

China Road Traffic Safety

The Achievements, the Challenges, and the Way Ahead

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China and Mongolia Sustainable Development Unit (EASCS)
East Asia and Pacific Region



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FOREWORD

Every year on Chinese roads between half a million to a million people¹ are killed or permanently disabled with millions more hospitalized, leaving behind shattered families and communities.

Road traffic injuries are a public health and social equity issue, disproportionately affecting the vulnerable road users and the poor. 67% of those killed and injured in road traffic accidents in China² are adults aged between 26 and 60 years – the breadwinners in a family. Road traffic injuries have an impact on development objectives, including delivery of the Millennium Development Goals (MDGs), because of their significant economic and social cost.

The World Bank Office in Beijing has produced this report – *China, Road Traffic Safety, the Achievements, the Challenges, and the Way Ahead* – to provide a comprehensive presentation of the current situation, including the achievements of the Chinese Government in the last five years, the experience of the World Bank over the last twenty years, and recommendations on the way ahead for World Bank's road safety initiatives. This report is also the first to provide an overview of the recent achievements of the broader international community.

As presented in the *World Report on Road Traffic Injury Prevention* (World Bank/WHO, April 2004), road traffic injuries are preventable. In some countries, an established set of interventions have contributed to significant reductions in the incidence and impact of road traffic injuries despite increasing traffic volumes.

But this requires strong political commitment and concerted, sustained efforts across a wide range of sectors at all levels (national, provincial, and local). A focus on results and learning from experience are key to reducing the impacts. The World Bank (and the broader international community) is committed to supporting the Chinese Government's initiatives towards reducing road traffic fatalities and injuries in the years to come.



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¹ See footnote 6 for the number of road traffic fatalities. General experience elsewhere estimates that for every road traffic fatality there are 4 severe permanently disabled cases (see *Global Road Traffic Injury: An Overview of the Problem*, Murray Mackay, *Technical Briefing on Global Road Traffic Safety*, United Nations, May 29, 2003).

² *2006 Annual Statistical Report on Road Traffic Accidents* (Traffic Management Bureau, Ministry of Public Security). 52% of the Chinese population is aged between 26 and 60 years (Year 2006 – 2007 *China Statistical Yearbook*).

CURRENCY EQUIVALENTS

(Exchange Rate Effective August 1, 2008)

Currency Unit = RMB (Chinese Yuan Renminbi)

RMB 1.00 = US\$ 0.146

US\$ 1.00 = RMB 6.85

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
ATC	Area Traffic Control
CDC	National Center for Disease Control and Prevention
GRSI	Global Road Safety Initiative
GRSP	Global Road Safety Partnership
HRI	Highway Research Institute (of the MOC)
ICR	Implementation Completion Report
MOC	Ministry of Communications ³ (Transport)
MOF	Ministry of Finance
MOH	Ministry of Health
MOST	Ministry of Science and Technology
MPS	Ministry of Public Security
MV	Motorized Vehicles
NDRC	National Development and Reform Commission
NH2	2nd National Highway Project
NMV	Non-Motorized Vehicles
PAD	Project Appraisal Document
PCD	Provincial Communications Department
PSB	Public Security Bureau
PSD	Public Security Department
RTA	Road Traffic Accident
RTI	Road Traffic Injury
RTSP	Road Traffic Safety Plan
RUE	Road User Education
TAIS	Traffic Accident Information System (of the Traffic Police)
TM	Traffic Management
TMC	Traffic Management Component
TMRI	Traffic Management Research Institute (Wuxi, Jiangsu Province)
UNICEF	United Nations Children's Fund
WB	World Bank
WHO	World Health Organization

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³ Until 2008, the MOC was responsible for interurban roads, and the Transport Department of the Ministry of Construction (MOCn) for urban roads. In 2008, the MOC and the Transport Department of the MOCn merged to form the Ministry of Transport (MOT).

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It is also available on the World Bank external website: <http://www.worldbank.org/reference/> (Documents & Reports).

DISCLAIMER

The findings, interpretations, and conclusions expressed herein are those of the author and do not necessarily reflect the views of the Board of Executive Directors of the World Bank or the governments they represent.

The World Bank does not guarantee the accuracy of the data included in this work.

Introduction

The Global Context

Road traffic injuries are a major but neglected global public health problem. Worldwide, the number of people killed in road traffic accidents each year is estimated at almost 1.2 million, while the number injured could be as high as 50 million. Without increased efforts and new initiatives, the total number of road traffic injuries and fatalities worldwide is forecast to rise by 65% between 2000 and 2020, while in low and middle-income countries, road traffic fatalities are expected to increase by as much as 80% over the same period.⁴

In 2002, road traffic injuries were the ninth leading cause of years lost⁵ worldwide, equal to 2.6% of the global burden of disease. On current trends, by 2020, road traffic injuries are likely to be the third leading cause of years lost.

China

The *World Report on Road Traffic Injury Prevention* (the “*World Report*”) predicts that the **East Asia and Pacific Region** will bear the highest number of road traffic fatalities between 2000 and 2020, with 28% of global road traffic fatalities in 2020.

According to the Ministry of Public Security (MPS), there were officially 104,372 road traffic fatalities in China in 2003. However, different approaches in calculating these fatalities may mean that the number has been underestimated.⁶

By contrast, according to the Ministry of Health (MOH), China had the highest number of road traffic fatalities in the world in 2003 (220,000), accounting for 18% of global road traffic fatalities, despite having less than 5% of the global vehicle fleet⁷. While the reasons for the discrepancy between the figures from the MPS and those from the MOH may be debatable, the situation in **China should constitute a priority for the *World Bank Global Road Safety Strategy*.**

Since 2003, the Chinese Government has undertaken a series of strong initiatives to improve the situation. The two most important measures are: (i) the establishment of the Inter-Ministerial Road Safety Forum (October 2003), and (ii) the implementation of the Road Traffic Safety Law (May 2004).

Statistics from both the Ministry of Health and the Ministry of Public Security show that from 2005, the per capita rate of road traffic fatalities has started to decrease.⁸ The per capita rate of all

⁴ 2003 figures, *World Report on Road Traffic Injury Prevention*, April 2004, WHO/World Bank.

⁵ Measured by DALYs: Disability-Adjusted Life Years. A health-gap measure that combines information on the number of years lost from premature death with the loss of health from disability.

⁶ The Ministry of Public Security estimated the number of road traffic fatalities within 7 days of an accident at 104,372 and 98,738 in 2003 and 2005 respectively, which, when adjusted to the international standard used by the Ministry of Health (death within 30 days of an accident) would give 111,678 and 105,650 fatalities in 2003 and in 2005 (after multiplication by a factor of 1.07 used in the UK). The MPS estimate is significantly lower than the estimate of the MOH which is 220,000 and 206,000 for the same years.

⁷ Vehicle fleet: cars, buses, and trucks (not including motorcycles, 3-wheelers, and tractors).

⁸ It would appear that the per capita rate of road traffic fatalities has started to decrease three years ahead of the time predicted by models which link road traffic fatalities to per capita GDP. The report *Traffic Fatalities and Economic Growth* (E. Kopits, M. Cropper, World Bank, 2003) examined data from 1963 to 1999 for 88 countries. The authors were able to develop models based on time series data for each country. One of their main findings showed a sharp increase in road traffic fatalities per head of population as Gross Domestic Product (GDP) per capita increased – but only at low levels of GDP per capita, limited to a peak of between \$6,100 and \$8,600 (at 1985 international dollar values), depending on the exact model. After that peak was reached, road traffic fatalities per head of population began to decline. China’s GDP per capita is expected to reach \$7,300 (this figure being the average between \$6,100 and \$8,600) in 2008 (at 1985 international dollar values).

injury⁹ related deaths is also decreasing¹⁰ and has dropped from 66.2 per 100,000 persons in 1992 to 61.5 per 100,000 persons in 2005. Of this, road traffic injury (RTI), which accounts for 28%, is the primary cause of injury related death in China.¹¹ The share of all deaths related to injury is also decreasing and has been lowered from 11.0% in 1992 to 10.1% in 2005. **Injury is the fifth leading cause of death overall and the leading cause of death for children and adults aged 1 to 44 years.**

However, **injury related deaths give only an indication of the severity of the problem.** For every injury related death, the Ministry of Health estimates¹² that there are 1.5 cases involving severe permanent disability, 20 cases requiring hospital admission, 100 cases requiring emergency¹³ medical services, and a total of 300 injuries.

Injury places a heavy burden on the national health system, **ranking first¹⁴ as the national cause of death and disability in 2003 and fourth¹⁵ in terms of its economic cost.**¹⁶ The economic cost of injury was estimated by the Ministry of Health to be 1.32%¹⁷ of GDP in 2003, with RTI accounting for approximately 30% of this overall cost: 0.40% of GDP. However this figure is three times less than the estimate of the *World Report* for low and middle-income countries which puts the figure of GDP lost to RTI between 1% and 1.5%.

The priorities of the health programs of international organizations active in China are usually well-aligned with those of the Ministry of Health. In the coming years, the priorities of the Ministry of Health and of the World Bank Health Sector are anticipated to concentrate on: (i) Health Sector Reform (health sector financing, health insurance, etc), (ii) Emerging Infectious Diseases (like Avian Flu), and (iii) Non-Communicable Diseases¹⁸ (NCD). **As yet, injury has not been established as a priority either by the Ministry of Health or the World Bank Health Sector.** Despite its importance and the fact that it can be prevented, injury has not been included in the five priorities for population and health in the *National Science and Technology Development Plan (2006–2020)*.

Experience in developed countries has shown that the key to successfully improving a particular health issue is to generate the requisite level of political commitment. This level of commitment should be based upon a reasonable in-country evaluation of the current and projected burden of this particular health issue in comparison to the burden of other health issues. The resources allocated by a government to address different health issues should be commensurate with their relative importance in terms of threatening the performance and sustainability of the national economy.

⁹ Injury includes: road traffic injury, occupational injury, suicide, drowning, fall, poisoning, homicide, etc.

¹⁰ *Third National Survey on the Main Causes of Death*, April 2008, Ministry of Health.

¹¹ *National Injury Prevention Report*, 2007, Ministry of Health.

¹² *National Injury Prevention Report*, 2007, Ministry of Health.

¹³ Injury accounts for 18% of emergency room treatments (*National Injury Prevention Report*, 2007, Ministry of Health).

¹⁴ Measured by PPYLL (Potentially Productive Years of Life Lost). In 2003, according to the MOH, injury caused an annual PPYLL of 10.4 million years, more than for any disease group. The concept of PPYLL is based on the productive value of individuals (age 15–64). It underscores the importance of productivity as a vital part of a country's development. DALYs (see footnote 5), in contrast, include the years lost well beyond the productive years. While DALYs measure the potential impact of a health problem on the quality of life of individuals, PPYLL provide more relevant information about the effect of a medical condition on the economy.

¹⁵ (2003 figures, MOH) behind Diseases of the Circulatory Systems (2.16 % of GDP – including Cerebrovascular Diseases and Cardiovascular Diseases), Respiratory Diseases (1.54% of GDP), and Digestive Diseases (1.41% of GDP).

¹⁶ As calculated by the MOH in 2003: sum of direct and indirect economic costs. Direct economic costs include: physician fees, hospitalizations, medicine, etc; and indirect economic costs were calculated by multiplying the average per capita earnings (9,101 RMB in 2003) by the years of productivity lost from morbidity and premature mortality (in PPYLL, including: short-term disabilities, long-term disabilities, and premature deaths).

¹⁷ Direct economic cost: 0.46% of GDP and indirect economic cost: 0.86% of GDP.

¹⁸ NCD account for 82.5% of all deaths (*Third National Survey on the Main Causes of Death*, April 2008, Ministry of Health) compared to 76.5% in 1992. Main Non-Communicable Diseases: Cancer, Cerebrovascular Diseases, Cardiovascular Diseases, Respiratory Diseases, etc.

To ensure its long term success and sustainability, the *World Bank China Road Safety Strategy* should be integrated with the *World Bank/WHO China Health Strategies*, which tend to be well-aligned with the *Health Strategy of the Chinese Government* as defined in the Five-Year Plan. In the short-term, **the priority of injury should be raised within the agendas of the World Bank Health Sector, other International Organizations¹⁹, and the Ministry of Health.**

Five years have passed since the *Review of World Bank Road Safety Initiatives in the People's Republic of China* (World Bank, Tony Bliss, June 2003) was released. It may now be an opportune time to build upon the achievements of the Chinese Government in partnership with the World Bank and **prepare for the upcoming Five-Year Plan period (2011 – 2015).** As envisaged in the *World Report*, **the World Bank could take the lead in partnership with the WHO and work together with the Chinese Government to implement a more rapid response to the projected burden of road traffic fatalities and injuries.**

Part 1 of this report presents the achievements of the Chinese Government in the last five years and the challenges it faces. Part 2 reviews the World Bank's experience with road safety in China over the last 20 years and summarizes the legacy of its efforts and the lessons learned. Part 3 discusses recommendations²⁰ on the way ahead for World Bank's road safety initiatives in China.

¹⁹ WHO, ADB and ILO (International Labor Organization on occupational safety).

²⁰ These recommendations were made by an external consultant and do not form a fixed/final Road Safety Strategy for the World Bank in China although they are closely aligned with the recommendations formulated in: (i) the *Review of World Bank Road Safety Initiatives in the People's Republic of China* (World Bank, Tony Bliss, June 2003) and (ii) the *World Bank Global Road Safety Facility Strategic Plan (2006 – 2015)*. They provide a basis for the way ahead for the World Bank but they should be validated against the expectations of Chinese officials and experts through high-level strategic dialogue.

1. Road Safety in China (2003 – 2008)

1.1 The Achievements of the Government

Without a well directed road safety program, road traffic fatalities and injuries will remain high. This will significantly undermine the health of the nation and its economic efficiency. The Chinese Government has taken a series of strong initiatives over the last five years to improve the situation at the national level:

1. Policies, Strategies and Performance Targets:

- Preparation of the draft National Road Traffic Safety Plan (RTSP) for the period of the 11th Five-Year Plan (2006 – 2010)

2. Implementation Arrangements:

- Legislation:
 - implementation of the Road Traffic Safety Law (2004)
- Leadership and Coordination:
 - establishment of the Inter-Ministerial Road Safety Forum – which entrusted national leadership for road safety to the Ministry of Public Security (2003)
 - establishment of Provincial and Municipal Road Safety Councils (2004)
- Funding (key programs):
 - Transport: National Highway Safety Enhancement Program (2004 – 2007)
 - Health: (i) development of the National Emergency Rescue System (2004 – ongoing) and (ii) Injury Prevention Programs (2005 – ongoing)
 - Road Safety Campaign: “Protecting Life, Traveling Safely” (2006 – 2008)
- Monitoring and Evaluation:
 - establishment of the National Injury Surveillance System (2006)
- Research:
 - the National Injury Prevention Study (2005 – 2007)
 - the National Science and Technology Action Plan for Road Traffic Safety (2008)
 - road safety programs of the National Research Institutes. The MOC Highway Research Institute will house the most sophisticated driving simulator in China (2009)

3. Road Safety Standards and Rules:

- Development of a wide range of standards covering: (i) Road Users, (ii) Vehicles, (iii) Road Infrastructure, and (iv) Emergency Rescue.

1.1.1 Policies, Strategies and Performance Targets

The draft National Road Traffic Safety Plan (2006 – 2010)

A draft National Road Traffic Safety Plan (RTSP) was prepared by the Inter-Ministerial Road Safety Forum for the period of the 11th Five-Year Plan (2006 – 2010). A summary plan²¹ based on this draft has been adopted by the State Council and is currently under implementation. This Plan can be viewed as a significant effort to place emphasis on achieving targets. As a result, clear targets have been set for a reduction in the number of road traffic fatalities. This can be summarized as follows:

1. During the period of the 11th Five-Year Plan (2006 – 2010), the annual number of road traffic fatalities²² is required to be less than the average annual number that occurred during the period of the 10th Five-Year Plan (i.e. 105,100).
2. In 2010, the annual number of road traffic fatalities has to be less than 90,000, while the road traffic fatality rate (deaths per 10,000 vehicles) is to be less than 5, and the number of accidents involving the deaths of more than 10 people is to be less than 37.

The draft RTSP represents a major development because it establishes a series of intermediate targets that cover a wide range of issues, including road users, vehicles, road infrastructure, emergency rescue, information systems, and research. It also makes mandatory the establishment of an annual target assessment and evaluation system for National, Provincial, and Municipal/County Road Safety Forum/Councils.

1.1.2 Implementation Arrangements

Legislation

The Road Traffic Safety Law (2004)

The Law, passed on October 28, 2003 in the 5th session of the Standing Committee of the 10th National People's Congress, China's top legislature, took effect on May 1, 2004. It is an extremely significant development because, for the first time, a law on traffic safety was adopted by the National People's Congress. Previous regulations were issued by the State Council, the next level down. The Law clarifies the roles and responsibilities of different parties²³:

- Article 5 states that the Ministry of Public Security (MPS) is responsible for the nationwide administration of road safety;
- The local Public Security Bureaus (PSB Traffic Police) are responsible for the administration of road safety in local areas;
- Articles 72 and 73 stipulate that the Traffic Police are also responsible for collecting and analyzing traffic accident data to be used in identifying the causes of accidents;
- The Communications and Construction Departments at the provincial, municipal and county levels are responsible for road safety within the context of their duties.

The law is impressive in its intentions, especially in its emphasis on being 'for the people' and protecting the 'weak' (cyclists, pedestrians) from the 'strong' (motorized vehicles):

²¹ This summary plan is not publicly available. A World Bank unofficial translation of the original draft plan is attached to Annex 1.

²² As monitored by the Ministry of Public Security.

²³ In June 2004, the World Bank completed a *Resource Guide to Road Safety Organizations in China* to map out all relevant national agencies, their relationships, and their roles and responsibilities under the Law.

- The right of life of pedestrians takes precedence over the right of way of motorists (Article 76).
- Special attention is given to the 'weak': cyclists, pedestrians, children and blind persons (Article 34).

The law, as it stands, would provide a sound model for countries in the rest of Asia and elsewhere with similar traffic situations.

Implementation Regulations

The Law presents general principles which are supported by the Implementation Regulations also issued on May 1, 2004. These provide the foundations for establishing road safety agencies at the provincial level. Article 3 specifies that, at the county level and above, each level of People's Government must:

- establish comprehensive Road Traffic Safety Working Coordination Systems;
- organize relevant agencies concerned with urban construction projects already underway to evaluate the traffic aspects;
- develop Road Traffic Safety Management Plans, determine their management objectives and organize implementation schemes.

Leadership and Coordination

Establishment of the Inter-Ministerial Road Safety Forum (2003)

The Forum was established in October 2003 under the direct supervision of the State Council. At the same time, the **national leadership for road safety was entrusted to the Ministry of Public Security**. The Forum is composed of 17 institutions and meets quarterly. Its role and responsibilities are to:

- prevent and reduce road traffic accidents;
- promote, analyze, and plan the national road safety effort;
- develop the national road safety strategy;
- establish an effective national road safety system;
- recommend road safety policies to the State Council;
- guide and supervise provincial and local governments;
- enhance inter-ministerial cooperation and coordination.

The Ministry of Public Security assumes the leading role in the Forum, but the executive power rests with the State Council, whose role is to establish policies and to allocate responsibilities and funding to each of the 17 institutions toward the road safety effort.

Establishment of Provincial and Municipal Road Safety Councils (2004)

These councils were established in 2004 by provincial and municipal governments as per the requirements of the Implementation Regulations which stated the necessity to set up "Comprehensive Road Traffic Safety Working Coordination Systems". Provincial and Municipal Road Safety Councils meet quarterly and are attended by 17 agencies. The meetings are prepared by the Traffic Police but are chaired by a Vice-Governor or a Vice-Mayor. The Traffic Police play a leading role, but the executive power rests with the Vice-Governor or the Vice-Mayor who decides the measures that are to be taken during the next quarter and the investments to be made.

Funding

In the last five years, the Chinese Government has increased significantly its financial commitment to improving road safety by financing a number of key programs across the following sectors:

Transport Sector

National Highway Safety Enhancement Program (2004 – 2007)

Between 2004 and 2007, the MOC invested 9 billion RMB on this national program which sought to identify and eliminate road traffic blackspots. A total of 278,000 blackspots were addressed along 83,000 km of highways. At the beginning of the project, the MOC released the “Guidelines for the Enhancement of Highway Safety Projects (September 2004, MOC)”.

Health Sector

Development of the National Emergency Rescue System (2004 – ongoing)

In the last five years, substantial efforts have been deployed by the Ministry of Health to build a National Emergency Rescue System. Programs, regulations and norms have been developed.²⁴ These programs focused primarily on central and western provinces which required more assistance than coastal provinces. Key initiatives include:

- Emergency Rescue Project: annual project with funding of one million RMB: training, meetings, and workshops in emergency rescue (2003 – ongoing);
- Annual Program in Hospital Management: annual program designed to enhance the capacity of hospitals to respond to emergency situations (2005 – ongoing);
- Strengthening the Emergency Rescue System of 22 provinces and cities in central and western China: national funding of 333 million RMB and provincial funding of more than 333 million RMB: procurement of equipment and training of 440,000 county doctors in emergency rescue and treatment (2005).

Injury Prevention

An Injury Prevention Division was established within the National Center for Disease Control and Prevention (CDC) in 2002. This division works in partnership with the Bureau of Disease Control and Prevention of the Ministry of Health. It undertakes a strong technical role in research and in project implementation while the Bureau of Disease Control and Prevention is involved in policy development.

The CDC carried out a series of studies and pilot-programs on injury prevention, some in partnership with international institutions. One of the major accomplishments of the CDC was the establishment of a National Injury Surveillance System in 2006.

An indication that the government is paying more attention to injury prevention is the decision to increase the staffing of the Injury Prevention Division of the CDC from 2 to between 20 – 30 professional staff within the next few years.

²⁴ A key document is the “*Planning for the Establishment of the National Medical Rescue System*” produced by the State Council and addressing different kinds of incidents (not only RTAs).

Road Safety Campaign: “Protecting Life, Traveling Safely” (2006 – 2008)

This 3-year campaign was launched in April 2006 jointly by the Publicity Department of the Chinese Communist Party, the Ministry of Public Security, the Ministry of Education, the Ministry of Justice, and the State Administration of Work Safety. It targets all road users across the country, but especially drivers, children and rural residents.

Monitoring and Evaluation

Establishment of the National Injury Surveillance System (2006)

The CDC established a National Injury Surveillance System in 2006. It complements the previous National Death Surveillance System. This is a key initiative as injuries are often not accurately represented by police statistics in developing countries, although they constitute a significant percentage of the health burden of road traffic accidents on national economies.

Research

The National Injury Prevention Study (2005 – 2007)

In 2005, the Ministry of Health launched the *National Injury Prevention Study* in partnership with the WHO. The final report was released in 2007. One of its key findings is that the total number of injury related deaths in China was estimated to be 732,000 in 2005, with **road traffic fatalities²⁵ ranking first at 206,000 and representing 28% of all injury related deaths.**

Pilot Projects on Injury Prevention (2005 – ongoing)

Since 2005, the Ministry of Health²⁶ has implemented eleven pilot research projects on injury prevention to assess the effectiveness of a number of key injury prevention measures in China. Four of these projects focus specifically on road traffic injury prevention.

The National Science and Technology Action Plan for Road Traffic Safety (2008)

This Action Plan is being prepared jointly by the Ministry of Science and Technology (MOST), the Ministry of Public Security (MPS), and the Ministry of Communications (MOC). A copy of the guideline establishing this plan is attached to Annex 2.

The goal of the plan is to “enhance road traffic accident prevention and emergency rescue” and to “effectively curb large road traffic accidents”. The plan sets a target for the mortality rate (road traffic fatalities per 10,000 vehicles) “to approach the level of middle-income countries”.

A leading group drawing from these three ministries will be established to prepare project proposals, feasibility studies, and oversee project implementation. Through a series of research programs and pilot-projects yet to be defined by the leading group, the action plan will focus on technology improvements in the following areas: (i) road user behavior, (ii) vehicles, (iii) road infrastructure, and (iv) traffic management.

²⁵ The definition taken for road traffic fatalities was the international standard: death within 30 days of an accident.

²⁶ This has occurred in partnership with international organizations, the private sector, universities, and associations.

The Road Safety Programs of the National Research Institutes

The Highway Research Institute of the MOC (HRI)

HRI's road safety activities include: (i) preparation of the highway design and safety standards of the MOC, (ii) education and driver training, (iii) testing of vehicles' safety, (iv) road safety audit and inspection, and (v) road projects and traffic related products. The HRI has carried out several research projects in road safety in the last five years, some internally, and some with international institutions like the Global Road Safety Partnership (GRSP). Its role will be strengthened in 2009 as it was selected to become the National Key Road Safety Laboratory; it will house the most sophisticated vehicle simulator in China.

The China Automotive Technology Research Center (CATARC)

The CATARC is a State level technological research institute directly under the State-Owned Assets Supervision and Administration Commission of the State Council. Its core competence is in technological research, standards setting and policy consulting in the passenger car sector. In the last five years, the CATARC has developed the C-NCAP (the Chinese New Car Assessment Program). Cars sold in China are rated on a 0 to 5 star rating scale according to their safety performances. Although this is not a mandatory test imposed by the government, it is nonetheless an innovative and courageous customer-driven initiative which ultimately may penalize domestic car manufacturers over foreign car manufacturers.

The Ministry of Science and Technology (MOST)

Since 2003, the Ministry of Science and Technology (MOST) has financed about twenty research projects in road safety/traffic management with each one costing approximately 800,000 RMB (US\$ 117,000). The majority of the bids for these projects has come from research institutes and universities.

The Traffic Management Research Institute of the MPS (TMRI)

The TMRI has performed more research in road safety since 2005 focusing on accident analysis and investigation, driver behavior, and enforcement. A national training program on accident analysis/investigation and enforcement was carried out in partnership with the ADB between 2006 and 2008.

1.1.3 Road Safety Standards and Rules

A wide range of standards covering: (i) Road Users, (ii) Vehicles, (iii) Road Infrastructure, and (iv) Emergency Rescue has been developed in the last five years (see²⁷ Annex 4).

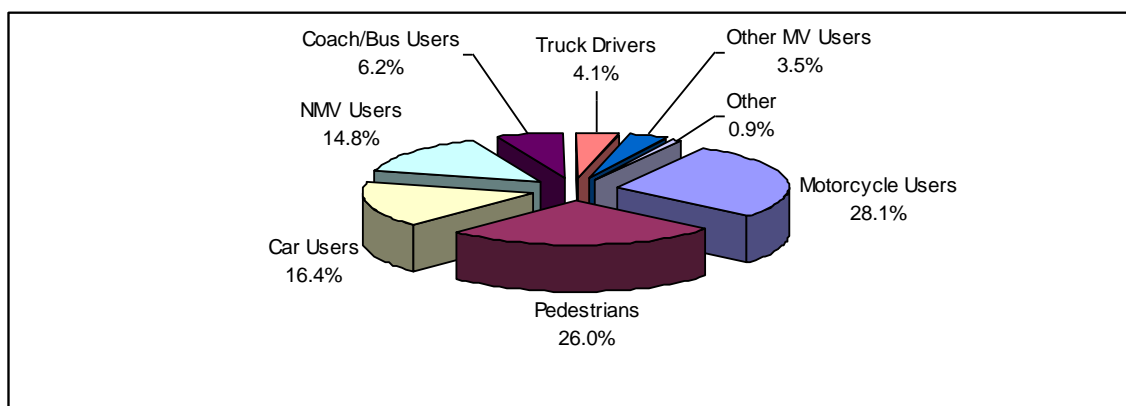
²⁷ Annex 4 presents only a few key standards that were developed between 2003 and 2008 and is not exhaustive. A separate study would be needed to: (i) compile the list of all road safety regulations, standards, and rules that were developed between 2003 and 2008, (ii) if possible, appraise them according to international good-practice, and (iii) review their effective implementation.

1.2 Road Traffic Accidents: the Situation

The analysis of road traffic accidents in this section is based on the *2006 Annual Statistical Report on Road Traffic Accidents* published by the Traffic Management Bureau of the Ministry of Public Security. It focuses on road traffic fatalities²⁸ because injuries appear to be underreported by the Traffic Police, as is often the case in many other countries.

1.2.1 The Victims of Road Traffic Fatalities

Transport Mode of the Victims



Graph 1: Distribution of road traffic fatalities by type of transport mode (users: drivers and passengers)

The majority of the victims of RTA fatalities (68.9%) can be classified as “the weak” or “the vulnerable road users”. This includes motorcycle users (28.1%), pedestrians (26.0%), and NMV users (14.8%).

1.2.2 The Official Causes of Road Traffic Fatalities

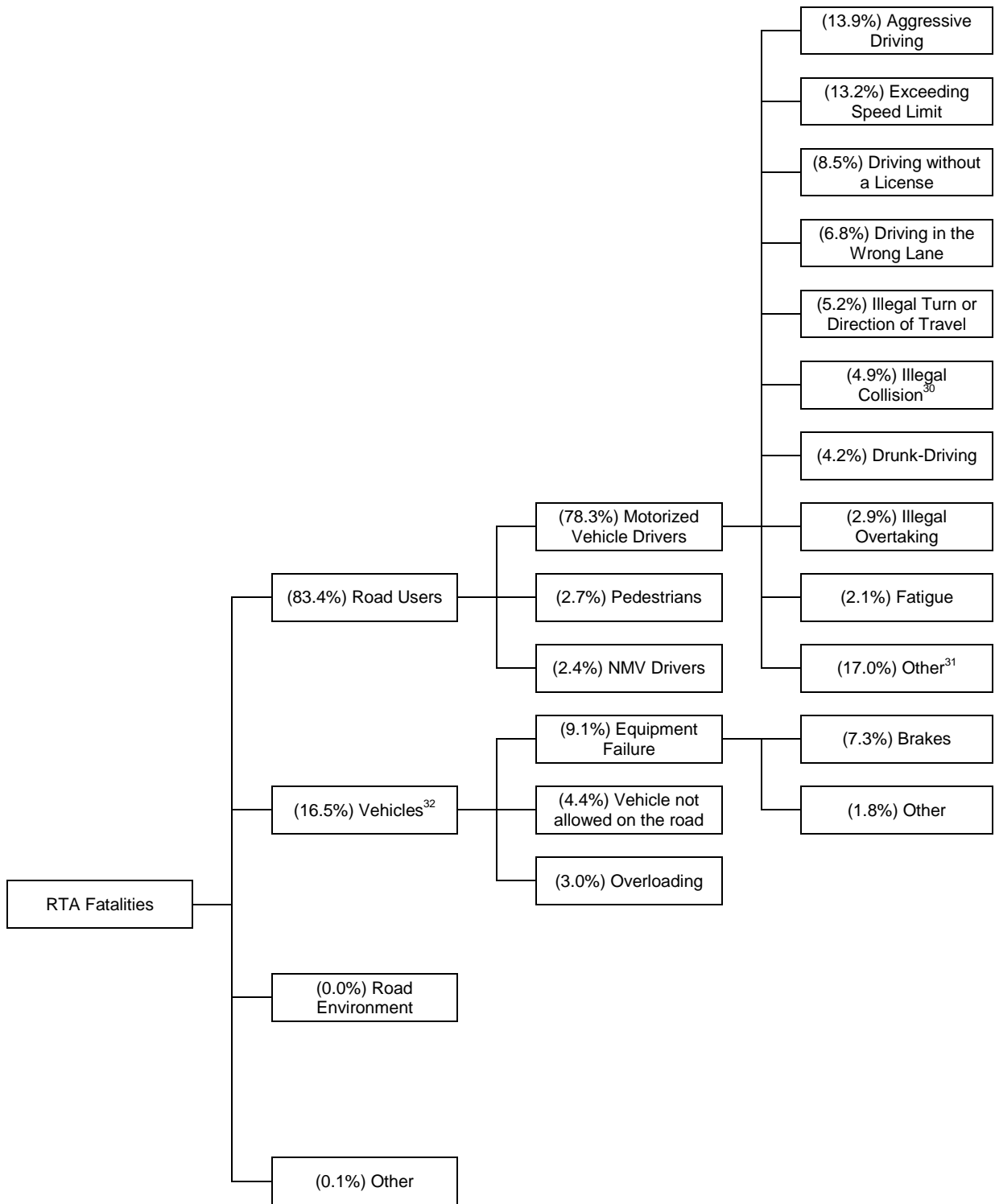
Note: Although the *Annual Statistical Report on Road Traffic Accidents* is very useful, it does not always provide definitive causes of accidents. Some examples of root causes stated by the Traffic Police include “driving without a license” or “vehicle not allowed on the road”²⁹: these are clearly risk factors, but not necessarily root causes.

The causes of RTA are usually divided between road users, vehicles, and the road environment.

According to the Summary Table of the *2006 Annual Statistical Report on Road Traffic Accidents*, the **official division of responsibilities** for the fatalities resulting from RTA are as follows:

²⁸ General experience elsewhere estimates that for every road traffic fatality there are 4 severe permanently disabled cases, 10 cases requiring hospital admission, and 30 cases requiring emergency room treatment (see *Global Road Traffic Injury: An Overview of the Problem*, Murray Mackay, *Technical Briefing on Global Road Traffic Safety*, United Nations, May 29, 2003).

²⁹ See definition of “vehicle not allowed on the road” p. 12.



³⁰ Literal translation of the original Chinese term: “Weifa Huiche”.

³¹ Category “Other” under “Motorized Vehicle Drivers” (total 17.0%): 1.8% have various causes that are clearly identified in the Summary Table of the 2006 Annual Statistical Report on Road Traffic Accidents, but 15.2% are listed as “Other” Driver Behavior(s) with no clear indication of the root cause(s).

³² “Vehicle not allowed on the road” and “Overloading” are listed in the Summary Table of the 2006 Annual Statistical Report on Road Traffic Accidents under “Road Users” and were placed here under “Vehicles” (raising the share of “Vehicles” from officially 9.1% to 16.5% of all road traffic fatalities).

Road Users (83.4% of all road traffic fatalities)

The first 5 causes (47.6% of all road traffic fatalities)

1. Aggressive driving (13.9% of all road traffic fatalities)

Aggressive driving includes behavior such as: (i) failure to yield the right of way (10.0% of all road traffic fatalities), (ii) disobeying traffic signals (2.0% of all road traffic fatalities), (iii) changing lanes illegally or in an unsafe manner (1.2% of all road traffic fatalities), and (iv) other aggressive driving behavior (0.7% of all road traffic fatalities).

2. Exceeding speed limit (13.2% of all road traffic fatalities)

3. Driving without a license (8.5% of all road traffic fatalities)

Two-thirds of these road traffic fatalities are caused by motorcyclists.

4. Driving in the wrong lane (6.8% of all road traffic fatalities)

This situation is frequently observed in China: a car driving in a bicycle lane in an urban environment or a slow truck driving in a high-speed car lane on an interurban highway.

5. Illegal Turn or Direction of Travel (5.2% of all road traffic fatalities)

Driver Impairment (officially 6.3% of all road traffic fatalities)

Drunk-driving (officially 4.2% of all road traffic fatalities)

Drunk-driving, accounting for 4.2%, is officially the 7th largest cause of the road traffic fatalities caused by drivers. However, this figure may be underestimated: the GRSP project on drunk-driving in the two largest cities in Guangxi Province (Nanning and Liuzhou) showed that drivers in excess of the legal blood alcohol concentration were involved in 25% of serious³³ RTAs.

Fatigue (officially 2.1% of all road traffic fatalities)

Fatigue is officially the 9th largest cause of the road traffic fatalities caused by drivers, accounting for 2.1% of all road traffic fatalities. Three-quarters of these accidents are caused by professional drivers.

Vehicles (16.5%³⁴ of all road traffic fatalities)

1. Equipment failure (9.1% of all road traffic fatalities)

Most of these failures are attributable to defective brakes which caused 7.3% of all road traffic fatalities. Other instances of equipment failure (1.8%) include defective lights/indicators, faulty tires, steering, and accelerators.

2. Vehicle not allowed on the road (4.4% of all road traffic fatalities)

“Vehicle not allowed on the road” covers the following causes. The vehicle either: (i) is not allowed to drive on the road where it was apprehended by the police (e.g. a tractor or a

³³ Serious RTA: accident causing serious injury or death.

³⁴ Please refer to footnote 32.

motorcycle on an expressway), (ii) does not comply with safety standards, (iii) is not roadworthy, (iv) is not registered, or (v) is not insured.

3. Overloading (3.0% of all road traffic fatalities)

60% of these road traffic fatalities are caused by trucks.

The Road Environment (officially 0.0%³⁵ of all road traffic fatalities)

Location of road traffic fatalities

80% of road traffic fatalities occur on ordinary roads (considered to be not a specialized section of road like a ramp or a bridge, etc) and 14% at intersections.

Road traffic fatalities and road categories

Road Category	% of Fatalities
Urban Roads	25%
Expressways	7%
Class 1	10%
Class 2	27%
Class 3	18%
Class 4	7%
Substandard	6%
Total	100%

25% of road traffic fatalities occur on urban roads. However, a study would be needed to estimate what fraction of the national traffic volume is intra-urban to establish which of the two areas – urban or interurban – is the most dangerous in terms of road traffic fatalities per vehicle kilometer.

Expressways are the safest road category in China with officially 3.3 road traffic fatalities per 100 million vehicle-km. However, they still remain 5 times more dangerous than expressways in western countries which have on average 0.7 road traffic fatalities per 100 million vehicle-km.

Approximately a third of road traffic fatalities (31%) occur on Class 3, 4, and substandard roads where a large variety of road users are allowed and the traffic mix is not separated. Apart from driver behavior and vehicle deficiencies, the main causes for road traffic fatalities on these roads would be:

- high traffic mix, including NMV and pedestrians;
- high speed differentials between motorized vehicles and NMV/pedestrians;
- poor road safety design: lack of traffic safety facilities, lack of markings, signs, etc;
- remoteness of hospitals and slow response of emergency rescue services;
- low levels of enforcement (few Traffic Police patrol on these roads);
- poor road safety knowledge of road users.

³⁵ Based on the Summary Table of the 2006 Annual Statistical Report on Road Traffic Accidents, the Road Environment was officially the cause for only 15 fatalities (0.02% of all RTA fatalities). Given the facts described in the above two sections (*Location of road traffic fatalities* and *Road traffic fatalities and road categories*), this number is certainly underestimated.

Summary

Road Users and Vehicles are officially the cause for 83.4% and 16.5% respectively of all road traffic fatalities. Responsibilities between different types of vehicles are shared as follows:

	Drivers/Road Users	Vehicles	Total
Trucks	22.2%	6.4%	28.6%
Coaches/Buses	7.0%	1.8%	8.8%
Cars	20.4%	3.1%	23.5%
Motorcycles	19.7%	2.3%	22.0%
Other Motorized Vehicles	9.0%	2.9%	11.9%
NMV/Pedestrians	5.1%	0.0%	5.1%
Total	83.4%	16.5%	99.9%

82.9% of all road traffic fatalities are caused by:

1. the professional transport industry (37.4%: 29.2% drivers and 8.2% vehicles);
2. cars (23.5%: 20.4% car drivers and 3.1% vehicles);
3. motorcycles (22.0%: 19.7% motorcycle drivers and 2.3% vehicles).

Road safety interventions should target not only these three main causes of road traffic fatalities but also the victims that cannot be reached through these interventions, especially pedestrians and NMV users who account for 40.8% of all road traffic fatalities.

1.3 Road Safety in China: the Challenges

1.3.1 Policies, Strategies and Performance Targets

The Chinese Government is currently pursuing a dual-track approach to road safety, with the MPS leading the effort toward improving national road safety while the MOH is involved in preventing accidental death and injury.

MPS: the draft National Road Traffic Safety Plan (RTSP)

The draft National Road Traffic Safety Plan (RTSP) is a sound initiative, but it could be improved in certain areas: (i) strategic focus, (ii) targets, (iii) implementation arrangements.

Targets should be:

1. comprehensive and cover the main causes of serious accidents and the whole range of road safety interventions;
2. prioritized according to their effectiveness in improving final outcomes;
3. achievable (given the constraints: time, funding, institutional capacity, etc).

Currently, the draft RTSP sets no quantitative targets for key areas such as driving without a license (8.5% of all road traffic fatalities) and driver impairment³⁶ (at least 6.3% of all road traffic fatalities). The targets that do exist are not prioritized with little explanation of how they are to be achieved.

Also, it does not identify three key implementation issues:

1. which agencies will be held accountable for meeting these targets and what interventions they will be required to carry out;
2. what funding³⁷ mechanisms will be in place to ensure that these agencies will have the appropriate resources, both human and financial to meet their respective targets;
3. how targets will be monitored. This implies that an effective monitoring system should be in place prior to the implementation of the plan.

MOH: Injury Prevention

According to the MOH, road traffic injuries account for roughly 25% of all injuries.³⁸ Injury is one of the nation's most serious and costly health problems. As seen in Section 1.1, while the Chinese Government has achieved much in the last five years in the field of general injury prevention, much still remains to be done. Despite its importance, injury is still excluded from the five priorities for population and health in the *National Science and Technology Development Plan (2006–2020)*.

The challenge, therefore, is for the Health Sector to continue to raise the priority of injury within the national health agenda. The MOH is currently developing the outline of a *National Injury Prevention Strategy* for the end of 2009 in partnership with the WHO.

³⁶ Drunk-driving (at least 4.2% of all road traffic fatalities) and driving while fatigued (at least 2.1% of all road traffic fatalities).

³⁷ Only two specific sources of funding are mentioned in the plan: (i) the obligation for governments at all levels to establish a Special Fund for Road Safety Awareness Campaigns, and (ii) a Traffic Safety Award Fund for major breakthroughs in Road Safety Research. Otherwise, the plan does not specify how "Governments at all levels shall ensure that the financial input to traffic safety matches the economic and social development levels".

³⁸ *National Injury Prevention Report*, 2007, Ministry of Health.

1.3.2 Implementation Arrangements

Legislation

Need to enforce the Road Traffic Safety Law

The Law, as it stands, would provide a good practice model for countries in the rest of Asia and elsewhere with similar traffic situations. The challenge is to enforce it when, as often prevails in developing countries, the dominant road users, such as motorized vehicles, often fail to yield to the weaker road users such as pedestrians, cyclists, and motorcyclists. Such enforcement will require a cultural change and this may take time to happen. However, consistent and effective enforcement from the Traffic Police will advance the process.

Leadership and Coordination

The key issue, as in many other countries, remains effective coordination between the key players. In this case, coordination is required between the MPS, the MOC, and the MOH.

Funding

Although identifying the funds spent on road safety is a critical step in developing an effective road safety management system, neither the central nor provincial/municipal governments are able to do this at present. In China, budgets comprise:

- “project fees” that cover specific sectoral programs (often research programs or pilot-projects). Road safety “project fees” are easily identifiable and are well known;
- “running fees” which form the majority of expenditure and cover staffing and administrative costs. Road safety “running fees” are embedded in broader sector budgets and as a result are not identified and monitored.

Agencies should be encouraged to identify and monitor their expenditure on road safety, at both the national and provincial/municipal levels.

Monitoring of Road Safety

Need to improve overall monitoring

The databases of the MPS and of the MOH recording the number of road traffic fatalities and injuries seem to be conflicting. In 2005, the MOH estimated the number of road traffic fatalities at 206,000, while the MPS reported the much smaller figure of 98,738³⁹. A dialogue could be initiated with the MPS and the MOH to understand the reasons for the discrepancy between their aggregate road traffic fatality data.

Traffic data and **intermediate targets** such as speeds, seatbelt or helmet wearing, driver impairment, etc. have started to be monitored, although currently this is not done in any systematic way.

The number of **road safety initiatives** is increasing but as noted previously, the amount spent on road safety by central/provincial agencies is not fully monitored.

³⁹ The MOH figure is within 30 days of an accident. The MPS reported 98,738 road traffic fatalities within 7 days of an accident, which corresponds to 105,650 fatalities within 30 days of an accident (after multiplication by a factor of 1.07 used in the UK).

Need to better quantify the economic cost of road traffic accidents

The current estimate by the MOH of the economic cost of road traffic accidents at 0.40% of GDP⁴⁰ is three times lower than the estimate of the *World Report* for low and middle-income countries. **Accurate quantification of the economic cost of road traffic accidents is critical to ensure that government spending on road safety matches the need.**

Effectiveness of road safety interventions

The evaluation of road safety interventions could be strengthened. Apart from a few advanced cities (like Shanghai and Guangzhou) and a few pilot-projects that have been supported by international institutions,⁴¹ the effectiveness of road safety interventions – both in terms of their cost/benefit and of their impact on the reduction of the number of road traffic fatalities and injuries – is not always systematically monitored. Evaluating the effectiveness of road safety interventions is necessary **to ensure that the allocation of public resources is effective and optimized.**

Need to enhance the sharing of information/databases between agencies

Despite some local initiatives aimed at integrating the various road safety databases, in general, such databases are not easily shared and integrated. The establishment of an information sharing mechanism between the National Traffic Management Bureau and the CDC was discussed during a workshop sponsored by the WHO in September 2005, but eventually no official agreement was reached because both systems were too different and could not be integrated.⁴²

Agency Performance Evaluation

Public Security

The Traffic Police are responsible for:

- accident monitoring (through the Traffic Accident Information System – TAIS);
- accident investigation, remedial measures, and inspection of traffic safety facilities;
- enforcement of driver behavior and vehicles;
- driver/vehicle testing and licensing/registration;
- traffic management (in urban areas).

Accident Monitoring: The Traffic Accident Information System (TAIS) of the Traffic Police

There is a need to improve the TAIS functionality, operation and management, and strengthen accident data collection, analysis and investigation. The strengths of the existing procedures are the establishment and operation of a national computerized system. This forms a sound basis for further development of accident reporting and analysis and the necessary institutional arrangements are already in place. Furthermore, a culture of accident reporting and analysis already exists and staff is in place to carry out this work. However, there are several deficiencies in the existing procedures. The fundamental weaknesses are:

⁴⁰ See page 2, paragraph 3.

⁴¹ An example is the *Guangzhou Seatbelt Intervention Project* developed by the George Institute (2004 – 2006) (see Annex 12, Section 7).

⁴² One of the reasons was that the definition of a fatality was not the same: “death within 7 days of an accident” for the Traffic Police and “death within 30 days of an accident” (the international standard) for the CDC.

- The primary focus of the TAIS is to provide statistics for national and provincial government, with a lesser focus on collecting data for accident causation analysis on which to base remedial measures.
- **For urban accidents**, no accurate locational reference is made for accidents. Thus, the derivation of accident blackspots tends to be done more by local knowledge and experience rather than in any systematized way.
- **For interurban accidents**, the TAIS is not integrated with the databases of the road agencies and therefore it has limited information on the road environment. This limits further the effectiveness of accident causation analysis and investigation.

Accident Investigation, Remedial Measures, and Inspection of Traffic Safety Facilities

A solid accident data system would greatly assist investigation and the in-depth research that is needed to fully understand accident causes and create effective countermeasures. Other limitations in accident investigation and remedial measures are:

- While the structural system of the TAIS is available for the police to potentially do more detailed and useful analysis, they generally do not have the resources and time.
- The focus of accident investigation tends to be more on the allocation of responsibility and blame as well as the derivation of costs for settlement purposes than on remedial measures.

Enforcement

Drivers are officially responsible for 78.3% of all road traffic fatalities. Enforcement and education are the two main interventions that can have a lasting influence on driver behavior. Enforcement arguably is the stronger of the two. Drivers will change their behavior only if they are convinced of the certainty of the penalty.

The main challenges for enforcement are in the following areas:

- Enforcement on rural/county highways;
- Monitoring and prioritization of enforcement interventions;
- Automation of enforcement interventions.

At the April 2006 Inter-Ministerial Road Safety Forum, the Vice-Minister of Public Security acknowledged the need to strengthen enforcement interventions on rural/county highways where almost a third of road traffic fatalities occur.

Enforcement activities are not always well aligned with the root causes of serious accidents. For example, both (i) license checking and (ii) drunk-driving appear to have been given a relatively low priority comprising less than 3% of all tickets issued for driver behavior.⁴³ This appears to conflict with the fact that unlicensed drivers caused 11% of the road traffic fatalities within the category of driver behavior, and that drunk-driving officially accounts for 5% of the road traffic fatalities within the same category. Additionally, monitoring the effectiveness of enforcement activities would greatly assist the Traffic Police in prioritizing their interventions.

Currently, the automation rate of enforcement interventions is still quite low compared to international standards. There are more radar units on key urban/interurban expressways and more red light violation cameras in cities, but there is clearly scope for the automation of enforcement interventions to be further enhanced. Exceeding speed limits and disobeying traffic

⁴³ 2006 Annual Statistical Report on Road Traffic Accidents.

signals, which accounts for almost 20% of all driver offences⁴⁴, should constitute a priority for automation. This will make more police-hours available and enable them to focus more effectively on other enforcement activities.

Driver Testing and Licensing

The Vice-Minister of Public Security at the April 2006 Inter-Ministerial Road Safety Forum highlighted the following:

- the license examination is not strict enough;
- some driving schools do not teach the full content of the driving program;
- in some areas, it is possible to get a license without passing the examination.

The general level of professionalism among examiners throughout China needs to be raised. In addition, the regulations on motorcyclist licensing should be reviewed. Motorcyclists constitute a particular problem. 36% of the road traffic fatalities they cause are attributable to unlicensed drivers and, as elsewhere in the world, they are much more at risk than truck and car drivers.

Transport

The Transport Agencies are responsible for:

- road design, road construction, and road maintenance;
- granting, renewing, and revoking the operating licenses of driving schools;
- granting, renewing, and revoking the operating licenses of transport companies.

Road Infrastructure

58% of road traffic fatalities occur on Class 2, 3, 4, and substandard highways. Most of these highways are in need of better traffic safety facilities and of better maintenance. It is important that road infrastructure is maintained to adequate safety standards. However, governments at all levels have generally not provided adequate funds and this increases the risk to road vehicles.

Driver Education and Training

Driver education and training was one of the first challenges mentioned by the Vice-Minister of Communications at the April 2006 Inter-Ministerial Road Safety Forum. Driver education is a significant issue given that: (i) the number of drivers has almost doubled between 2001 and 2006 (rising from 82 million to 150 million), and (ii) every year between 10 to 15 million drivers need to be trained and tested. The MOC plays a key role in the annual renewal of the operating licenses of driving schools. The main challenge is to ensure the quality of training.

The Professional Transport Industry

The Professional Transport Industry was another challenge mentioned by the Vice-Minister of Communications during the April 2006 Inter-Ministerial Road Safety Forum. According to Part 1.2.2, the Professional Transport Industry is responsible for the highest share of road traffic fatalities (37.4%). The MOC plays a key role in professional driver training and in granting, renewing, and revoking operating licenses. The challenge to be met is that the Professional

⁴⁴ 2006 Annual Statistical Report on Road Traffic Accidents.

Transport Industry is highly fragmented with a significant number of small and self-owned companies.

Health

Emergency Rescue

The main challenges for emergency rescue are the following:

- implementation of an effective national emergency rescue network;
- emergency rescue of the poor.

Implementation of an effective national emergency rescue network. Significant resources have been invested in emergency rescue in the last five years but more needs to be done to reduce the gap between the contrasting level of services provided in inland and in coastal provinces.

Emergency rescue of the poor. Over half of the road traffic fatalities are rural dwellers⁴⁵ who are often remote from hospitals and have limited insurance and financial reserves.

Injury Prevention

The key challenges for injury prevention in China have been noted earlier:

- injury has not been prioritized as a major health issue by the Government⁴⁶;
- there is a need for a National Injury Prevention Strategy.⁴⁷

In addition, there is also a need to strengthen the National Injury Surveillance System which has only been in effect since 2006.

Education/Awareness-Raising

The challenge is to reach out, through effective and low-cost awareness-raising programs, to pedestrians and NMV users who account for 40.8% of all road traffic fatalities.

Research

China needs to continue investing in road safety research and train more road safety experts.

1.3.3 Road Safety Standards and Rules

The challenges for road safety standards and rules are listed in Annex 5.

⁴⁵ According to the 2006 Annual Statistical Report on Road Traffic Accidents, 53% of the victims of RTA have a rural residence permit (rural “hukou”).

⁴⁶ Injury has not been included in the five priorities for population and health in the *National Science and Technology Development Plan (2006–2020)*.

⁴⁷ The MOH is developing the outline of a *National Injury Prevention Strategy* for the end of 2009 in partnership with the WHO.

2. Experience⁴⁸ of the World Bank with Road Safety in China (1985 – 2008)

2.1 Review of Interurban Road Safety Initiatives

2.1.1 Interurban Road Safety Initiatives (1985 – 2003)

An overview of all interurban road safety activities carried out under World Bank's highway projects in the last 15 years (1993 – 2008) is documented in Annex 6. A more detailed description of key interurban road safety activities is attached to Annex 7.

Road safety components typically comprised less than 0.2% of total project funds (ranging from US\$ 50,000 to US\$ 500,000). These initiatives are referred to as “1st generation” highway safety projects with certain versions more evolved than others.

Until recently, the World Bank's road safety strategy in China has concentrated on the gradual and effective use of pilot and demonstration programs, to pave the way for more widespread adoption of the particular road safety components promoted within larger project investments. Its interventions in highway safety in China can be summarized in three main stages:

1985 – 1995: the beginnings of highway safety (1st version of 1st generation highway safety projects)

In 1985, the World Bank launched the *National Road Traffic Safety Study* under the China Highway Project. This was the first road safety component under the first World Bank highway project in China.

Following the momentum created by the study, some highway projects started to include road safety components. Since the PCDs had not been directly responsible for overall safety (this belonged to the Traffic Police), and because there was a general lack of institutional coordination with the Traffic Police, many projects during this period started with engineering studies on which to base proper safety programs. The focus was placed on the causes of accidents, identification of blackspots, safety audits/design, provision of safety equipment, and training.

Examples of this are: the Shandong Provincial Highway Project – 1989, the Guangdong Provincial Highway Project – 1992, the Fujian Provincial Highway Project – 1993, the Xinjiang Highway Project – 1994, and the Shanghai – Zhejiang Highway Project – 1995.

But this effort was not systematic and some highway projects did not have road safety components. Examples of these are: the Henan Highway Project – 1992, the Shaanxi Highway Project – 1992, and the National Trunk Highway Project – 1994.

However, from 1995 onward, road safety components were systematically included in all highway projects.

1996 – 1999: focus on implementation arrangements and on road infrastructure interventions (2nd version of 1st generation highway safety projects)

1996 can be viewed as a turning point for highway safety in China with the establishment of the *World Bank Framework for Road Safety Improvement in China*. The framework recommended

⁴⁸ See Annex 12 for the Experience of Other Major International Institutions with Road Safety in China.

the establishment of national and provincial road safety councils to improve cooperation and coordination across the multitude of agencies involved in road safety. A particular focus of this recommendation was the relationship between the Ministry of Communications and the Ministry of Public Security and their respective organizations at the provincial level.

The 2nd Xinjiang Highway Project – 1996, following the Xinjiang Highway Project – 1994, was the first 2nd version highway safety project. These projects⁴⁹ had the following characteristics:

- Strengthen and systematize the technical/engineering activities of the 1st version highway safety projects on:
 - monitoring: accident causation and analysis. This often included the development of joint accident analysis systems between the PCDs and the PSDs;
 - road infrastructure: (i) technical studies relating to safety audits and implementation of audits, including development of safety audit procedures/manuals, (ii) training of PCD staff in highway safety design, construction and maintenance and in safety audits, (iii) technical studies on safety at construction sites, (iv) provision of safety equipment, and (v) blackspot identification and treatment pilot-programs.
- Address the need for road safety leadership and coordination at the provincial level by (i) establishing Multi-Agency Traffic Safety Steering Groups, and (ii) organizing Highway Policy Seminars to build sector institutions.

2000 - 2003: development of provincial policies and strategies and enlargement of the scope of interventions (3rd version of 1st generation highway safety projects)

The 3rd Henan Highway Project – 2000 was the first 3rd version highway safety project. These projects⁵⁰ had the following characteristics:

- Strengthen the activities of 2nd version highway safety projects, including institutional development, monitoring of road safety, and road infrastructure interventions.
- Engage Provincial Multi-Agency Leading Groups established under the 2nd version highway safety projects to develop provincial road safety policies and action plans.
- Enlarge the scope of road safety interventions to: (i) road users and (ii) vehicles.

The combination of institutional reform and decentralization of MOC functions, which delegated substantial authority and responsibility to the PCDs, as well as the forced corporatization of parts of the PCDs, were all factors conducive for the projects to make positive progress.

2.1.2 Since 2004: Planting the Seeds for the Next Phase

2004 marked a significant development in road safety both for the Chinese Government and for the World Bank. In May 2004, the first Road Traffic Safety Law⁵¹ was implemented. This followed the establishment of the National Inter-Ministerial Road Safety Forum in October 2003 which coincided with the *Review of World Bank Road Safety Initiatives in the People's Republic of China* (June 2003).

Until 2004, the strategy pursued by the World Bank was ultimately confined to what could be negotiated under a single highway project with a single client: the PCD. This constrained the

⁴⁹ Including also: (i) the 2nd Henan Highway Project-1996, (ii) the Tri-Provincial Highway Project-1998, and (iii) the 4th National Highway Project-1999.

⁵⁰ Including also: (i) the 3rd Xinjiang Highway Project-2002, (ii) the Hubei Xiaogan-Xiangfan Highway Project-2002, and (iii) the Hubei Shiman Highway Project-2004.

⁵¹ In June 2004, the World Bank completed a *Resource Guide to Road Safety Organizations in China* to map out all relevant national agencies, their relationships, and their roles and responsibilities under the Law.

introduction of safety components to only specific elements – albeit important elements – of a complex Road Safety Management System⁵².

The 3rd version highway safety projects in Xinjiang, Henan, and Hubei tested the World Bank’s road safety strategy in terms of the willingness and capacity of counterpart organizations to extend their operational practices and involve other agencies. This marked a progression from the previous model set up in the mid-1990s under the *Framework for Road Safety Improvement in China* which had accomplished its objectives and had reached its limits. It was successful at:

- initiating a road safety culture within PCDs strongly focused on road infrastructure interventions through safety audits, design/audit manuals, blackspot programs, etc;
- starting to develop provincial interventions for road users, including education and enforcement, and for vehicles, especially truck overloading and the safety of commercial transport operations;
- establishing accident information and analysis systems;
- establishing cooperation mechanisms between PCDs and PSDs on (i) accident information/analysis and on (ii) truck overloading;
- establishing Provincial Multi-Agency Traffic Safety Leading Groups;
- initiating the preparation of Provincial Road Safety Action Plans.

The impact and sustainability of 1st generation highway safety projects was the strongest in the provinces that implemented its three successive versions, mainly: (i) Xinjiang, (ii) Henan, and (iii) Hubei. On average, it took the World Bank 10 years to bring these provinces to this advanced stage. However, the limits of the World Bank’s strategy are that:

- because client provinces were not held accountable to the Central Government for improving road safety outcomes, the success of such initiatives relied largely on the willingness of counterpart provinces to cooperate and own the initiatives.
- it was a long process. It took 10 years to improve road safety management in a few provinces. Less than 0.2% of the total project amount was invested in road safety components and while World Bank projects had an impact at the provincial level, they had, inevitably, a limited impact at the national level.
- it was strongly anchored in the PCDs which have only a limited power on this issue and did not target the PSDs which have the actual power to enforce as well as the power to monitor.
- some efforts were made to involve other agencies (like the PSDs) but most activities were owned and carried out by the PCDs and were mono-sectoral. This was actually the reason for their success since the PCDs were ultimately the only agencies that were accountable to the World Bank for their results on the projects.
- it was tied to highway projects that targeted traditional World Bank’s client provinces (like Xinjiang, Henan, and Hubei) and could not focus on other provinces which may have been more interested and at a stage of development where they were more ready to pursue such initiatives.

In 2003, the *Review of World Bank Road Safety Initiatives in the People’s Republic of China* concluded that the next, and more difficult step, would be to seek opportunities for large-scale, stand-alone, multi-sectoral road safety projects. It was considered that by undertaking such projects, more could be learned about what could be achieved with an integrated good practice package of safety initiatives. These “**2nd generation road safety projects**” would be carried out

⁵² Good-Practice Road Safety Management Systems (see Annex 3) are characterized by: (i) their clearly defined performance targets, (ii) well-established implementation arrangements, and (iii) integrated safety interventions, which in turn all have further dimensions critical to success.

at the national or provincial levels and the counterparts would not be limited to the MOC and the PCDs. The following table contrasts the two approaches (“1st Generation” vs. “2nd Generation” road safety projects):

<ul style="list-style-type: none"> • 1st Generation <ul style="list-style-type: none"> – Small components in larger infrastructure projects – Mainly single sector – Simple to prepare – Outcomes often limited to the project level 	<ul style="list-style-type: none"> • 2nd Generation <ul style="list-style-type: none"> – Large stand alone road safety projects – Multi-sectoral – Complex to prepare – Larger outcomes
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One of the key attributes of 2nd generation projects is their capacity to maximize road safety outcomes by generating systematic and sustainable impacts. Under 1st generation projects, this is more difficult and takes longer to achieve, and is also often confined to limited fields such as road engineering. Road safety components of 1st generation projects are also carried out in a sporadic and temporal manner when they are not built into a scheme of successive versions targeting a province. Other key attributes of 2nd generation road safety projects include:

- covering all three elements⁵³ of the Road Safety Management System;
- targeting the highest concentrations of road traffic injuries and fatalities in the road network.

To achieve these attributes, a 2nd generation project would normally require client ownership, agency accountability for performance (i.e. results based), adequate funding, the management of complex relationships, and a sustained government and agency commitment to the success of the project and its extension beyond the project.

Using Swedish Consultant Trust Funds, the World Bank undertook a short study in Hubei and Jiangxi Provinces which included an assessment of implementing stand-alone road safety projects. One of the recommendations of the study was the establishment of a Road Traffic Safety Training Center (RTSTC) in Hubei to strengthen road safety awareness, increase the quality of traffic safety facilities, and establish a network of local road safety practitioners to support these initiatives. The RTSTC was formally established in 2007 with a US\$ 500,000 grant from the World Bank Global Road Safety Facility⁵⁴, funding from the Hubei Provincial Communications Department (US\$ 200,000) and corporate sponsorship from PSA Peugeot Citroen.

In 2006 and in 2007, the World Bank supported a six-month study to identify the opportunities and challenges for developing 2nd generation road safety projects in China. Different options were systematically reviewed and analyzed. 14 projects were identified (see Annex 10). Four were at the national level (Preliminary Study and Awareness Campaigns), two at the inter-provincial level (Demonstration Corridor and Traffic Police Capacity Building), four at the provincial level, and four at the municipal level (Demonstration Corridors, Blackspot Treatment/Audit, and Awareness Programs). Most projects were small, multi-sectoral, stand-alone projects that could be funded from World Bank study funds and counterpart funds.⁵⁵

The least feasible option would be at the inter-provincial level because it would be necessary to coordinate different provinces in addition to various sectors. The most feasible options would be at the national and at the provincial/municipal levels.

⁵³ (i) Performance targets, (ii) implementation arrangements, and (iii) interventions (see Annex 3 for Good-Practice Safety Management Systems).

⁵⁴ See Annex 11 for the activities of the World Bank Global Road Safety Facility in China.

⁵⁵ These funds may come from a ministry, local government contribution, or donation from the private sector.

At the national level, major stakeholders such as NDRC and MOC have suggested that a study project on the topic is more feasible. Such a study should be undertaken in partnership with the Chinese Research Institutes. The key factor for projects to be viable lies in the willingness of ministries to allocate research grants on potential activities.

At the provincial and municipal levels, four major constraints were identified:

1. **willingness** of provincial/municipal governments to carry out 2nd generation projects and therefore to commit funding to non-revenue generating activities;
2. **fund availability**: the financial capacity of provincial/municipal governments becomes an important factor influencing their willingness;
3. **institutional capacity**: coordination capacity of provincial/municipal government agencies is critical to the success of 2nd generation projects;
4. **approval of the Central Government (MOF and NDRC)**: obtaining the approval of the Central Government is critical to carrying out a large stand-alone 2nd generation road safety project at the provincial/municipal level.

A key recommendation was made by the study: At the provincial and local levels, it is advisable to introduce the project into economically more developed provinces located along the coast. Developed coastal provinces are likely to be more ready than other provinces in terms of willingness, funding, and institutional capacity. The outcomes of 2nd generation projects are likely to be the highest and the most sustainable in such provinces.

The study raised the issue of which body would be responsible for loan repayment. It is important to note that the Traffic Police have no independent financing capacity.

The following conclusions and concerns were identified on the promotion of the 2nd generation project concept:

- as it is new to many stakeholders and officials, the concept of 2nd generation road safety project needs to be clearly explained and discussed among wider groups of stakeholders on its suitability in China's context;
- the promotion of 2nd generation practices should be in accordance with the existing domestic road safety agenda and plans;
- the practicability and incentives of borrowing for non-profitable road safety activities need to be further identified;
- further analysis of the expressed concerns or constraints is vital to moving the concept into practice. Such analysis should be made through continued outreach efforts and dialogue with the relevant government agencies.

2.2 Review of Urban Road Safety Initiatives

2.2.1 Overview of Urban Road Safety Initiatives

Road safety programs have been included as part of the Traffic Management Components (TMC) of all World Bank Urban Transport Projects in Shanghai, Guangzhou, Liaoning, Urumqi, Shijiazhuang, Wuhan, and Xi'an. They typically comprise less than 1% of total project funds (ranging from US\$ 0.15 to US\$ 4.7 million) in the context of a TMC, which comprises on average 6% of project funds. However, the TMC as a whole aims to improve road safety. A comprehensive review of World Bank Urban Traffic Management Components in China can be found in Annex 8. All the road safety activities carried out under World Bank Urban Transport Projects in the last 15 years are listed in Annex 6. A typical Urban Traffic Management and Road Safety Program includes the following:

1. Policies, Strategies and Performance Targets:

- Preparation and implementation of integrated traffic management measures.

2. Implementation Arrangements:

- Leadership and Coordination:
 - establishment of Project Leading Groups and/or Traffic Management Committees.
- Monitoring and Performance Evaluation:
 - support to either enhance or replace the Traffic Accident Information System (TAIS) so that local data collection and analysis can better address local needs, and improve locational referencing and causation analysis;
 - technical assistance to carry out an accident analysis study using real data to lead directly to a blackspot remedial measure program focused on engineering measures.

3. Interventions:

- Road Users:
 - Road User Education (RUE) programs (including support for more targeted campaigns, equipment to promote RUE in the media, production of a “Highway Code” and traffic management maps);
 - occasional enforcement programs with the Traffic Police.
- Road Infrastructure and Traffic Management:
 - road safety audit of project components;
 - remedial measures including blackspot improvement, signing and marking improvement, etc;
 - traffic design and management interventions, including civil works, physical junction channelization, design and management of facilities for pedestrians and cyclists (NMV), training, etc;
 - safety/traffic management equipment including signalization, traffic signals, specification and design of ATC systems, controllers, etc.

2.2.2 Summary of Urban Road Safety Initiatives

The Shanghai Metropolitan Transport Projects I & II (1991 – 2000)

The enhancement of accident reporting, data collection and analysis led to the development of remedial measures which exceeded the typical RUE methods previously used by the Shanghai Traffic Police. Although recommendations were made for a specific pilot area, they were not implemented due to new road construction superseding the proposals. However, the concept of an accident analysis program leading to engineering measures has been adopted.

The establishment of a road safety center to provide equipment to train and test drivers and develop expertise for targeting road safety problems achieved all of its objectives. The driver training and testing equipment is fully utilized and has been replicated in three other centers. Institutional strengthening has resulted in better management and control of driver training, as well as testing and re-testing after accidents and violations. A driver penalty points system pioneered in Shanghai in 1993 was replicated nationwide in March 2000. Road safety schools were established throughout the municipality after training abroad. There has also been a reduction in accident rates and it is considered that the center has been integral in this success.

Guangzhou City Center Transport Project (1998 – 2007)

This was a World Bank traffic management and safety program which especially sought to improve traffic safety for pedestrians.

In particular, the RUE component has developed a well-focused program to improve road safety awareness, including the production of a Highway Code, an improved accident database for Guangzhou, a RUE exhibition, and activities which target specific groups of children.

The channelization at intersections carried out under the first phase of the Traffic Management Component was one of the first demonstrations of such low-cost and effective techniques in China. The third phase recommended incorporation of the latest international practices on channelization, pedestrian safety islands, and physical separation through curbs and “green islands”. Guangzhou can be seen as a model for other cities in the effective demonstration of low-cost traffic management investments, representing the first instance in China where the Traffic Police collaborated with planning and municipal engineering bureaus to design and implement such schemes.

Liaoning Urban Transport Project (1999 – 2005)

The project was ambitious in the scope of the traffic management subcomponents, especially in wishing to develop non-motorized vehicle facilities. It became clear during the course of implementation that the World Bank and the three cities faced certain challenges in the areas of channelization and of modern traffic management measures.

The road safety study made sound points about audits, which were new to the Chinese case for urban roads, and also about broader accident costing. Useful suggestions for accident remedial work were provided with examples of good international practice. Accident blackspot treatments have been implemented as per the recommendations of the study.

Urumqi Urban Transport Project (2000 – 2007)

The World Bank undertook a road safety review and a detailed accident analysis showed that of 41 accidents recorded on the Ring Road in the first 9 months of 2002, 33 involved pedestrians. In these accidents, 12 pedestrians died and 26 were seriously injured. It was apparent that a number of design and construction standards had not been met, and that pedestrian facilities had not been constructed according to plan and were severely lacking. Specific recommendations focused on preventing pedestrians crossing the expressway at-grade, but also addressed a number of other issues. These included: better accident data collection, analysis and investigation; better safety procedures for road-workers; improved facilities for pedestrians; improved at-grade junctions; improved barrier design; and introduction of Road Safety Audits.

Shijiazhuang Urban Transport Project (2001 – 2008)

Although accident numbers and rates in the city had been decreasing in recent years, the fatality rate was extremely high, and the incidence and type of accidents were uncommonly severe, especially when compared with other cities of similar population and motorization within China. Road traffic fatalities per 100,000 people were 19.6 compared to 3.8 in Shanghai and 2.9 in Hong Kong (year 2000). Like most other provincial cities, Shijiazhuang has only limited adherence to the TAIS. In 2000, under the Traffic Police, a total of 10 staff were involved in accident analysis and investigation at headquarters in addition to accident investigators based in the urban and rural Traffic Brigades. The proposed remedial measures focused on traffic management and

engineering techniques. The main recommendations were to install traffic signals (including pedestrian signals), guardrails, and pedestrian footbridges and subways.

Wuhan Urban Transport Project (2004 – ongoing)

In addition to the usual Traffic Management and Road Safety Components of Urban Transport Projects, the project enhances the focus of RUE towards children and includes training in road safety audits of new and improved urban roads.

Liaoning Medium Cities Infrastructure Project (2006 – ongoing)

In the Liaoning Medium Cities Infrastructure Project, the usual traffic management and road safety activities are implemented under an institutional framework tied to the Municipal Road Safety Council. The component is linked to a process of improvement and measurement on key corridors and intersections in the city where safety is an issue.

Xi'an Sustainable Urban Transport Project (2008 – ongoing)

The road safety subcomponents have drawn on lessons learned from previous projects and have increased resources specifically targeted at road safety. The subcomponents comprise: (i) an ATC system, with associated junction channelization; (ii) a road safety program to investigate and analyze accidents and implement remedial measures; (iii) enforcement and road user education measures; (iv) traffic facilities for cyclists and pedestrians; and (v) road marking equipment.

2.3 Lessons Learned

An exhaustive list of all the lessons learned from World Bank Road Safety Components is attached to Annex 9. Key lessons learned can be summarized as follows:

2.3.1 Interurban Road Safety

Policies, Strategies and Performance Targets

For traffic safety to improve dramatically, the matter must be elevated to the highest levels of Government (Tri-Provincial Highway Project, Mid-Term Evaluation, 2002)

In 2002, four projects⁵⁶ highlighted the following: “The World Bank's role so far has been confined largely to matters under the jurisdiction of its project executing agencies, namely the engineering aspects of road safety. Improving road safety requires coordinated action in engineering, education and enforcement. However, the current diffusion of responsibilities in these different areas makes it difficult to address the problem in a comprehensive manner. For traffic safety to improve dramatically, the matter must be elevated to the highest levels of Government.”

⁵⁶ Tri-Provincial Highway Project, Mid-Term Evaluation, 2002; Inner Mongolia Highway Project, PAD, 2002; 3rd Xinjiang Highway Project, PAD, 2002; 2nd Anhui Project, PAD, 2003.

A broader, multi-sector approach, with a longer timeline, is warranted for meaningful results (Xinjiang Highway Project, ICR, 2000)

In 2000, the ICR of the Xinjiang Highway Project stressed that: “Experience under the project suggests that one should not underestimate the risks, nor should one have too high expectations within the confines of one single project. A broader, multi-sector approach, with a longer timeline, is warranted for meaningful results. This should figure prominently in the dialogue between the World Bank and the Chinese Government, both at national and provincial levels.”

Implementation Arrangements

Leadership and Coordination

Good cooperation between the PCDs and the PSDs needs to be established (Xinjiang Highway Project, ICR, 2000)

The Provincial Communications Department can work only on what falls under its responsibility, namely the engineering aspects of road safety. Many highway projects noted the need for higher levels of government to encourage more effective coordination between the PCDs and the PSDs. The Anhui Highway Project showed that once the Provincial Government was convinced of the interest of the road safety component, coordination with the Traffic Police was possible and the road safety issue could be tackled more efficiently.

Interventions

Road Users

Programs need to focus not only on physical interventions but also on changes in the attitudes of drivers and pedestrians (Henan 2, Mid-Term Evaluation⁵⁷, 2001)

An independent evaluation of the road safety component of the 2nd Henan Highway Project was conducted by mid-term to assess the user perception of the improvements (drivers, pedestrians, and Traffic Police). It was found that (i) the main causes of accidents included speeding, violation of traffic rules, and use of non roadworthy vehicles, and (ii) that the program needed to focus not only on physical interventions but also on changes in the attitudes of drivers and pedestrians (i.e. on education and on traffic enforcement).

Vehicles

Need to continue pressing solutions to the overloading problem (Jiangxi 2, ICR, 2007)

Truck overloading remains a problem throughout China – studies typically find that over 75% of trucks are overloaded with the average overload sometimes exceeding 100%. A few years after opening, the right hand lane of many expressways already shows signs of rutting due to the high number of overloaded trucks. On other roads, there have been catastrophic failures of bridges due to overloading. The pressure to keep transport costs low has sometimes resulted in government reluctance to take strong measures to enforce legal axle loads. The measures presently in place have only limited success in persuading truckers to reduce overloading. These include spot checking and fining by the police, and higher tolls based on weight. Another aspect of the

⁵⁷ Two other projects also stressed the same need: Anhui 1, ICR, 2006; and Xinjiang 3, PAD, 2002.

solution, which may not have been considered sufficiently, would be to increase the design axle load. Designing stronger pavements, while more costly initially, may lower the total cost of transport by allowing heavier trucks, provided that they are in turn more roadworthy and safer. Higher permissible axle loads may also make enforcement more acceptable to the transporters. Axle loads were increased in the European Union after studies showed that they would result in lower overall transport costs, including infrastructure and vehicle operating costs.

Road Infrastructure

The lessons learned on road infrastructure are the following (see Annex 9 for more details):

- Dangerous down-hill grades: additional measures should be implemented at the design stage to improve the safety of new roads (NH2, ICR, 2005). These include factors such as ensuring a constant safe gradient over the length of the section, providing additional lanes and emergency stopping bays.
- Interconnecting Roads (NH2, ICR, 2005, and Jiangxi 2, ICR, 2007): it is important to pay close attention to the interconnecting road program during project design. The expressway alignment, and the number and location of interchanges need to be carefully considered.
- Closer review of designs and technical specifications are required (Jiangxi 2, ICR, 2007).
- It is important to ensure that the World Bank team regularly visits the site (Jiangxi 2, ICR, 2007).
- The World Bank should pay more attention to the impact of construction works on safety and should include mitigation measures during the construction phase (Henan 3, ICR, 2007).

2.3.2 Urban Road Safety

Policies, Strategies and Performance Targets

Need to transform World Bank's urban road safety activities into institutional actions

The early urban transport projects focused on a series of bottom-up actions (intersection improvement, NMV separators, supporting the police, etc). However, although these were important and valuable, it is necessary to note that they did not appear to develop into any institutional actions. In the Liaoning LMCIP Project and in the Taiyuan Urban Transport Project, such activities are now being implemented under an institutional framework tied to the Municipal Road Safety Council. This approach should create a stronger link between the World Bank-financed activities, and the city's own traffic safety efforts. The process also creates a platform for the city to engage with the World Bank on traffic safety issues more generally and also supports a capacity building process for the city.

Implementation Arrangements

Sensitization of key decision makers is crucial for successful project implementation

In Urban Transport Projects, the Mayor or the City Council is often the main driving force. In the Liaoning Urban Transport Project, differences in the understanding of issues between the World Bank and local leaders was in large part responsible for the problems faced by technical staff in implementing the Traffic Management Components. There was a conflict in the vision between the appraised activities relating to junction channelization, and the reductions of road space for pedestrians and cyclists sought by leaders. Urban Transport commands significant attention from municipal leadership. To be able to facilitate change in this sector, it is critical for political

decision-makers to be alerted to the relevant issues through policy-dialogue, targeted workshops and seminars, and study tours.

Need to integrate the institutions dealing with traffic engineering

It is necessary for the coordination between the traffic management system and the new road infrastructure to be stronger. Examples include better design of the ground level junctions under the inner ring-roads, integration of inner ring-road monitoring equipment and ATC. Implementation would require the creation of a traffic management coordination team which brings together members from different agencies.

Interventions

The lessons learned on interventions, including road design and traffic management are the following (see Annex 9 for more details):

- Need to address the causes of accidents on urban expressways and arterial roads.
- Need to improve road design: A better functional classification of roads is required and road design standards need to be reviewed so that designs can be based more on road function. A systematic process of road safety audits for new and improved urban roads needs to be established to prevent accidents.
- Need to develop a comprehensive approach to traffic management.
- Need to integrate traffic management with investments in ATC to obtain the commitment of the Traffic Police.

2.4 The Challenges

Difficulty of engaging with the Ministry of Public Security at the national level

The Ministry of Public Security at the national level is the main agency involved in road safety. However, the World Bank is constrained in its ability to lend directly to the MPS. This is because the MPS, as a direct recipient, would not have the capacity to repay a loan as it does not of itself generate revenue and is limited to budgetary allocations.

The World Bank has worked with the Traffic Police at the municipal level and, to a lesser extent, at the provincial level:

- at the municipal level, the Traffic Police, responsible for Traffic Management, were the main counterparts for World Bank's Urban Road Safety Projects.
- at the provincial level, the Traffic Police were the direct counterparts for only 4 out of 144 road safety activities. This included training and provision of enforcement equipment. The Traffic Police were involved to varying degrees in 25 other road safety activities, but Provincial Communications Departments have otherwise held the leadership. Activities have included road safety action/reform plans, road safety leading groups, accident analysis studies/systems, and road safety seminars. For most road safety initiatives, the clients were the PCDs. The main reasons for not having engaged more directly with them at the provincial level are, as discussed above, the institutional constraints on direct lending.

Projects with varying impacts on clients at the local level

The road safety components were well aligned with the World Bank road safety strategy and can be qualitatively judged as successful in terms of their contribution to improved road safety management practices and outcomes at the project-level. The issue is whether these components had a lasting positive impact on clients, either cities or provinces.

It was certainly more challenging for urban road safety projects to have a lasting impact on cities than for successive provincial highway safety projects targeting the same province to have a lasting impact on the province. Shanghai was the only client to have multiple urban transport projects, while Xinjiang, Henan, Hubei, and other provinces implemented at least 3 highway projects with road safety components. It would be instructive to measure the real outcome of these components on the current road safety management practices of client provinces and ascertain whether these projects had a lasting impact on PCDs practices. It might also be useful to establish whether they were conducted in a manner that lead clients to appreciate their value and therefore decide to replicate these initiatives outside the scope of World Bank projects.

According to interviewed World Bank's staff, most of these components were useful at the project level but it is uncertain as to whether or not they were replicated later elsewhere by clients on their own initiative.

Need to leverage experience between projects

Given the institutional environment in China, there are major advantages in maximizing the experience of previous projects. This was especially successfully carried out under the road safety components of urban transport projects where the same consultant was used. Such an approach was made possible by the smaller volume of Urban Transport Projects. There were 8 projects in 15 years that had significant Traffic Management/Road Safety Components.

In Highway Projects, in some cases (in Xinjiang/Henan and in Hubei/Jiangxi), the same consultant was able to be used thereby taking advantage of the experience gained in other projects. However, in general, road safety experience in Highway Projects was not systematically leveraged due to the higher volume of projects – 24 projects in 15 years, which inevitably meant that more task team leaders and more consultants were involved.

Need to identify successful good-practice initiatives that can be replicated elsewhere

There is a need for the World Bank to identify successful good-practice initiatives. Thereafter, consideration should be given to establishing more systematic approaches to adapt and systematize/replicate these initiatives either in the same city/province or elsewhere. This will assist in avoiding duplication of efforts.

A strong example of a successful initiative is the traffic safety program that was established in six villages in Hubei Province. These villages had suffered from recurrent fatal accidents. However, through the successful implementation of a multi-sectoral education program, the number of annual road traffic fatalities was reduced from seven to zero.

3. The Way Ahead for the World Bank

Although the three priorities set in the *Review of World Bank Road Safety Initiatives in the People's Republic of China* (World Bank, Tony Bliss, June 2003) still hold in general terms, noticeable progress over the last five years means that they are now in a position where they can be adjusted:

- The first one⁵⁸ should become to raise the priority of injury in general and road traffic injury in particular within the agendas of the World Bank Health Sector, other International Organizations, and the Ministry of Health (see Part 3.1).
- The second one should still be to develop ways of implementing a more rapid response to the projected burden of road traffic fatalities and injuries (see Part 3.2).
- The third one should still be to identify opportunities to invest in integrated, stand-alone road safety programs, compared to the previous approach of mono-sectoral, road safety components which were embedded in large transport project investments (see Part 3.3).

These recommendations provide a basis for the way ahead for the World Bank but they should be validated against the expectations of Chinese officials and experts through high-level strategic dialogue. Such a dialogue would usefully inform both parts about their more recent developments in road safety and examine more closely the World Bank's role and the added value it can bring to China.

If the World Bank decides to proceed with a China Road Safety Initiative, it should recognize the level of commitment both of staff and of budget that would be needed. Due to their institutional complexity, road safety projects are much more resource intensive than other types of transport projects, and it is advised that a full-time in-country dedicated staff conversant with the workings of local institutions be assigned for project preparation and implementation.

In the short-term, two projects could be prepared:

1. a *Health Study/AAA* presented in paragraph 2 of Part 3.1;
2. the *First China Road Safety Project* presented in Part 3.3.1.

3.1 Raising the Priority of Injury in the Health Sector

In partnership with the World Bank⁵⁹ China Health Sector, other International Organizations (WHO, ADB, UNICEF, ILO⁶⁰) and in consultation with the Chinese Government:

1. **The World Bank could build upon the close relationship that it has already established with the MOH in other areas and seek to extend this to raising the priority of injury in general and road traffic injury in particular**⁶¹. The MOH is the best placed agency to raise such priority and also to help generate the appropriate level of (i) political commitment and (ii) funding that will be needed to address this problem over the medium to long term.

⁵⁸ The first priority defined in the *Review of World Bank Road Safety Initiatives in the People's Republic of China* (June 2003) was to build a more inclusive approach to road safety at the country strategic level in China, compared with the situation in 2003 where road safety goals were excluded from national development aspirations. But this has been accomplished in the last 5 years as shown in Part 1.1.

⁵⁹ Synergies could be sought within the World Bank China Program at large: for example, within the Infrastructure Sector, the safety agenda could also include: safety of other transport modes, safety for construction and maintenance works, and mining safety.

⁶⁰ The International Labor Organization on occupational safety. According to the *National Injury Prevention Report (MOH, 2007)*, RTI and occupational injury accounted for 47% of all injury related deaths in 2005.

⁶¹ Road traffic injury would be a strong focus, being the first cause of injury related death in China.

2. **A study/AAA could be undertaken with the MOH in collaboration with the WHO to raise the priority of injury in general and road traffic injury in particular within the national health agenda.** This study, done by a Senior Health Economist⁶², would review and make recommendations to strengthen: (i) the current Chinese Disease Monitoring Systems (both for mortality and morbidity), (ii) the costing methods used to assess and prioritize the burden of injury and diseases, and also to (iii) analyze the projected burden of injury and diseases in the next ten to fifteen years and their impact on national, provincial and local government expenditures. **This study could produce an authoritative report (in the form of a book or a government document) to serve as the basis for program planning, public policy, and interventions in the Health Sector.**

This study is expected to cost approximately US\$ 500,000. Funding could come from: (i) the World Bank Global Road Safety Facility, (ii) the GRSI, (iii) other International or Bilateral Institutions, (iv) the Private Sector, and/or (v) NGOs. As an example and because of financial constraints, an initial, less expensive pilot-study (US\$ 250,000) could be carried out in a province that would be a preferred client for a 2nd generation road safety project (Shanghai, Jiangsu, Zhejiang, or Guangdong – see Part 3.3) before being expanded to the national level.

3.2 From Gradualism to Rapid Response

In consultation with the Government and in partnership with other donors and partners:

1. **The World Bank should establish a formal relationship with the MPS at the national level** and offer to provide assistance to the Inter-Ministerial Road Safety Forum.
2. **The World Bank should continue to engage closely with NDRC on road safety** as: (i) the World Bank already has a good working relationship with NDRC, (ii) NDRC is a key member of the Forum, and (iii) NDRC's approval will be required for the implementation of 2nd generation road safety projects.
3. **The World Bank could offer to provide assistance to the Chinese Government with the development and the implementation of the *National Science and Technology Action Plan for Road Traffic Safety*.** The World Bank is in a unique position to bring international good practice and resources to help China. **This issue should first be discussed with the MOC**, which is best placed to invite the World Bank to contribute to the preparation of the Plan.
4. This engagement in the *National Science and Technology Action Plan for Road Traffic Safety* could enable the World Bank to progressively establish a working relationship with the MPS at the national level and prove that the World Bank can be a valuable partner on road safety. A next step for the World Bank could be to offer to provide assistance to the MPS and to the Forum with the development of National and Provincial/Local Road Traffic Safety Plans/Strategies.
5. Like the review of the current Chinese Disease Monitoring Systems recommended in Part 3.1, the reporting/monitoring tools and processes of the Traffic Police (including the TAIS) could be reviewed and appraised according to international good-practice. Recommendations could be made to improve them and if possible, to align them with the reporting/monitoring systems of the MOH. A dialogue could be initiated with the MPS and the MOH to understand the reasons for the discrepancy between their road traffic fatality data.

⁶² Preferably conversant with the workings of Chinese Health Institutions.

6. Road safety standards/rules and their implementation could be reviewed and appraised according to international good-practice. Recommendations could be made to promote cost-effective standards that are intrinsically safe for all road users, especially for the vulnerable road users. Compliance⁶³ interventions could also be reviewed. This work could be shared between international donors:
 - Both the World Bank and the ADB would be in a good position to review, in partnership with the MOC, the HRI, the MPS, and the TMRI: (i) MOC road safety standards⁶⁴ and rules, (ii) regulations for commercial transport operations, (iii) traffic management standards and rules, and (iv) accident investigation methods and remedial measures.
 - The GRSP, because of its support from the private sector, would be well placed to review vehicle safety standards and rules, including seatbelt/helmet standards and rules.
 - The WHO could review emergency rescue/treatment standards and rules.
 - UNICEF could review the content and implementation of road safety education programs for primary and middle schools.
 - The review of enforcement⁶⁵ interventions, road safety education programs/campaigns, and driver training and testing/licensing regulations could be shared between international and bilateral institutions.
7. Chinese capacity in road safety research could be appraised and recommendations could be made to identify key areas for international cooperation.
8. Road safety manuals⁶⁶ developed by the World Bank under transport projects could be compiled and nationally promoted to all provinces/cities to accelerate the learning process and contribute to the professional development of road safety staff and managers.
9. Successful World Bank road safety initiatives in China could be compiled (both for Highway and Urban Transport Projects) and disseminated to project teams.

These initiatives could either be carried out separately or under the *National Road Safety Strategy and Performance Management Framework Component* of the *First China Road Safety Project* (presented in Part 3.3.1). If they were to be carried out separately, the sources of funding would be the same as those identified for the *Health Study/AAA* presented in Part 3.1.

3.3 From Project Components to Stand-Alone Programs

As recommended by the *Review of World Bank Road Safety Initiatives in the People's Republic of China* (World Bank, Tony Bliss, June 2003) and by the *World Bank Global Road Safety Facility Strategic Plan (2006 – 2015)*⁶⁷, opportunities for integrated, stand-alone road safety investments (“2nd generation road safety projects”) at the municipal and/or at the provincial level could be identified and implemented **as high-profile demonstration programs**.

The following sections describe options for implementing 2nd generation road safety projects in the short, medium, and long-term. In the short-term, the *First China Road Safety Project* (US\$ 30 to 50 million⁶⁸) could be prepared.

⁶³ Compliance interventions aim to make road builders and operators, the vehicle industry, and road users adhere to road safety standards and rules.

⁶⁴ This could also include safety standards for construction and maintenance works.

⁶⁵ The ADB has started to work on Traffic Law Enforcement in partnership with the TMRI in Wuxi.

⁶⁶ Road safety audit manuals, manuals on safety at worksites, manuals on the identification of blackspots, etc.

⁶⁷ *World Bank Global Road Safety Facility Strategic Plan (2006 – 2015)*, see: Facility Mission, Goals and Objectives (paragraphs 2 and 3).

⁶⁸ See paragraph “Project Amount/Scale” next page. The effective minimum lending amount for World Bank projects in China is at least US\$ 20 million. Less than this amount, the cost of preparation and implementation is effectively not sustainable.

3.3.1 In the Short-Term

Preparation of the First China Road Safety Project (US\$ 30 to 50 million)

This project could be linked to the *National Science and Technology Action Plan for Road Traffic Safety* which will have Demonstration Programs, although such linkage is not a necessary condition for its preparation and implementation.

Project Amount/Scale

An audit of the *Review of World Bank Road Safety Initiatives in the People's Republic of China* (June 2003) by the World Bank Quality Assessment Group (QAG) in 2004 contained the following remark: “the Panel felt that some more thought should be given to start with a small stand-alone operation to test the workings of the agreed institutional mechanisms and the commitment of the concerned authorities to road safety before embarking on a large scale operation”. US\$ 30 to 50 million would be a good amount to do a significant project.

Client

It would be preferable if the client was NDRC, which would coordinate with the main sectors involved (Public Security, Health, and Transport) and with Provincial/Municipal DRCs. Consequently, the feasibility of this project should first be discussed with NDRC.

Project Components

The Road Safety Project could have 2 main components:

1. National Road Safety Strategy and Performance Management Framework;
2. Road Safety Demonstration Pilot Projects (municipal and maybe also provincial projects).

Component 1: National Road Safety Strategy and Performance Management Framework (US\$ 3 to 5 million)

Component 1 could support the preparation and implementation of some of the initiatives described in Part 3.2. It could be composed of several TAs carried out at the national level.

Further to these initiatives, it could also include the following subcomponents:

- development of funding mechanisms and resource allocation processes for road safety;
- review and strengthening of coordination/leadership arrangements;
- capacity building/training at the national, provincial and local levels.

Component 2: Road Safety Demonstration Pilot Projects (US\$ 27 to 45 million)

Implementation of 2nd generation road safety pilot projects. In the short-term, it seems more likely that 2nd generation projects will be prepared at the municipal level, for the following reasons:

1. Given the smaller scale of a municipality, it may be more efficient to concentrate funds and resources in a smaller area rather than spread them more widely over a larger and more populous province.

2. The relationship of the World Bank with the Traffic Police has been most successful at the municipal level. The Traffic Police were the counterparts for the Traffic Management and Road Safety Components of Urban Transport Projects which contrasts with the more limited involvement of the Traffic Police in the Road Safety Components of Highway Projects.
3. The argument needs to be made⁶⁹ to convince provinces to borrow funds for large 2nd generation projects either through a first series of smaller Demonstration Pilot Projects (more likely municipal projects) and/or the Health Study/AAA presented in Part 3.1.

It is unlikely that any city will be willing to borrow US\$ 27 to 45 million for road safety. A more realistic amount for each city to borrow would be in the region of US\$ 13 to 23 million.

Two options are possible:

1. A project targeting two to three cities (each city borrowing approximately US\$ 13 to 23 million);
2. Two-phase project targeting: (i) one or two cities in Phase 1 (Municipal Demonstration Pilots) and (ii) key interurban corridors (Provincial Demonstration Pilots) in Phase 2. These cities and corridors would be located in one or two provinces, and each of the two phases would cost some US\$ 13 to 23 million.

Each project could be composed of three components: (i) a municipal/provincial road safety assessment; (ii) an institutional and capacity building program; and (iii) demonstration pilots carried out along major municipal/provincial fatal corridors.

1. The municipal/provincial road safety assessment would: (a) describe and assess the current municipal/provincial road safety management system (cf. Annex 3) and the capacity⁷⁰ of relevant sectoral agencies involved in road safety; and (b) in consultation with the client municipalities/provinces develop an action plan for components (ii) and (iii).
2. The institutional and capacity building program would strengthen the municipal/provincial road safety management system and the capacity of relevant sectoral agencies involved in road safety. It would be carried out in close cooperation with Municipal/Provincial Road Safety Councils.
3. The demonstration pilots would consist of an integrated package of good practice road safety initiatives in the fields of enforcement, education, engineering, and emergency services, carried out along major municipal/provincial fatal corridors.

This could lead to the preparation and implementation of larger provincial 2nd generation road safety projects in the medium to long term (see Parts 3.3.2 and 3.3.3).

Selection of the Project Cities and Provinces

The World Bank financed study, *Review of Past Experiences and Options for Forward Progress (2006 – 2007)*, recommended that it was advisable to introduce new types of road safety projects into economically more developed⁷¹ areas located along the coast. Developed coastal areas are likely to be more ready than other areas in terms of willingness, funding, and institutional capacity. The outcomes of 2nd generation projects are likely to be better and more sustainable in such regions.

⁶⁹ This was one of the conclusions of the World Bank financed study *Review of Past Experiences and Options for Forward Progress (2006 – 2007)*.

⁷⁰ Technical and managerial capacity but also the tools, processes, and norms/regulations that are being used.

⁷¹ This needs to be further discussed with MOF and NDRC as the World Bank lending program needs to be aligned with the priorities set by MOF and NDRC. However, the World Bank should state its preference that at least one of the two/three cities be in developed coastal areas.

It would be preferable if these project cities were concentrated in one or two provinces to:

- facilitate project implementation;
- prepare for the second phase of the project (if it is possible for a two-phase project to be implemented) with interurban road safety pilot projects along key provincial corridors (possibly between these cities);
- prepare for further road safety projects in adjacent provinces (see Parts 3.3.2 and 3.3.3).

Option 1: Yangtze River Delta Region (Shanghai, Jiangsu, and/or Zhejiang)

Shanghai would be the first city to consider for the following reasons:

- The Shanghai Traffic Police are one of the most advanced in China. The ICR of the Shanghai Metropolitan Transport Project concluded that the Shanghai Traffic Police could become a leading road safety agency in the country. Furthermore, they appear to crosscheck their fatality data with the health sector and insurance companies.
- Shanghai is the only coastal city to have successfully implemented both (i) a World Bank Transport Project and (ii) a World Bank Health Project with interventions in Injury Prevention.
- The Health Sector in Shanghai is very advanced both in Emergency Medical Services and in Injury Prevention.
- Shanghai has top quality universities that could become national centers of excellence in road safety. Furthermore, Shanghai is close to the Traffic Management Research Institute of the Traffic Police (Wuxi, Jiangsu Province).
- The next logical stage after a municipal project would be to improve inter-urban road safety around the municipality. Shanghai is adjacent to two major coastal provinces, Jiangsu and Zhejiang, that are strategically located in central China at the intersection of the north/south – east/west transport corridors.

For Shanghai, undertaking a Road Safety Project with the World Bank would send a strong signal to the world that it is building itself into a major global sustainable city which is considering all areas of municipal management and is keen to compete with other Asian cities like Hong-Kong, Singapore, etc.

The other cities would ideally be located in Jiangsu and/or Zhejiang Provinces, adjacent to Shanghai:

Jiangsu Province could be a target province for World Bank's road safety interventions for the following reasons:

- developed coastal province adjacent to Shanghai;
- central location in China;
- home to the TMRI: Traffic Management Research Institute of the Traffic Police;
- its Provincial Communications Department is considered to be one of the best in China.

Nanjing and Wuxi could be considered for municipal projects. Nanjing is the provincial capital while the TMRI is located in Wuxi.

If a project cannot be implemented in Jiangsu Province, adjacent **Zhejiang Province** could be considered with Hangzhou and perhaps Ningbo as potential target cities.

Option 2: Pearl River Delta Region (Guangzhou, Shenzhen, and Dongguan)

Another possible location could be Guangzhou, as the Guangzhou Traffic Police have expressed interest in doing a road safety project with the World Bank. The proposed road safety components are attached to Annex 13. Guangzhou has already successfully implemented a World Bank Urban Transport Project that had a Traffic Management and Road Safety Component (presented in Section 2.2.2). The Traffic Police and the George Institute have successfully carried out the *Guangzhou Seatbelt Intervention Project*. The drawback of doing a project in Guangzhou is that the health sector monitoring of road safety seems to be fragmented and monitoring of road traffic fatalities/injuries would have to rely mainly on the Traffic Police. The health sector does not appear to be as strong as in Shanghai.

As a possible alternative, other cities in Guangdong Province (like Shenzhen or Dongguan) could be approached to prepare either a one-phase or a two-phase Road Safety Demonstration Pilot Project.

Option 3: Bohai Delta Region (Beijing, Tianjin, and Hebei Province)

Finally, as alternatives, Beijing, Tianjin, and Hebei Province could be approached to prepare either a one-phase or a two-phase Road Safety Demonstration Pilot Project.

Option 4: Central and Western Provinces/Cities

Implementing 2nd generation road safety pilot projects in central and western provinces/cities that are less developed than coastal provinces adds another level of difficulty to an issue that is already complex. It would not be a recommended option in the short term, but could be one in the longer term.

3.3.2 In the Medium-Term

The *First China Road Safety Project* would pave the way for the preparation of larger-scale provincial 2nd generation road safety projects. Strong support would be needed from the Central Government to prepare such projects.

As recommended in the World Bank financed study *Review of Past Experiences and Options for Forward Progress (2006 – 2007)*, preference should be given to developed coastal provinces, i.e.: Jiangsu/Zhejiang, Guangdong, and Hebei. Jiangsu would be preferred because of (i) its central location in China, (ii) the presence of the Traffic Management Research Institute of the Traffic Police (in Wuxi), (iii) its Provincial Communications Department is considered to be one of the best in China.

3.3.3 In the Long-Term

2nd generation road safety projects could be prepared in other provinces, ideally adjacent to the provinces that tested the first series of projects. The first pool of provinces to be considered for 2nd generation road safety projects could be Jiangsu, Zhejiang, Guangdong, and Hebei, while the second pool could be Shandong and Fujian (which are located between Hebei, Jiangsu, Zhejiang, and Guangdong) and Hubei (which is poorer and more inland but which could act as an opening to projects in western China).

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Annex 1: Draft National Road Traffic Safety Plan for the “11th Five-Year Plan” (2006 – 2010)

**Inter-Ministerial Road Safety Forum
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Preface

As a prerequisite for the safe operation and rapid progress of the transport sector, road traffic safety is an important factor in economic development and social progress. It also serves as a basic guarantee for people’s livelihood and is key in the effort to build a prosperous equal society. Enhanced road traffic safety which guarantees safety for people’s life and property is essential to realizing, maintaining and developing the fundamental interests of the wider public. It is a specific manifestation of the effort to widely implement a scientific perspective on development.

During the “10th Five-Year Plan” period, the growth of road accidents was initially curbed in China. However, the country continues to endure a high incidence of road accidents, and the rate of road accident fatalities ranks first in the world. In addition there are other continuing problems in this area, including major road accidents which result in a large number of deaths and injuries, no fundamental improvement in the basic conditions for pedestrians, vehicles and roads, no resolution of the root causes of management problems, as well as other prominent problems and difficulties. China still faces a grave safety situation in the road traffic sector. During the “11th Five-Year Plan” period, China will maintain rapid economic development and social progress which will lead to an increase in the transport demand. With more pressure on the road sector, there is likely to be continued road traffic safety problems.

This plan is formulated as a master arrangement of road traffic safety for the “11th Five-Year Plan” period, according to the laws and regulations on road traffic safety and relevant national policies. It is an attempt to comprehensively prevent road accidents, prompt governments at all levels and the society as a whole to pay more attention and invest more in the efforts to enhance road traffic safety, and thereby realize the sustainable development of road traffic safety work.

The Road Traffic Safety Plan for the “11th Five-Year Plan” period consists of 5 parts, including the current and future trends of road traffic safety, guidelines and objectives, main tasks, key projects planned to be implemented (engineering projects) and guarantee measures planned to be implemented.

1. Current and Future Trends of Road Traffic Safety

The Party Central Committee and the State Council attach great importance to road traffic safety. During the “10th Five-Year Plan” period, the government promulgated and implemented the *Road Traffic Safety Law*. Meanwhile, the State Council convened conferences on research of road traffic safety work and approved the mechanism of the National Inter-Ministerial Road Safety Forum. Also, the relevant local departments implemented the arrangements of the Party Central Committee and the State Council to enhance road traffic safety, enforced the *Road Traffic Safety Law* and relevant laws and regulations, and carried out the “Five Rectifications” and “Three Enhancements” schemes to prevent road accidents. These two schemes were intended to rectify

drivers' behavior, traffic order, the transport industry, motor vehicle production enterprises and dangerous road sections. It was also intended to improve accountability, education and publicity, as well as law enforcement and inspection. The overall aim is to comprehensively reduce and prevent major road accidents leading to group deaths and injuries and progress from 'high frequency' to 'nearly curbed' and finally to 'reduction on a yearly basis.' Between 2003 and 2005, the number of road accidents in China reduced at an annual average rate of at least 90,000, with the road traffic accident fatality rate dropping at an average annual rate of more than 5,000 and the fatality rate per 10,000 vehicles decreasing from 10.8 to 7.6.

During the "11th Five-Year Plan" period, China will maintain a rapid, sustainable and coordinated development in the economic and social sectors. In 2010, China is expected to reach a total cargo transport volume of 22 billion tons and a passenger transport volume of 25 billion persons, up by 65% and 48% respectively over 2005. In addition, accelerated urbanization will increase the rate of private car ownership. China will have a motor vehicle ownership volume of 185 million, up by 42% over 2005. Also, there will be improvement in vehicle production, refitting, repairs and, more importantly, safety. The country will have a road traffic mileage of 2.3 million km and an expressway traffic mileage of 65,000 km, up by 19% and 58% respectively compared to 2005. The comprehensive road traffic safety governance mechanism will promote the improvement of the road traffic environment and have a positive effect on the road traffic safety status.

However, China still faces a serious road traffic safety situation.

1.1 China still experiences a high incidence of road accidents

1. A large number of traffic accidents in total. In 2005, China had 450,000 road accidents which accounted for 62.7% of accidents of all kinds. During the "10th Five-Year Plan" period, China experienced a 60.7% increase in the average number of road accidents over the period of the "9th Five-Year Plan."
2. Many fatalities and severe injuries result from traffic accidents. In 2005, China had a total of 98,738 fatalities and 469,911 injuries from road accidents, with road accident fatalities accounting for 77.7% of the fatalities resulting from all accidents nationwide.
3. Major traffic accidents leading to multiple deaths and injuries. In 2005, China had a total of 47 major road accidents, each of which resulted in 10 or more fatalities. For each year during the "10th Five-Year Plan" period, China averaged 45 major road accidents, each of which resulted in 10 or more deaths. These accidents were especially prevalent in the mountainous areas in western China.
4. High fatality rate per 10,000 vehicles for traffic accidents. In 2005, China had a road traffic fatality rate of 7.6 per 10,000 vehicles. In contrast, the USA, the EU and other developed countries and regions had a rate of about 1 to 2 while it is as low as 0.9 in Japan. The road traffic fatality rate per 10,000 vehicles is about 4 to 5 in South Korea, Malaysia and other neighboring countries.

1.2 Prominent problems and difficulties remain for road traffic safety

1. Road users are insufficiently aware of the importance of traffic safety and the governance by law and it may take a significant amount of time to improve road users' awareness and behavior. This is particularly applicable in rural areas. At present, drivers need to improve behavior in certain areas. This includes speeding, driving while fatigued, drinking and driving, illegal loading and other conduct which severely affects road traffic safety. In addition, there are also many offences by non-motor vehicles and pedestrians.

2. During the “11th Five-Year Plan” period, China will still have an imbalance between rural and urban development, and a high percentage of motor vehicles with a low level of safety including motorcycles, low-speed trucks, tricycle trucks, and tractors. These vehicles will account for 70% of the total. Also, it will be difficult to fundamentally improve the general safety of passenger and cargo vehicles. In addition, there will be great difficulty to effectively solve the problems of un-roadworthy vehicles, illegally assembled vehicles, and non-licensed vehicles driving on the road.

3. It is common to find motor vehicles, non-motor vehicles and pedestrians mixing in traffic. At present, medium- and low-grade roads in the road network account for over 80% of the total traffic mileage. Low-grade roads have insufficient road traffic safety facilities, incomplete traffic signs and lines, and inadequate traffic control. During the “11th Five-Year Plan” period, it will be difficult to greatly improve the technical structure and grades of roads in a short time. In addition, the rural areas will continue to face low-grade roads and incomplete safety facilities.

4. The safety management mechanism with long-term effects for road transport enterprises has not yet been established. The growth rate of vehicles and transport volume far exceeds that of road construction and the subsequent improvement in road traffic safety conditions. There will be a gap between the supply and demand in road transport, bringing more factors which might trigger road accidents. It will also be difficult to quickly improve the transport management regime and traffic safety management mechanism. Also, some road transport enterprises do not currently effectively hold people accountable for work safety. In particular, no noticeable results have yet been achieved from the supervision of passenger and cargo transport drivers and vehicles.

5. Mismanagement on road traffic safety. At present, traffic safety management is generally inadequate. Some localities, government departments and work units do not pay sufficient attention to traffic safety and the measures for road traffic safety management. Some law-enforcement groups are not well-educated or adopt management ideas, methods, approaches and systems which do not meet the demand from traffic. In addition, laws are not enforced strictly.

6. An incomplete emergency rescue and first aid system for road accidents. With an incomplete emergency rescue and first aid mechanism and inadequate pre-planning, China has a road accident fatality rate far higher than developed countries.

During the “11th Five-Year Plan” period, China has to formulate comprehensive policies, and take effective measures to implement them. These policies and measures can be implemented as mechanism innovations, financial input, education and publicity, safety research and engineering technology application, safety management and traffic law enforcement, accident rescue and first aid, etc, to effectively curb the rate of road accidents, and reduce the high frequency of road accidents fatalities.

2. Guidelines and Objectives

2.1 Guidelines

Efforts shall be made to implement the “Five Rectifications” and “Three Enhancements”, carry out the “Creating Safe and Accessible Counties” scheme, move ahead with the road traffic safety work in a coordinated way, and forge a safe, orderly and accessible road traffic environment. This needs to be done in accordance with the overall requirements of “government leadership, department accountability, combined efforts and joint administration, as well as comprehensive governance.”

2.2 Overall objectives

During the “11th Five-Year Plan” period, efforts shall be made to comprehensively improve road users’ sense of traffic safety, law governance and politeness by improving the comprehensive road traffic safety governance mechanism, improving the road traffic infrastructure, increasing law enforcement and management, to create adequate road traffic order, and effectively reduce road accidents and the resulting fatalities as much as possible.

During the “11th Five-Year Plan” period, the objective is to limit the annual road accident fatalities to less than the annual average rate during the “10th Five-Year Plan” period. China also aims to limit the road accident fatality rate to less than 90,000 nationwide by 2010, and the road accident fatality rate per 10,000 vehicles to less than 5.0, and reduce by over 20% (compared to 2005) the number of major accidents resulting in fatalities of 10 people or more.

3. Main Tasks

3.1 Enhance education and publicity on road traffic safety and improve the nation’s awareness of road traffic safety

1. Establish a society-based education and publicity system on traffic safety lead by the government

Efforts shall be made to establish the leadership agencies for road traffic publicity at all levels, led by the government and with participation from various government departments in charge of publicity, police, education, justice and administration, safety supervision, traffic, agriculture (agricultural machinery), construction, culture, radio and television. An accountability regime for traffic safety publicity should also be established in government departments, enterprises, public institutions, schools, communities, and villages and townships, which will hold full-time or part-time people accountable, adopt objective management, and form traffic safety education and publicity systems with the full participation of the whole society.

2. Establish a long term traffic safety publicity mechanism

Governments at all levels shall formulate a traffic safety publicity and education plan, organize and carry out relevant activities as part of the traffic safety publicity and education project, facilitate the publicity efforts for rural areas, communities, work units, schools and households, promote the long-term development and institutionalization of traffic safety. Efforts shall be made to enhance education on the laws of traffic safety to the whole society, and incorporate the traffic safety laws into the “Five & Five” scheme.

3. Incorporate traffic safety education into the curriculum of all schools

Efforts shall be made to formulate a public education plan for traffic safety, incorporate the knowledge of traffic safety into the curriculum and teaching plans of all kinds of schools and at all levels as a compulsory course for all students. Efforts shall also be made to incorporate student’s compliance with traffic safety laws and regulations into their evaluations, and include the performance of traffic safety knowledge education, rate of compliance with traffic laws by students and rate of traffic accidents into the school performance evaluations.

The awareness rate of traffic safety knowledge for elementary and middle school students is aimed to exceed 95% by 2010.

3.2 Strictly implement training, tests and management to improve the safety behavior of drivers

1. Enhance driver training

Efforts shall be made to further improve the training regime for motor vehicle drivers and continue to deepen our commitment to the Drivers' Behavior Improvement Program. Efforts shall also be made to enhance the management of driving schools and trainers, to implement the all-round development education program for drivers, strictly implement the practitioner qualification training, driving training and management regimes for drivers engaged in passenger road transport and cargo transport as well as road transport of dangerous chemicals.

2. Strictly implement the drivers' tests

Efforts shall be made to increase the strictness of the training, performance review, supervision and management regimes for drivers, and improve the quality of testers. It shall also be necessary to reform the contents of drivers' tests, and effectively improve the drivers' sense of safety, and further standardize the tests for motor vehicle driving. This should especially apply to tests for driving large- and medium-sized passenger vehicles, towing vehicles, large trucks and tractors. There should also be an attempt to increase the strictness of the practitioner qualification tests for drivers engaged in passenger road transport and cargo transport operations, road transport of dangerous chemicals, and school vehicle drivers.

During the "11th Five-Year Plan" period, efforts shall be made to improve the inspection of accidents involving novice drivers, and their trainers and testers. The objective is to reduce by 2010 the rate of road traffic fatalities involving novice drivers by 10% when compared to the level of 2005.

3. Further improve the driving license management

Efforts shall be made to enhance the inspection, issuance and management of motor vehicle driving licenses, improve the review and verification regime of traffic safety offence scoring, introduce innovative management methods for the needs of road traffic safety and improve the system of incentive and punishment for drivers.

During the "11th Five-Year Plan" period, the objective is to have more than 95% of the drivers with an accumulated traffic law offence score of over 12 points participate in learning and tests.

4. Drivers management and re-education

Efforts shall be made to enhance the daily management of drivers, and impose a strict management regime on drivers engaged in passenger and cargo transport as well as on novice drivers, and establish a credit system for drivers. Efforts shall also be made to research a new mode for driver management, expand the role of drivers' association, work units, communities and rural organizations at grassroots levels, and regularly educate the drivers within the jurisdiction on safe driving.

3.3 Enhance the management of motor vehicles and improve their safety levels

1. Gradually increase the percentage of safer vehicles in the overall mix of motor vehicles

The National Development and Reform Commission, the General Administration of Quality Supervision, Inspection and Quarantine, and the Certification and Accreditation Administration

of the People's Republic of China shall gradually improve the product quality and safety performance of motorcycles, low-speed trucks, tricycle vehicles, tractors and other vehicles, and gradually reduce and eliminate motor vehicle types which have low safety performance and large emission pollution. They shall also attempt to develop public transport, and promote safer and more environmentally friendly motor vehicle development. This would be achieved by formulating and adjusting the development policies for the motor vehicle industry, as well as adjusting the certification requirements and technical standards for compulsorily certified products.

2. Enhance the management and supervision of motor vehicle production and refitting enterprises

Efforts shall be made to enhance the production of passenger transport and cargo transport vehicles of all kinds, especially the management and supervision of refitting. Refitting of tanker vehicles and container vehicles shall be prohibited. Efforts shall be made to more tightly control the illegal production by manufacturers and illegal sales by dealers. Efforts shall be made to enhance and improve the compulsory certification system for vehicle products, enhance prototype testing, guarantee quality capability review and production consistency inspection, and strictly control the vehicle production access and market access. There shall also be follow-up inspection and law enforcement supervision for certified vehicles, complete safety regulation, and an attempt to ensure that new factory motor vehicles meet all technical standards in safety performance. Increased efforts shall be made to promote the certification of vehicle spare parts and ensure the product quality and utilization safety of spare parts. By 2010, China shall eliminate the phenomenon of "Reduced Tonnage" for cargo transport vehicles and eradicate the misconduct of "Reduced Tonnage" and "Large Tanks for Small Vehicles" for vehicles transporting dangerous chemicals.

3. Enhance the research and promotion of safety devices for motor vehicles

Efforts shall be made to enhance research on the safety performance of motor vehicles and gradually improve the safety features of vehicles. Compulsory requirements shall be imposed on vehicles to install active protection and passive protection devices, to make vehicles noticeably safer and reach international levels.

By 2010, passenger vehicles, heavy duty trucks, and semi-trailer tractors operating on the road shall all install and utilize automobile travel recorders which have passed national compulsory product certification. Cargo vehicles shall attach motor vehicle reflective markers and install rear collision prevention facilities.

4. Enhance the supervision of the safety technology testing industry and of the repair and maintenance industry for motor vehicles

The supervision of the safety technology testing industry and repair and maintenance industry for motor vehicles should be enhanced. There should also be more investment in the R&D and application of portable tractor testing equipment. Also, efforts shall be made to establish or improve the motor vehicle recall system as well as compulsory motor vehicle scrapping to ensure that the safety performance of motor vehicles is suitable for safe travel.

5. Increase the strictness of motor vehicle registration and travel access

Motor vehicle registration should be more strictly monitored to confirm the identity of the motor vehicle to be registered, so as to improve the capacity to identify stolen vehicles as well as illegally assembled vehicles. The daily inspection of motor vehicles should be made stricter. This

should include large-sized passenger vehicles, cargo vehicles, vehicles transporting dangerous chemicals, and school vehicles. There is also a need to improve the tractor information management system, and promote the nationally uniform computerized registration software.

3.4 Implement the accountability for traffic safety and enhance safety supervision on transport enterprises

1. Improve the work safety of transport enterprises

The transport department shall increase the strictness of the market access for transport enterprises, technical supervision for operating vehicles, qualifications for drivers, and improve the safety supervision of passenger transport sites and stations. Government departments in charge of traffic, police and safety supervision shall monitor transport enterprises, establish an effective transport safety accountability system and travel safety management system. They shall establish a self-discipline mechanism of transport safety composed of industry associations, transport enterprises and drivers, guide transport enterprises to implement safe production and accountability as well as to instigate an insurance regime for carriers operating road passenger transport and transport of dangerous chemicals.

2. Increase the strictness of the examination and safety approval for passenger lines

The transport authorities shall examine and approve passenger lines according to enterprise grade, road grade and traffic safety conditions. Passenger transport lines at or below the third grade will not be approved for operating on mountainous roads or at night unless they can demonstrate adequate safety standards.

3. Enhance the management of road transport enterprises engaged in the business of dangerous chemicals transport

The authorities in charge of safety supervision, police, traffic, quality supervision, industry and commerce shall enhance the transport of dangerous chemicals, strictly supervise the market access for the enterprises engaged in the transport of dangerous chemicals, including transport vehicles, drivers and convoy vehicles. They shall also strictly supervise the examination and approval of the dangerous chemicals transport lines and schedules, and eliminate the safety hazards in the filling, warehousing and transport of dangerous chemicals.

By the mid-term of the “11th Five-Year Plan” period, the objective is to have a 100% pass rate on the tests of vehicles carrying dangerous chemicals, and by 2010, the objective is to have vehicle positioning and management systems installed on 100% of the vehicles transporting dangerous chemicals.

3.5 Enhance the construction of traffic safety facilities and improve road access conditions

1. Improve the traffic management facilities and traffic safety facilities

Governments at all levels shall improve traffic safety impact appraisal system of key planning and construction projects and guarantee that traffic safety facilities are designed, constructed and tested simultaneously with corresponding new constructions and renovations.

By 2010, newly constructed roads shall all have complete, scientific and reasonable traffic management facilities and safety protection facilities.

2. Enhance the integrated governance of road sections with high accident rates

The traffic authorities shall rectify road sections with high accident incidence in accordance with the road traffic safety guarantee program. The police authorities shall adopt traffic control measures and traffic control when necessary. For important road sections with high accident incidence, the system of nominal supervision shall be adopted for provinces, municipalities and counties. Governments at all levels and traffic authorities shall raise funds, and formulate and complete governance plans.

By 2010, the objective is to make all the newly constructed and renovated roads free from road sections which have high accident incidence. The aim is also to reach a rectification rate of 95% for the road sections with high accident incidence and a rectification rate of 90% for the road sections with underlying safety hazards: 90% and 80% respectively in central China, and 80% and 60% respectively in western China.

3.6 Scientific management and strict law enforcement in improving the road traffic order

1. Guiding, standardizing and supervising road traffic behavior

The rights and obligations in road traffic shall be further defined, especially to plan and organize traffic, enhance the guidance, standardization and supervision of the road traffic users' behavior, and maintain adequate traffic order. Also, regulation of road traffic behavior shall be continually revised and improved and traffic law enforcement shall be more targeted and effective. There shall also be increased supervision and inspection of motor owners' compulsory motor vehicle insurance. Authorities shall identify and punish work units and individuals who fail to acquire compulsory motor vehicles insurance according to the law.

2. Reduce key traffic safety offences

Efforts shall be made to reduce speeding, driving while fatigued, drinking and driving, illegal loading, unlicensed driving, driving unlicensed vehicles, and the failure to use safety belts or helmets and other serious traffic safety offences over the long-term. To achieve these reductions it will be necessary to define medium- and long-term objectives, formulate corresponding plans, and establish a law enforcement system and method.

By 2010, the objective is to reduce the number of traffic accident fatalities caused by speeding by 15% compared to 2005. It will also aim to increase the safety belt utilization rate to over 70% for motor vehicles, and a safety helmet utilization rate of over 80% for motorcycle drivers and riders. It will aim to eliminate illegal passenger transport for cargo vehicles and tractors as well as the re-use of scrapped and illegally assembled tractors.

3. Punish traffic offences against law

Traffic accidents are to be strictly handled and offenders will be punished for offences against law, and victims' lawful rights will be protected. Also, efforts shall be made to identify and punish those responsible for supervision and management in cases of traffic accidents which result in fatalities. There will also be retroactive inspections of transport enterprises in the case of major accidents according to the *Road Traffic Safety Law*, *Work Safety Law*, *Road Transport Regulations*, etc. The government shall also enforce the law against evaders from traffic accident responsibilities.

4. Enhance the training of traffic law enforcers

The development of traffic law enforcers shall be enhanced nationwide. This involves educating the traffic law enforcers on topics of management and strict law enforcement to achieve standard and institutionalized safety management training for traffic law enforcers.

During the “11th Five-Year Plan” period, the objective is to establish training bases of road traffic safety management nationwide, and local training bases in the provinces, autonomous regions and municipalities directly under the central government.

3.7 Establish a traffic accident rescue and first aid system and reduce the rate of traffic accident fatalities

1. Establish and improve the joint operation mechanism of traffic accident rescue and first aid

Efforts shall be made to improve the joint operation mechanism of traffic accident rescue and first aid including the police and fire fighting departments, sanitation departments, traffic departments, agricultural machinery producers, insurance companies, social assistance fund, and emergency rescue agencies. Also a rapid response system for traffic accidents will be established along with emergency rescue and first aid pre-planning systems, emergency rescue and first aid “green channel” in order to standardize traffic accident rescue, and to improve the capability to rescue injured people as quickly and efficiently as possible.

During the first several years of the “11th Five-Year Plan” period, the objective is to complete the establishment of the joint operation mechanism of traffic accident rescue and first aid for national expressways. By 2010, the objective is to form a network of traffic accident emergency rescue and first aid covering national expressways, state roads and provincial roads.

2. Establish the integrated information platform for traffic accident emergency rescue and first aid

Efforts shall be made to establish the integrated information platform for traffic accident emergency rescue and first aid, improve the integrated response and capability to transmit information, on-site first aid, trans-shipment of traffic accidents, and ensure that vehicles and equipment for fire fighting, first aid, tow and lift, demolition and rescue, emergency lighting and accident handling arrive on the accident site as soon as possible.

By 2010, the traffic police teams (including the traffic police teams for expressways) at the county level nationwide shall all establish the joint operation mechanism of traffic accident rescue and first aid with fire fighting and first aid centers or hospitals designated by the Ministry of Health.

3. Enhance the training of emergency rescue and self-rescue knowledge

Training on basic emergency rescue and self-rescue knowledge shall be held for drivers and organized by police authorities at all levels. This training shall also be available to other road users and other traffic participators and will be organized by health care authorities at all levels. Emergency rescue and self-rescue shall be promoted as part of the driver training and tests. Efforts shall be made to guarantee that a proportion of the residents living along the road receive basic first aid training.

4. Establish the emergency response pre-planning mechanism for road accidents from the transport of dangerous chemicals

The provincial and municipal governments shall establish and improve the emergency response planning mechanism for road accidents arising from the transport of dangerous chemicals. Enterprises engaged in the transport of dangerous chemicals shall establish the corresponding emergency response and rescue pre-planning, and work with the relevant government departments to carry out annual drills.

3.8 Enhance the fundamental research and technology application and make the accident prevention efforts more scientific

1. Enhance the analysis of traffic accidents and research preventive measures

The research of road traffic safety management policies shall be enhanced. This should cover fundamental theories of road traffic safety, causes of traffic accidents as well as accident prevention technology. Emphasis shall be placed on the research of driver behavior, the relationship between roads and traffic accidents, the relationship between vehicles and traffic safety, and road traffic accident technologies.

2. Establish the traffic management information resource sharing and exchange platform

Efforts shall be made to complete the road accident information management system. This will establish an analysis system for major traffic roads and improve the integrated analysis capability for traffic accidents. Also, information resources shall be integrated on motor vehicles, drivers, traffic accidents and traffic offences to enhance the safety management of motor vehicles and drivers. This will also be an attempt to realize the two-way data exchange of traffic management information between the police, transport, health, insurance, agricultural machinery, quality supervision, industry and commerce, and other sectors. In addition, efforts shall be made to link insurance rates with traffic offences.

3. Enhance the research and application of traffic management facilities and traffic safety facilities

Continued efforts shall be made to enhance the research of traffic control technologies, especially traffic symbols and lines and conduct comprehensive research and development of effective buffer and collision prevention as well as speed limiting facilities.

4. Integrated application of high and new technologies to improve road traffic safety

Technologies shall be applied to monitor transport enterprises' vehicles and drivers, as well as the research, development and application of anti-collision technologies. Other technologies shall be used to prevent driving while fatigued, drinking and driving and speeding. New technologies shall be utilized to improve the road and vehicle travel safety. Efforts shall be made to enhance the research and application of traffic accident on-site survey and accident appraisal technologies.

5. Enhance the development and application of traffic law enforcement equipment

Efforts shall be made to enhance the development, upgrading, promotion and application of electronic equipment, speed meters, alcohol testers and other traffic law enforcement equipment for road traffic. Efforts shall also be made to increase the strictness of testing and the certification of the quality of traffic law enforcement equipment and increase the regulation strength of the

industry as well as formulate the possession standards for speed meters, alcohol testers and other traffic law enforcement equipment.

4. Key (Engineering) Projects Planned to be Implemented

4.1 Traffic safety engineering project for rural roads

1. Governments at the county and village levels shall designate full-time staff to be responsible for the traffic safety of rural roads; integrate the organization at grassroots and agricultural (agricultural machinery) departments to participate in the governance of traffic safety; establish police patrol teams for key roads at the county and village levels; establish assistance staff for traffic safety; establish and complete traffic safety prevention and control networks; and have integrated governance of the traffic safety in rural areas.
2. Carry out the traffic safety education and publicity featuring “Protecting Life & Traveling Safely” in rural areas; raise traffic safety awareness in villages and agricultural households, and improve farmers’ sense of traffic safety, legal governance and correct traffic behavior.
3. Efforts shall be made to standardize road traffic management facilities in rural areas and gradually complete traffic safety facilities and improve the access and safety conditions of rural roads. Also, favorable policies shall be adopted to encourage public transport in rural areas, support the construction of rural passenger transport stations and effectively solve farmers’ travel difficulties.
4. Efforts shall be made to enhance the management of motor vehicles in rural areas, and increase the registration rate for rural motorcycles, low-speed trucks, three-wheeled tricycle trucks and tractors.

4.2 Expressway traffic management and emergency rescue and first aid demonstration program

1. Efforts shall be made to establish an effective and scientific travel safety management mode for expressways and to construct and complete the traffic monitoring system for expressways, and speed monitoring system.
2. Efforts shall be made to enhance the research of traffic organization and safety management for expressways, standardize the safe travel for expressways, and reduce speeding on expressways, illegal road use and illegal lane changes and other offences.
3. Efforts shall be made to establish the meteorological pre-warning system for expressways, automatic testing system of traffic contingencies and traffic accidents, emergency rescue planning, emergency rescue and first aid green channel for expressways, and comprehensively improve the emergency response capability and the rescue and first aid capability for expressway accidents in order to reduce the fatalities from expressway accidents.

5. Guarantee Measures for Plan Implementation

5.1 Implement the traffic safety responsibilities of local governments at all levels

1. Governments at the provincial, municipal and county level shall establish leadership agencies in road traffic safety, incorporate traffic safety into the agenda of local governments at all levels,

and establish an indicator system and evaluation system for annual traffic safety performance review.

2. Local governments shall establish road traffic safety education and publicity and achieve long-term and institutionalized education and publicity in traffic safety.

5.2 Increased financing for the traffic safety sector

1. Governments at all levels shall ensure that the financial input to traffic safety matches the economic and social development levels. Increased funds shall be made to traffic safety facilities and construction funds for traffic management facility. In addition dedicated fixed funds for the publicity of traffic safety shall be established.

2. Efforts shall be made to mobilize all relevant parties, expand financial channels, and provide financial guarantees for road infrastructure, traffic management facilities, traffic safety facilities, traffic accident emergency rescue and the construction of a first aid system.

3. More input into dedicated funds, with efforts made to enhance and improve training and traffic law enforcement equipment, medical and healthcare rescue equipment for traffic safety law enforcers, medical, healthcare and rescue staff as well as to construct road traffic safety management specialization bases nationwide.

4. Efforts shall be made to establish a Science and Technology Incentive Fund for traffic safety, and achieve major effects after application.

5.3 Complete laws, regulations and technical standards

1. Efforts shall be made to enhance the formulation of complementary laws and regulations of *Road Traffic Safety Law*, form a systematic and complete legal structure in road traffic safety with the *Road Traffic Safety Law* as the core, implement the rules of this law with motor vehicle traffic accident responsibility compulsory insurance regulation with State Council regulations as the main body, and local laws and regulation as the supplement. Efforts shall also be made to enhance the research of policies on the legal responsibilities for traffic offences and improve the legal system on the administrative responsibilities, civil responsibilities and criminal responsibilities for traffic law offences.

2. Efforts shall be made to complete the technical standards in road design, construction and vehicle safety, make timely revisions and supplements to technical standards for road traffic management facilities, traffic safety facilities and vehicle safety devices, and form a relatively complete technical standard system in road traffic safety.

5.4 Provide technical support in traffic safety

1. Efforts shall be made to establish a research institute in traffic safety for national roads, establish a research and experiment platform in traffic safety, and comprehensively improve research in traffic safety in China.

2. Efforts shall be made to enhance the development of science and technology staff in traffic safety, and to establish a well-structured, streamlined and creative science and technology staff group in traffic safety at an internationally advanced level.

3. Efforts shall be made to enhance the research of major science and technology projects in traffic safety, and develop advanced and practical traffic safety products.

4. Efforts shall be made to unify the technical standards in traffic safety products and information technologies, and improve the system of traffic safety product certification.
5. Efforts shall be made to enhance exchange and cooperation in the traffic safety sector between national governments, international organizations and foreign civil groups.

**Inter-Ministerial Road Safety Forum
June, 2006**

Annex 2: National Science and Technology Action Plan for Road Traffic Safety

Unofficial Translation
World Bank Beijing Office
July, 2008

State/Science/Development/High-Tech [2008] No. 120

Science and Technology (S&T) Departments (Commissions and Bureaus), Public Security Departments (Bureaus), Transport Departments (Commissions and Bureaus) for the provinces, autonomous regions, and Municipalities directly under the Central Government,

The *National S&T Action Plan for Road Traffic Safety* is formulated jointly by the Ministry of Science & Technology, the Ministry of Public Security and the Ministry of Transport, in order to carry out the Party's major strategic arrangements relating to "More Attention Paid to Social Progress and More Efforts Made to Guarantee and Improve People's Livelihood" as proposed at the 17th National People's Congress (NPC), to further implement the *National Medium- and Long-term Science and Technology Development Planning Outline (2006 to 2020)*, and to expand the role of S&T innovation in the efforts to guarantee traffic safety, reduce major road traffic accidents leading to group deaths and injuries, and eventually establish a safe road traffic environment. This *Action Plan* is hereby printed and delivered to you now. Please actively attempt to facilitate the implementation of the plan according to local conditions.

Ministry of Science & Technology, Ministry of Public Security, Ministry of Transport.

February 20, 2008

National Science and Technology (S&T) Action Plan for Road Traffic Safety

Road traffic safety is essential not only to the life and work of the general public, but also to the stability of society. Therefore, building a comprehensive road traffic safety system is a major social program which plays an important role in the efforts to guarantee and improve people's livelihood. In this situation, the *National S&T Action Plan for Road Traffic Safety* (hereinafter referred to as the *Action Plan*) has been formulated to carry out the Party's major strategic arrangement relating to "More Attention Paid to Social Progress and More Efforts Made to Guarantee and Improve People's Livelihood" proposed at the 17th NPC, and to meet the Central Committee's overall requirement that "Top priority shall be given to the improvement in people's livelihood, with great efforts made to solve the most direct and practical problems of interest that the public is most concerned about." It is also aimed at further implementing the *National Medium- and Long-term Science and Technology Development Planning Outline (2006 to 2020)*, and establishing a safe road traffic environment, and expanding the important supporting role of S&T innovation in the efforts to guarantee traffic safety, and to create a system of technology, standards, measures and sustainable development capabilities in road traffic safety which are consistent with the national conditions of China.

1. Background

Under the leadership of the CPC Central Committee and the State Council, and through the joint efforts of various departments and localities, China has maintained a decrease in all of the three road traffic safety indicators (“Three Decreases”). These are the number of road traffic accidents, death toll, and fatality rate per 10,000 vehicles. In particular, major road traffic accidents have been reduced significantly. However, with socioeconomic development and urbanization, as well as the constant rapid growth of motorization, a large number of factors still affect road traffic safety, some of which have not yet been effectively solved. China remains in a period of high incidence of road accidents. This is characterized by high fatalities from road traffic accidents, a relatively high fatality rate per 10,000 vehicles, and frequent severe major road traffic accidents leading to multiple deaths and injuries. In addition, accident prevention is underdeveloped, as are emergency rescue measures which are not sufficiently able to deal with the accident rate. According to statistics, China had 327,000 road traffic accidents in 2007, which led to 81,600 fatalities, accounting for approximately 75% of the total fatalities from all accidents. Although China has just 8% of the total vehicles in the world, it represents 16% of the total fatalities from road traffic accidents in the world. China has a road traffic fatality rate per 10,000 vehicles of 5.1 and a death/injury ratio of road traffic accidents of 1:4.7. This is much higher than developed countries. Road traffic accidents have become one of the major factors harming life and property. This affects social stability and has attracted attention from the Party, Government, and the general public. In particular, with the advent of the 2008 Olympic Games, a safe and smooth road traffic environment will be of great significance to China’s efforts to present a positive image in hosting the event.

A large population, combined with rapid urbanization and motorization, dictates that China is faced with a mix of factors much more complex than any other country in the road safety sector. Specifically, these factors are pedestrians, vehicles, roads, the environment, and management, among others. International experience and China’s practice, shows that S&T innovation and application is an important way to solve the problems affecting road traffic safety. Thus, it has become necessary for those in the road safety sector to mobilize and integrate relevant S&T, industry and government resources. It is also necessary to establish and improve the system of technology, measures and standards in the field of road traffic safety guarantee, through S&T innovation, and improve the capability to develop a sustainable road transport sector.

2. Principles

1. Guiding the demand. Efforts shall be made to conduct research with specific targets, and promote the efforts to establish an advanced and applicable system of road safety guarantee technology, according to the current conditions, obvious dangers and development features in the field of road traffic safety.

2. Self-reliant innovation. Efforts shall be made to commence strengthening the relevant S&T innovation capability in the field of road traffic safety, to draw upon the advanced international experience, and to create key road safety technologies which are appropriate for China’s national conditions. This will finally address the deficiencies in technology in the road safety sector.

3. Comprehensive integration. Integrated measures shall be adopted to improve the research, promotion and application of technologies that are targeted at the relevant factors including people, vehicles, roads, the environment, management, etc, with the aim of solving the complex problems that affect road safety.

4. Breakthrough on key issues. In view of the large number of major traffic accidents that lead

to multiple deaths and injuries and the weak technology that governs road safety, as well as the demand to guarantee a smooth road traffic environment for the upcoming Olympic Games, efforts shall be made to conduct research on key technology and engineering demonstrations to effectively improve the road traffic safety in China.

5. Use of demonstrations. Demonstrative applications shall be conducted for typical road sections as well as cities and engineering projects, with efforts also being made to formulate and improve the relevant national and industry standards, and to guide and promote the applicable technology that is needed to become standard, systematic and widely applied.

3. Objectives

The first objective is to organize the relevant domestic industries and departments, carry out research and demonstrative applications of key technologies in the field of road safety, and produce a number of technically advanced S&T research results. These should demonstrate satisfactory results in practice, as well as broad prospects for application with clear intellectual property rights. The second objective is to rely on S&T to improve the capabilities of road accident prevention, pre-warning, traffic control and emergency rescue. The third objective is to reduce the fatalities from road accidents on a yearly basis, further reduce the number of major road traffic accidents, and bring the fatality rate per 10,000 vehicles closer to the level of intermediately developed countries. This is to be done with the aim of protecting the safety of people's life and property to the fullest extent possible.

4. Key Tasks

The following research on key technologies and typical demonstrative projects shall be launched, focusing on major traffic accidents which lead to multiple deaths and injuries:

1. Behavior intervention technology for traffic participants

Technology in this field includes: the analysis technology of behavior characteristics for traffic participants; technology and equipment for behavior monitoring and intervention for road traffic participants; technology of identification and early warning for vehicle drivers, new technology and equipment for the training, examination and management for drivers; technology for traffic environment adaptation for drivers, new technology for road safety publicity; and technology and equipment for wide education on road safety.

2. Vehicle safety and transport organization technology

Technology in this field includes: application of new technologies and equipment on vehicle safety performance, safety technology for road transport organization; and operational safety monitoring technology and equipment for the operation of vehicles.

3. Road infrastructure safety guarantee technology

Technology in this field includes: technology and equipment on the safety design, operation safety and safety evaluation of road infrastructure; technology and equipment on the supervision of hazards; early warning and rectification of road traffic infrastructure; technology and equipment regarding the operational safety monitoring and emergency response for large bridges and tunnels; and technology and equipment for the monitoring of the status of the road operation and early warning of adverse weather conditions.

4. Road traffic management and safety guarantee technologies

Technology in this field includes: new technology and equipment for road traffic management and law enforcement; technology and equipment on road accident treatment and emergency rescue; technology on traffic management; traffic control technology, technology on road traffic safety management planning and safety appraisal; technology of organization and safety for unusual traffic; technology for the analysis of illegal traffic behavior and traffic accidents as well as repeated traffic accidents; technology for the rapid response to major traffic accidents, and technology for the identification, information exchange and control of restricted vehicles.

5. Organization and Management

1. Establishing a responsible organization

Efforts shall be made to establish a leadership team for the *Action Plan*. It will comprise leaders from the Ministry of Science & Technology, Ministry of Public Security and Ministry of Transport. Under this team, an office shall be established with its members constituted by leaders from the main business divisions or bureaus of the abovementioned three ministries, responsible for implementing the *Action Plan*. Other relevant government departments shall be included if necessary.

2. Setting up an expert panel

Efforts shall be made to establish an expert panel for the *Action Plan* consisting of experts in the relevant fields. It will be responsible for formulating feasibility study reports and implementation plans as well as providing technical consultations.

3. Formulating implementation plans

The Office shall organize an expert panel to formulate implementation plans for the *Action Plan* under the guidance of the leadership team. They will then formulate project proposals and feasibility study reports after implementation plans have been examined and approved by the leadership group. The next stage will be the procedure of demonstration, review and approval, and project initiation.

4. Setting up dedicated funds

The Ministry of Science and Technology, the Ministry of Public Security and the Ministry of Transport shall allocate dedicated funds for the start-up of the *Action Plan*, and shall encourage and mobilize various social resources to form a combined force which advocates the implementation of the *Action Plan*.

Annex 3: Good-Practice Road Safety Management Systems

Good practice road safety management systems are characterized by (i) their clearly defined performance targets, (ii) well-established implementation arrangements and (iii) integrated safety interventions, which in turn all have further dimensions critical to success.

Consideration of these strategic elements raises important questions that were addressed as part of the China review.

1. Performance Targets

Setting performance targets raises questions of an ethical nature, including what constitutes an acceptable level of safety. Who is responsible and accountable for ensuring this level of safety?

These are fundamental questions that should be addressed at the outset of any strategic review, although it is recognized that the effectiveness of interventions can in turn influence the acceptable level of safety and assignment of responsibility, to the extent that the benefits of interventions are required to exceed their costs.

Such considerations, whether explicit or implicit, in turn raise complex questions about how and whether or not to attribute a cost to injuries and the loss of life.

2. Implementation Arrangements

Implementation arrangements must address core issues of efficiency and effectiveness. Is clear government and agency leadership evident? Are interventions being targeted and coordinated to maximize safety outcomes, in accordance with robust evaluation criteria? Are legislative instruments achieving their aims? Are funding mechanisms sustainable? Are interventions monitored, evaluated and adjusted accordingly?

These questions go to the very core of management and governance arrangements and explore the institutional foundations upon which successful safety programs are built.

3. Interventions

Interventions address the design and operation of the road network, the conditions under which vehicles and road users are permitted to use it, and they set related safety standards and rules or seek compliance with them. Interventions must be viewed in an integrated sense, as a systematic application of standards, rules and compliance regimes.

In particular, determining interventions raises questions of how to shape the road environment and control the exposure to risk within it. It also raises questions concerning the trade-offs to be made between standards and rules and compliance.

STRATEGIC ELEMENTS OF A ROAD SAFETY MANAGEMENT SYSTEM:		
<p>PERFORMANCE TARGETS</p> <p>Performance targets are road safety outcomes and related programs and project outputs that are endorsed by the community, participating agencies and governments at all levels.</p>	<ul style="list-style-type: none"> • Final outcomes consist of social costs, fatalities and serious injuries. They are what we seek to avoid. • Intermediate outcomes are not desired for themselves but for what they entail - better outcomes. They include average traffic speeds, the proportion of drunk drivers, seatbelt-wearing rates, helmet-wearing rates, the physical condition of the road network and the standard of the vehicle fleet. • Outputs represent physical deliverables; e.g. the frequency of police patrols, or alternatively they can correspond to milestones showing that a specific task has been completed. 	
<p>IMPLEMENTATION ARRANGEMENTS</p> <p>Interventions require a range of tools, mechanisms and procedures to efficiently implement them. Implementation also includes activities that enhance the effectiveness of safety interventions.</p>	<ul style="list-style-type: none"> • Leadership and coordination • Legislation • Resource allocation • Funding mechanisms • Monitoring and Evaluation 	
<p>INTERVENTIONS</p> <p>Interventions are measures that improve road safety outcomes. They relate either to the design and operation of the road network, or to the conditions under which vehicles and road users are permitted to use it; and they relate to either standards and rules or compliance with them.</p>	<p>Road safety standards and rules</p>	<p>Compliance with road safety standards and rules</p>
<p><u>Design and operation of the road network</u></p> <p>Network interventions govern its safe design and operation and vary by road type (access, collector and distributor; urban and rural).</p> <p>All relate to the road environment.</p>	<p>Standards and rules stipulate how road safety assets are to be built and used, and how road safety activities are to be conducted. They include regulations governing how the road network is to be used, such as speed limits, vehicle standards and road user licensing requirements. Safety standards also cover road design, construction and maintenance, and standards set for road based emergency medical services.</p> <p>Compliance interventions aim to make road builders and operators, the vehicle industry and road users adhere to safety standards and rules. Compliance can be improved by a combination of:</p>	
<p><u>Conditions of entry and exit to the road network</u></p> <p>These govern who can use the road network safely and how.</p> <p>They apply both to vehicles (trucks, buses, cars, motorcycles and bicycles) and road users (drivers, cyclists, pedestrians and passengers).</p>	<ul style="list-style-type: none"> • Education (which relies on persuasion), • Enforcement (which relies on deterrence), and • Performance assessment (which relies on reward or incentives). 	

Annex 4: Key Road Safety Standards⁷² Developed Between 2003 and 2008

1. Road Users:

- Application Law on the Adjudication of Personal Injury Compensation (Dec. 2003, Supreme People's Court)
- Regulations on Drivers License Application and Use (April 2004)
- Students: (i) Amendment of the Mandatory Education Law to include the Safety Management Regulations for Kindergartens, Primary, and Middle-Schools (September 2006, Ministry of Education); (ii) Approval of the Primary and Middle-Schools Public Safety Education Guidelines (February 2007, State Council)
- Drivers: Regulations on the Management of Motor-Vehicle Driver Training (April 2006, MOC)

2. Vehicles:

- Notice on Strengthening Vehicle Management to Protect Highway Safety (May 2005, NDRC)
- Notice on Vehicle Manufacturing Enterprises and Products (2005, NDRC)
- Practices of Agencies in charge of Motor-Vehicle Technical Safety Inspection (February 2006, GAQSIQ)
- Notice on the Work to Further Strengthen the Management of Road Transport Vehicles (April 2006, MOC)
- Notice on the Implementation of Traffic Signs for the Transport of Dangerous Goods (May 2006, MOC, MPS, GAQSIQ, and NDRC)
- Establishment of the C-NCAP (2006)
- Truck Overloading: (i) Main Points for the National Work to Control Truck Overloading (2006, MOC, MPS, and 9 other Ministries) and (ii) Highway Protection Ordinance (State Council, Legislative Plan – in preparation)
- Motor-Vehicle Licensing Regulations (effective: October 1, 2008, Ministry of Public Security)
- Provincial Regulations on the Management of Commercial Transport Operations (regularly updated, MOC)

3. Road Infrastructure:

- Guidelines for the Enhancement of Highway Safety Projects (September 2004, MOC)
- Guardrail Safety Performance Evaluation Standards⁷³ (JTG TF83, 2004, MOC)
- Highway Quality Inspection and Evaluation Standards (JTG F80, 2004, MOC)
- Regulations on Rural Highway Construction Management (January 2006, MOC): these regulations make mandatory the installation of protection facilities, signs, markings and drainage systems on rural highways.
- Specifications for the Design of Highway Safety Facilities (JTG D81, 2006, MOC)
- Provincial Regulations for Highway Management (regularly updated, MOC)

⁷² This Annex presents only a few key standards that were developed between 2003 and 2008 and is not exhaustive. A separate study would be needed to: (i) compile the list of all road safety regulations, standards, and rules that were developed between 2003 and 2008, (ii) if possible, appraise them according to international good-practice, and (iii) review their effective implementation.

⁷³ There is an ongoing project to update these norms (MOC, 2008).

4. Emergency Rescue:

- Guidelines for the Clinical Treatment of the Injured in Road Traffic Accidents (2006, MOH)
- National Standards for Ambulances (2007, MOH)

5. Traffic Accidents:

- Regulations/Procedures for Handling Road Traffic Accidents (April 30, 2004)
- Regulations/Procedures for Handling Illegal Road Traffic Behaviors (April 30, 2004)

Annex 5: Road Safety Standards & Rules – The Challenges

In China, engineering designs for road infrastructure are inherently biased toward the motor vehicle, the inevitable result of deriving from high-income country standards and rules. Although good examples can be found where the needs of vulnerable road users are accommodated, the overall emphasis still appears to be on the creation of a high-speed, free-flowing environment for cars and trucks. This gives rise to obvious risks in situations where traffic and speed are mixed.

If future deaths and injuries on a vast scale are to be averted, a stronger focus on meeting the safety requirements of pedestrians, cyclists, motorcyclists, low speed agricultural vehicles and other special purpose vehicles is required.

1. Interurban Road Safety

1.1 Road Infrastructure

Responsibilities

Preparation of Road Standards and Norms

Interurban road standards and norms are issued by the Highway Department of the MOC but their preparation is outsourced to the Research Institutes. The MOC Highway Research Institute is the most important in this regard and has prepared some 64 standards and norms in the last three years.

Design Review

All design documents are prepared in two stages: preliminary design and detailed/final design. Both stages are subject to review either at the national level (MOC) or at the provincial level (PCDs):

- The design is subject to review by the MOC if the highway is part of the national network or if the province is interested in a review by the MOC.
- In other cases, the review for provincial and local highways is carried out at the provincial level.

Design review is carried out by Certified Design Institutes. The “National Design Survey Association” is responsible for auditing these Institutes on a regular basis and for renewing their certificates. Provincial designers are expected to follow national technical standards and guidelines very strictly.

There is no systematic training plan organized by the MOC to train provincial designers. Training is usually delivered whenever important new norms or specifications are issued.

Road Categories and Safety Standards & Norms

Road Categories

There are five road categories in China:

- Expressways (45,339 km, maximum speed limit: 120 km/h, minimum: 70 km/h);
- Class 1 (45,289 km, maximum speed limit: 100 km/h);
- Class 2 (262,678 km, maximum speed limit: 80 km/h);

- Class 3 (354,734 km, maximum speed limit: 80 km/h);
- Class 4 (1,574,833 km, maximum speed limit: 80 km/h).

There are also 1,174,126 km of substandard roads.

Road Safety Standards & Norms

Safety issues that have been repeatedly identified by World Bank missions on China highway projects in the last five years include:

- ❑ In drawings at the final design stage, little, if any, indication is given regarding crossroads, obstacle protection, safety distances, and passing zones.
- ❑ Obstacle protection, safety guardrails (including safety distance):
 - World Bank missions have raised concerns about the systematic implementation and inspection⁷⁴ of safety standards.
 - Lack of detailed design and precise location of guardrails on final drawings.
 - Obstacle protections are often designed to protect the road infrastructure from collision with vehicles instead of vice versa.
- ❑ Some Chinese standards for down-hill grades would not be permitted in other countries. There are additional measures that could be implemented at the design stage such as ensuring a constant gradient over the length of the section, providing additional lanes, and emergency stopping bays.
- ❑ A need to improve signs and markings, especially for passing zones on Class 2, Class 3, Class 4, and substandard roads.
- ❑ Arterial roads through developed rural areas (“linear villages”): issue discussed during the Xinjiang Road Safety Workshop – see Annex 11).

Chinese road infrastructure standards⁷⁵ could be reviewed and appraised according to international good practice.

Planning and Coordination Issues

- ❑ There is a lack of planning on ways in which expressways and local roads can be integrated. Different agencies are responsible for expressways and local roads, road safety, and maintenance which creates problems in planning and coordination.

1.2 Road Safety Audits and Road Safety Inspection

Road Safety Audits

Safety audits of road designs are not mandatory in China. The MOC Highway Research Institute carries out a few road safety audits on expressway projects at the request of clients who elect to pay for this service. There is ongoing discussion within the MOC to make road safety audits mandatory for expressway projects. However, the challenge will be to make them mandatory for

⁷⁴ Inspection of safety facilities is regulated by the “Quality Inspection and Evaluation Standards for Highway Projects” (JTG F80 2004) issued in 2004.

⁷⁵ Standards for the design of Highway Safety Facilities have been issued in 2006: “Specifications for the Design of Highway Safety Facilities” (JTG D81 – 2006). Standards for the design of guardrails have been issued in 2004: “Highway Guardrail Safety Performance Evaluation Standards (JTG TF83-01-2004)” and will be updated in 2008.

all the other categories of highways (Class 1 – 4 and substandard highways which are the most dangerous).

The main issues that the MOC is facing are:

- Funding: ways would need to be found to include safety audits in the project cost.
- Training: a critical mass of competent road safety auditors would need to be trained.

Road Safety Inspection

Before Traffic Opening

Inspection of all categories of Chinese highways is mandatory before traffic opening. It is regulated by Norm JTG F80 (issued in 2004): “Quality Inspection and Evaluation Standards for Highway Projects.” “First Level Qualified Test Centers” (e.g. the MOC HRI) are responsible for carrying out highway inspection prior to opening to traffic.

After Traffic Opening

Road safety inspection is the responsibility of the Traffic Police. Every year, a specialized unit of the Traffic Police Bureau in each county is responsible for inspecting the safety of all roads under its jurisdiction. Specifically, they look at markings, signs, road safety facilities, etc. An annual report is sent to the County-Level Road Safety Council and to the County-Level Road Agency. When major issues are identified, the County-Level Road Safety Council will report to the Provincial Traffic Police Bureau. It is unclear whether or not the Traffic Police have established a specific database for road safety inspection.

The Road Agencies also conduct road inspection programs which focus mostly on road maintenance. They have their own separate database. There is a need for closer cooperation between the Traffic Police and the road agencies on road inspection and the productive sharing of information/databases would be a recommended first step.

1.3 Blackspot Management

The Traffic Police identify blackspots using their own accident database. Blackspot treatment programs are funded partly by local/provincial governments, the Traffic Police, and the Road Agencies.

1.4 Road Assessment Programs

The International Road Assessment Program (iRAP) is discussing a pilot project in China with the MOC Highway Research Institute (HRI).

2. Urban Road Safety

2.1 Road Infrastructure

An improved functional classification of roads is required and road design standards need to be reviewed so designs can be based more on road function. National standards for road and junction design are issued by the State Council. There is a recognized need for changes to national design standards for road and junction design to cater for new traffic patterns and demands. There are many examples of existing local practices which do not conform to national standards (e.g. lane

widths). There is also a need to revise road cross-sections as well as junction design to foster safety and efficiency features such as central reserves and junction channelization islands. Greater provision for pedestrians and cyclists should be made, with particular emphasis on safety. Roads in the suburbs are not safe as insufficient consideration is given to pedestrians and cyclists.

A systematic process of road safety audits for new and improved urban roads needs to be established to prevent accidents.

2.2 Traffic Management

Road safety in urban areas is closely related to effective traffic management which segregates motorized and non-motorized road users and by using traffic calming in cases where mixed uses of infrastructure are required.

Non-Motorized Transport (NMT)

Provision for pedestrians is currently following early western experience where a few commercial and 'cultural' streets are pedestrianized but there is no overall comprehensive strategy to improve conditions throughout the network for pedestrians. There is no doubt, however, that conditions for pedestrians have significantly improved in major cities over the past 10 years. Particular examples are the increasing use of multi-phase traffic signals and mid-block signalized pedestrian crossings which have improved safety and efficiency. Sidewalk design has also improved considerably with more resources being allocated to better surfacing and dropped curbs for the disabled and textured surfaces for the blind. However, much remains to be done. The following table summarizes the historical trends of provisions for pedestrians in Chinese cities:

Decade	Pedestrian Provision	Comments
1990s	Segregated and marginalized	<ul style="list-style-type: none"> • segregation by barriers and grade-separated crossing facilities as the pace of motorization and road construction increases; • street markets increasingly removed indoors and 'street life' is diminished.
2000s	Commerce-driven	<ul style="list-style-type: none"> • implementation of pedestrianized shopping streets driven by economic and commercial motives; • multi-phase signals enable non-conflicting parallel pedestrian phases; • implementation of mid-block signalized crossings; • central safety island designs improve and provision is more widespread.

Provision for bicycles is steadily being reduced with adverse implication for safety. Bicycles and other NMTs are increasingly being marginalized by the use of single section road cross-sections that do not provide physically segregated lanes for bicycles. In addition, there is an increasing use of NMT lanes for through MV traffic and parked vehicles. In many cities, the use of electric bicycles is increasing as a greater number of cheaper models come on the market.

There has been surprisingly little innovation in traffic signals for NMTs. While many cities signal NMTs on separate phases using cycle signal aspects, these phases run parallel with MV phases. There are no designs which feature advance bicycle stop-lines whereby bicycles could receive an advance green. However, early cut-offs are often used to allow bicycles to clear junctions. There

has been no use of colored surfaces to delineate the NMV lane. The following table summarizes the historical trends of NMV provisions in Chinese cities:

Decade	NMV Provision	Comments
1990s	Restriction	<ul style="list-style-type: none"> • large volumes of bicycles on urban roads are perceived to be causing ever increasing congestion; • bicycles perceived as backward; • bicycle bans and other restrictive measures begin to be imposed on selected urban roads; • exclusive NMV roads seen as the first step in marginalizing bicycles and eliminating them; • attempts to reduce private modes such as bicycles and motorcycles (but not cars) and develop public transport; • NMV and parking encroachment in bicycle lanes.
2000s	Marginalization and electrification	<ul style="list-style-type: none"> • NMVs increasingly banned from major roads; • NMVs forced to use sidewalks with pedestrians; • NMV lanes used for MV parking and as MV lanes with ensuing safety implications for the NMV lane; • electric bicycles developed and begin to replace NMVs and mopeds with safety implications in NMV lane.

Junction Channelization and Design

The National Standards have probably hindered the smooth development and implementation of many junction channelizations in World Bank projects. These are often implemented as junction widening schemes because large junction areas are specified by the standards. In the past, city authorities and some Chinese transport professionals have considered that increasing junction areas was the key to improving capacity. However, this attitude tended to hinder the implementation of good junction channelization design.

However, recently there has been a gradual change evident in cities such as Shanghai, Guangzhou and Wuhan where the benefits of physical junction channelization with islands rather than hatched markings are being realized. These cities have recognized the efficiency advantages of tightening up junctions, narrowing approach lanes, channelizing vehicles in direct and clear paths and bringing stoplines forward to minimize clearance times and increase efficiency.

Three trends are now emerging in junction design in Chinese cities:

- The use of more sophisticated phasing arrangements at traffic signals so that the pedestrian phases can operate without conflict from the vehicle phases. This includes the use of staggered pedestrian crossings which allow pedestrians to cross a wide road in two stages.
- The tightening up of junctions using physical junction channelization islands and bringing stoplines forward.
- The use of narrower lanes at junction stoplines in order to extract more capacity out of the junction. Although these lanes may not conform to the National Standards, they are increasingly being used experimentally in many Chinese cities.

Area Traffic Control and Traffic Signals (ATC)

ATC systems are becoming standard for most large cities in China. The trend is towards installing adaptive systems with the Australian SCATS system and the British SCOOT system as market leaders. To date, there is no comparable domestic Chinese system available.

The signal sequence is gradually becoming standardized and this is formalized in the 2004 Road Traffic Safety Law. The sequence now follows the western practice of a red, starting red/amber, green, leaving amber sequence. Previously, there was no starting red/amber but the Beijing and Shanghai authorities recognized the safety and efficiency advantages of the starting red/amber and are systematically converting all their signals to this sequence.

There are various shortcomings which still need to be addressed:

- Policy Issues:
 - There is a need for clarification of policy on criteria for traffic signal provision, signal design and standardization of operation including policy on countdown signals.
 - There is a need to update the National Standards on signalization and junction design to reflect the new requirements of traffic management.
- System Design Issues:
 - Size of system and number of junctions to be signalized and coordinated.
 - Coordination with civil works, especially junction channelization.
 - Type of system - whether fixed time, responsive or adaptive.
- Detailed Design Issues:
 - Cycle times are typically too long, often over 3 minutes, and are reducing junction efficiency. Typically, a maximum of 2 minutes is appropriate for most junctions.
 - Inter-green times (the time between one green on one phase ending and the next green on the opposing phase starting) are often too short and do not provide adequate safety clearance for pedestrians or vehicles.
 - There should be a review of countdown signals (popular in many cities) whereby the signal timings are displayed above the junction either on a gantry arm or on a central podium. Experience in the west has shown some safety implications whereby drivers focus on the countdown times rather than on the junction.

CCTV and Red Light Violation Cameras

At present, there are few speed cameras, although speeding is a significant problem on many roads. Data on the number and percentage of violations handled by electronic or automatic means is emerging. For example, in Guangzhou, it is estimated that 50,000 road user violations per month are dealt with through CCTV and red light violation cameras.

Annex 6 : Overview of World Bank Road Safety Components in China

A comprehensive review of all interurban and urban road safety activities carried out under World Bank's transport projects in the last 15 years (1993 – 2008) is documented in the following 4 pages⁷⁶.

The evaluation shows the impact of each project in terms of: (i) Policies, Strategies, and Performance Targets, (ii) Implementation Arrangements, and (iii) Interventions (see Annex 3 for Good-Practice Road Safety Management Systems). The following conclusions can be drawn:

For Interurban Road Safety Components:

4 main periods can be distinguished⁷⁷:

- 1. 1985 - 1995: The beginnings of highway safety (1st version of 1st generation highway safety projects):** before 1995, not all World Bank Highway Projects had road safety activities (example: the National Trunk Highway Project – 1994). Road safety activities focused mainly on monitoring of road safety and on road infrastructure interventions.
- 2. 1996 - 1999: Focus on implementation arrangements and on road infrastructure interventions (2nd version of 1st generation highway safety projects):** 1996 can be viewed as a turning point for highway safety in China with the establishment of the “*World Bank Framework for Road Safety Improvement in China*” which recommended the establishment of national and provincial road safety councils to improve cooperation and coordination across the multitude of agencies involved in road safety. From 1996, all World Bank Highway Projects had road safety activities and these focused mostly on: (i) monitoring, (ii) road infrastructure interventions, and (iii) implementation arrangements at the provincial level.
- 3. 2000 - 2003: Development of provincial policies and strategies and enlargement of the scope of interventions (3rd version of 1st generation highway safety projects):** These projects had the following characteristics: (i) strengthen the activities of 2nd version highway safety projects, including institutional development, monitoring of road safety, and road infrastructure interventions; (ii) engage provincial multi-agency leading groups established under the 2nd version highway safety projects to develop provincial road safety policies and action plans; and (iii) enlarge the scope of road safety interventions to: (a) road users and (b) vehicles.
- 4. From 2004: Planting the seeds for the next phase:** The 3rd version highway safety projects in Xinjiang, Henan, and Hubei tested the World Bank's road safety strategy in terms of the willingness and capacity of counterpart organizations to extend their operational practices and involve other agencies. This marked a progression from the previous model set up in 1996 under the *Framework for Road Safety Improvement in China* which had accomplished its objectives and had reached its limits. From 2004, the World Bank is progressively transitioning from the 1st generation model to a new model of highway safety projects.

For Urban Road Safety Components:

In comparison, Urban Transport Projects were more uniform. This is because the same consultant was used since 1993 to design and implement the Traffic Management/Road Safety Components.

⁷⁶ For the activities of the World Bank Global Road Safety Facility, please refer to Annex 11.

⁷⁷ Separated by thicker lines in the tables.

PROJECT APPROVAL YEAR	94/08	1994	1994	1995	1996	1996	1996	1996	1998	1998	1998	1999	1999	2000	2001	2002	2002	2002	2003	2004	2005	2006	2006	2007	2008
HIGHWAY (HW) PROJECT	Total	Natl Trunk	Xin- Jiang 1	Shang -Hai/ Zhe- Jiang	He- Nan 2	Xin- Jiang 2	NH2	Shaan -Xi 2	NH3	Tri Prov	An- Hui 1	NH4	Fu- Jian 2	He- Nan 3	Jiang -Xi 2	Inner Mong	Xin- Jiang 3	Hubei Xiao- Xiang	An- Hui 2	Hubei Shi- Man	Inner Mong HW& Trade	Jiang -Xi 3	Fujian HW Sect Inv	Shaan -Xi/ An- Kang	Anhui HW Rehab
TOTAL NUMBER OF ROAD SAFETY ACTIVITIES	144	0	6	6	9	9	8	6	12	7	4	11	2	4	7	6	7	12	7	5	1	4	3	3	5
1. POLICIES, STRATEGIES AND PERFORMANCE TARGETS	9																								
Study on the provincial economic losses incurred by road traffic accidents	2																								
Preparation of a Long-Term Road Safety Action Plan by the Multi-Agency Provincial Safety Council	1																								
Preparation of a Road Safety Institutional Plan under the direction of the Traffic Safety Leading Group	2																								
Preparation of a Road Safety Infrastructure Action Plan under the control of the PCD	2																								
Preparation of a Highway Safety Action Plan focused on engineering and education campaign measures	1																								
Preparation of a Highway Safety Management Plan for Class 1 and Class 2 roads	1																								
2. IMPLEMENTATION ARRANGEMENTS	33																								
2.1 Leadership & Coordination	16																								
Establishment of a Provincial Multi-Agency Traffic Safety Leading Group (and Secretariat)	3																								
Establishment of a joint PCD/Police Road Safety Coordination Group (focused on truck overloading)	3																								
Establishment of a Provincial Highway Safety Council under the leadership of a Vice-Governor	1																								
Establishment of a Road Safety Unit in each Project Office involved in Rd Safety from HW design to operation	2																								
Establishment of a joint PCD/Traffic Police Study/Research Team	1																								
Organization of Highway Policy Seminars to build sector institutions	6																								
2.2 Monitoring of Road Safety	17																								
Preparation of a Comprehensive Road Safety Monitoring Plan	1																								
Development of Accident Analysis Systems (used by the PCD and the Traffic Police)	9																								
Study of factors contributing to traffic accidents (collection of basic data on traffic accidents)	6																								
Monitoring of the safety measures taken during and after the construction of civil works	1																								

PROJECT APPROVAL YEAR	94/08	1994	1994	1995	1996	1996	1996	1996	1998	1998	1998	1999	1999	2000	2001	2002	2002	2002	2003	2004	2005	2006	2006	2007	2008
HIGHWAY (HW) PROJECT	Total	Natl Trunk	Xin- Jiang 1	Shang -Hai/ Zhe- Jiang	He- Nan 2	Xin- Jiang 2	NH2	Shaan -Xi 2	NH3	Tri Prov	An- Hui 1	NH4	Fu- Jian 2	He- Nan 3	Jiang -Xi 2	Inner Mong	Xin- Jiang 3	Hubei Xiao- Xiang	An- Hui 2	Hubei Shi- Man	Inner Mong HW& Trade	Jiang -Xi 3	Fujian HW Sect Inv	Shaan -Xi/ An- Kang	Anhui HW Rehab
3. INTERVENTIONS	102																								
3.1 Road Users	8																								
<i>Enforcement</i>	4																								
Traffic Police training/activities	3																								
Provision of equipment to the Traffic Police	1																								
<i>Education & Awareness Raising</i>	4																								
Design and implementation of driver training courses	1																								
Establishment of six Traffic Safety Villages	1																								
Road user safety information campaign (mainly for pedestrians)	1																								
Road safety training to communities along the road project	1																								
3.2 Vehicles	6																								
Development of a Provincial Action Plan on Truck Overloading	3																								
Preparation and evaluation of pilot tests on Truck Overloading	1																								
Study on the Safety of Commercial Transport Operations	1																								
Training courses for transport enterprises staff and for PCD staff	1																								
3.3 Road Infrastructure	88																								
<i>Safety Standards for Design, Construction and Maintenance</i>	57																								
Road Safety Audit	18																								
Development of road safety audit procedures/checklist/manual	10																								
Development of safety manuals for HW construction and maintenance	5																								
Preparation of safety guidelines for road design, construction & operation	3																								
Development of tunnel safety manuals	3																								
Training	18																								
<i>Safety Equipment & Facilities</i>	7																								
Provision of road safety equipment and facilities	7																								
<i>Remedial Measures</i>	24																								
Provincial Blackspot Identification & Improvement Pilot Study/Program	10																								
Blackspot Treatment Program (civil works, signing and marking works)	12																								
Road safety activities at work sites	2																								

PROJECT APPROVAL YEAR	1993 – 2008	1993	1998	1999	2000	2001	2004	2006	2008
URBAN TRANSPORT PROJECT	TOTAL	2nd Shanghai Metropolitan Transport	Guangzhou City Center Transport	Liaoning Urban Transport	Urumqi Urban Transport	Shijiazhuang Urban Transport	Wuhan Urban Transport	Liaoning Medium Cities Infrastructure Project (LMCIP)	Xi'an Sustainable Urban Transport
TOTAL NUMBER OF ROAD SAFETY ACTIVITIES	130	12	17	16	16	17	17	23	12
1. POLICIES, STRATEGIES AND PERFORMANCE TARGETS	9								
Development of action plans to improve RS on key city corridors	1								
Implementation of integrated Traffic Management (TM) measures	8								
2. IMPLEMENTATION ARRANGEMENTS	26								
2.1 Leadership & Coordination	9								
Mobilization of Municipal RS Councils to undertake appropriate TM actions	1								
Establishment of a Traffic Management Committee	1								
Establishment of a Project Leading Group	7								
2.2 Monitoring of Road Safety	17								
Accident data collection & analysis/investigation	4								
Traffic accident management computer software	2								
Review of accident information collection procedures	2								
Road accident study & analysis	3								
Development of control measures for accident analysis	2								
Study to improve the TAIS	1								
Enhancement of the Traffic Management Information System	2								
Monitoring of traffic volumes, speeds, enforcement actions on key corridors	1								

PROJECT APPROVAL YEAR	1993 – 2008	1993	1998	1999	2000	2001	2004	2006	2008
URBAN TRANSPORT PROJECT	TOTAL	2nd Shanghai Metropolitan Transport	Guangzhou City Center Transport	Liaoning Urban Transport	Urumqi Urban Transport	Shijiazhuang Urban Transport	Wuhan Urban Transport	Liaoning Medium Cities Infrastructure Project (LMCIP)	Xi'an Sustainable Urban Transport
3. INTERVENTIONS	95								
3.1 Road Users	7								
<i>Enforcement</i>	1								
Effective enforcement of the National Road Traffic Safety Law	1								
<i>Education & Awareness Raising</i>	6								
Establishment of a Road Safety Center	1								
Road user education program/campaign	3								
Road safety handbooks/manuals	1								
Road safety education vehicle	1								
3.2 Road Infra. & Traffic Management	88								
<i>Design</i>	7								
Road Safety Audit	7								
<i>Remedial Measures</i>	14								
Blackspot improvement measures	7								
Signs and markings	7								
<i>Traffic Management Measures</i>	35								
Traffic Management - Civil Works	7								
Channelization of modal traffic (including junctions)	8								
Safety facilities for pedestrians and cyclists (NMV)	7								
Segregated bicycle routes	4								
Planning of a network of NMV and pedestrian routes	2								
Training	7								
<i>Safety/Traffic Management Equipment</i>	32								
Signalization (traffic signals, ATC, controllers)	8								
Procurement of CCTV	7								
Procurement of red light cameras	3								
Traffic information induction variable message board	5								
Accident hot line equipment	1								
Equipment for traffic management education	1								
Upgrading of traffic management command centers	1								
Other road safety equipment	6								

Annex 7: Review⁷⁸ of Key World Bank Highway Safety Components in China

1. Policies, Strategies and Performance Targets

Comprehensive Road Safety Action Plans (Hubei Xiaoxiang and Anhui 2)

Under the Hubei Xiaoxiang⁷⁹ Highway Project, a long term comprehensive road safety action plan (2002-2006) was prepared, covering the entire province and involving various provincial level entities through coordinated actions. A similar plan was prepared under the 2nd Anhui Highway Project.

Highway Safety Management Plan for Class 1 and Class 2 Roads (Hubei Shiman)

Under the Hubei Shiman Highway Project, the Hubei Provincial Communications Department is preparing a Provincial Highway Safety Management Plan that sets out road safety goals, objectives, policies, and priorities for Class 1 and Class 2 roads and the organizational processes and measures that are needed to effectively implement them.

The 2004 Study on Economic Losses of Road Traffic Accidents in Henan Province (Henan 3)

This report included 11 proposed recommendations, including blackspot treatment which were implemented and monitored subsequently on several national roads in Henan under the *National Road Traffic Safety Law* with the contribution of police departments.

2. Implementation Arrangements

Leadership and Coordination

Establishment of a Provincial Multi-Agency Traffic Safety Leading Group and Secretariat (Henan 2)

The Leading Group for Road Safety Coordination and its Secretariat were established at the start of the project. It was headed by the Secretary General of the Provincial Government with the Vice-Directors of the Henan Provincial Communications Department and of the Provincial Public Security Department (PSD) as deputies. It provided effective guidance to implement the various activities under the program, starting with the improved accident data reporting and analysis, and the establishment of safety audit procedures. The Leading Group was assessed as effective in the *Review of World Bank Road Safety Initiatives in the People's Republic of China* (June 2003).

Road Safety Units (NH3, NH4, Hubei Xiaoxiang, and Hubei Shiman)

Specialized units on environment, quality control, and road safety were established. These units have substantially contributed to reduce traffic accidents and enhance the efficiency of managing the overall provincial road network. They have proven to be sustainable, and not only remain active, but have actually enhanced their operations since they were first created. The Road Safety Unit's main tasks were to carry out road safety audits, road accident analysis and statistics

⁷⁸ This review presents only a few key initiatives that were developed under World Bank Highway Safety Projects in China.

⁷⁹ Hubei Xiaoxiang: Hubei Xiaogan – Xiangfan Highway Project.

collection, give recommendations on safety measures and activities, and monitor the safety measures taken during and after the construction of civil works.

Joint PCD/PSD Research Team (Anhui 1)

To undertake the Highway Safety Study, a Research Team with the participation of the Anhui Provincial Traffic Police was established by the Anhui Provincial Communications Department. This team was key to addressing traffic safety issues and to enhancing traffic safety in Anhui. The Research Team was also a very efficient tool for the foreign expert team to collect traffic accident data and undertake analysis.

Organization of Highway Policy Seminars to Build Sector Institutions (NH2, NH3, NH4, Hubei Xiaoxiang, Fujian 2, and Jiangxi 2)

The NH3 seminars continued under the Fourth National Highway Project (NH4) and Hunan officials have indicated that they will continue with the seminars after completion of NH4. Very comprehensive monitoring plans were prepared for institutional development and road safety during these seminars.

Monitoring of Road Safety

Development of Accident Analysis Systems (Shaanxi 2, Hubei, and Jiangxi Projects)

- Shaanxi 2: Software on traffic accident management and analysis (Shaanxi 2 – 1996): this software became standard in Xinjiang, Henan, and Jiangxi.
- NH4 (Hubei):
 - Accident analysis systems are being developed further with the cooperation of the police. For example in Hubei, the Hubei Provincial Communications Department has contracted the development and maintenance of its accident analysis system to the Hubei Provincial Police College.
 - Development and testing of an Accident Analysis System on NR107 (Hubei Province) on the basis of a model designed by Hunan Province under the bi-provincial NH4 project. Operational Accident Analysis System jointly used by the Traffic Police and the Hubei Provincial Communications Department.

3. Interventions

Road Users

Driver Training Study (Shaanxi 2)

Under the Driver Training Study, completed in December 1998, senior- and middle-level driver training courses were developed in cooperation with the Shaanxi Provincial Traffic Training School and the Shaanxi Provincial Skills Training School. These courses have become popular in China and are used in other provinces such as Anhui, Fujian, and Shanxi.

Traffic Safety Villages (Hubei Xiaoxiang)

The six traffic safety villages that were established in Hubei Province are a very successful initiative. Six villages which had recurrent accidents were identified. Through a multi-sectoral education program, the number of annual fatalities was reduced from seven to zero.

Vehicles

Study on Overloaded Vehicles (Hubei Xiaoxiang and Anhui 2)

The project supported the preparation and evaluation of pilot tests on control practicalities and applicable measures on truck overloading, with a view to develop a comprehensive Provincial Policy and Regulation Framework. The study was organized as follows:

- identification of possible policy alternatives and the definition of criteria for assessing damage caused by overloaded vehicles.
- preparation of pilot tests on three different road classes in three different locations in the province. The objectives were to define and test relevant control practicalities, with the assistance of the Traffic Police Department and representatives of the transport industry, and to assess the efficiency of possible measures to apply when an overloaded truck is identified.
- evaluation of the test results and development of comprehensive policies and regulations on overloaded vehicles applicable to the whole province.

A Provincial Action Plan on Truck Overloading (covering policies and regulations) has also been developed under the 2nd Anhui Highway Project.

Safety Review Process for Road Freight and Passenger Transport Enterprises (Hubei Shiman)

The project is developing a safety review process for road freight and passenger transport enterprises in Hubei Province, specifying mandatory safety requirements, procedures and monitoring arrangements for the granting, continuation and removal of freight and passenger transport operating licenses.

It also includes the design and delivery of training courses to management and operational staff of transport enterprises and to the staff of the Hubei Provincial Communications Department to ensure compliance with safety requirements, procedures, and monitoring arrangements.

Road Infrastructure

- Road Safety Audit Manuals (most projects): the manuals and the training provided in the areas of quality control and road safety and their application to date are good indications that the improvements are durable. NH4: safety audits of expressway design are regularly conducted and changes have been made in typical vertical and horizontal radius to increase sight distance.
- Traffic safety management manual at construction site (NH3).
- Blackspot Identification and Treatment Programs (most projects).
- Road Safety Inspection (Jiangxi 2): to identify traffic safety improvements such as improved guardrails and protection for drains.

Annex 8: Review of World Bank Urban Traffic Management Components in China

1. Pedestrian Facilities

Project City	Pedestrian Facilities	
	The Context	World Bank Project
Shanghai I Shanghai II	New road construction has eroded 'human scale' of city. In recent years, more commerce-driven pedestrian facilities being implemented including pedestrian streets.	SCATS ATC and junction channelization eventually improved situation for pedestrians after introduction of multi-phase signals.
Guangzhou	New road construction erodes 'human scale' of city. Pioneering staggered pedestrian crossings implemented.	Pedestrian strategy in GUTS. Pedestrian facilities comprising 1.9km of footways and 30 at-grade signalized pedestrian crossings.
Liaoning: Shenyang	Motor vehicles have priority with little provision for pedestrians that is either safe or convenient.	Pedestrian improvements at 27 junctions. The World Bank advocates good design for pedestrians at 40 large junctions.
Liaoning: Fushun	Few facilities for pedestrians.	No specific elements, although ATC has potential to include pedestrian phases.
Liaoning: Anshan	City has been cleaned up and greened including footway upgrading. Pedestrian crossing facilities 10 years behind Beijing/Shanghai.	Improvements along 5.7km of footway and equipment to provide medians and pedestrian barriers.
Urumqi	Pedestrians considered a problem, needing to be controlled by physical segregation by barrier and grade-separation. Severance in shopping and residential areas. Subways in converted underground shelters are very deep. MV parking, access and hawkers on footways. No pedestrianized streets.	One pilot mid-block signalized pedestrian crossing; pedestrian phases at 78 sets of traffic signals; 18 footbridges; 1 subway; 38.4km of footway improvements; and pedestrian safety barriers. However, very little has been implemented so far.
Shijiazhuang	City designed for MVs resulting in pedestrian severance, lack of continuity of routes and poor pedestrian safety.	Pedestrian footbridges crossing primary roads implemented; removal of footway parking not implemented.
Wuhan	The city has the potential to be pedestrian-friendly built on its existing pedestrian facilities of mid-block crossings and junction channelization islands.	63 mid-block signalized pedestrian crossings, pedestrian phases in 99 ATC junctions (54%), one pedestrian street, 13 footbridges, 7 subways and 40km of footway renovation.

The World Bank projects initially aimed to have significant pedestrian components. However, the clients' focus was on new road construction to provide for motor vehicles. As a result, the specific pedestrian components of these World Bank projects were very minor. Attempts to improve conditions for pedestrians through better junction design have been difficult to achieve with very few good junction channelization designs with protected areas for pedestrians implemented. However, pedestrians have been served through improved traffic management

facilities, including ATC and traffic signals, new road construction including footways and grade-separated pedestrian crossings, and road maintenance including footway renovation.

The World Bank's theme was very strongly in favor of pedestrian provision and while this was not always reflected in the clients' actions, it is clear that the message has been heeded. Transport professionals now recognize the importance of planning and providing for pedestrians and ensuring that cities retain a human scale. The need now is for these elements to be incorporated into actions and implemented in appropriate measures.

The main elements of urban transport projects remain road infrastructure. As a result pedestrian elements focus on sidewalk reconstruction and renovation and on grade-separated and at-grade crossing facilities. The World Bank attempted to include pedestrianization schemes but these were not accepted by the client who preferred such schemes to be scoped without World Bank involvement.

2. NMV Facilities

Project City	NMV Facilities	
	The Context	World Bank Project
Shanghai I	NMVs banned from many major routes. Concept of exclusive MV/NMV routes reduced the spread of routes available to NMVs and was not fully implemented for NMVs.	19.4km of exclusive NMV routes; 1.6km of NMV missing links; NMV bridge over Suzhou Creek.
Shanghai II		TM measures in a package to improve road space allocation and provide for safe NMV use. However, NMV concept not fully or properly realized. Poor designs, provision and enforcement.
Guangzhou	NMVs banned from many major routes. Concept of exclusive MV/NMV routes reduced the spread of routes available to NMVs and was not fully implemented for NMVs.	Very little in project. Little improvement for NMVs. Bus priority facilities may have actually worsened conditions for NMVs.
Liaoning: Shenyang	NMVs marginalized by wide MV roads and forced to share footway with pedestrians.	NMV routes in association with bus priority routes still not implemented.
Liaoning: Fushun	Although NMVs have a significant mode share, there are few segregated facilities.	None in project.
Liaoning: Anshan	With the downgrading of Angang, large peak hour flows of NMVs have declined.	4km of exclusive NMV road.
Urumqi	NMVs are a low mode share due to climate and terrain. Few segregated facilities.	None in project.
Shijiazhuang	NMVs are a significant mode share with a wide spread of routes throughout the city.	Concept of NMV Pre-Dominant routes developed and 5km of new routes implemented. However 24km of existing routes not converted as proposed.
Wuhan	NMV mobility declining, although it is still a significant mode share. Facilities in need of improvement.	60km of NMV priority routes with either MV/NMV segregation or MV restrictions.

The World Bank aimed to maintain and enhance existing NMV mode shares in the cities. It also sought to prevent marginalization from increased motorization, and improve the safety of NMV.

The World Bank learned the lessons of developing systems of NMV and MV exclusive routes; that this only works if both are implemented in parallel and this was not the case in Shanghai and Guangzhou. The concept of NMV Pre-Dominant Roads (as developed for Shijiazhuang) allows the maintenance of a wide spread of NMV routes throughout a network. However, in the projects, NMV facility implementation was weak and piecemeal and probably not sufficient to reverse the decline.

3. Junction Channelization

Project City	Junction Channelization and Design	
	The Context	World Bank Project
Liaoning: Shenyang	Large junctions with 6 - 10 lanes with little channelization. 20% of junctions have physical islands.	150 channelization designs still not approved by World Bank because they are essentially junction widening.
Liaoning: Fushun	Prefers to channelize by using road markings.	58 junctions, only 6 implemented with reasonable designs; others waiting for ATC equipment.
Liaoning: Anshan	Still committed to the traditional concept of channelization which is essentially junction widening.	8 junctions widened but not channelized.
Urumqi	Very little implemented in recent years. Still committed to junction widening and channelization by road markings. However, World Bank's principles applied successfully at three sites.	100 junctions finally designed to World Bank standards after being returned several times for redesign.
Shijiazhuang	Use of narrower lanes down to 2.75m to extract more capacity at junctions. Does not comply with National Standards.	62 channelizations of adaptive ATC junctions.
Wuhan	Good junction channelization already being implemented and the prospect is encouraging for the World Bank project.	300 channelizations including mid-block pedestrian crossings, 46 of these are physical channelizations.

In all projects, the World Bank has funded technical assistance from international and domestic consultants for junction channelization design. Generally, this has enabled better designs yet not all cases have been successful. The following presents the typical case in most project cycles:

1. The Client, with technical assistance from international and domestic consultants, designs junction channelizations with traffic signals and ATC.
2. Despite assistance, the final designs often tend to focus on junction widening and often do not address pedestrian safety and efficiency.
3. The World Bank requests redesign in order to tighten up junctions, provide physical islands, and make safe and convenient provision for pedestrians.
4. The designs go back and forth between the World Bank and the Client until finally an appropriate design - or an acceptable compromise is reached - and the junctions are approved for implementation.
5. Once the traffic signals have been procured, implementation usually - but not always - proceeds according to the design principles. In earlier projects, junction channelization and traffic signal installation were often poorly coordinated with one going ahead without the other. In recent projects, coordination has improved.

4. ATC (Area Traffic Control and Traffic Signals)

ATC is at the heart of the TMCs in the World Bank projects not only because of its cost effective benefits in terms of traffic efficiency, but also for its ability to respond to the fast pace of motorization and changing traffic patterns, ATC can also provide safe and efficient crossing facilities for pedestrians and NMVs. There is also high ownership of ATC in World Bank projects. However, there are issues regarding procurement, including providing equipment to supplement an existing system. This is reflected in the below Table which shows that ATC has only been implemented in two projects so far. There are also challenges for telecommunications with regard to leasing/buying telephone lines or dedicated fiber-optic networks.

Unit: no. of traffic signaled junctions

Project City	Existing 2004			World Bank Project ¹			
	Fixed Time	Adaptive ²	Total TS	Already installed ³	Planned ⁴	Total	TCC equipment provided
Shanghai	1,893	982	2,875	70	-	70	Equipment for five TCC sub-centers, CCTV and telecoms
Guangzhou	457	63	520	51	167	218	CCTV and telecoms
Liaoning: Shenyang	143	172	315	-	150	150	None
Liaoning: Fushun	33	-	33	-	58	58	Interior fittings, video wall, CCTV and telecoms
Liaoning: Anshan	88	10	98	-	-	-	None
Urumqi	60	-	60	-	88	88	CCTV and telecoms
Shijiazhuang	63	17	80	-	130	130	CCTV and telecoms
Wuhan ⁵	185	71	256	-	246	246	Equipment for two TCC sub-centers and CCTV

¹ World Bank project traffic signals include some upgrades of existing signals plus new sites; ² All existing adaptive systems are SCATS with the exception of Anshan (Beijing Line Control System) and Wuhan (SAINCO/Telvent and SICE systems from Spain); ³ SCATS; ⁴Guangzhou and Shenyang are SCATS, Fushun is SAINCO/Telvent and remainder under bidding; ⁵ Includes planned SICE system for Hankou.

5. Enforcement

The enforcement components are closely linked with the road user education components. In recent years, the World Bank has funded larger amounts of enforcement equipment. For example, in Wuhan, CCTV, red light violation cameras and VMS equipment accounted for around 13% of total TMC cost.

Project City	Existing 2004			World Bank Project			Remarks
	CCTV	Red Light Cameras	VMS	CCTV	Red Light Cameras	VMS	
Shanghai ¹	800	700	6 25	-	-	-	
Guangzhou ²	142 180	60 330	2 50	30	-	3	
Liaoning: Shenyang	101	87	5	50	100	2	
Liaoning: Fushun	-	-	-	23	9	-	
Liaoning: Anshan	18	156	7	-	-	-	
Urumqi	-	-	-	52	-	-	
Shijiazhuang	-	-	-	62	-	-	
Wuhan ³	82	19	14	20	60	6	Equipment still to be procured and installed

Status in 2004:

¹ Shanghai VMS = 6 existing plus another 25 under installation over 2004 - 2006; ² Guangzhou CCTV = 142 existing plus 180 planned; red light cameras = 60 existing plus 330 planned; VMS = 2 existing plus 50 planned; ³ Includes Zhuankou and planned SICE system for Hankou.

CCTV: The issue of CCTV is contentious, as it has the potential to be used for non-traffic purposes. Furthermore, the project cities frequently do not have the resources to fully utilize the traffic benefits of CCTV. Another complication with CCTV is communications: a fiber-optic cable is often required and networks have to be either bought or leased. CCTV is not a necessary component of ATC system but it can be a useful add-on for traffic surveillance and monitoring.

Red Light Violation Cameras: Local police frequently cite red light running in Chinese cities as a major road traffic safety issue. Hence the trend is towards the installation of larger numbers of cameras. Despite road accident data showing that speeding is a significant cause of accidents (13% of recorded road traffic fatalities in 2006⁸⁰), there is as yet little impetus to install speed cameras, despite considerable road safety benefits achieved in many western countries.

Variable Message Signs (VMS): VMS are frequently requested by clients to be included in a TMC. Often, the rationale cited by the Chinese Traffic Police for their provision is road user education. However, it is clear that more sophisticated uses are evolving in Shanghai and Guangzhou according to typical uses of VMS for enforcement, route guidance, and information.

⁸⁰ 2006 Annual Statistical Report on Road Traffic Accidents.

Annex 9: Lessons Learned from World Bank Road Safety Components in China

1. Interurban Road Safety

1.1 Policies, Strategies and Performance Targets

For traffic safety to improve dramatically, the matter must be elevated to the highest levels of Government (Tri-Provincial Highway Project, Mid-Term Evaluation, 2002)

In 2002, four projects⁸¹ highlighted the following: “The World Bank's role so far has been confined largely to matters under the jurisdiction of its project executing agencies, namely the engineering aspects of road safety. Improving road safety requires coordinated action in engineering, education and enforcement. However, the current diffusion of responsibilities in these different areas makes it difficult to address the problem in a comprehensive manner. **For traffic safety to improve dramatically, the matter must be elevated to the highest levels of Government.**”

A broader, multi-sector approach, with a longer timeline, is warranted for meaningful results (Xinjiang Highway Project, ICR, 2000)

In 2000, the ICR of the Xinjiang Highway Project stressed that: “Experience under the project suggests that one should not underestimate the risks, nor should one have too high expectations within the confines of one single project. **A broader, multi-sector approach, with a longer timeline, is warranted for meaningful results.** This should figure prominently in the dialogue between the World Bank and the Chinese Government, both at national and provincial levels.”

1.2 Implementation Arrangements

Leadership and Coordination

Good cooperation between the PCDs and the PSDs needs to be established (Xinjiang 1, ICR, 2000)

The Provincial Communications Department can work only on what is under its responsibility - the engineering aspects of road safety. With the guidance of higher levels of government, **good cooperation needs to be established between the Provincial Communications Department and the Traffic Police who are in charge of enforcement and education.**

Successful cooperation between the PCDs and the PSDs (Henan 2 & 3 and Anhui 2)

In Anhui, successful implementation of the road safety study proved that once the Management of the Provincial Government was convinced of its merits, **coordination with the Traffic Police was possible and the Traffic Safety Issue could be more efficiently addressed.** However, there is not one single approach for achieving such coordination, and the various approaches or methods will depend on the political environment and institutional framework.

⁸¹ Tri-Provincial Highway Project, Mid-Term Evaluation, 2002; Inner Mongolia Highway Project, PAD, 2002; 3rd Xinjiang Highway Project, PAD, 2002; and 2nd Anhui Highway Project, PAD, 2003.

1.3 Interventions

Road Users

Programs need to focus not only on the physical interventions but also on changes in the attitudes of drivers and pedestrians (Henan 2, Mid-Term Evaluation, 2001; Anhui 1, ICR, 2006; and Xinjiang 3, PAD, 2002)

An independent Evaluation of the Safety Component of the 2nd Henan Highway Project was conducted by mid-term to assess the user perception of the improvements (drivers, pedestrians and Traffic Police). It was found that (i) the main causes of accidents included speeding, violation of traffic rules, and use of non roadworthy vehicles, and (ii) that **the program needed to focus not only on the physical interventions, but also on changes in the attitudes of drivers and pedestrians (i.e. on education and traffic enforcement).**

Vehicles

Need to continue pressing solutions to the overloading problem (Jiangxi 2, ICR, 2007)

Truck overloading remains a problem throughout China. Studies typically find that over 75% of trucks are overloaded with the average overload sometimes exceeding 100%. A few years after opening, the right hand lanes of many expressways already show signs of rutting due to the high number of overloaded trucks. On other roads, there have been catastrophic failures of bridges due to overloading. To keep transport costs low, the Government has been reluctant to take strong measures to enforce legal axle loads. The measures presently in place seem to do little to persuade truckers to reduce overloading. They include spot checking and fining by the police, and higher tolls based on weight. **Another aspect of the solution, which may not have been considered sufficiently, would be to increase the design axle load.** Designing stronger pavements, while more costly initially, may lower the total cost of transport by allowing heavier trucks. Higher permissible axle loads may also make enforcement more acceptable to the transporters. Axle loads were increased in the European Union after studies showed that they would result in lower overall transport costs, including infrastructure and vehicle operating costs.

Road Infrastructure

Dangerous down-hill grades: additional measures should be implemented at the design stage to improve the safety of new roads (NH2, ICR, 2005)

Most accidents on dangerous down-hill grades are still due to truck overloading, and until recently, the PCDs were not permitted to stop overloaded trucks as this element of enforcement was the responsibility of the Police. While improvements in overweight enforcement will limit the degree of overloading, there are additional measures that should in the future be implemented at the design stage to improve the safety of new roads. **These include factors such as ensuring a constant gradient over the length of the section, providing additional lanes, and emergency stopping bays.** However, improvements such as these are not embodied in the MOC's design standards, which designers closely adhere to, even with regard to how they may have previously been applied. Working with the MOC to update design standards, improving training of designers, and implementing proper design safety audits would significantly improve the safety on similar projects.

Interconnecting Roads (NH2, ICR, 2005, and Jiangxi 2, ICR, 2007)

It is important to pay close attention to the interconnecting road program during project design. The expressway alignment, number and location of interchanges need to be carefully considered to ensure that the full potential benefits of the expressway are realized. It is necessary to carefully review the class and designs of the interconnecting roads to ensure that they are sufficient to meet the likely traffic demand from the expressway. Design institutes can sometimes design inadequate at-grade junctions and this can present major traffic safety problems when the roads have a high speed alignment.

Closer review of designs and technical specifications are required (Jiangxi 2, ICR, 2007)

A common problem on expressways in China occurs when different elements of the designs are done by different individuals and/or institutions. This fragmented approach leads to conflicts and inconsistencies such as signs being installed in the same location as noise barriers (creating a break in the noise barrier); noise barriers not being placed in the appropriate location; obstacles such as bridge piers not being adequately protected, etc. **It is important to review the designs from an overall perspective to ensure that these types of problems are eliminated.** To achieve this, it is necessary that: (i) the different design teams have collaborative meetings where they jointly review the documents and resolve inconsistencies; and (ii) all bidding documents be thoroughly reviewed by experienced engineers prior to bidding.

Design changes during construction need to be checked more rigorously to ensure they reflect the same standards that were applied to the original design. Importantly, when the field conditions are different to those indicated in the designs, the designs should be updated to reflect reality. For example, when the embankment is higher than what the design indicates, the slope protection should be extended.

It is also important to ensure: obstacles are avoided and, if that is impractical, that they are properly protected; crossroads for interconnecting roads are properly designed with good sight distances; all road signs must be properly sited and visible; lane markings and transitions are properly designed and painted; annex areas have proper lane marking and channelization; noise barriers are built without gaps, extending an appropriate distance before/after the buildings to be protected, and are built with suitable materials; borrow areas must be carefully selected, preferably in areas without hills, and excavated in an appropriate manner which will allow for eventual reinstatement; slope protections need to be designed to reflect the actual field conditions, and appropriate techniques used.

It is important to ensure that the World Bank teams regularly visit the site (Jiangxi 2, ICR, 2007)

Supervision missions identified a number of problems with the expressway: incorrectly designed interchanges which were dangerous; traffic safety deficiencies; incorrect noise barrier implementations; inadequate side slope protection; and improperly restored borrow areas. In hindsight, **some of these would have been avoided by frequent and longer visits to the project site by World Bank supervision missions.**

The World Bank should pay more attention to the impact of the construction works on safety (Henan 3, ICR, 2007)

The World Bank should pay more attention to the impact of the construction works on safety and include mitigation measures during the construction phase. During road construction and maintenance, there can be an increase in traffic accidents resulting in more

injuries and fatalities. Upon being opened to traffic, a sharp reduction in road traffic accident injuries and fatalities was observed on the new expressway.

2. Urban Road Safety

2.1 Policies, Strategies and Performance Targets

Need to transform the World Bank's Urban Road Safety activities into institutional actions

The early urban transport projects (including Wuhan Urban Transport Project) focused on a series of bottom-up actions (intersection improvement, NMV separators, supporting the police, etc) which while important and valuable, did not appear to be transformed into any institutional actions.

In the Liaoning LMCIP Project and in the Taiyuan Urban Transport Project, these activities are being implemented under an institutional framework linked to the Municipal Road Safety Council. **This approach should create a stronger connection between the World Bank-financed activities, and the city's own traffic safety efforts.** The process also creates a platform for the city to engage with the World Bank on traffic safety issues more generally and supports a capacity building process for the city.

2.2 Implementation Arrangements

Sensitization of key decision makers is crucial for successful project implementation

In urban transport projects, the Mayor or the City Council is often the main driving force. In Liaoning Urban Transport, differences in the understanding of issues between the World Bank and local leaders was in large part responsible for the problems faced by technical staff in implementing the traffic management components. There was a conflict in the vision between the appraised activities related to junction channelization, and the reduction of road space for pedestrians and cyclists sought by leaders. **Urban transport commands significant attention from municipal leadership.** To be able to facilitate change in this sector, **it is critical for political decision-makers to be alerted to the relevant issues** through policy-dialogue, targeted workshops and seminars, and study tours.

Need to integrate the institutions dealing with traffic engineering

Coordination between the TMS and the new road infrastructure needs to be stronger. Some examples of areas that could be improved are: better design of the ground level junctions under the Inner Ring Road; integration of Inner Ring Road monitoring equipment and ATC. **Implementation requires the creation of a traffic management coordination team which seeks to bring together members from different agencies.**

2.3 Interventions

Need to address accidents on urban expressways and arterial roads

Data from Shanghai and Urumqi **gives concern about the increasing number of accidents occurring on urban expressways and arterial roads.** The *Annual Statistical Report on Road Traffic Accidents* shows that, from 1998 onwards, 60% of road traffic injuries or fatalities on urban classified roads occurred on expressways and arterial roads. However, there is a need to

place this statistic into better context by acquiring further data on the length and classification of urban roads.

Need to improve road design

A better functional classification of roads is required and road design standards need to be reviewed so that designs can be based more on road function. One example is lane widths. Greater provision for pedestrians and cyclists should be made which allows greater consideration for safety. Suburban roads are generally not safe as insufficient consideration is given to pedestrians and cyclists.

A systematic process of road safety audits for new and improved urban roads needs to be established to prevent accidents.

Need to develop a comprehensive approach to traffic management

There is often an over-reliance on roads with little systematic planning and appreciation for integrated solutions consisting of traffic management, or facilities for pedestrians and cyclists. **Advantage should be taken of the opportunity to develop innovative and appropriate design measures for NMVs.** The concept of separating MV and NMV flows is now accepted, but complete separation will take time.

Need to integrate traffic management with investments in ATC to obtain the interest and buy-in of the Traffic Police

The Traffic Police, who are responsible for traffic operations and enforcement, often have limited experience of comprehensive traffic management. The World Bank's experience with transport projects indicates the need to integrate traffic management with project sponsored investments in Area Traffic Control (ATC) systems so as to encourage the Traffic Police to take a broader view of the importance of traffic management.

Declining pedestrian and cyclist mobility

Non-motorized transport (NMT), traditionally the mainstay of urban transport in Chinese cities and still prevalent in the poorer sections of the society, **currently suffers from inadequate attention from city transport planners.** This is particularly true from a safety perspective. Pedestrian crossings are limited, while traffic management for cyclists is based mainly on control and prohibition. In addition, there are no NMT networks, and cyclists are often forced to ride in dangerous mixed traffic. The construction of new roads, built essentially to solely accommodate automobiles, is aggravating these problems.

Need to involve the Traffic Police in the design of traffic management schemes

There is a need to involve the Traffic Police in the design of traffic management schemes and also to make these schemes as much as possible "self-enforcing".

Annex 10: Opportunities and Challenges for 2nd Generation Road Safety Projects in China

In 2006 and in 2007, the World Bank supported a six-month study⁸² to identify the opportunities and challenges for developing 2nd generation road safety projects in China. Several options were systematically reviewed and analyzed. 14 projects were identified:

Nb.	Project Status	Sector	Potential Source of Funds	Project Scope	Scale
National Level					
1	standalone	multi	WB Study fund+Chf1	Preliminary study	small
2	standalone	multi	WB Study fund+Chf1	Awareness campaign	small
3	standalone	multi	WB Study fund+Chf3	Preliminary study	small
4	standalone	multi	WB Study fund+Chf3	Awareness campaign	small
Inter-Provincial Level					
5	component	single	WB loan	Demonstration corridor	small
6	standalone	single	WB Study fund+Chf1	Capacity building (CB)	small
Provincial Level					
7	component	multi	WB loan	Demonstration corridor	small
8	standalone	multi	WB loan+Chf2	Blackspot treatment + audit + CB&TA + awareness	large
9	standalone	multi	WB Study fund+Chf1	Blackspot treatment /audit/ CB&TA/awareness	small
10	standalone	multi	WB Study fund+Chf3	Blackspot treatment /audit/ CB&TA/awareness	small
Municipal Level					
11	component	multi	WB loan	Demonstration urban area improvement	small
12	standalone	multi	WB loan+Chf2	Blackspot treatment + audit + CB&TA + awareness	large
13	standalone	multi	WB Study fund+Chf1	Blackspot treatment /audit/ CB&TA/awareness	small
14	standalone	multi	WB Study fund+Chf3	Blackspot treatment /audit/ CB&TA/awareness	small

Notes:

1. Chf means fund from the Chinese side including:

- Chf1: Research aid from MOST, MPS, MOC, etc;
- Chf2: Provincial or municipal government contribution, which may include soft loan from China Development Bank;
- Chf3: Donation from large companies.

2. “WB loan” here means “savings from WB loan”.

3. “WB study fund” refers to World Bank’s Trust Fund such as Consultant Trust Fund (CTF) etc.

4. Regarding the project scale, “small” < US\$ 1 million, and “large” > US\$ 1 million, but this definition is not rigid.

The least feasible options at the present time would be at the inter-provincial level (projects # 5 and # 6) because it would be necessary to coordinate different provinces in addition to various sectors. The project would need to be strongly supported by the Central Government to coordinate the activities of all the member provinces and it would be far more involved than a first option at the provincial level.

⁸² *Review of Past Experiences and Options for Forward Progress (World Bank, 2006 – 2007).*

The most feasible options would be at the central/provincial/municipal levels:

At the National Level

At the national-level, major stakeholders such as NDRC and MOC have suggested that **a study project on the topic is more feasible**. Such a study should be jointly undertaken by Chinese experts (Chinese Research Institutes) and foreign experts, using grants mobilized through the World Bank. Additional sources of funding may include research grants from major ministries such as MOST, MOC, MPS, etc, and private sector donations aligned with Corporate Social Responsibility (CSR). The potential examples of national level projects (projects # 1 to # 4) include preliminary study or awareness campaigns that are supported by multiple sectors.

The readiness of the Central Government appears to be the greatest constraint for introducing potential study projects at the national level, where the key factor for projects to be viable lies in the willingness of the ministries like MPS, MOC and MOST to allocate research grants on potential activities.

At the Provincial and Municipal Levels

4 major constraints were identified:

1. **willingness** of provincial/municipal governments to carry out 2nd generation projects and therefore to commit funding to non-revenue generating activities;
2. **fund availability**: provincial/municipal governments financial capacity becomes an important factor that influences their willingness;
3. **institutional capacity**: coordination capacity of provincial/municipal government agencies is critical to the success of integrated/multi-sectoral 2nd generation projects that are complex to prepare and implement;
4. **understanding and commitment of the Central Government (MOF and NDRC)**: all projects that were identified at the provincial and municipal levels were using World Bank's study fund or World Bank's loan savings (that are already approved by MOF) and were almost all small in scale. These projects can be carried out with minimum approval procedures from the Central Government. However, if the World Bank wants to carry out a full large stand-alone 2nd generation road safety project at the provincial or at the municipal level, more funding will be needed than just loan savings or study funds, and getting the understanding and the commitment of the Central Government (MOF and NDRC) **will be key to get the project approved and running**.

A key recommendation was made by the study: at the provincial and local levels, it is advisable to introduce the project into economically better developed provinces which are located along the coast (Guangdong, Zhejiang, Shanghai, and Jiangsu Provinces). Developed coastal provinces are likely to be more ready than other provinces in terms of willingness, funding, and institutional capacity. The outcomes of 2nd generation projects are likely to be the highest and the most sustainable.

The study raised **the issue of the owner** of a large scale (costly) stand-alone 2nd generation project at the provincial/municipal level. It is important to note that the Traffic Police have no independent financing capacity.

Concerns were identified on the promotion of the 2nd generation project concept:

- as it is new to many stakeholders and officials, the 2nd generation project concept needs to be clearly explained to and discussed among a wider group of stakeholders regarding its suitability in China's context;
- the promotion of 2nd generation practices should be in line with the existing domestic road safety agenda and plans;
- the practicability and incentives of borrowing (loans) for non-profitable road safety activities need to be further identified;
- further analysis of the expressed concerns or constraints is vital to moving the concept into practice. Such analysis should be made through continued outreach effort and dialogue with government agencies.

Annex 11: The Activities of the World Bank Global Road Safety Facility in China

The activities of the World Bank Global Road Safety Facility in China to-date include support for:

1. The establishment of the Hubei Road Traffic Safety Training Center (RTSTC) (2007 – ongoing);
2. The China Seatbelt Study carried out by Monash University in Jiangsu and Zhejiang Provinces (2007 – ongoing);
3. The Xinjiang Road Safety Workshop (April 7-9, 2008) in Urumqi.

1. The Hubei Road Traffic Safety Training Center (RTSTC) (2007 – ongoing)

The RTSTC was formally established in 2007 with a US\$ 500,000 grant from the World Bank Global Road Safety Facility, funding from the Hubei Provincial Communications Department (US\$ 200,000) and corporate sponsorship from PSA Peugeot Citroen.

The objective of the project is to establish a provincial multidisciplinary center, the Hubei Provincial Road Traffic Safety Training Center, to strengthen people's awareness of road safety, raise the level of road infrastructure facilities, establish a synthetic feedback network of road safety, and reduce the road accident rate. The Project consists of the following parts:

1. Collecting domestic and international knowledge on road safety issues, including specifically on the design of safer roads, accident prevention, road safety indicators, dangerous areas and blackspots. The purpose of this collection is to provide road safety management and implementation training for staff employed in the road safety sector.
2. Preparing and implementing training courses on road safety for staff involved in the preparation of World Bank Road Safety Projects.
3. Developing training materials for courses on road safety design, road safety audit, emergency health services, driving behavior, traffic safety management and training materials for trainers of drivers.
4. Carrying out traditional and e-learning training programs on road safety at the provincial level for the staff of the Hubei Provincial Communications Department, Public Security Department, Health Department, and Education Department.
5. Developing a website on road safety for the Hubei Road Traffic Safety Training Center.
6. Carrying out activities linked with traffic safety, including road safety audits, blackspot identification, road safety education, vehicle overloading inspection and control, and emergency response.

2. The China Seatbelt Study (2007 – ongoing)

This study aims to evaluate the comparative changes in seatbelt wearing patterns in the contrasting Chinese cities of Nanjing (Jiangsu Province) and Zhoushan (Zhejiang Province) over a 3 year period in an environment of rapid motorization and legislative change and to make a comparison with the use of seatbelts in Melbourne, Australia in the 1970s in the presence of strong regulations and enforcement.

Goals and objectives:

- Address an important road safety problem in China with the goal of death and injury prevention and conduct a demonstration evaluation program.
- Build capacity for road safety and injury prevention research and development in China.

3. The Xinjiang Road Safety Workshop (April 7-9, 2008)

Five experts from 5 different countries (France, Australia, New Zealand, Canada, and China) gave presentations on topics including: accident statistics and analysis, infrastructure safety management, safety audit, road user behavior, education, enforcement, vehicle standards, sustainable road safety design, and road safety rating (including iRAP: the International Road Assessment Program), etc.

More than 60 representatives from various highway administration agencies, design institutes, and traffic police bureaus of Xinjiang Province participated in the workshop.

Day 1 (April 7)

9:30am Registration

10:00am-10:20am: Opening speeches

Xinjiang Communications Department leader – 10 minutes

WB Representative (Ms. Fei Deng) – 10 minutes

10:20am – 1:45pm

Section 1 Accidents Statistics and Analysis

- (1) International Road Safety Good Practice
- (2) Prevalent Accidents in China
- (3) Accident Data Records
- (4) Statistics of Accidents
- (5) Accidents Causation Analysis
- (6) Injury Surveillance Systems

Speakers: Fergus N Tate (National Road Safety Leader, MWH Global, New Zealand), Mr. He Yong (Director, Highway Research Institute of the Ministry of Communications), Jean-Marie Braun (World Bank Consultant – Highway Design and Road Safety Expert)

Schedule:

10:20-11:05: Fergus N Tate (MWH Global, New Zealand)

Presentation: Practice in NZ (1, 3, 4, 5, 6), 45 minutes

11:05-11:35: Jean-Marie Braun (World Bank Consultant)

Presentation: Practice in France (1, 3, 4, 5, 6), 30 minutes

11:35-12:05: Q&A: 30 minutes

Coffee Break: 35 minutes (including group photo)

12:40-1:25 Mr. He Yong, Highway Research Institute of the Ministry of Communications

Presentation: Actions in China (2 to 6), 45 minutes

1:25-1:45: Q&A: 20 minutes

1:45pm – 3:00pm: Lunch

3:00pm – 5:30pm

Section 2 Infrastructure Safety Management

- (1) Road Safety Impact Assessment
- (2) Road Safety Audit
- (3) Road Safety Inspection
- (4) Blackspot Management
- (5) Network Safety Management
- (6) Safety Rating

Speakers: Fergus N Tate (MWH Global, New Zealand); Mr. He Yong, Highway Research Institute of the Ministry of Communications; Alain Dube (Director, Quebec Department of Transportation, Canada).

Schedule:

3:00 – 4:30: Fergus N Tate (Sections 1 through 5 and iRAP)

4:30 – 5:00: Alain Dube (Safety Rating)

5:00 – 5:30: He Yong

5:30pm – 5:50pm: Coffee Break

5:50pm – 7:20pm

Section 3 Road User Behavior, Education, Enforcement, and Vehicle Standards

- (1) Behavior
- (2) Education
- (3) Enforcement
- (4) Vehicles

Speakers: Jean-Marie Braun (World Bank Consultant), Mr. He Yong, Highway Research Institute of the Ministry of Communications.

Schedule:

5:50 – 6:20: Jean-Marie Braun (World Bank Consultant): situation in France, 30 minutes

6:20 – 6:50: Mr. He Yong, Highway Research Institute of the Ministry of Communications

6:50 – 7:20: Q&A: 30 minutes

Day 2 (April 8)

10:00am – 1:50pm

Section 4 Sustainable Safe Road Design: Theory

- (1) Sustainable Safety Principles
- (2) Road Functions
- (3) Road Categories

Speakers: Jean-Marie Braun (World Bank Consultant); Paul Hillier (ARRB Group Ltd)

Schedule:

10:00 – 11:30: Jean-Marie Braun (World Bank Consultant): principles and situation in France, 90 minutes

11:30 – 12:00: Q&A: 30 minutes

Coffee Break: 20 minutes

12:20 – 1:20: Paul Hillier (National Road Safety Leader, ARRB Group Ltd, Australia): theory and situation in Australia and in other countries, 60 minutes

1:20 – 1:50: Questions and discussion: 30 minutes

1:50pm – 3:00 pm: Lunch

3:00pm-7:00pm

Section 5 Sustainable Safe Road Design: Application

- (1) Cross Section
- (2) Junctions
- (3) Alignment
- (4) Roadside Protection
- (5) Pedestrian Facilities
- (6) Cyclists Facilities

Speakers: Jean-Marie Braun (World Bank Consultant); Paul Hillier (ARRB Group Ltd); one expert from a Chinese Design Institute

Schedule:

3:00-4:30: Jean-Marie Braun (World Bank Consultant): principles, practice in France and practice in China, 90 minutes

4:30-5:00: Q&A

Coffee Break: 20 minutes

5:20-6:20: Paul Hillier (ARRB Group Ltd): practice in Australia and in other countries as well as how to fit it into China's context, 60 minutes

6:20-6:50: Discussion and questions: 30 minutes

Day 3 (April 9)

10:00am – 1:30pm

Section 6 Safety for Linear Villages/Cities

- (1) Problems Encountered
- (2) Problem Analysis
- (3) Solutions

Speakers: Paul Hillier (ARRB Group Ltd), Jean-Marie Braun (World Bank Consultant); one expert from a Chinese Design Institute

Schedule:

10:00-11:30: Paul Hillier (ARRB Group Ltd): principles and practice in Australia and in other countries as well as how to fit it into China's context, 90 minutes

11:30-12:00: Q&A: 30 minutes

Coffee Break: 20 minutes

12:20-1:05: Jean-Marie Braun (World Bank Consultant): practice in France and practice in China, 45 minutes

1:05-1:30: Questions and discussion: 25 minutes

1:30pm – 3:00pm: Lunch

3:00pm – 4:30pm

Section 7 Case Studies from Xinjiang

Kui-Sai Highway
S201

Speakers: Designers & Police Officers from Xinjiang, (45 minutes each)

4:30pm – 7pm

- Discussion among all participants on how to solve the Road Traffic Safety Issue in Xinjiang
- Proposal for an Action Plan

7pm – 7:20pm: Conclusion of the Workshop: XCD and the World Bank

Annex 12: The Efforts of Other Major International Institutions in China

1. The Asian Development Bank (ADB)

The ADB has carried out two major technical assistance (TA) programs in the last 10 years:

- Capacity Building in Traffic Safety Planning and Management (1999 – 2003, US\$ 800,000)
- Road Safety Improvement (2005 – 2008, US\$ 1.5 million)

Main National Partners

The ADB has worked with the following national partners on road safety:

- The Traffic Management Bureau of the Ministry of Public Security (TMB – MPS)
- The Traffic Management Research Institute of the Traffic Police (TMRI in Wuxi, Jiangsu)
- The Ministry of Communications (MOC)

Scope of Intervention

Policies, Strategies and Performance Targets

TA: Capacity Building in Traffic Safety Planning and Management (1999 – 2003, US\$ 800,000: Japan Special Fund: US\$ 500,000 and MPS: US\$ 300,000)

The Government of China requested a technical assistance (TA) grant from the ADB to guide the Ministry of Public Security (MPS) in its efforts to improve road safety. The TA was the first directed at the MPS and the first to deal with road safety at the national level.

The objectives of the TA were to: (i) review traffic legislation, rules and regulations; (ii) review traffic management and accident systems; (iii) conduct training both locally and overseas; (iv) prepare promotion materials; (v) develop a national road safety program; and (vi) assess the needs for further capacity building in the MPS and in the Provincial Public Security Departments.

A comprehensive National Road Safety Reform Program (NRSRP) was developed. The Program included ten main components: (i) establishment of a National Road Safety Council (NRSC), (ii) legislation, (iii) road infrastructure improvement, (iv) data system, (v) education, (vi) emergency medical services, (vii) traffic management and police enforcement, (viii) driver training, (ix) vehicle testing, and (x) donor support.

The Government is highly committed to implement the NRSRP. It has already implemented the first two components of the program soon after the completion of the TA, namely:

1. Establishment of the Inter-Ministerial Road Safety Forum in October 2003, under the leadership of the MPS.
2. Introduction of the Road Traffic Safety Law in May 2004, in accordance with the TA recommendations.

TA: Road Safety Improvement (2005 – 2008, US\$ 1.5 million: ADB: US\$ 625,000, GRSI: US\$ 375,000, and MPS: US\$ 500,000)

The TA is to: (i) implement the NRSRP components through policy and institutional reforms in a “model province”⁸³ to show the benefit of road safety improvement, (ii) formulate an action plan capable of being monitored to replicate these initiatives in other provinces and (iii) develop a national road safety investment plan to advance national implementation of the NRSRP.

2. The World Health Organization (WHO)

The WHO received a global mandate from the United Nations on road safety in 2004. It is active in two areas: emergency rescue and treatment, and road traffic accident prevention.

In China, the WHO has been active in both areas. Road traffic accident prevention was approached from the broader perspective of injury prevention.⁸⁴

Main National Partners

The WHO works with the following national partners on road safety:

Emergency Rescue and Treatment

- The Department of Medical Administration, Ministry of Health (MOH), Division of Medical Services.

Injury Prevention

- The Center for Disease Control and Prevention (CDC) of the Ministry of Health (MOH). In injury prevention, the CDC focuses on national surveillance (both for injury and death), research, education/training, and implementation of pilot-projects.
- The Bureau of Disease Control and Prevention, Division of Mental Health, of the MOH.
- The WHO Liaison Office of the Human Health Resources Development Center of the MOH, which is also active in education/training and implementation of pilot-projects. It is involved in the joint GRSP/WHO Drinking and Driving Project in Guangxi.

Scope of Intervention

Policies, Strategies and Performance Targets

The WHO emphasized the importance of developing a National Injury Prevention Strategy. Such a strategy is being prepared by the MOH in partnership with the WHO for the end of 2009.

The WHO organized a Multisectoral Road Safety Forum in partnership with the CDC in Beijing in June 2007 which was attended by national and international experts.

The WHO also organized an International Road Safety Forum for the Private Sector in Shanghai in November 2007 before the Michelin Bibendum Challenge. The objective of the forum was to define the role of large private sector companies in road safety and encourage such companies to become more actively involved.

⁸³ The ADB has selected Guangxi Province.

⁸⁴ Road traffic injuries account for roughly 25% of all injuries in China (*National Injury Prevention Report*, 2007, Ministry of Health).

Implementation Arrangements

Monitoring and Evaluation

The WHO supported the establishment of the injury surveillance system of the CDC. The WHO's "Guidelines for conducting community surveys on injuries and violence" (issued in 2004) were used by the CDC to develop the national injury surveillance system.

Interventions

The WHO took part in the following initiatives:

1. The Guangzhou Seatbelt Intervention Project, in partnership with the George Institute for International Health (2004 – 2006).
2. The Launch of the Chinese Version of *the World Report on Traffic Injuries*, in partnership with the World Bank, the MOH, the MPS, and the MOC (October 2004).
3. The National Training Workshop on the "TEACH-VIP"⁸⁵ Program, in partnership with the CDC (November 2004).
4. A Workshop on Road Accident Data Collection and Utilization, in partnership with the CDC and the MPS (September 2005).
5. Publication of the short report: *Turning the Tide, Injury Violence and Prevention in China* (2006).
6. The UN Road Safety Week (2007).
7. Supporting the preparation of the *National Injury Prevention Report* (2007, MOH).
8. The Drinking and Driving Project in Guangxi, in partnership with the GRSP (ongoing).
9. Launch of a National Data Collection Exercise on Injury and Death (2008). The CDC was selected to carry out the survey.

3. The Global Road Safety Partnership (GRSP)

The GRSP is active in China through the Global Road Safety Initiative (GRSI).⁸⁶ The GRSI focuses on the key road safety issues identified in the *World Report on Road Traffic Injury Prevention* (WHO/World Bank, April 2004). These include pedestrian safety, drinking and driving, helmet use, speed management, and seatbelt use.

Main National Partners

Since the start of its operations in China in 2005, the GRSI has worked closely with the following institutions:

- The Beijing Municipal Communications Bureau
- The Beijing University of Technology
- The Beijing Traffic Management Bureau
- The Traffic Management Research Institute of the Traffic Police (TMRI in Wuxi, Jiangsu)
- The Human Health Resources Development Center (HHRDC) of the MOH
- The Center for Disease Control and Prevention (CDC) of the MOH

⁸⁵ TEACH-VIP is a comprehensive injury prevention and control curriculum, comprising 60 lessons of 1 hour each. Extensively tested and receiving broad acceptance worldwide, TEACH VIP is available to all organizations wishing to teach injury prevention.

⁸⁶ The GRSI is a five year program (2005-2009) implemented by the GRSP and funded by seven of the world's largest automotive and oil companies (Ford, GM, Honda, Michelin, Renault, Shell, and Toyota). Since its inception, the GRSI has focused on ASEAN, China, and Brazil.

- The Nanning and Liuzhou Municipal Traffic Management Bureaus
- The MOC Highway Research Institute (HRI)
- The Institute of Comprehensive Transport (ICT) of the National Development and Reform Commission (NDRC)

Scope of Intervention

Policies, Strategies and Performance Targets

The GRSI supported the ADB Road Safety Improvement TA (2005 – 2008).

Implementation Arrangements – Monitoring and Evaluation

All GRSI projects are built in two phases:

- Phase 1: situational study: understanding the nature and the extent of the problem.
- Phase 2: intervention program based on the findings of Phase 1 and setting precise targets for results.

Interventions

Improving the Safety of Vulnerable Road Users (VRUs) at Junctions

The project targets the safety of vulnerable road users (VRUs) at junctions in Beijing. According to local traffic police data, 45% of crashes in Beijing involve this road user group. The initiative aims to identify the nature of problems faced by VRUs at junctions in urban areas and then design, implement and evaluate improvements.

Two workshops were held in 2006 as part of the project. The first workshop focused on enhancing the relevant knowledge and skills of the project team. The second workshop was a high profile event entitled “Improving the Safety of Vulnerable Road Users (VRUs) at Intersections” held in Beijing in December 2006. The workshop focused on bringing together representatives of diverse disciplines to discuss road safety issues in China, share international good practice, and increase awareness about the importance of improving the safety of VRUs at urban intersections.

Six intersections were selected for improvement. Upon completion of the project, the selected junctions will be used to demonstrate road safety improvements to professionals and to the general public. In addition, the project team will produce a practice manual for VRU safety at junctions in urban areas.

The Drinking and Driving Project

The GRSI is carrying out a major project on drunk-driving in partnership with the WHO, the MOH, and the Traffic Police in the cities of Nanning and Liuzhou (the two largest cities in Guangxi Province). The goal of this four-year project is to understand the actual scale of the problem of alcohol impaired driving in these two cities and introduce targeted and appropriate measures to reduce the incidence of drinking and driving in these pilot cities.

The Speed Management Project

This two-year project (2008 – 2009) is being jointly prepared by the GRSI and the MOC Highway Research Institute. One of the objectives of the project is to translate the *Speed Management Manual*⁸⁷ into Chinese. Another objective is to focus on three selected road sections: an expressway and a Class 2 road in Guangxi, and an urban road in Beijing. The pilot program will identify and analyze factors causing accidents with a special focus on speed management, including: road user behavior, vehicles, and road infrastructure.

The Project on Road Traffic Safety on Children and Youth in China

This project is still at the preparation stage. It will be implemented in the Cities of Harbin and Guangzhou. It focuses on child road traffic injuries (RTI) with an aim to:

- Reduce child road traffic injuries;
- Recommend key legislation and national standards on child safety to the Chinese Government;
- Raise public awareness on child safety;
- Work with local authorities to enforce child safety measures;
- Encourage vehicle manufacturers to improve vehicle safety for children.

4. The United Nations Children's Fund (UNICEF)

UNICEF is active in the field of child injury prevention, dedicating an annual budget of US\$ 450,000, of which US\$ 100,000 come from the Private Sector.⁸⁸

Main National Partners

Its main national partners in road safety are:

- The National Working Committee for Children and Women (both at the national level and at the provincial/local levels) under the State Council.
- The Center for Disease Control and Prevention (CDC) of the MOH.
- The Bureau of Disease Control and Prevention of the MOH.

Scope of Intervention

Policies, Strategies and Performance Targets

UNICEF maintains an ongoing dialogue with the Chinese Government on safety indicators and standards at the national and provincial levels. This dialogue has been successful as the indicators of the *Beijing Injury Survey* have been integrated into the list of health indicators to be monitored during the current Beijing Municipal Five-Year Plan.

⁸⁷ Jointly published by: GRSP, FIA, and the World Bank.

⁸⁸ Suzhou Chint Enterprise Development Co. (a Chinese firm) and Aston Martin.

Interventions

Pilot-Programs

UNICEF implements pilot-programs in partnership with the MOH that promote safe homes, safe schools, and safe communities in various municipalities and provinces across China.

Research

UNICEF has recently carried out two major studies on child injury in China:

- The Beijing Injury Survey – Child Injury Report (September 2004)
- The Technical Report on Child Injury (May 2007)

5. PSA Peugeot Citroen

75% of the Chinese car market is held by foreign manufacturers. PSA is the second largest⁸⁹ European vehicle manufacturing group. Its corporate social responsibility (CSR) activities are focused on: (i) urban mobility, (ii) environment, and (iii) road safety.

Over the past 14 years, Citroen has produced and sold 600,000 vehicles in China through its joint venture: Dongfeng Citroen Automobile Company (DCAC). In 2005, the group held 4.5% of the Chinese new passenger vehicle market with 140,400 units sold (9th place). It has a strong presence in Hubei Province with two major plants: one in Wuhan for car manufacturing and one in Xiangfan for mechanical components.

Main National Partners

PSA has worked with the following national partners:

- The Center for Disease Control and Prevention (CDC) of the MOH
- The Beijing Traffic Engineering Association
- The Chinese Association for Science and Technology of the Ministry of Science and Technology (MOST)
- The Beijing Chinese German Safe Driving Technology Development Company
- The Chinese media

Scope of Intervention

Interventions

Hubei Road Traffic Safety Training Center

PSA is supporting the World Bank Road Traffic Safety Training Center in Hubei Province by providing equipment and experts to be used for training.

⁸⁹ By sales volume.

Awareness Raising

National Discussion Groups on Road Safety – 2004 - 2007

Between 2004 and 2007, PSA led road safety discussion groups across China. The groups organized regular meetings with national and international road safety experts. Journalists and local authorities were invited to join. The objective was to raise awareness of the road safety issue at the national level through the media. This effort has produced results and the media are more aware of safety issues and have increased communication and awareness accordingly over the last three years.

International Symposium on Road Safety – 2005

PSA organized an International Symposium on Road Safety in Beijing in partnership with the CDC and the Beijing Traffic Engineering Association on June 28, 2005.

Children Road Safety Campaign – 2005 (PSA: US\$ 100,000)

This campaign was conducted in partnership with the CDC and the media. 200,000 booklets were distributed.

The Road Safety Chain of Life Contests – 2008 (PSA: US\$ 200,000)

PSA sponsors three national road safety contests organized by the CDC, including:

1. road safety poster;
2. road safety TV spot;
3. road safety radio interview.

Road Safety Exhibition – 2008 (PSA: US \$200,000)

In June 2008, PSA launched a Road Safety Exhibition at the National Museum of Science and Technology. It is targeted at children and focuses on traffic rules, accident prevention, emergency rescue, etc.

The Road Safety Caravan – 2008 (PSA: US \$150,000)

This initiative is being carried out in partnership with the Beijing Chinese German Safe Driving Technology Development Company. It is aimed at teenagers and focuses on driving lessons.

6. Michelin

Michelin, through its three brands, Michelin, Warrior, and PF Goodrich, holds 20% of the Chinese tire market for passenger cars. CSR is an integral part of the company's values, processes and objectives, focusing on sustainable mobility. Safety is one of the priorities. Michelin is also one of the seven companies supporting the GRSI.

Main National Partners

Michelin has worked with the following national partners:

- The National Road Traffic Safety Association

- The Beijing Public Transport Company
- The Association for the Transport of Dangerous Goods
- The Chinese media

Scope of Intervention

Policies, Strategies and Performance Targets

The 2004 and 2007 Bibendum Challenges

The Bibendum Challenge, created by Michelin in 1998, is a concerted effort by pre-eminent leaders in the automotive world including vehicle manufacturers, technical partners, energy suppliers, and institutes, to provide political and economic decision makers, as well as opinion leaders, with insight and in-depth understanding on the latest advanced vehicle technology to help achieve a more fuel-efficient, cleaner, safer and freer-flowing road mobility.

The 2004 and 2007 Bibendum Challenges were held in Shanghai with the support of the Chinese Ministry of Science and Technology (MOST), the State Environmental Protection Administration (SEPA), the National Development and Reform Commission (NDRC), and the Shanghai Municipal Government.

In November 2007, just before the Bibendum Challenge, Michelin sponsored the WHO's *Global Road Safety Forum*. The objective of the Forum was to define the role of large private sector companies in road safety and encourage such companies to become more actively involved.

Action Plan for Truck Overloading

Truck overloading has been identified by Michelin as a key safety issue in China. The group has collected information on this issue through its network of retailers. It has developed a draft Action Plan for the Private Sector and would be ready to discuss it with representatives from the main transport companies and with the Chinese Government.

Interventions

The GRSI Drinking and Driving Project (Guangxi)

Michelin China is financing part of the second phase of this project. The goal of this four-year project is to understand the actual scale of the problem of alcohol impaired driving in the two largest cities in Guangxi (Nanning and Liuzhou) and introduce targeted and appropriate measures to reduce drinking and driving in these pilot cities.

Awareness Raising

The "Michelin Driving School" Project

In 2007, the "Michelin Safety Brochure" was distributed to five driving schools in three cities: Beijing, Shanghai, and Shenyang. Around 70,000 new drivers were reached.

The Michelin Safety Club

In 2006, Michelin China developed 13 standard TV spots focusing on tire safety, overloading, road safety rules and regulations, and fuel savings. These spots were compiled into a CDROM entitled the “The Michelin Safety Club”. The company spent substantial financial resources in 2006 and 2007 to broadcast these spots in the Chinese media.

The Shanghai Traffic Safety Brochure

In 2005 and 2006 Michelin launched a series of activities on “traffic safety” in cooperation with the Shanghai Traffic Police Bureau and the Shanghai Communications Bureau. One of the activities was the preparation of a *Traffic Safety Brochure* for the Shanghai Traffic Safety Day on May 5, 2006.

The Guiyang Yellow Cap Campaign

This initiative was conducted in partnership with the National Road Traffic Safety Association in Guiyang (Guizhou). 300,000 Yellow Caps were distributed to primary and middle school students to increase their visibility on the roads and reduce the risk of accidents.

Products

The Beijing Municipal Bus Fleet

In 2006, the Beijing Public Transport Company elected to equip its buses with Michelin’s radial tires and replace bias tires. As a result, the company’s tire default rate dropped by 80% and both safety and energy savings were achieved.

Besides Beijing, Michelin also provides tire services for Tianjin, Zhengzhou, Dalian, Hangzhou, and Xiamen Bus Companies.

Services

The Sui Ni Xing Initiative

This initiative was launched in March 2006 and is targeted at passenger cars. For every two tires purchased, Michelin provides 24 hour roadside assistance, free puncture repair, quality warranty, and exclusive customer services. This service covers more than 200 cities nationwide. This initiative is the most comprehensive after-sales service on the Chinese market. Customers are given the *Michelin Road Safety Brochure* upon extension of the service for an additional year. The company celebrated its 500,000th customer in April 2008. This successful initiative is expected to be developed for trucks.

The Community Tire Checking Initiative

This initiative was launched in August 2005 through the “TirePlus Service Network”. Michelin provided free checkpoints within community areas to check tire pressure. This initiative was carried out in 41 cities, including Beijing, Shanghai, and Guangzhou, and reached more than 20,000 vehicles.

Safety Training Programs for Retailers

Michelin is the first tire manufacturer to provide extensive training programs to retailers and large fleets in China. Each year, the Michelin Beijing Training Center receives over 750 retailers. Every two years, the company organizes a national training program for its customers.

7. The Beijing Chinese-German Safe Driving Technology Development Company (CGSD)

CGSD was founded in 2004 as the first sino-foreign joint-venture in the field of road safety between the Highway Research Institute of the Ministry of Communications (HRI) and the German firm Degener Lehrmittel GmbH. The company's engagement in China is strongly supported by the Governments of China and Germany.

CGSD is committed to improving road safety, focusing mainly on the following areas: driving education and training, the professional transport industry, and road traffic management.

CGSD conducts customized training programs for public and private partners, aiming at raising drivers' skills in safe driving, and promoting brand and product marketing through transport-related social responsibility campaigns.

Main National Partners

CGSD has worked with the following national partners:

- The Highway Research Institute of the Ministry of Communications (HRI)
- Provincial/Municipal Communications Departments/Bureaus
- The Professional Transport Industry
- Municipal Traffic Police Bureaus

Scope of Intervention

Interventions

Development of Road Safety Guides/Handbooks

Development of the following Road Safety Guides/Handbooks:

- Safe Driving Guide(s) for Learner Drivers
- Taxi Operation Safety Handbook
- Taxi Handbook (special version for the Olympic Games in Beijing)
- Training Manual for Beijing Taxi Drivers (including handicapped drivers)
- Training Book for Professional Drivers (both for passenger and freight transport)
- Training Book for Shaanxi Province Road Transport Managers
- Manual for Safe Driving (with a focus on oil transport)
- Safety Awareness Handbook for Children

Training Courses for Private Transport/Logistics Companies

Fleet Management Training

In cooperation with provincial/municipal communications departments/bureaus, CGSD organized and conducted fleet management training programs for more than 2,500 fleet managers of logistics companies in 12 different cities in year 2008. CGSD training focused on: road safety, modern fleet organization, effective business development, and safe and sustainable fleet operation.

Transport of Dangerous Goods (with a focus on Oil Transport)

Training of more than 1,800 fleet managers on professional/safe driving in the oil transport industry.

2008 Olympic Games: Training of Beijing Taxi and Bus Drivers

CGSD delivered a series of “train-the-trainers” programs where more than 3,500 fleet managers and trainers of Beijing Taxi and Bus Companies were trained. CGSD also developed customized and efficient driver training programs and softwares.

Driver Training Programs for Various Companies/Institutions

Delivery of driver training programs for various companies/institutions including: Volkswagen, Allianz, the German Chamber of Commerce, etc.

Awareness Raising

The Road Safety Caravan (2008)

This initiative is being carried out in partnership with PSA Peugeot Citroen. It is aimed at teenagers and focuses on driving lessons.

Organization of Various Children-related Road Safety Events

8. The George Institute for International Health

The George Institute for International Health seeks to improve global health through undertaking high quality research and applying this research to health policy and practice. The Institute is a legally independent, not-for-profit institution, affiliated with the University of Sydney, Australia.

China has always been a focus of the Institute’s health research, due to its enormous population and the health challenges it faces in becoming one of the world’s leading economies. The Institute has developed projects in the following areas: cardiovascular diseases, injury prevention, neurological and mental health, nutrition and lifestyle.

In 2006, The George Institute’s China Program was established as a formal legal entity - The George Institute, China. This significant change in status reflects the Institute’s continued commitment to working in China and in particular, its commitment to building local capacity.

Main National Partners

Its main national partners in road safety are:

- The Guangzhou Municipal Traffic Police Bureau
- The Traffic Management Bureau of the Ministry of Public Security
- The Ministry of Health
- The Beijing Chinese German Safe Driving Technology Development Company
- The Beijing University of Technology

Scope of Intervention

Implementation Arrangements – Monitoring and Evaluation

The Guangzhou Seatbelt Intervention Project (US\$ 430,000)

The George Institute initiated the *Guangzhou Seatbelt Intervention Project* in partnership with the Guangzhou Municipal Traffic Police and BP China. The WHO and the Traffic Management Bureau of the Ministry of Public Security were consulted during project preparation and implementation.

The project involved the implementation of an intervention that comprised health promotion (including social marketing and health education), training and enhanced traffic police enforcement, with the aim of increasing the prevalence of seatbelt use for drivers and front seat passengers in Guangzhou. The intervention was evaluated using a comparison group pre-test post-test design which also included an extensive cost effectiveness evaluation.

Following the 12-month intervention period, the prevalence of seatbelt use increased significantly, from 50% to 62% in the intervention city. Based on the increased use of seatbelts observed as part of the intervention, the total number of Disability Adjusted Life Years (DALYs⁹⁰) saved as a result of the intervention was estimated at 530.

The intervention provided the government with the opportunity to build capacity in road safety and at the same time, provided information on the opportunity to target financial resources in order to reduce the burden of road traffic injury. The study also provided outcomes such as changes to police enforcement practice and comprehensive road safety communication strategies.

Interventions

Study on Non-Standard Motorcycle Helmet Use (China Study: US\$ 15,000)

This one-year study will be carried out in 10 countries to identify the prevalence of non-standard helmet use among helmet wearing motorcyclists and to assess the determinants of non-standard helmet use.

China Novice Driver Study (US\$ 133,000)

The study would review the current registry system for novice drivers and formulate recommendations on driver training. The study would likely comprise the following components:

- a review of the current system in China;

⁹⁰ See footnotes 5 and 14 p. 1 and 2 on DALYs.

- a review of practices from a few selected developed countries;
- an intervention phase which would use a comparison group (pre-test/post-test design) to illustrate the benefit of good practices.

Study on Trucks (estimated project amount: US\$ 100,000)

This study is under discussion. The objective would be to identify the main accident risk factors for trucks. The study would build upon a similar study carried out by the George Institute in Sydney. It would comprise the following components:

- a review of current standards, legislation, and accident statistics;
- a mapping of key risk factors (driver, vehicle, and road infrastructure);
- recommendations.

9. Safe Kids China

Safe Kids Worldwide is a global network of organizations whose mission is to prevent accidental childhood injury, a leading killer of children. It is sponsored by Johnson & Johnson, General Motors-Chevrolet and Federal Express. Safe Kids combines several factors to create programs that reduce injuries. The China office opened in 1999 with an annual budget of about US\$ 250,000.

Main National Partners

Its main national partners in road safety are:

- The Center for Disease Control and Prevention (CDC) of the MOH
- The Bureau of Disease Control and Prevention of the MOH
- Municipal Traffic Police Bureaus

Scope of Intervention

Interventions

Research

The Child Pedestrian Injury Survey in Three Cities

The survey was conducted in Beijing, Shanghai, and Guangzhou between 2000 and 2004 in partnership with Municipal Traffic Police Bureaus and the China CDC. Data from the police and hospitals were reviewed. The survey measures the magnitude of child pedestrian injury and provides key recommendations for prevention.

Education/Awareness Raising

The Walk This Way 2005 Campaign

On April 12, 2005, Safe Kids China launched the *Walk This Way 2005 Campaign* in Beijing. Volunteers, including 25 FedEx employees, taught 350 primary and middle school students about passenger safety. The campaign reached 30,000 primary and middle school students in Shanghai, Beijing, and Guangzhou. It was supported by the CDC and the Ministry of Public Security.

FedEx-BMW Williams F1 Team Day

This event was held on September 27, 2004 in Shanghai in partnership with the Traffic Police on the theme of "speed and safety for bicyclists". Cycling activities were organized for primary and middle school students.

The Huamu Community Pilot Project

Huamu is a community of Shanghai. It comprises 9 schools: 5 primary schools and 4 middle schools.

The pilot project started in January 2008. It includes three major components:

- A Community Needs Assessment. A needs assessment helps program planners to determine populations with an increased risk for injury, and measures gaps in resources needed to adequately address factors related to the occurrence of injuries. Most importantly, completing a needs assessment can help determine if there is a true need for a particular program in a community.
- A Walkability Check, consisting of 5 questions to children: (i) Did you have enough room to walk safely? (ii) Was it easy to cross streets? (iii) Did drivers behave well? (iv) Was it easy to follow safety rules? (v) Was your walk pleasant?
- A "Photo-Voice" project for children. Children were asked to take pictures of dangerous areas in their community and write a few lines.

This project will be extended to 6 districts in Shanghai by the end of 2008.

The School Road Safety Education Project

This program is ongoing and targets 800 schools in 9 cities. It is targeted at children aged between 6 and 12 years. It was initiated in 2004 and is expected to continue in the coming years. Safe Kids developed a 30 page road safety training brochure for children. It includes case studies and tests, as well as a presentation and a film. The electronic version of these materials is available in a CDROM. The program is designed for 2 classes of 45 minutes per year. It also includes a Walkability Check. Every year, Safe Kids receives feedback from teachers and adjusts the training accordingly. Since 2004, the program has been implemented in 2,000 schools and 1 million primary and middle school students have been reached.

Annex 13: The Proposed Urban Road Safety Project in Guangzhou

Meeting on Wednesday, April 30, 2008 with the Guangzhou Traffic Police:

- Mr. Wu Guanghui, Guangzhou Traffic Police Bureau, Director;
- Mr. Bu Yongqiang, Guangzhou Traffic Police Bureau, Safety Education Division, Division Chief;
- Mr. An, Guangzhou Traffic Police Bureau, Technology Division, Division Chief.

Component 1: Integrated road infrastructure planning, construction and management system (road safety would be a major focus)

The Guangzhou Traffic Police would appreciate acquiring international good practice on how to design, build and operate roads more safely, and have individuals from the different agencies involved in these three different stages (namely Design Institutes/Firms, the Municipal Construction Bureau, and the Traffic Police) work together from the beginning of a project.

The Traffic Police have to handle the management of roads that were designed and built by other agencies that have a limited operational knowledge of traffic management and road safety. To improve road safety, the Traffic Police can suggest remedial measures (like blackspot treatment, improvement of traffic safety facilities, etc) to the Vice-Mayor in charge of the Municipal Road Safety Council who then decides if such investments should be undertaken or not. But this approach is costly and only remedial.

Component 2: Road User Education Program

The Guangzhou Traffic Police indicated a preference to reach pedestrians (mainly the weak: young and old people, with an emphasis on children and middle/high school students), but appeared willing to consider any Road User Education Program.

Component 3: Introducing high-tech equipment (e.g.: radars, breathalyzers, ambulances, etc), and associated good practices from developed countries

The Guangzhou Traffic Police have identified speeding and drunk-driving as the cause of a significant number of accidents. They would appreciate it if developed countries could assist with (i) advanced technology and equipment, and (ii) accompanying good practices on how to check speed and alcohol levels. They also discussed ambulances and the possibility of the health sector joining the project.