HISTORY AND DEVELOPMENT OF ROAD SAFETY IN CHINA

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ABSTRACT
Road safety in China has made great improvements in recent years. The history of road safety in China is reviewed, including three stages. The characteristics of each stage are analyzed. The development of road safety in recent years is also analyzed. The changed road safety environments are analyzed, including fast economic development, fast increase of road mileage, rapid increase of motor vehicle ownership, and rapid growth of traffic volume. Although these bring the adverse effect to the road safety, road accidents in China significantly reduced, and accident rate and fatality rate significantly decreased. And the measures to improve road safety are listed.

While enjoying the convenience by road traffic, people are also exposed to road accidents. According to statistics of the Ministry of Public Security, from 1951 to 2011 (no statistics of road accidents in 1968 and 1969), China's total number of direct victims in road traffic accidents (don't include that of be applicable for the simple disposal procedure, except otherwise stated. Same below) reached to 11.0223 million people, of whom 2.3012 million died and 8.7211 million injured, shown in Figure 1. It seems that a super large city has disappeared under the wheels. Over the past 60 years, an annual average of 39,000 people died of road traffic and 178,000 injured.
THREE STAGE OF ROAD SAFETY

China’s number of road accidents was increased before falling down and can be divided into 3 stages: from the founding of new China to the beginning of reform and opening up, the total number of road traffic accidents was lower and increased slowly; since the reform and opening up, it increased rapidly and reached to the historical peak in 2002 with the total fatalities amounting to 109,381 and injuries to 562,074. After 2004, the number of road accidents has been declining year on year. Fatalities have similar changes with that of road accidents.

1.1 Early stage of China’s establishment - 1984

At the beginning of the new China, the combination of short road traffic mileage, absence of automobile industry and small number of 50,000 civilian vehicles led to a few number of road accidents and only several hundreds of fatalities. Since the 3rd Plenary Session of 11th Central Committee of CPC and with the implementation of the reform and opening up policies, national economy has developed unprecedentedly and road traffic mileage as well as motor vehicle population has been increasing in an unprecedented way, hence increased road accidents accordingly. Especially the opened road transportation market to individuals in 1983 and 1984, road safety has worsened (Zhang J., 2012).

The stage was the most rapid increase of road accidents with fatalities reaching from several hundred at the beginning of 1950s to over 25,000 in 1984 with an annual increase rate as high as 11.17%.
1.2 1985-2004
Opening transportation market to individuals and rapid increase of individual transportation vehicles have been positive to enhance material and fund exchange between urban and rural areas and alleviate transportation pressures. But un-advanced performance of individual vehicles and poor driving skills led to rapid increase of road accident. China’s roads in cities and rural areas were low in standards and poor in quality, and motor vehicle population was large, meanwhile the roads were under administration of multi-departments, to address this problem, the State Council decided to reform road management system in 1986 and put road transport under the unified management of public security departments. From 1987 to 1991, number of accidents was stable. After 1992, with the deepening of reform and opening up, rapid development of national economy, rapid increase of traffic mileage, and population of motor vehicles, road accidents have been growing fast and especially so after 1998. Number of accidents reached to historical high in 2002, and declined in 2003 and increased in 2004. During this period, China’s fatalities increased from 25,000 to nearly 110,000, an increase of 3.33 times and annual growth of 7.49%. It was the period when road accidents witnessed the most rapidly increase of absolute numbers.

To contain road accidents, Chinese government has taken a portfolio of targeted measures. With the establishment of National Inter-ministerial Joint Conference on Road Traffic Safety on October 22, 2003 and the implementation of the Road Traffic Safety Law of the People’s Republic of China on April 1, 2004 (Since 2004, according to the Road Traffic Safety Law of the People’s Republic of China, the statistics standards of road traffic accidents have changed greatly), China’s road traffic safety entered into a fresh new development stage.

1.3 2005 - present
With a series of policies and measures gradually taking effect, road traffic accidents in China went down quickly. China has successfully achieved the objectives of curbing high incidence and gradually reducing accidents, gradually improving road safety year on year. The five indicators including the number of accidents, the fatalities, the injured persons, the fatality rate per 10,000 registered vehicles, the fatality rate per 100,000 population showed a decline in varying degrees. In 2011, a total of 210,812 accidents happened, resulting in 62,387 people died and 237,421 people injured. In the same year, the fatality rate per 10,000 registered vehicles reduced to 2.78, and that of 100,000 population dropped to 4.66, respectively, registering at 58.26%, 49.37%, 45.11 %, 27.95% and 56.51% of 2004 respectively, shown in Figure 2.
During this period, the annual fatalities of road traffic accidents in China dropped from 107,000 to 62,000, a drop of 41.74% and average annual decrease of 7.43%. It was a period with the fastest decrease of road accidents. The fatalities in 2011 were equivalent to that of 1993. The decrease of the fatalities were made against the backdrop of fast economic development, fast increase of road mileage, rapid increase of motor vehicle ownership and rapid growth of traffic volume.

2 DEVELOPMENT IN RECENT YEARS

2.1 Fast Economic Development

With the further deepening of the reform and opening up, China's economy has maintained a high growth rate. China has witnessed the fast economic growth period since 2005 with GDP increasing from 15.99 trillion yuan in 2004 to 47.16 trillion yuan in 2011, registering an average annual growth rate of 16.71%, shown in Figure 3. The rapid economic development will inevitably bring about the growth in traffic demand which will directly or indirectly affect road traffic safety.
2.2 Fast Increase of Road Mileage
The rapid development of the economy and the continued growth of road traffic demand need fast, efficient, safe and convenient road network. Since 2005, China's road construction has maintained rapid growth momentum. Highway mileage increased from 1.87 million kilometers by the end of 2004 to 4.11 million kilometers (Since 2006, rural roads have been incorporated into highway mileage) by the end of 2011, and highway density from 19.49 km/hundred square kilometers by the end of 2004 to 42.77 km/one hundred square kilometers by the end of 2011, shown in Figure 4. The expressway mileage increased from 34,300 kilometers by the end of 2004 to 84,900 kilometers by the end of 2011. In the last seven years, the mileage recorded a net increase of 50,700 kilometers, an increase of 147.74% with an average annual growth of 7236.86 kilometers, and the expressway mileage continued to rank the second in the world and the national expressway network framework was basically formed. Mileage of rural roads increased from 1.42 million kilometers by the end of 2004 to 3.56 million kilometers at the end of 2011. At the same time, urban road mileage also steadily increased.
Figure 4: China's road mileage (2004-2011) (Source: Ministry of Transport, PRC, 2004-2011)

2.3 Rapid Increase of Motor Vehicle Ownership

With the rapid economic development and improvement of people's living standards, more and more households have access to the cars. Motor vehicle ownership has increased from 108 million at the end of 2004 to 225 million at the end of 2011, with an average annual growth of 11.06%, shown in Figure 5. As of the end of 2011, the number of vehicle per 1000 population was 167. Compared with some developed countries, China is still in a period of rapid growth of motorization. China has become the world’s largest automobile producer and sales market for three consecutive years. It can be predicted that with the rapid development of China's economy, the vehicle ownership will continue to maintain a high growth rate.
Figure 5: China’s motor vehicle ownership (2004-2011) (Source: Traffic Administrator Bureau, 2004-2011)

2.4 Rapid Growth of Traffic Volume
Strong transport demand has directly driven the increase of road transportation volume and traffic volume. Take the traffic volume of national highway network and expressway network which undertake major transportation task as examples. Compared with 2004, traffic volumes of the two networks in 2011 grew by 72.18% and 164.58% respectively, shown in Figure 6. Despite of big increase of traffic volumes, the congestion degree of the two networks don’t increase significantly due to the obvious achievements of two networks in recent years. In 2011, the average congestion degree of national highway network and expressway network was 0.42 and 0.31 respectively.
2.5 Road Traffic Safety Improved Greatly

Accident significantly reduced. The death toll of road traffic accidents in China in 2011 dropped to 62,000 people, 42.96% lower than the peak of 2002. Assuming that the fatalities remains consistent with the previous year, the number of deaths of road traffic accidents from 2005 to 2011 reduced by 44,690. In other words, due to the improvement of road traffic safety in China, from 2005 to 2010, nearly 45,000 people avoided death from road traffic accident injury. The reduction in the number of fatalities has directly alleviated the suffering of hundreds of thousands of families. Sustained decline in the number of deaths of road traffic accidents in China since 2006 helps China to be reduced to the world’s second in terms of annual death toll of road traffic accidents.
Accident rate was significantly declined. The accident rate per 100 million vehicle kilometers traveled and the fatality rate per 100 million kilometers traveled can relatively objectively reflect the level of road traffic safety. On national highway network (including some expressways) and expressway network which undertake major transportation task as examples, the accident rate per 100 million vehicle kilometers traveled and the fatality rate per 100 million kilometers declined in recent years. In 2011, the accident rate per 100 million vehicle kilometers traveled on the two networks 4.3 and 2.0 and the fatality rate per 100 million vehicle kilometers travelled 1.6 and 1.1 respectively.

Continued road traffic accident deaths and accident rate have fully illustrated that road traffic safety is gradually improving in recent years. This hard-won improvement was made against the backdrop of fast growth of economy and motor vehicle ownership. The rapid improvement of traffic safety is inseparable to the unremitting efforts made by the Chinese government. Since 2003 when the Chinese government made comprehensive deployment for road traffic safety for the first time, a work pattern featuring unified leadership, relevant departments taking up respective functions, comprehensive governance and addressing both symptoms and underlying causes has been formed. Thanks to a series of the systemic and targeted measures, high incidence of road traffic accidents has been curbed in a short period of time and road safety improved rapidly. The party and government have attached great importance to the work of traffic safety and implemented a series of effective measures which are the fundamental reasons for the rapid improvement of road traffic safety in China. These measures include: (1) Set road safety goals; (2) Set up National Interministerial Joint Conference on Road Safety; (3) Improve relevant laws, rules and regulations; (4) Launch road traffic safety special overhaul; (5) Improve drivers’ driving skill; (6) Strengthen transport industry management; (7) Improve safety performance of motor vehicles; (8) Launch safety overhaul project of road infrastructures; (9) Improve emergency works; (10) Strengthen road traffic safety education; (11) Make science and technology play a supportive role to improve safety.

Since some problems constraining road safety have not been addressed, therefore with China’s rapid economic development and growth of personnel, vehicle and material volumes, pressure of containing transport accidents will become bigger. And any negligence will make road accidents relapse strongly.
3 CONCLUSION

The history of road safety in China can be divided into three stages. Since 2005, the road safety has made great improvements in China with the fast economic development, fast increase of road mileage, rapid increase of motor vehicle ownership, and rapid growth of traffic volume. China’s experience in improving the road safety has proven that as long as taking the targeted policies and countermeasures, the trend of high incidence of road accidents can be suppressed, and rapid economic development do not necessarily bring the high incidence of road accidents. Meanwhile, the pressure to further improve road safety is growing.

REFERENCES