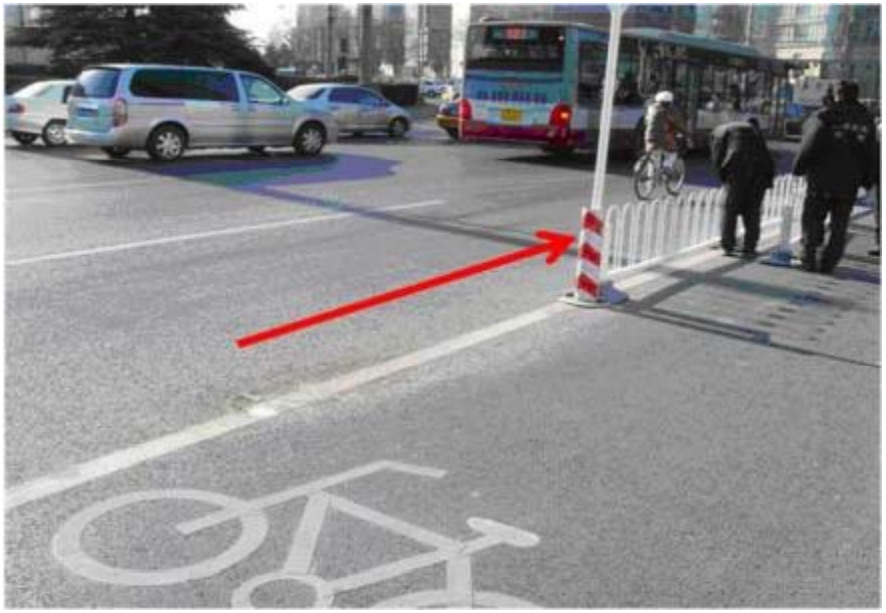
- Problems:

1. The barriers separating bicycles from vehicles were set inappropriately; therefore, many bicyclists use the vehicle lane.

2. The intersection is too big for the pedestrians to cross at one stage.

- Countermeasures:

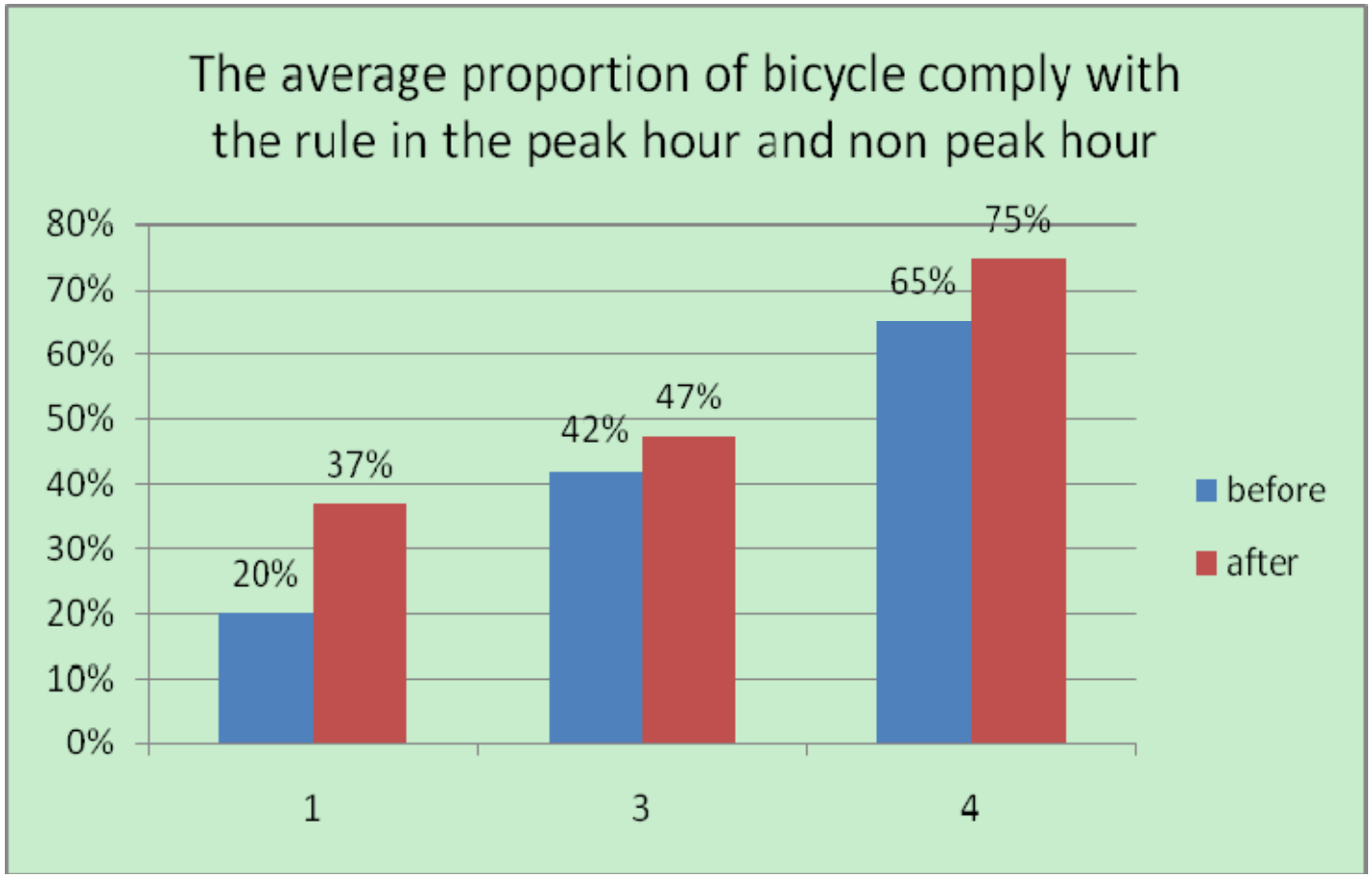
1. Modify the length and radius of the barriers;
2. Made the bicycle lane one meter wider at the section 1 ;
3. Install a 9-meter barrier between section 1 and 6;
4. Install pedestrian island for pedestrian's two-step crossing at the west entrance.



Before

After

Dongsi Shi Tiao



Dongsi Shi Tiao

- Pedestrian Island Usage：89%
- Average walking speed of pedestrians when crossing the Intersection
  - Before： 1.3m/sec.
  - After： 0.9m/sec.
- 79 percent of the pedestrians feel much safer when cross the street

Conclusion

- The traffic conflicts have been reduced at all selected intersections after taken the countermeasures;
- All road users especially the VRUs feel safer when crossing the intersections;
- To improve the road safety is not necessary expensive.

Discussion

- The countermeasures used in the project are neither expensive nor unique. What makes the project unique are:

  a) Multi-sector cooperation;
  b) Evidence based decision making

- However, it is only the beginning of the long process, there still are a lots of room for continuous improvement.

Discussion

- As a output of the project, a good practice manual *Design &Operational Guide on Vulnerable Road User Safety at Intersections* is being developed based on international/national good practice and experience gained from the project. The manual will be published in both Chinese and English. We hope it can be used as a reference book by leaders and professionals in the field of road safety.

Thank You!