Traffic Safety Situation in China

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RESUME

Le présent article a analysé les principaux caractères des problèmes de sécurité des routes en Chine et les principales causes qui ont entra né les accidents fréquents de circulation des routes en Chine, a présenté aussi les mesures prises par l'Etat au niveau supérieur et les perspectives futures.

Texte en anglais

1. OVERVIEW

In the past fifteen years, China has witnessed booming traffic industry. As of the end of 2005, China's mileage of highways had amounted to 1,930,500km.The expressways were newly developed and their existing traffic mileage is up to 41,005km, in the second place globally; the rural highway construction has achieved historic breakthrough with county and township highways of 1,475,700km (490,000km for county highways and 980,000km for township highways) and village highways of 1,540,000km. In accordance with the National Expressway Network Planning and the National Rural Highway Construction Planning, China will construct the national expressway network with total mileage of 85,000km and the rural highway network with total mileage of 3,700,000km in the forthcoming fifteen years approximately. At that time, expressways and highways will play a more important role as fundamental guarantee in China's economic and social life.

With the rapid development of economy, China's motorization has become a necessary trend. By the end of 2005, the tenure amount of motor vehicles had reached 130 million. Yet in company with the speedy development of economy and society and motorization progress is increasingly severe road traffic safety situation. Figure 1 shows from 2001 to 2004, China's fatalities from road traffic accidents was kept over 100,000 persons per annum for four continuous years, and the fatalities fell down below 100,000 persons in 2005 but it was still in severe level. China is confronted with rigorous traffic safety situation.

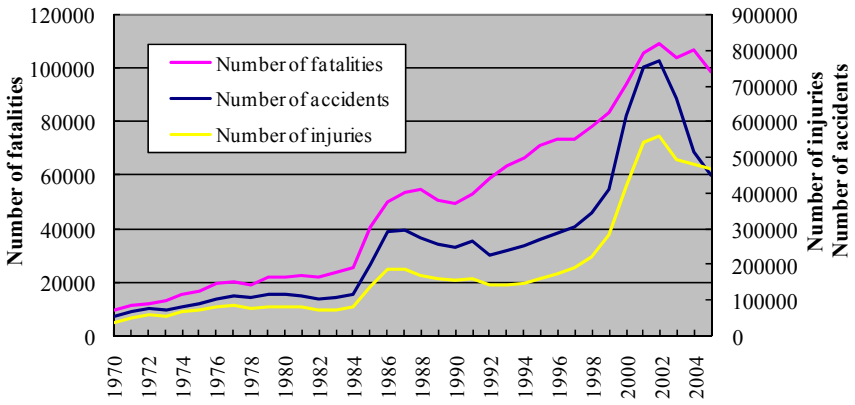

Figure 1 - Traffic Accident Increase (1970-2005)

2. MAJOR FEATURES OF ROAD TRAFFIC SAFETY PROBLEM IN CHINA

The major features of the road traffic safety problem in China are mainly indicated in the following aspects:

2.1 High number of fatalities from traffic accidents, high fatality rate

China's fatalities from road traffic accidents have ranked first in the latest ten years and it is increasing at a high percentage. The number of fatalities from traffic accidents in China has occupied over 10% of that in the world while the tenure amount of motor vehicles in China accounts for only about 2% of that in the world, and the road traffic mileage in China accounts for only about 6% of that in the world.

China suffers high fatalities per accident. There is one death for every five traffic accidents in China (see Table 1). Taking the fatality rate per 10,000 vehicles as an example, China suffered a fatality rate as high as 9.93 in 2005, several fold of that in other countries.

Table 1 - Comparison of Number of Road Traffic Accident with One Death between China and Other Countries (Year 2004)

Country	Total number of traffic accidents	Number of fatalities	Number of traffic accident with one death
USA	6181000	42636	145
Germany	2261689	5842	387
Ireland	22306	374	60
Japan	952191	7358	129
China	517889	107077	5

2.2 Traffic accidents mainly occurred in class 2 and class 3 highways.

Table 2 indicates China's mileage of class 2 and class 3 highways and relevant accident conditions as of the year end of 2005, of which the mileage of class 2 and class 3 highways accounted for 30.7% of the total mileage of highways while their accident amount and fatality accounted for 60% and 61.9% respectively of that of all highway accidents in that year. So it can be concluded that class 2 and class 3 highways (two-lane highways) suffers bad safety condition.

Table 2 - Percentage of Mileage of Class 2 and Class 3 Highways and their Accidents (Accounting for Total Highway Accidents %)

Class of highway	Number of accidents	Number of fatalities	Traffic mileage
Class 2	34.1	36.2	12.8
Class 3	25.9	25.7	17.9

Source:[1],[2]

2.3 Expressways are confronted with severe traffic safety situation.

From 1994 to 2005, China's expressway traffic mileage had an annual average rate of increase of 70.53%. In the same period, the expressway's traffic accident amount, fatalities and injuries had the annual average rate of increase of 83.25%, 77.48% and 76.30% respectively. As of the end of 2005, the expressway traffic mileage accounted for 2.12% of the national total mileage of highways, while the traffic accidents occurred on expressways in the full year had led to 6,407 deaths, accounting for 8.35% of the total fatalities from road traffic accidents.

China is suffering high expressway traffic fatality rate. Japan has kept a fatality rate about two persons per 100km expressway in the last five years, while in the same period, China had a fatality rate of eight persons per 100km expressway, four times of Japan's. China's expressways suffer high fatality risk (percentage of fatality accounting for traffic casualties). China had an expressway traffic accident fatality risk of 29% in 2004 while Japan had kept constant 2% in it.

In China, the traffic accident rate of the expressway is far higher than that of average highway. The expressway features good alignment, high quality road surface, complete enclosure, no disturbance of pedestrians and slow vehicles, and complete traffic safety facilities, so theoretically the expressway should have less accident amount than other types of roads, which is also proved in many countries (see Figure 2). While just on the contrary, the expressway has higher accident rate than average highway in China.

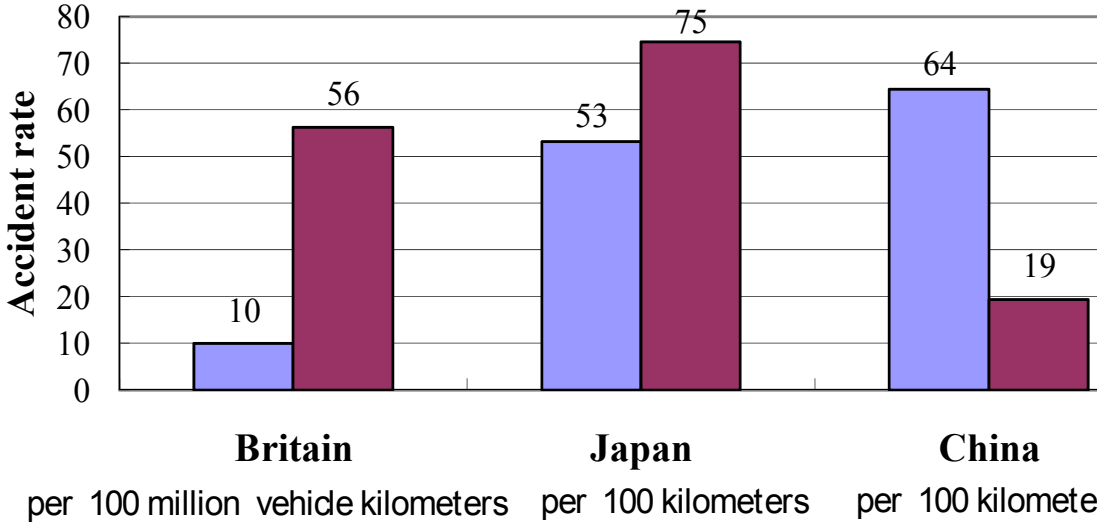

Figure 2 - Comparison of Accident Rate of the Expressway with Other Roads or Average Highway

2.4 Rural highway traffic safety problem is brought to the fore.

According to the statistics of the Ministry of Public Security[1], there were 101,757 traffic accidents occurring in county highways and township highways throughout the country in 2005, which had led to 23,707 deaths, which accounted for 22.6% and 24% of the national road traffic accident amount and fatality respectively. Rural highway traffic safety problem has been brought to the fore.

Farm vehicle accident is serious. In 2004, the number of fatalities from the traffic accidents caused by farm vehicle accident was 11,270 persons, accounting for 10.53% of the national traffic accident fatalities. Most of agricultural vehicles such as transport vehicles, animal-drawn carts, tractors are running on rural highways.

Serious mass injuries and mass fatalities occurred in rural highways. In recent years, the number of severe traffic accident with 10 fatalities at least in rural highways keep high. In 2004, the critical traffic accidents with fatalities over 10 per accident in rural highways led to 361 fatalities and 877 injuries in total, accounting for 42.37% and 36.94% respectively of the total amounts. In 2005, there was a reduction of 15 critical traffic accidents in rural highways than 2004, yet the percentage was still as high as 15%.

Farmers and farm workers have become the major group of victims of traffic accidents. The number of farmers and farmer workers who died of traffic accidents has kept over 20,000 persons per year since 1998, and it tends to rise in general. In 2005, traffic accidents had led to 28,035 fatalities and 107,792 injuries of farmers and farmer workers in

total in China, accounting for 28.4% and 22.9% of the total fatalities and total injuries respectively. It means that there is one farmer or farmer worker every three fatalities of traffic accidents.

2.5 Traffic participants' illegal behaviors are the primary cause of traffic accidents.

Taking the year 2005 as an example, motor vehicle drivers caused 417,355 accidents throughout the country and led to 91,062 fatalities, accounting for 92.7% and 92.2% of total accident amount and total fatalities respectively. The mistake of non-motor vehicle drivers, passengers and pedestrians led to 20,090 traffic accidents and 4,207 fatalities, which accounted for 4.5% and 4.3% of total accidents and total fatalities respectively. The human's illegal behaviors led to 437,445 traffic accidents and 95,269 fatalities, accounting for 97.2% and 96.5% respectively. The traffic participants' illegal behaviors have become the major factor that led to China's traffic accidents.

3. ANALYSIS ON THE LEADING CAUSES FOR ACCIDENT-PRONE ROAD TRAFFIC IN CHINA

The inharmonic traffic system elements among human, vehicle and road have led to the accident-prone traffic.

3.1 Severe mixed traffic

In recent years, China has seen rapid increase of tenure amount of motor vehicles, yet in aggregate, China is still in low motorization level. Cars, bicycles, motorcycles and pedestrians usually have to use the same road in mixed state, which is very prone to cause traffic accidents. The economic development and change of land use along highways have intensified this unsafe status. Arterial highways passing through villages and towns usually have potential safety hazards of mixing of motor vehicles and non-motor vehicles, pedestrians passing across roads in the sections of villages and towns. The severe mixed traffic makes the largest difference between China and other countries, and it is also the substantial cause that leads to the accident-prone China road traffic.

3.2 The insufficient traffic safety awareness of road users

The road users still know insufficiently with road traffic safety and they are lack of the sense of the traffic safety.

These years have witnessed ascending number of newly licensed drivers accompanying the arrival of cars held by families, and the drivers of motor vehicles are in great irregularity of capability. It is very common to see driving without a driver's license, driving of unregistered vehicle, speeding and overload, intoxicated driving, fatigued driving, illegal carriage of passengers in a wagon, going through a red light, etc. The traffic accidents caused by the factor of driver have accounted for 91% of accident amount. Besides the drivers of motor vehicles, the pedestrians, cyclists and other traffic participants also have poor traffic safety awareness. It is very common to see their legal traffic behaviors, for example, they don't walk on non-motor road, go through a red light, pass across a road and enter expressway. The illegal behaviors of traffic participants have become the major cause of road traffic accidents in China.

3.3 The vehicle performance is incapable of matching the roads well.

In general, China-made vehicles, especially wagons are on the low side of performance. The poor vehicle performance leads to the poor matching of vehicles with

roads, which has led to the accident proneness of road traffic accidents and aggravated the consequence of traffic accidents in a certain extent in China.

With the improving rural road traffic and the growth in the living standard, more and more motorcycles, three-wheeled motor vehicles, small-sized four-wheel trucks are used by farmers for traveling and production. It is reported that there had been over 22.32 million three-wheeled motor vehicles, slow speed trucks, tractors under the management of public security organs and farm machinery authorities as of the end of 2005, and the number accounted for nearly 17.12% of the national tenure amount of motor vehicles (130 million vehicles); the tenure amount of motorcycles summed to over 75.56 million, accounting for 57.95% of the national tenure amount of motor vehicles. These vehicles have relatively low safety factor while they are most popular in the rural market, which constitutes a potential hazard in the traffic safety of rural highway. Owing to the low purchasing power of the rural, some illegally assembled vehicles and discarded vehicles in cities have flowed to the rural market in considerable amount. These motor vehicles can't give any guarantee on safety feature. And the lagging short distance passenger transport in the rural has forced farmers usually to take a three-wheel motored vehicles tractor or motorcycle, etc. which makes some market space for illegal carriage of passengers for wagons in the rural area to some extent, and leads to the increase of possible severe traffic accident with mass deaths or mass injuries.

3.4 Road construction, operation and management, etc. fail to keep up with the actual requirements.

According to the statistics of the Ministry of Public Security, the traffic accidents caused by road factor accounted for only 0.06% in 2005[1]. Yet usually traffic departments are prone to attribute to the factor of human because they give paramount consideration to the liability division of traffic participants. Considering this fact, the percentage that road factor should account for a higher percentage in the traffic accident amount actually. In fact, sound road conditions can give effective reduction of the occurrence probability of traffic accidents, vice versa.

So far China still has low percentage of high grade highways and the vast majority of its highways are below class 2 in technical grade. Taking the year 2005 as an example, the highways below class 2 accounted for 84.1% of total highway mileage. Restricted by the original construction concept and construction capital, these highways were not sufficiently stressed on traffic safety and suffer low standard, poor road condition and severe potential safety hazard.

As far as roads are concerned, traffic safety is still neglected in some road construction for the restriction of landform and funds.

4. GOVERNMENT ACTIONS

The rigorous road traffic safety situation has aroused the considerable stress of the Chinese government. Since 2004, Law of the People's Republic of China on Road Traffic Safety and its implementing rules have been promulgated in succession, and followed by some industrial and local statutes on road traffic safety. And a series of measures have been taken to prevent road traffic accidents and made considerable achievements.

4.1 Establishing of national road traffic safety inter-ministerial joint conference system

National road traffic safety inter-ministerial joint conference ("joint conference" for short) was established in October 2003 upon the approval of the State Council for the purpose of strengthening the organization and leading on national road traffic safety work and integrating the strength of ministries. The joint conference is led by the Ministry of Public

Security and it consists of the Ministry of Public Security, the Ministry of Communications, National Administration for Supervision and Management of Safe Production, 15 ministries and administrations in total.

Under the leadership of the State Council, the joint conference grasps the national road traffic safety information, analyzes road traffic safety situation, makes a research on the relevant policies and establishes middle and long-term strategic planning; It makes a unified planning on research of national road traffic safety, arranges national road traffic safety, directs and supervises the road traffic safety work of the people's governments in the levels of the province, autonomous region and municipality and their functional departments; coordinates and solves road traffic safety problems of departments concerned, promotes inter-ministry coordination for information sharing, establishes long acting mechanism to prevent and reduce road traffic accidents and push road traffic safety work in its entirety.

4.2 Launching the publicity education project for road traffic safety

It is decided to carry out the traffic safety publicity education project with the subject of "protection of lives and safe transportation" throughout the country from 2006 to 2008 by Publicity Department, Ministry of Public Security, Ministry of Education, Ministry of Justice and National Administration of Work Safety in order to push traffic safety publicity education. It is aimed at establishing joint work mechanism for traffic safety publicity of organs on publicity, public security, educational administration, judicial administration, safety supervision in three levels of province, city and county through three years efforts. It will deepen traffic safety publicity and popularize traffic safety code and safety knowledge to enhance the traffic law concept and safety consciousness of drivers, students of primary schools and high schools, urban and rural residents, and the sampling percent of pass on traffic safety knowledge and the rate of abiding by traffic codes of the urban and rural residents will increase evidently; it will deepen the traffic safety education to drivers and other traffic participants, and those severe illegal activities such as driving without a driver’s license, fatigued driving, speeding, overload, intoxicated driving, passenger carriage of slow speed wagons and tractors, etc.

4.3 Implementing national highway safety enhancement project

In order to improve the service of low level road facilities wholly, and guarantee safe road traffic, the Ministry of Communications planned to spend three years in implementing the project of "highway safety enhancement" with the subject of "eliminating potential traffic safety hazards and cherishing our lives" in national highways and provincial highways throughout the country from 2004, and would rebuild the sections of national and provincial arterial highways on sharp curves, steep slopes, bad viewing range, danger roadside, etc. to improve the traffic conditions of countrywide roads. So far, a sum over RMB 6,700 million yuan has been invested in the project and approximately 230,000 potential traffic safety hazards were rebuilt and eliminated with accumulative mileage more than 85,000km.Viewing the actual effect, the number of road traffic accidents reduces averagely 90,000 cases per year and the annual average reduction of 5,000 fatalities since 2004; the road traffic environment is more safe and effective and the road traffic safety level is evidently improved. The Ministry of Communications has determined to guarantee the annual capital input in highway safety enhancement project in five more years on the basis of current three years implementation.

4.4 Conducting the rectification of vehicle overload

It is very common in China in recent years that road transportation vehicles are overloaded, which evidently does harm to traffic safety. According to statistics, seventy

percent of China's road safety accidents were caused by overloaded vehicles, and fifty per cent of critical or large road traffic accidents with mass deaths and mass injuries have direct relation with overload of vehicles. Overload also gives serious damage to road infrastructure.

The rectification of overload of transportation is an important basis for preventing road traffic accidents. According to the unified arrangement of the State Council, eight ministries and commissions including the Ministry of Communications, Ministry of Public Security and National Development and Reform Commission, etc. have taken economic, administrative, legal and technical measures to focus on the government of vehicle overload in the whole country from the aspects of publicity education, road surface execution of law, vehicle production and refitting, tonnage standardization, and issue of license plate, transportation market order, road toll policy, etc. and have made considerable achievements that the national vehicle overload rate dropped down to approximately 10% from former over 80%, an effective curb to vehicle overload.

4.5 Implementing the driver's qualification education project and strengthening transportation industry management

Drivers are the critical factor of road traffic safety. As the supervision authorities of driver training market, Ministry of Communications has launched driver education campaign with the core content of "civilized and safe driving". It places stress on improving trainees' correct driving concept and safety awareness while teaching them operating skills. It reforms driver training methods to enhance training effect and it also stresses on transportation industry management and the informatization management of practicing drivers; popularizes the driver’s electronic practicing certificate and establishes the information platform of practicing drivers. The statistics indicates that the percentage of fatalities in the accidents caused by drivers with less than three years driving ages reduced 7.6% in 2005 than that in the previous year. Of them, the accident rate of drivers with less than one year driving experience declined 16.1% than that in the previous year. The driver education campaign has made some phased effect and the overall quality of drivers is ascending stably.

4.6 Implementing forecast of meteorological disasters and emergency rescue

Safe and smooth road traffic transportation is increasingly suffering from unfavorable meteorological conditions such as fog, ice and snow, rainstorm; natural disasters such as debris flow, landslide and washout, and various carriage leakage of dangerous goods. In July 2005, the Ministry of Communications and China Meteorological Administration signed the Memoranda on Joint Development of Monitoring, Forecast and Alarming on Highway Traffic Weather, which is aimed at developing advanced warning method for arterial highways, weather information piloting strategy and issuing mechanism, establishing relevant emergency measures, information feedback and evaluation system to improve China's road safety enhancement and modernization of emergency management according to the most common meteorological disaster types of washout, fog damage suffered by China's roads and combining the forecast of large range strong rainfall and the fog monitoring along roads in flood season.

The Chinese government put forward the important subject of expediting the construction of emergency mechanism for public affairs in July 2003.In the second session of the 10th National People's Congress of 2004, it was proposed to establish emergency state law and strengthen accident emergency management. China's emergency response plans had basically been compiled in February 2005 and they include General Emergency Response Plan for National Public Emergencies, 25 special response plans and 80 response plans of departments. Road Traffic Emergencies Response Plan was compiled

under the organization of the Ministry of Communications and approved by the State Council among the emergency plans of departments; on the basis, we will make great efforts to give publicity education on the major contents of prevention, danger avoiding, self-aid, mutual aid and reduction of natural disasters, and keep enhancing the public 's sense of crisis and capability to save themselves and help with each other, which is the core work in the next stage.

4.7 Pushing new concept on highway survey and design

New highway survey design concept was put forward in the national highway survey design work conference in September 2004 and 15 highway survey design projects were designated to be demonstration ones. The new highway survey and design concept stresses on "human-oriented and vehicle-oriented" and is aimed at realizing the purpose of saving resources, protecting environment and promoting the harmonic state of highway construction with the nature by means of adopting standard indices in a scientific and flexible way.

4.8 Conducting fundamental researches on road traffic safety

The Ministry of Communications has organized and implemented a series of fundamental researches on road traffic safety, and a series of results have been get and put into application for the purpose of containing China's accident-prone road traffic situation and providing technical support for road traffic safety enhancement. So far, "The Research on the Applied Technologies for Road Traffic Safety" was conducted including the following items: technologies on the traffic safety enhancement in foggy region of expressways; safety of roadsides; technologies on safety enhancement of successive long and steep downhill highway sections; operation safety for highway tunnel entrances and exits; safety of highway intersections; setup of highway traffic signs and markings; traffic safety of forest and scenic highways; road traffic safety data base; road traffic safety manual, etc. In addition, the researches on road safety audit, setup of expressway speed limit sign, behavior and psychology of road users are also carried out.

4.9 Conducting international communication and cooperation on traffic safety

China stresses on learning the successful experience of developed countries in preventing road traffic accidents and has strengthened international communication and cooperation in the sector of traffic safety. China has conducted communication and cooperation with USA on roadside safety, with Sweden on road safety audit, with Netherlands on road safety design, with Germany on accident data acquisition, etc. with sound effect made. Furthermore, we have developed effective communication with some international organizations like World Bank, Asian Development Bank, International Road Federation (IRF) and PIARC. Ministry of Communications of the People's Republic of China and PIARC held the International Road Safety Seminar together with the subject of "exchanging road safety experience and constructing safe and easy roads" in October 2005, and road safety experts from 26 other countries participated it. Through international communication and cooperation, some advanced road traffic safety concepts have been accepted gradually by China's road traffic safety management and technical persons with considerable influence made.

5. PROSPECT

5.1 Pushing the establishment and implementation of China's road safety strategy

The strategy of road traffic safety has been established in many countries and regions. The road safety strategy works out the middle and long-term target of the road safety of a country or region from macroscopic aspect, and gives systematic analysis on the traffic safety of the entire road system and defines the major safety problems existed in the entire road traffic system, establishes relevant solutions and action plans, and gives monitoring and evaluation to ensure the realization of the road safety strategy.

Currently China has started researches on the analysis of road traffic safety situation, road traffic safety strategy and safety plan. The Chinese government has promised that "this government will realize the target that there is a significant reduction of road traffic accidents and casualties, from high accident rate to basic curb to the reduction year by year". The joint conference system for the national road traffic safety work has been set up, yet it is not an independent and powerful institution. It is still a problem that how to coordinate the forces in every direction to push China to establish, issue and implement road safety strategic plan in the existing system. Therefore, we need relevant international organizations and experts from other countries to put forward suggestions and impose influence in the level of the government to push the Chinese government to implement the strategic plan on road safety, and give technical supports to ensure smooth establishment and implementation of strategic planning.

5.2 Technical supports desired

In recent years, China has taken a series of measures to improve road traffic safety situation from every aspect involved in road traffic safety, and reduced the probability of occurrence of road traffic accidents remarkably and lessened the severity of road traffic accidents considerably. Yet there is no denying that China is still confronted with severe road traffic safety situation in comparison with other countries, and needs more efforts to relieve it. We have conducted some communication and cooperation with some countries and international organizations, yet we still wish to get some technical supports from international experts for some engineering technical problems we are concerned or existing specially in China.

These technical problems we desire to solve are stated as below:

(1) Traffic safety of successive long and steep downhill section. It is very common to see successive long and steep downhill sections in China's mountain highways for restriction of landform and road construction capital. In the condition that overloaded wagons are still relatively universal, the successive and long and steep downhill sections that lead to the reduction of vehicle brakeage and even invalidity are worsening the traffic safety. We are concerned that how to guarantee the traffic safety in successive long and steep downhill sections of highways.

(2) Traffic safety of large intersection. In recent years, some large intersections have appeared in the plain region of some developed provinces in eastern China and they have brought out some difficulties in traffic organization and some safety problems occurred meanwhile. What we are concerned most is what size of intersection do best to road safety, how to organize traffic in these large intersections in the condition of mixed traffic, and how to conduct safety design of intersections.

(3) Setup of guide sign system. The booming motorization has promoted the demand of self-driving. A scientific and effective guide sign system is the important guarantee for road users to position themselves and reach the destinations safe and sound with the help of traffic map as well. We are eager to know how to set up the guide sign system effectively and how to select the information for the guide signs and how to arrange a guide sign.

(4) Safety of tunnel traffic. As of the end of 2005, China had 2,889 highway tunnels with 1.527 million linear meters, of which 424 are super long and long tunnels with 791,000 linear meters. The tunnel of Zhongnanshan Mountain has been completed with total length of 18.02km.Long tunnels and groups of tunnels have brought challenges to the traffic safety of tunnels. We are concerned how to conduct the safety design of tunnels, how to guarantee the safety of entrance and exit section of tunnels and how to guarantee the tunnel operation safety.

(5) Safety of rural highways. China's rural highways include county highway, township highway and village highway that are divided by the administrative grade. China has enhanced the construction of rural highways in recent years. So far, the mileage of rural highways has exceeded 3 million kilometers, accounting for over 85% of the total highway mileage. We are concerned how to balance the safety demand of low traffic volume and investment of rural highways and what's the construction standard and safety standard for the construction of rural highways.

6. CONCLUDING REMARKS

Just as what are mentioned in the above, we have started effective cooperation with some countries and international organizations. We take cognizance that the smooth cooperation between China and foreign countries lie in necessary capital support and the operation of some research organization or operating mechanism that is on behalf of the government. And we also learn that communication and training is just the cooperation means in the primary stage and the cooperation in special project or engineering under the framework agreement of government cooperation is a much more efficient cooperation mode.

China is still confronted with severe traffic safety situation with its own characteristics and reasons. Its government and society have paid attention to them and taken a series of measures to solve them with some achievements made, yet China still has many to desire in the field. Looking ahead, we wish to push the government to establish and implement China's road safety strategy and wish our technical matters could get your attention and supports with more communication and cooperation made together.

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