
Changes in Traffic Safety Policies and Regulations in China (1950-2010)

1. Road Traffic Safety in China

1.1 Economic Growth, Urbanization and Transport Development in China

Since the founding of People's Republic of China (PRC) in 1949, the country has been experiencing profound changes in its economic development. In the last 60 years, the average annual economic growth rate reached 8%. Economic growth has accelerated since 1978, when China started the policy of economic reform and opening-up. In three decades (1979-2009), gross domestic product (GDP) increased by approximately 83 times from 406.3 billion to 34.05 trillion yuan, while the per capita GDP increased from 419 to 25,575 yuan. During this period, China was the country with the fastest GDP growth rate, which was 9.76% calculated at 1978 constant price.

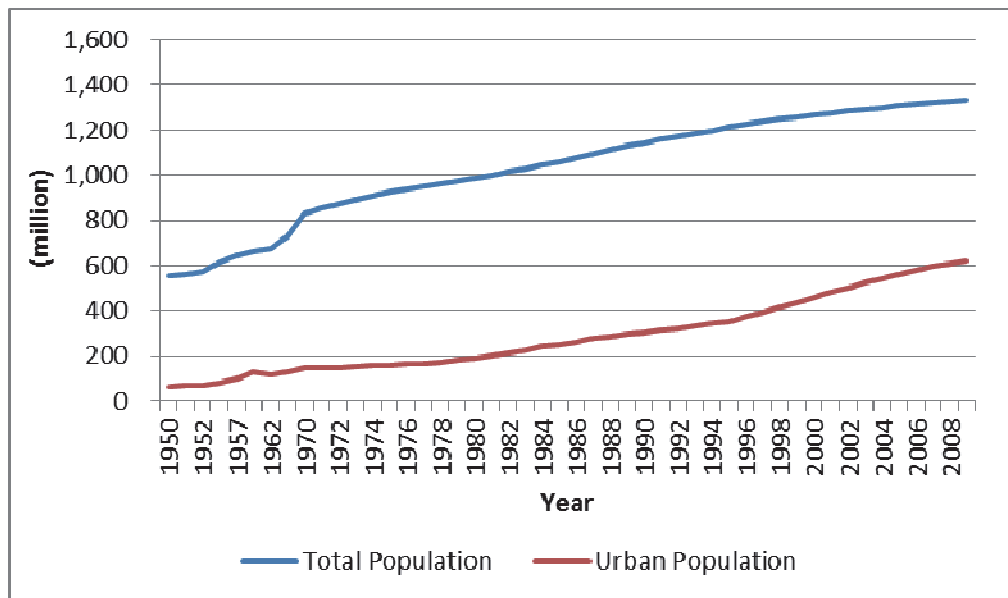


Figure 1 Changes in the total population and urban population of the PRC, 1950-2009

(Source: <http://www.stats.gov.cn/tjsj/ndsj/2010/html/D0301e.htm>)

The rapid economic development was accompanied by a dynamic urbanization process. In the last 60 years, the total population has more than doubled, reaching 1.33 billion in 2009. Meanwhile, the urban population increased by nearly 10 times from 57.65 million to 0.62 billion. As a result, the proportion of urban population reached 46.6% at the end of 2009.

During the last three decades the Chinese government made transportation development one of the priorities in its national economic strategies, aiming at building an integrated transport infrastructure system. This had become particularly important since 1997, when the Asian economic crisis broke out. The Chinese government introduced proactive fiscal policies and strengthened the investment in infrastructure development (for example, the proportion of highway investment in GDP reached around 3% in 2005). The investment in transportation infrastructure contributed to national economic

growth and greatly improved the transport systems. Since then road transport has been developing rapidly in China.

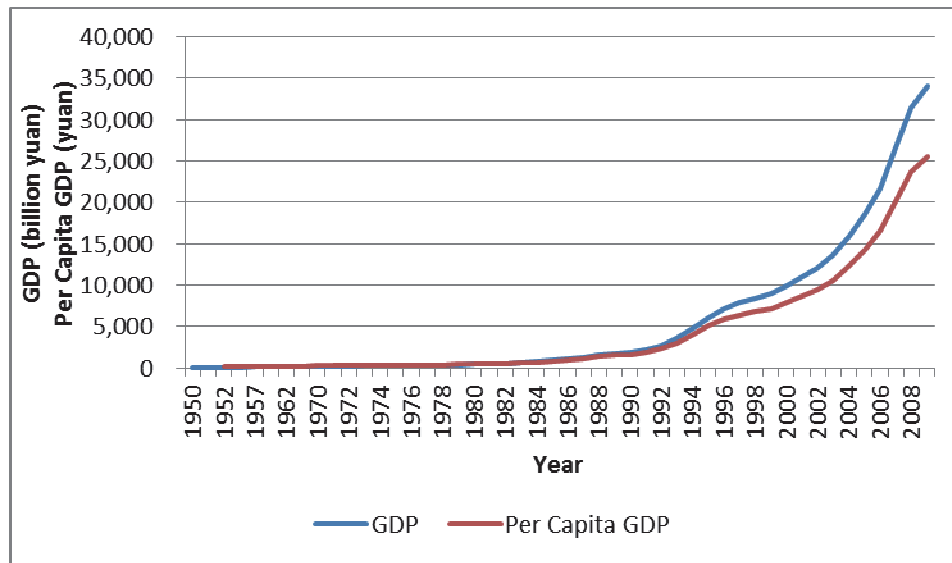


Figure 2 Changes in GDP and per capita GDP, 1950-2009

(Source: <http://www.stats.gov.cn/tjsj/ndsj/2010/html/C0201e.htm>)

As shown in Figure 3, in 1978 the total length of highways in China was about 0.89 million km; the highway network density was 9.3 km/100 km². At the end of 2009 the total length of highways reached 3.86 million km (excluding Hong Kong, Macao and Taiwan) with the density close to 40.2 km/100 km². Freeways have developed rapidly since 1988, when the first one, the 18.5 km-long Shanghai-Jiading Freeway, was completed and opened to traffic. In the ensuing 20 years the total length of freeways continued to grow, reaching 65,100 kilometers in 2009. Meanwhile, the total length of urban roads in China reached more than 0.26 million km, increasing by 28% from 2003.

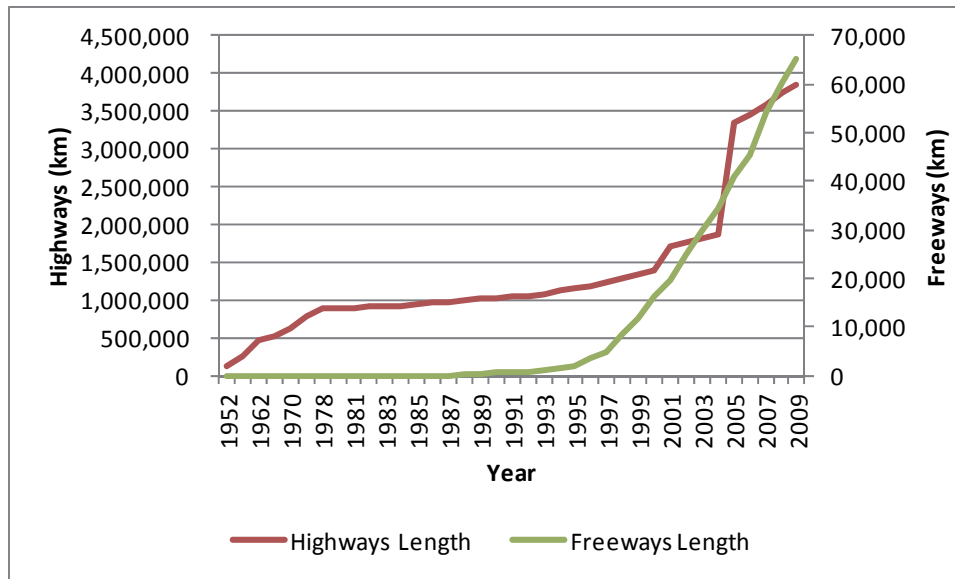


Figure 3 Highway and freeway development, 1952-2009

(Source: <http://www.stats.gov.cn/tjsj/ndsj/2010/html/P1604e.htm>)

Note: Highways are major roads connecting important destinations, such as large towns and cities.

Freeways are access-controlled highways designed exclusively for high-speed vehicular traffic, with all traffic flow and ingress/egress regulated.

The ownership of civil vehicles grew relatively slowly before 1990. From 1990 to 2000, however, it began to increase rapidly and exceeded 10 million during this period. After 2000, it increased even faster and exceeded 30 million in 2005. At the end of 2009, the total number of vehicles was more than 62.8 million in China.

There were no privately owned vehicles before 1980. Thereafter, the number of private vehicles experienced a mild increase through 2000 to 6.25 million. By the end of 2009, this number had grown by more than 6 times to 45.75 million, and its proportion on overall vehicles had increased from 39% to 73% in less than ten years.

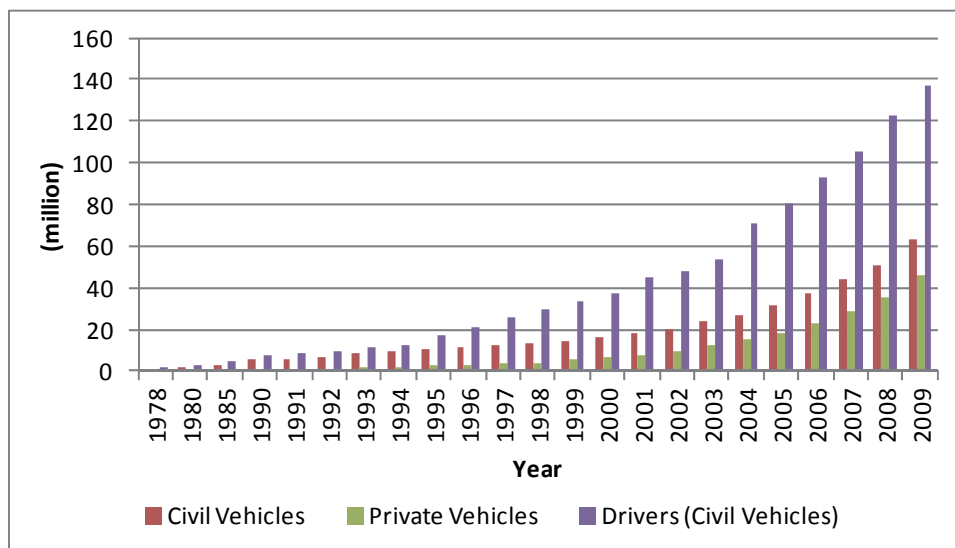


Figure 4 Civil and private vehicles and drivers, 1978-2009

(Source: <http://www.stats.gov.cn/tjsj/ndsj/2010/html/P1624e.htm>;
<http://www.stats.gov.cn/tjsj/ndsj/2010/html/P1625e.htm>)

Note: Civil vehicles are vehicles used for civil purposes, including passenger vehicles (large, medium, small and mini size) and freight trucks (heavy, medium, light and mini size). Private vehicles are privately-owned civil vehicles.

The number of motorcycles was 675.41 million in 2004. Within five years the number increased by about 40%, reaching 945.31 million in 2009.

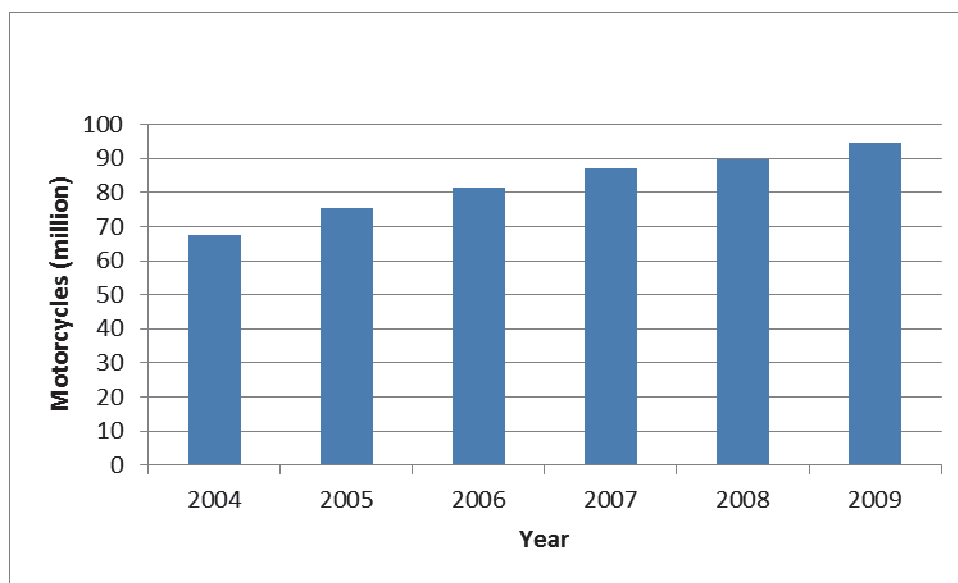


Figure 5 Number of motorcycles, 2004-2009

(Source: China Road Traffic Accident Statistics Yearbook 2004-2009)

The number of motor vehicle drivers increased by 70 times during the last three decades. In 2009, the total number of motor vehicle drivers was 137.4 million, of which drivers with less than 3 years of

experience accounted for 34.76% and drivers with less than one year of experience accounted for 10.46%.

As to passenger and freight transport, Figures 6 and 7 show the changes of share by each transport mode since 1952. As a result of the road infrastructure improvement and rapid motorization, road transport developed rapidly. The passenger-kilometer share of highways increased from 9.1% in 1952 to 54.4% in 2009, while the freight ton-kilometer share of highways increased from 1.9% in 1952 to 30.4% in 2009. Railways and waterways remained major modes for transporting heavy cargo over long distances.

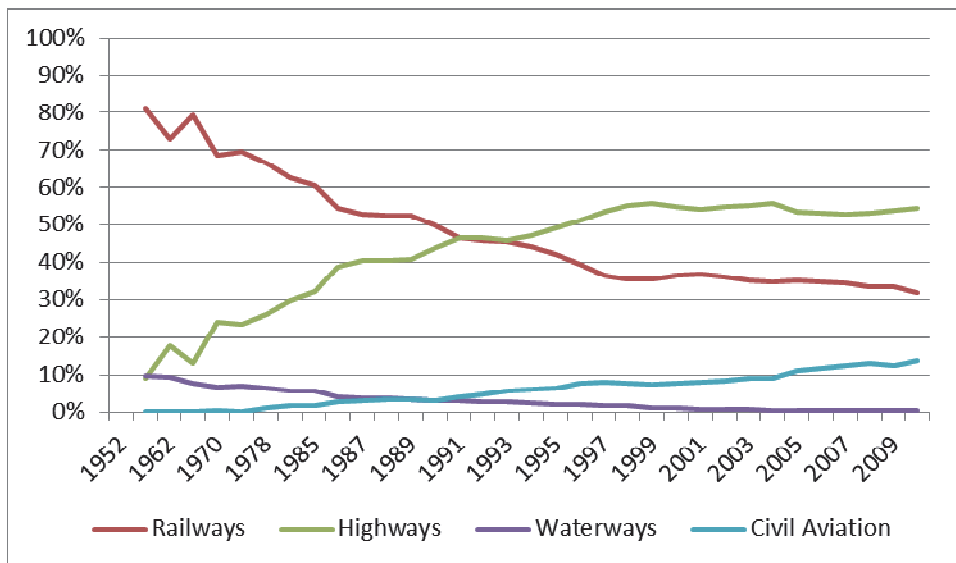


Figure 6 Passenger-kilometers by mode (%), 1952-2009

(Source: <http://www.stats.gov.cn/tjsj/ndsj/2010/html/P1607e.htm>)

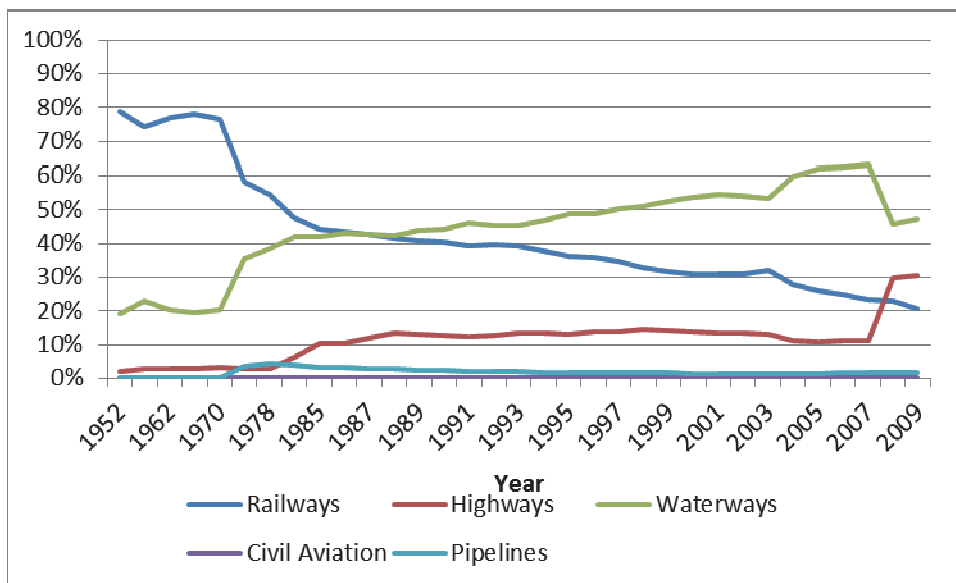


Figure 7 Freight ton-kilometers by mode (%), 1952-2009

(Source: <http://www.stats.gov.cn/tjsj/ndsj/2010/html/P1607e.htm>)

1.2 Trends of Traffic Accidents and Casualties in China

(1) Changes in the number of traffic accidents and casualties and fatality rates

As can be seen in Figure 8, the numbers of traffic accidents, fatalities and injuries in China increased continuously since the founding of the PRC (note that traffic accident fatalities include those who die within seven days after the accident). Compared to 1951, the number of fatalities increased by 5.7 times in 1960, 10.3 times in 1970, 24.6 times in 1980, 56.8 times in 1990, 109.2 times in 2000, and 75.6 times in 2010. Basically, the number of fatalities doubled every ten years before the year 2000.

As shown in Figure 8, during the periods of 1982–1987 and 1995–2002, China experienced a rapid increase in the numbers of traffic accidents and casualties. The number of accidents, deaths and injuries increased by 1.8, 1.4 and 1.6 times respectively within the first period, and by 1.8, 0.5 and 2.5 times within the second period. In 2001 the number of deaths exceeded 100,000 for the first time and peaked in 2002, reaching 109,381 fatalities a year.

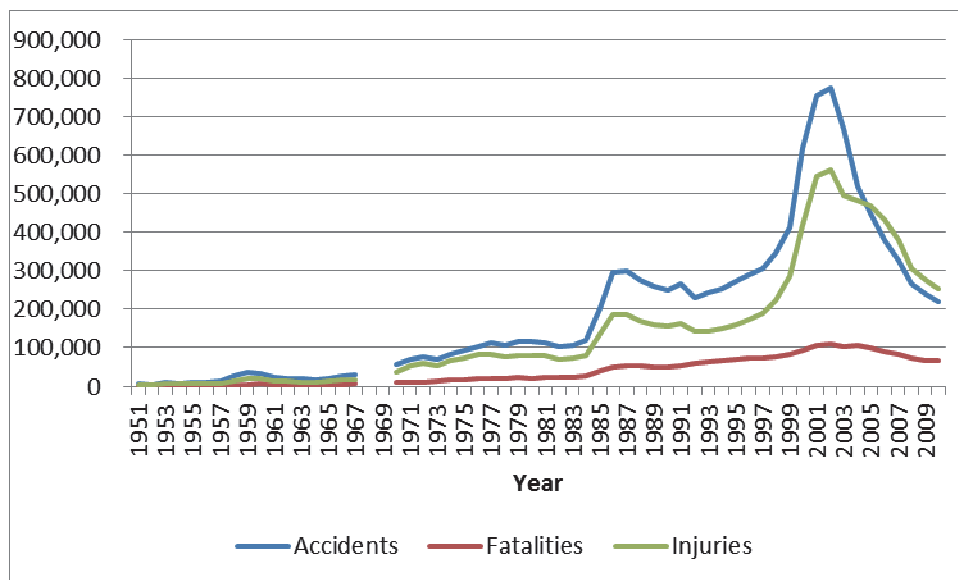


Figure 8 Road traffic accidents, fatalities and injuries, 1951-2010

(Source: China Road Traffic Accident Statistics Yearbook 2010, pp. 146-147: data are not available for 1968 and 1969)

In 2005, the number of deaths dropped below 100,000 again and since then there has been a rapidly decreasing trend in the number of accidents and casualties. However, the absolute number is still high. In 2010 the numbers of accidents, fatalities and injuries were 219,521, 65,225 and 254,075 respectively. The average of traffic fatalities in the last five years was 75,514, which ranked the second largest in the world, following India.

The fatality rate per ten thousand vehicles also decreased continuously from the 1970s onward, reaching 3.15 in 2010. On the other hand, the fatalities per one hundred thousand population kept

rising until 2003, when it peaked at 8.08 and then dropped to 4.89 in 2010. The different patterns in the fatality rate changes were probably due to the rapid motorization and relatively slow increase in the nation's population. The decrease in the fatality rates was achieved in a period of rapid growth in both the economy and motorization, which indicates that traffic safety had improved in recent years. However, compared with developed countries, the accident rates were still high in China. For example, in 2009 the fatality rate per ten thousand vehicles was 3.63 in China, contrasting with 0.66 in the UK and 0.64 in Japan. Moreover, considering China's population of 1.3 billion and the huge number of vehicles, the absolute number of fatalities caused by traffic accidents was still much higher compared to other countries. For example, in 2009 the number of fatalities in China was 67,759, about twice of that in the US. Moreover, the fatality rate (fatalities/casualties) is about 20%, which is much higher than that of developed countries.

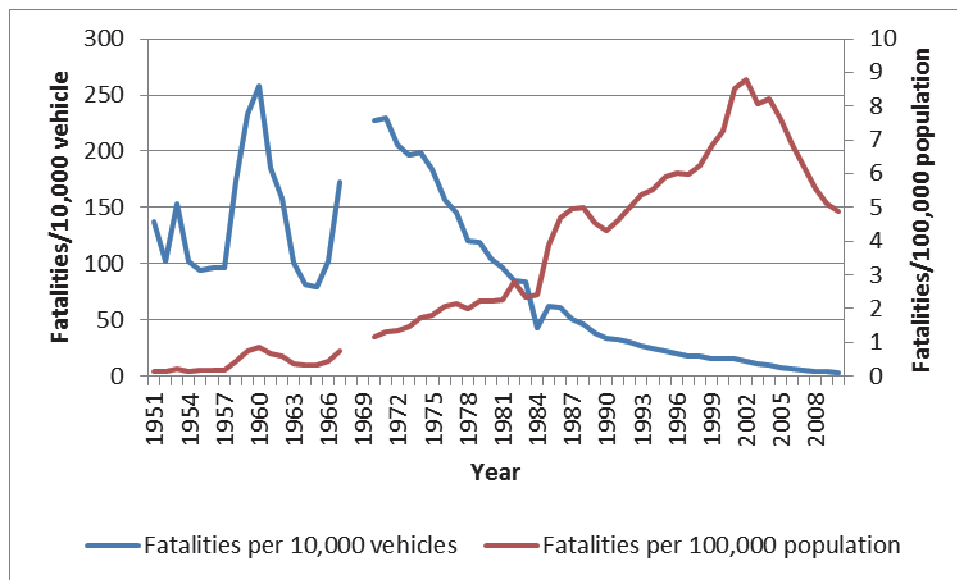


Figure 9 Fatalities per 10,000 vehicles and per 100,000 population, 1951-2010

(Source: China Road Traffic Accident Statistics Yearbook 2010, pp. 146-147: data are not available in 1968 and 1969)

(2) Traffic fatalities on highways and freeways

Highways had much higher fatality rates than did urban roads. During 2000-2010, the numbers of fatalities on highways were generally about 3 to 4 times of those on urban roads. The total number of fatalities on highways started declining in 2005. However, the number on freeways continuously increased from 2,162 in 2000 to 6,647 in 2006, corresponding to the rapid development of freeways. Then it began to drop slightly. In 2010, the number of fatalities on freeways was 6,300. The top three causes for fatalities on freeways were speeding, driver fatigue and inappropriate maneuvers. It is also shown in Figure 10 that fatalities on class 2 and 3 highways were reduced but still accounted for more than 50% of the total fatalities. In 2010, the number of fatalities on these two types of roads reached 26,419, which was about 57% of the total.

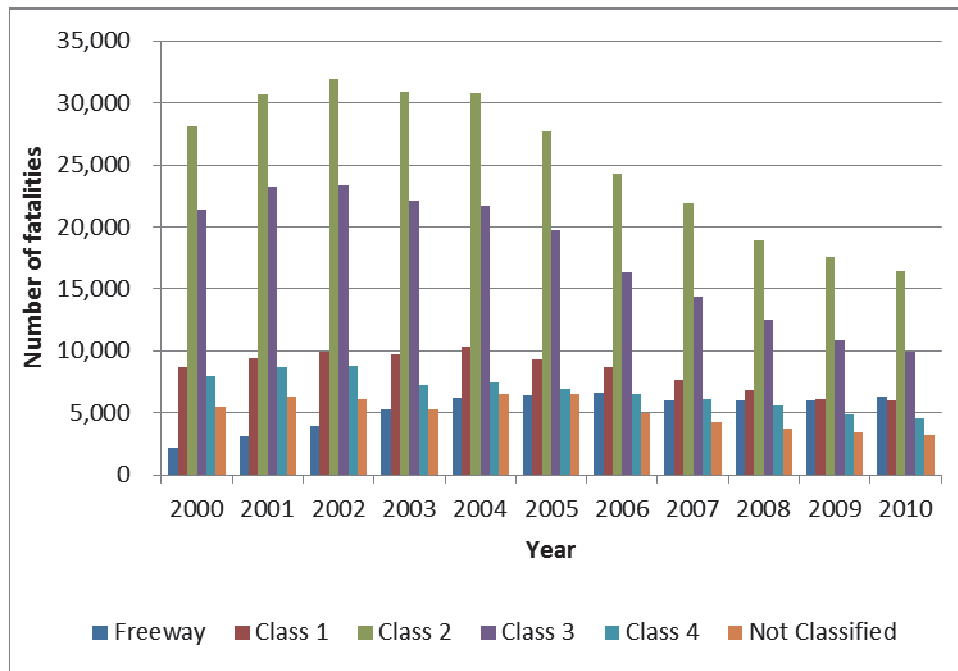


Figure10 Number of fatalities by highway type, 2000-2010

(Source: China Road Traffic Accident Statistics Yearbook 2000-2010)

(3) Newly licensed and less experienced drivers

The percentage of accidents and fatalities attributed to new drivers (with less than one year of licensed driving) and less experienced drivers (with 2-3 years of experience) rose in 2003. This is partly because the SARS outbreak in 2003 prompted travelers to shift from public transportation to private automobiles. As a result, there was a huge number of new and inexperienced drivers on the road. They had less time and fewer opportunities to develop good hazard perception skills required for safe driving. In 2005, the number of fatalities caused by new and less experienced drivers was 31,534, which accounted for 43.9% of the total number of fatalities. During 2007–2010, the percentages decreased to about 30%. Meanwhile, drivers of 6–10 years of experience generally caused more than 25% of the total fatalities each year since 2003.

On the other hand, the percentages of fatalities caused by experienced drivers (with more than 10 years of experience) increased from 2003 onward. However, considering the large population of drivers in this group, they were still safer drivers compared to others. Generally speaking, driving experience accumulated through either on-road driving or reeducation at driving school contributes to road traffic safety.

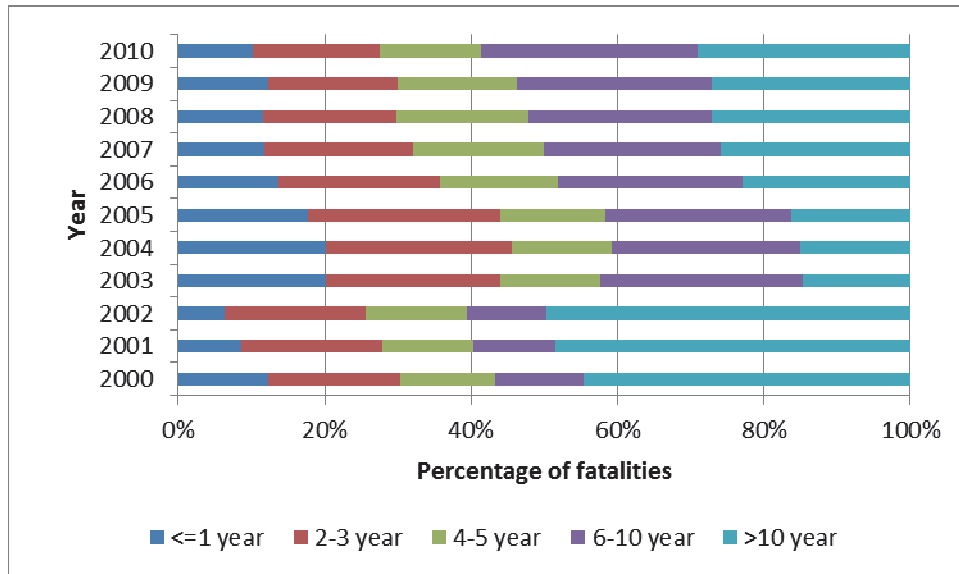


Figure 11 Percentages of fatalities caused by drivers of different experience levels
(Source: China Road Traffic Accident Statistics Yearbook 2000-2010)

(4) Safety of pedestrians, bicyclists and motorcyclists

As vulnerable road users, pedestrians, motorcyclists and bicyclist were the main victims in road traffic accidents. China was still at the early stage of motorization, and thus walking and riding bicycles and motorcycles were still major transportation modes for many people in the country. The mixed traffic pattern in China not only intensified the conflicts with motor vehicles but also increased the casualties of pedestrians, bicyclists and motorcyclists. Since 2005, the government had adopted a series of policies to improve road safety, and the fatalities and injuries of pedestrians, bicyclists and motorcyclists had decreased year by year. In 2010 the fatalities of pedestrians, bicyclists and motorcyclists were 16,281, 8,968 and 14,264, respectively, decreasing by 39%, 38% and 37.5% from 2004. However, the proportions of fatalities and injuries were still high. In 2010, pedestrians, bicyclists and motorcyclists accounted for about 25%, 14% and 22% of the total fatalities in road traffic accidents.

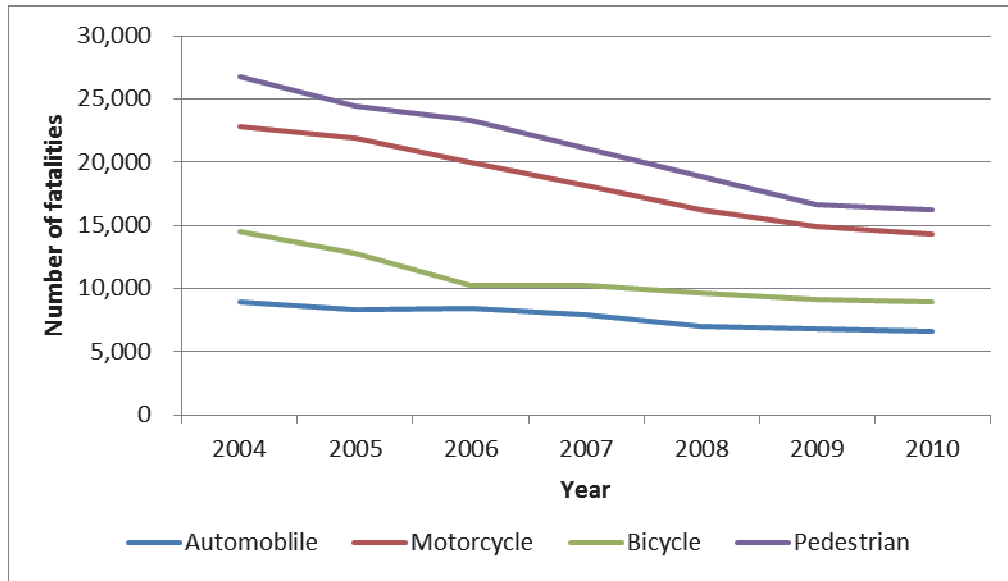


Figure 12 The number of fatalities by traffic mode, 2004-2010
(Source: China Road Traffic Accident Statistics Yearbook 2004-2010)

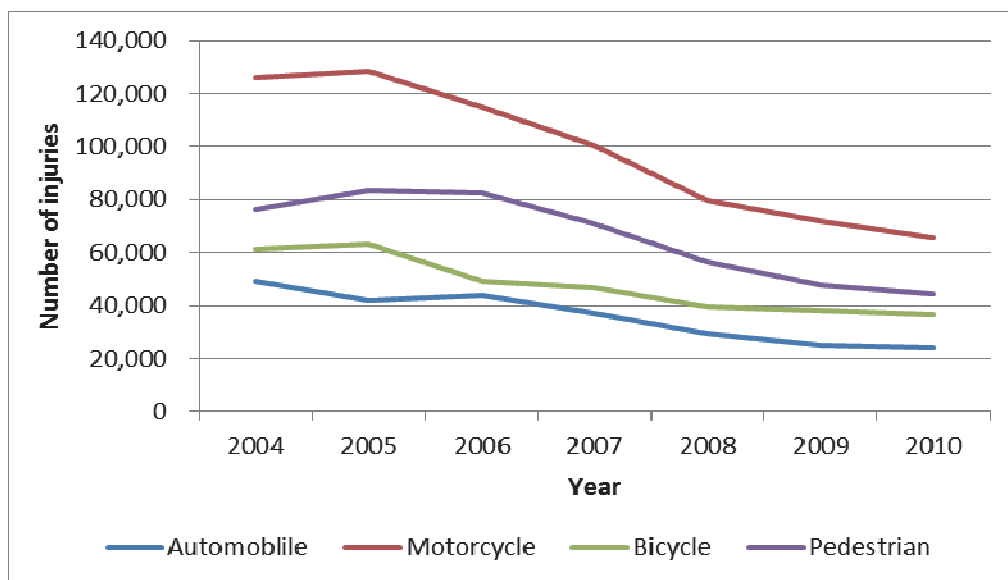


Figure 13 Number of injuries by traffic mode, 2004-2010
(Source: China Road Traffic Accident Statistics Yearbook 2004-2010)

(5) Severe traffic accidents causing a large number of casualties

Severe traffic accidents that caused more than ten fatalities in one accident happened every year. Although the proportion of such accidents was not large, they led to very serious consequences and induced bad social impacts. In recent years, the number of severe accidents has been decreasing. However, the average number of fatalities in one accident was about 15, indicating that the severity of those accidents was not mitigated. Severe accidents frequently happened in mountainous areas. Figure 14 shows the number of accidents causing more than ten fatalities in recent years. In 2010, there were 34 severe accidents causing 461 fatalities and 432 injuries. The fatality rate (fatalities/casualties) was

55%. Compared to 2000, the number of severe accidents, fatalities and injuries decreased by 41%, 49% and 55% respectively.

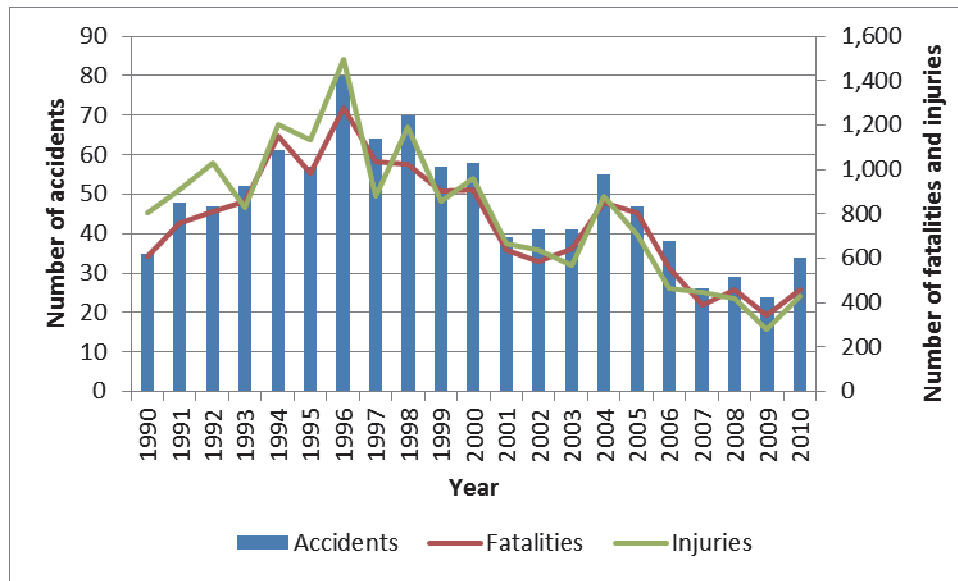


Figure 14 Severe accidents causing more than ten fatalities, 1990-2010

(Source: China Road Traffic Accident Statistics Yearbook 2010, p. 153)

1.3 Characteristics of Fatal Traffic Accidents

(1) Time distribution of fatal accidents

The number of fatal accidents by month may be influenced by the season, climate, economic activities, festivals and so on. Figure 15 shows the number of fatalities due to road traffic accidents by month in 2010, from which some patterns can be observed. March was the month with the lowest number of fatalities, and thereafter fatal accidents generally increased month by month. November and January had the highest fatalities in the year. The total number of fatalities from November to January was close to 20,000, accounting for about 30% of the total number of fatalities during the year.

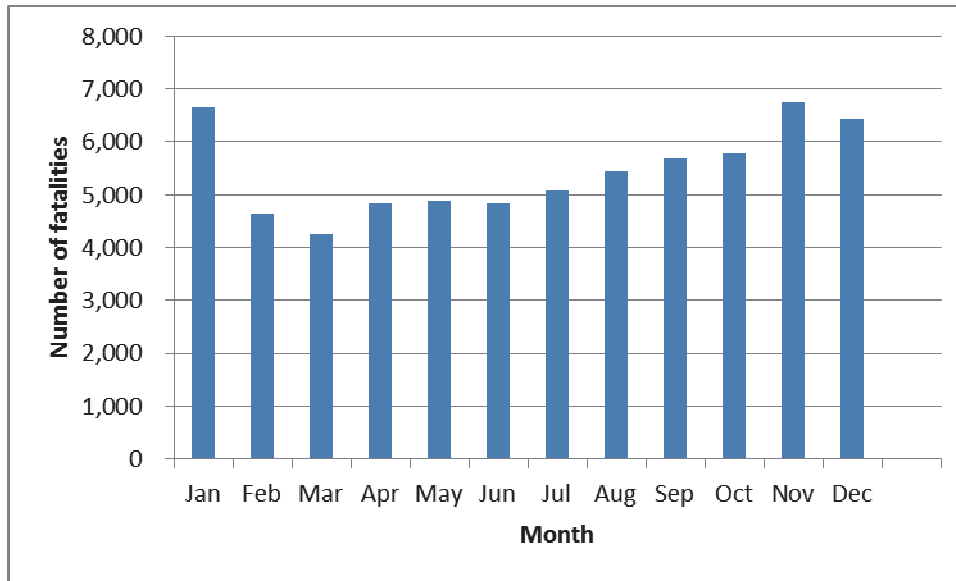


Figure 15 Number of fatalities by month

(Source: China Road Traffic Accident Statistics Yearbook 2010, p. 9)

The number of fatal accidents by day of the week in 2010 shows that there were fewer accidents on Fridays and Saturdays. However, the differences between accidents on these two days and other days were generally less than 2%. The high proportion of fatalities on weekend may be caused by the increase of entertainment and recreation activities.

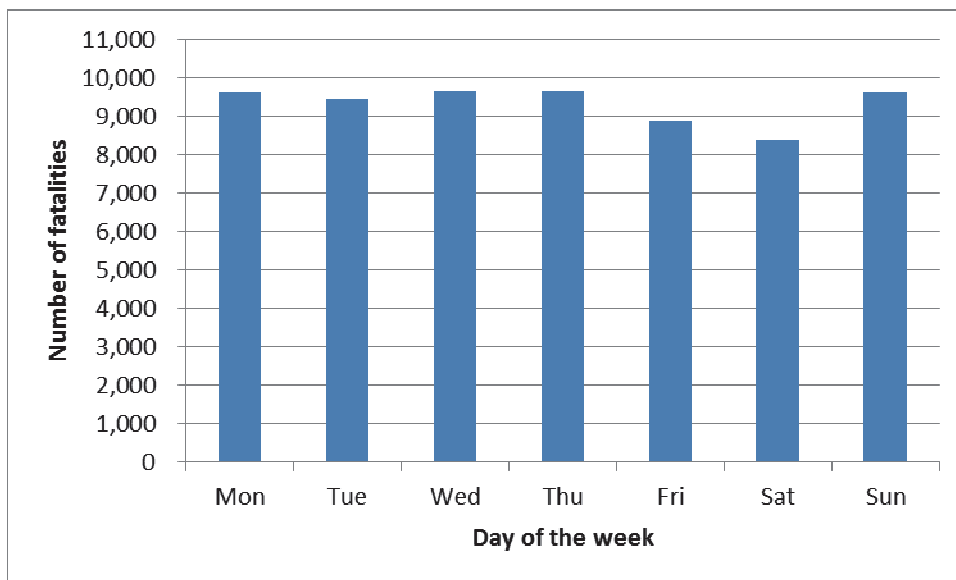


Figure 16 Number of fatalities by day of the week

(Source: China Road Traffic Accident Statistics Yearbook 2010, p. 10)

Figure 17 shows the number of fatalities due to traffic accidents by hour of the day in 2010. The peak periods were 6-9 a.m., 1-4 p.m. and 5-9 p.m., during which about 52% of the fatalities occurred, while from 1 to 6 a.m. the number of fatalities caused by traffic accidents was around 14%.

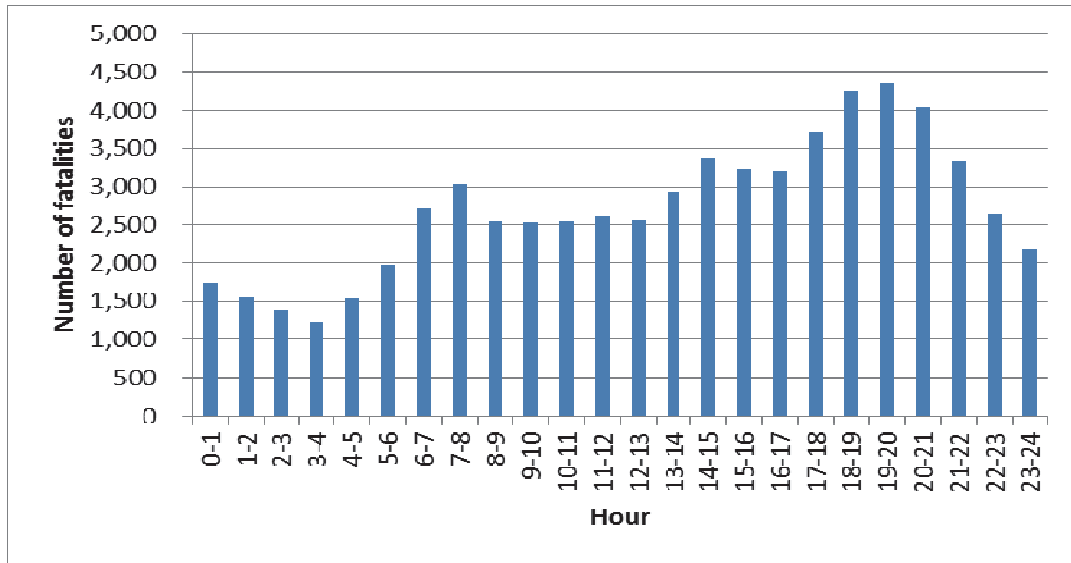


Figure 17 Number of fatalities by hour of the day

(Source: China Road Traffic Accident Statistics Yearbook 2010, p. 13)

A large proportion of fatal accidents happened in the nighttime, especially when there was no lighting. A driver’s judgment could be affected by darkness, and reduced visibility increased accident risks. Another reason could be driver fatigue. In 2010, 29% and 17% of all fatalities happened in the nighttime with and without lighting respectively. Necessary safety facilities could reduce the risk of nighttime driving and prevent many traffic accidents.

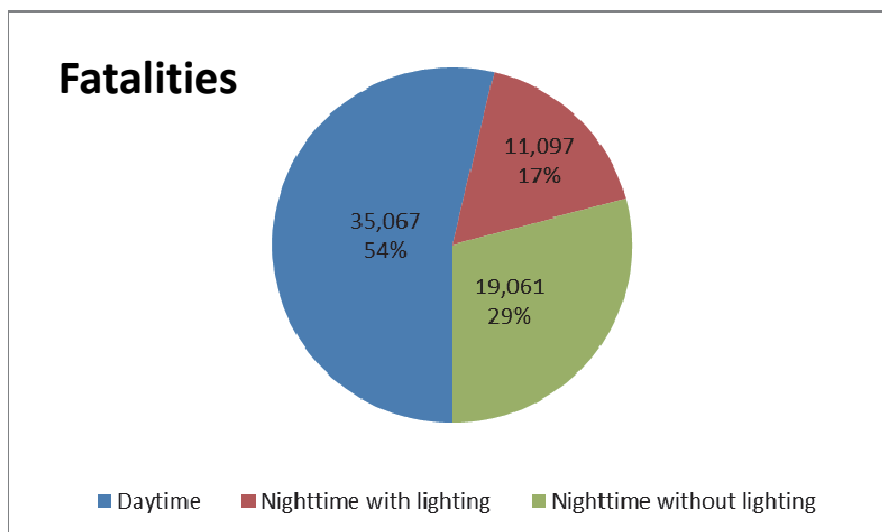


Figure 18 Number of fatalities by daytime and nighttime

(Source: China Road Traffic Accident Statistics Yearbook 2010, p. 47)

(2) Space distribution of fatal accidents

Developed areas in China had many more accidents and fatalities. Table 1 shows the fatalities and fatality rates by province (including municipalities directly under the central government) in 2010. Guangdong, Zhejiang, Jiangsu, Shandong and Sichuan were the top five provinces with respect to the

number of traffic fatalities, accounting for 37% of the total fatalities in the year. One possible reason was the rapidly increasing passenger and freight traffic induced by the economic development in these areas. On the other hand, Xizang, Qinghai, Gansu, Xinjiang, and Shanxi provinces, as less developed regions located in western China, had the highest fatality rates. The fatalities per 10,000 vehicles for these provinces were 18.16, 9.49, 7.09, 6.58 and 5.79 respectively, which were much higher than the national average of 3.15. The fatality rates of Henan, Hebei and Beijing were 1.11, 2.05 and 2.06 per 10,000 vehicles, which were the lowest in the country. It is also found that the fatality rate per 10,000 vehicles was negatively correlated with the density of high-grade roads. More fatalities happened in rural areas, where high-grade roads were poorly developed and traffic rules were not well followed by drivers.

Table 1 Number of fatalities and fatality rates by province

Province	Fatalities	Fatalities/10,000 vehicles	Fatalities/100,000 population
Guangdong	6,203	3.22	6.44
Zhejiang	5,382	4.79	10.39
Jiangsu	5,031	3.45	6.51
Shandong	4,268	2.09	4.51
Sichuan	2,931	3.06	3.58
Anhui	2,877	3.00	4.69
Fujian	2,822	3.82	7.78
Hebei	2,693	2.05	3.83
Shanxi	2,449	5.79	7.15
Guangxi	2,342	2.84	4.82
Hunan	2,162	3.29	3.37
Liaoning	2,129	3.98	4.93
Xinjiang	2,023	6.58	9.37
Hubei	1,944	2.55	3.40
Shanxi	1,944	3.96	5.15
Yunnan	1,886	2.60	4.13
Henan	1,825	1.11	1.92
Jiangxi	1,603	2.72	3.62
Gansu	1,506	7.09	5.71
Jilin	1,454	3.77	5.31
Heilongjiang	1,395	4.15	3.65
Neimenggu	1,375	3.10	5.68
Guizhou	1,136	3.93	2.99
Chongqing	1,017	3.76	3.56
Shanghai	1,009	4.04	5.25
Beijing	974	2.06	5.55
Tianjing	950	5.30	7.74
Qinghai	573	9.49	10.28
Hainan	471	2.80	5.45
Ningxia	442	3.11	7.07
Xizang	409	18.16	14.10

(Source: China Road Traffic Accident Statistics Yearbook 2010, pp. 15-16)

(3) Accidents by age and gender

In 2010, the numbers of traffic fatalities caused by males and females were 62,972 (97%) and 2,253 (3%) respectively. On the other hand, males also seemed to be more at risk than women. About 76% of the fatalities and 72% of the injuries were males.

In terms of age, 31,211(48%) of the fatalities were between 21-45 years old. On the other hand, the same age group (21-45 years old) also caused 78% of the fatalities in traffic accidents. Fatalities among those over 65 years old rose every year. Elderly people may suffer from reduced visual acuity and reaction ability, and it may be more difficult for them to recover from a severe accident; thus the fatality rate was high for this age group. In 2010, about 7,386 (11%) of the fatalities were elderly people over 65.

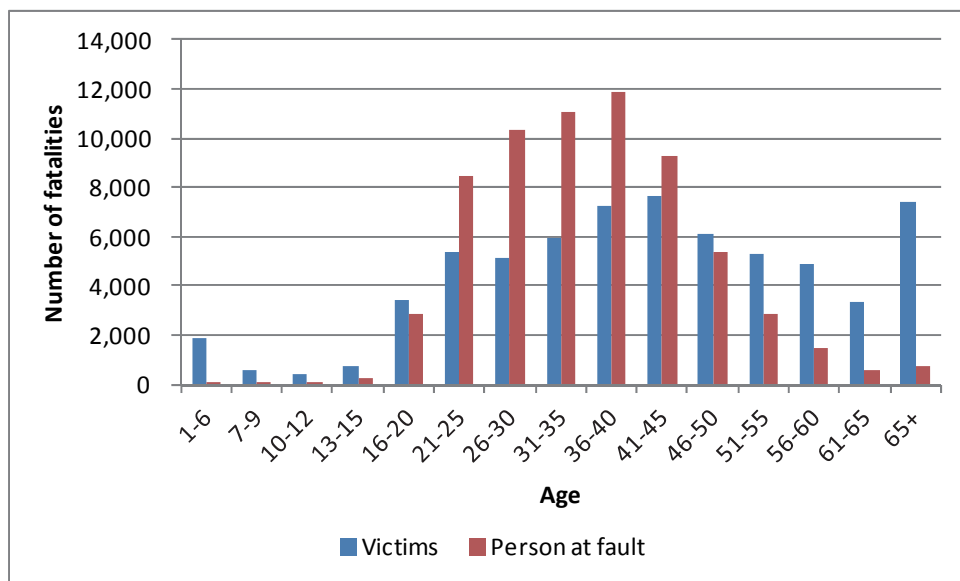


Figure 19 Number of fatalities by age of victim and by age of person at fault
(Source: China Road Traffic Accident Statistics Yearbook 2010, pp. 56, 59)

(4) Accident types

The most common accident types were head-on, intersecting paths and rear-end, which together accounted for 72% of all accidents in 2010. These types also resulted in severe outcomes. As can be seen in Table 2, head-on, intersecting paths and rear-end accidents accounted for about 27%, 25% and 13% of all fatalities in 2010.

Table 2 Numbers of accidents and fatalities by accident type

Accident type	Accidents	Percentage	Fatalities	Percentage
Head-on	54,491	24.82%	17,531	26.88%
Intersecting paths	81,862	37.29%	16,497	25.29%
Rear-end	22,273	10.15%	8,957	13.73%
Sideswipe: opposite direction	4,696	2.14%	1,009	1.55%
Sideswipe: same direction	6,948	3.17%	1,588	2.43%
Pedestrians	26,422	12.04%	7,484	11.47%
Overtake	5,440	2.48%	3,570	5.47%
Fixed object	5,993	2.73%	2,697	4.13%
Parked vehicle	2,355	1.07%	1,130	1.73%
Animal	53	0.02%	18	0.03%
Others	8,988	4.09%	4,744	7.27%

(Source: China Road Traffic Accident Statistics Yearbook 2010, p. 8)

(5) Causes of accidents

The road transport system consists of humans, vehicles, roadways and the environment. Any defects in these elements may cause accidents. According to the 2010 road accident statistics, the number of accidents and fatalities caused directly by road conditions was small, about 0.01% of all accidents. Lack of road safety facilities contributed to most of the road-related accidents. Vehicle-related accidents accounted for less than 0.11 % of all accidents, and were mostly attributable to technical malfunctions, including brake, steering, and light malfunctions. However, it should be pointed out that the number of accidents and fatalities caused by road and vehicle factors may be underestimated. Many accidents due to both the road or vehicle factors and human factors were recorded as human-related accidents.

Human factors include all factors related to drivers and other road users that may contribute to an accident. Traffic violations of motor vehicle drivers, bicyclists, pedestrians, etc. were generally the main reason of traffic accidents. For example, the number of accidents resulting from violations by road users was 211,042, which accounted for 96% of all road traffic accidents in 2010. Of these accidents, 199,934 (91%) was caused by the motor vehicle drivers, 8,745 (4%) by non-motorized vehicle riders, and 2,363 (1%) by pedestrians and passengers. Compared to 2009, the number of accidents caused by these three groups of road users decreased by 8%, 8% and 13% respectively. In terms of casualties, 62,646 died and 244,492 were injured from accidents caused by road user violations, which accounted for 96% of the total fatalities and 96% of the injuries. Accidents caused by motor vehicle drivers accounted for 92% of the fatalities and 91% of the injuries, making motorist violations the major factor behind road traffic accidents.

The top three violations of traffic laws and regulations for motor vehicle accidents are speeding, failing to yield and unlicensed driving. In 2010, the numbers of accidents and fatalities caused by speeding were 21,755 and 9,134, which accounted for 10% and 14% of the total accidents and fatalities respectively. Failing to yield where required by traffic laws caused 37,928 accidents and 7,788 fatalities, accounting for 17% of the total accidents and 12% of the fatalities. Unlicensed driving cannot be neglected either, in that it caused 12,637 accidents and 4,443 fatalities, which were 6% and 7% of the total accidents and fatalities respectively. Other motorist violations that were major reasons for traffic accidents, included traveling in the wrong direction, illegally occupying exclusive lanes and overtaking-related violations, which caused 3,521 (5%), 2,224 (3%) and 2,101 (3%) fatalities respectively in 2010. Moreover, 3% of the fatalities were associated with alcohol use.

The top three reasons for accidents and fatalities caused by non-motorized vehicle riders were failing to travel as required by regulations, take-up of vehicle lanes, and traveling in the wrong direction. Major violations by pedestrians and passengers that caused traffic accidents included walking on roads prohibited to pedestrians and failing to follow traffic signals.

1.4 National Organization with Jurisdiction over Traffic Safety

Road traffic safety directly involves at least three ministries at the central government level: the Ministry of Public Security, the Ministry of Transportation, and the Ministry of Housing and Urban-Rural Development (formerly known as the Ministry of Construction).

The Ministry of Public Security is the sole administration in charge of road traffic accidents in China. All road traffic accident data is collected by the public security administrations in each district or county, and then the data is aggregated and reported to the upper public security administration. The Traffic Administration Bureau of Ministry of Public Security then analyzes the data and publishes the annual China Road Traffic Accidents Statistics.

The Ministry of Transportation establishes the development strategies, policies and regulations for the highway industry. It is also in charge of planning, construction, operation and maintenance of highways and freeways.

The Ministry of Housing and Urban-Rural Development is in charge of urban and rural planning and related infrastructure construction. It is responsible for the planning, design, construction and maintenance of roads in the urban areas.

Coordination among these ministries is very important in effectively addressing road traffic accident problems. The National Inter-Ministry Joint Conference Institute on road traffic safety was established in 2003. The institute is led by the State Council. Its major responsibilities include but not limited to the following:

- analyze the current situations of traffic accidents,
- develop medium- and long-term strategic safety plans,

- propose and carry out countermeasures,
- provide guidance and supervise the road safety work, and
- promote coordination among different agencies and sharing of information.

It is important to enhance the road traffic safety administration system and formulate a national road safety strategy to enhance the influence of the institute on road traffic safety at both the national and provincial levels. The key point is whether or not the plan made by the institute can be effectively implemented at the local level. In addition, coordination among agencies at the provincial and municipal levels is also critical for addressing road traffic safety issues. The National Inter-Ministry Joint Conference Institute should play a more active role so as to strengthen the coordination among different levels of government and to ensure the successful implementation of the road safety policies and strategies.

1.5 Special Issues Concerning Road Traffic Safety in China

(1) Lack of safety awareness of road users

Drivers in China are very different from those in developed countries who have “grown up” in vehicles. Chinese drivers may possess good driving skills but lack awareness of traffic safety. Chinese drivers are deeply affected by their experience of riding a bicycle. For example, they tend to change lanes frequently to overtake other cars, which can save a little travel time but with greatly increased risk of collision. Most motor vehicle users have poor safety awareness; for example, many drivers and passengers do not fasten their seat belts. Traffic law violations, such as jaywalking, speeding and drunk driving are very common, and many offenders go unpunished, so they are likely to continue taking the same risk. Thus, cultivating common awareness of traffic safety is the first step toward reducing traffic accidents.

In addition, other road users, including pedestrians and bicyclists, do not have much traffic safety knowledge either. Thus, it is essential that traffic safety education be conducted at home, school and the community, from children to adults, in order to realize widespread safety awareness. Furthermore, strict law enforcement and punishment of traffic violations will enhance the effectiveness of safety education.

(2) Mixed traffic pattern and lack of traffic safety facilities

The mixed traffic pattern on most national highways causes traffic congestion and severe traffic accidents. Traffic safety features are often neglected in road design. The investment in road traffic safety facilities was 2 billion yuan in 2004, equivalent to 0.5% of the total highway investment. This is much lower than that of developed countries such as Japan (during 1975–1986, the percentage of investment in road safety measures in total road investment was approximately 13–18%, and the percentage of investment in road safety measures to GDP was approximately 0.2–0.4%). The highest priority for China is to increase the investment in road safety facilities such as guardrails, speed bumps,

median barriers, overpasses, etc. Meanwhile, it is important to introduce a cost-benefit approach to allocate the limited funding to the most effective measures. It is a common practice to choose high-tech countermeasures to address road traffic accidents in China. However, some low-cost measures—such as mandatory seat belt usage or strict enforcement of penalties on speeding, overloading, drunk driving and so on—might also be very effective alternatives.

(3) Overloaded and oversized trucks and unsafe vehicles

Due to unfair competition and relatively expensive tolls, many freight carriers run overloaded and oversized trucks. Those trucks not only cause heavy damage to the roads (it is estimated that such damage may reduce the road maintenance cycle from 15 years to 6–8 years) but also cause many traffic fatalities. It is estimated that 70% of traffic accidents are related to overloaded and oversized trucks. Since April 30, 2004, seven ministries, including the Ministry of Communication and the Ministry of Public Security, have jointly implemented a nationwide program of strict enforcements on overloaded and oversized trucks. This program is reported to have substantially reduced road traffic accidents.

Vehicles that fail to pass the required inspections are prohibited from running on roads. However, some of these vehicles are illegally sold to rural areas, where such regulations are not strictly enforced. These vehicles bring a high risk of traffic accidents and cause emission problems as well.

(4) Traffic accident analysis and data sharing

In China, transport agencies have road departments but few have traffic safety departments. Although the techniques of road design and construction keep improving, the expertise needed to analyze and deal with traffic accidents has not developed strongly. Moreover, very few public agencies have a complete accident database and reliable statistics on traffic accidents. None of them has accumulated information from hospitals and insurance companies. Due to insufficient human and technical resources, accident recording outside the urban areas is highly defective, with presumably a large number of unreported accidents in rural areas.

It is necessary to establish a separate department in charge of road traffic accidents at the municipal and provincial levels. It is also important to establish a traffic accident investigation system with joint efforts from the police, medical personnel, psychologists, traffic engineers, automobile engineers, and insurance companies. Information from hospitals and insurance companies can be used to reexamine the accident data collected by the public security administration and to complete the accident database. The database should be open to traffic safety researchers who need these “medical records” to diagnose the traffic accidents.

2 Traffic Safety Policies and Regulations in China

2.1 Laws, Regulations and Rules on Traffic Safety

Before the reform and opening-up of China's economy in 1978, traffic accidents were not a severe problem because of the low motorization rate. However, as the number of traffic accidents increased rapidly in the 1980s, the government began to realize the importance of improving road safety to protect peoples' lives, and has played an active role in this field ever since. In 1986, the State Council announced the *Reform of Road Traffic Management Structure*, which stated that the public security agencies had jurisdiction over road traffic in urban and rural areas. In 1988, the State Council promulgated *Road Traffic Management Regulations*, and followed up with *Disposition of Road Traffic Accidents* in 1991. Against this backdrop, the Ministry of Public Security began to draft the *Road Traffic Safety Law*, the first law on traffic safety in China. The law was passed in 2003 and took effect on May 1, 2004. Accompanying it was the *Implementation Rules of the Road Traffic Safety Law* enacted by the State Council. The *Road Traffic Safety Law* provides that:

- Motor vehicles have to reduce speed when passing through crosswalks. When pedestrians are crossing the street, vehicles have to stop and yield to the pedestrians.
- Motor vehicle liability insurance is mandatory.
- Enforcement against drunk driving is to be strengthened.
- Enforcement against overloading is to be strengthened.
- Driving without a driver's license is punishable with less than 15 days' detention.
- Motor vehicle drivers should be responsible for the accidents involving motor vehicles and non-motorized vehicles or pedestrians. If there is evidence that non-motorized vehicle riders or pedestrians have violated the laws/regulations in accidents, the motor vehicle drivers are to take part of the responsibility.
- Hit-and-run accidents will result in permanent revocation of the driver's driving license.
- The driving speed on freeways is not allowed to exceed 120 km/h.

Local regulations and rules on traffic safety are established based on the *Road Traffic Safety Law*. So far, a relatively comprehensive system of laws and regulations on road traffic management in China has been formed, including the *Road Traffic Safety Law* and other laws and regulations promulgated by related ministries and departments, and local governments.

2.2 Inter-Ministry Joint Conference on Road Traffic Safety

In October 2003, the State Council founded the Inter-Ministry Joint Conference on Road Traffic Safety, which was made up by 15 ministries and departments, including the Ministry of Public Security, the Ministry of Propaganda, the Ministry of Construction and the Ministry of Transportation. In 2009, the Conference membership was enlarged to comprise 19 ministries and departments. The major responsibilities of the Conference include:

- Analyzing traffic safety issues
- Proposing countermeasures
- Developing medium- and long-term strategic plans
- Guiding and supervising road traffic safety programs at the provincial and municipal levels
- Promoting coordination, cooperation, and information sharing among different departments and agencies
- Establishing a long-term mechanism to reduce the number of road traffic accidents and improve traffic safety in a comprehensive way

2.3 Traffic Safety Campaigns

Since 2003, the public security agencies in many areas of the country have launched a series of campaigns to eliminate traffic violations, especially speeding, overloading, drunk driving, fatigue driving, driving without a license and so on. These campaigns have proved to be effective in reducing road traffic accidents.

(1) “The Five Improvements and Three Enhancements”

In January 2004, the Ministry of Public Security launched the first nationwide road traffic safety campaign across the country, namely, “The Five Improvements and Three Enhancements.” It was aimed at reducing road traffic accidents, especially severe accidents, in order to protect people’s lives and properties. In 2008, the Inter-Ministry Joint Conference reviewed and passed a motion for extending the campaign. The major focuses of the campaign have been as follows:

- 1) Improve the quality of driver training and education; the rules on driving tests and driver’s license issuance should be strictly followed; the qualifications of drivers of operational motor vehicles should be carefully examined.
- 2) Improve traffic management, especially the transport of dangerous chemical goods; enhance traffic safety management for severe weather or emergent events; improve emergency rescue mechanisms.
- 3) Improve the management of transportation corporations; strictly enforce the *Road Transport Regulation* and other stipulations; urge the transport businesses to supervise their drivers and motor vehicles dynamically.
- 4) Improve the management of businesses engaged in motor vehicle production and reconfiguration; improve motor vehicles’ safety performances and improve vehicle registration and examination procedures.
- 5) Inspect the roads regularly and improve the road conditions to reduce traffic accidents and casualties; improve traffic safety in work zones.
- 6) Enhance the role of government agencies in promoting the traffic safety programs; related

departments in charge of traffic safety should actively take the responsibility of supervision and law enforcement.

- 7) Enhance traffic safety propaganda and education; develop the traffic safety propaganda and education system led by the government and implement the program on a long-term basis.
- 8) Enhance traffic safety law enforcement; complete the traffic safety law and regulation system and technical standards; provide training to police officers to improve enforcement and punishment of traffic offenses.

(2) “Counties and Districts with Safe and Smooth Traffic”

In November 2005, the Ministry of Public Security and the Ministry of Transportation decided to conduct “Counties and Districts with Safe and Smooth Traffic” campaign in all counties and municipal districts in the country. By 2008, this campaign had been carried out in most counties and districts. The goals set up in 2008 were that:

- The number of accidents and casualties would decrease;
- The number of accidents with 10 or more fatalities would decrease;
- Fatalities per 10,000 vehicles would be no more than 4.7;
- More than 60% of the counties and districts would be those with safe and smooth traffic.

The following measures were proposed to achieve these goals:

- 1) The government should attach great importance to road traffic safety programs and provide guidance and support to the programs. The provinces are supposed to hold inter-department meetings to discuss the implementation of traffic safety management in the rural areas and propose implementation plans to carry out the campaign of “Counties and Districts with Safe and Smooth Traffic.”
- 2) Traffic management departments within public security agencies are the major forces to supervise the campaign and they should spare no effort to prevent and reduce severe road traffic accidents. Their responsibilities include: developing road traffic safety evaluation system and freeway surveillance system; conducting research on measures to prevent severe road traffic accidents; improving management of motor vehicles and drivers in the rural areas and so on.
- 3) Enhance coordination and cooperation among different agencies, such as those in charge of transportation, safety supervision and quality inspection. Motor vehicles failing to pass the inspections should be prohibited from running on the roads. Conduct a complete examination of freeway signs and markings as well as road traffic safety facilities in the rural areas.
- 4) Reinforce the education and propaganda of road traffic safety in the counties and municipalities.

- 5) Since 2005, goals for safe and smooth traffic have been achieved by 1,826 counties and districts nationwide.

(3) “Enhancement of School Bus Safety”

In November 2006, the Ministry of Education and the Ministry of Public Security announced the *Emergent Notice of Examining School Buses in Primary and Middle Schools*. The notice required that:

- 1) A large-scale examination of primary and middle school buses be carried out;
- 2) The qualifications of school bus drivers be examined and safety education be given to the drivers;
- 3) Safety education be carried out in schools;
- 4) Schools take the responsibility of traffic safety management; and
- 5) Traffic violations be punished according to the relevant laws and regulations.

With the joint efforts of education departments and traffic management department of public security agencies, this campaign proved to be successful. During November and December of 2006, 87,031 school buses at 116,986 primary and middle schools were examined, and 6,225 of those buses did not pass the inspection. In addition, 3,337 school bus drivers were determined to be unqualified and were prohibited from driving school buses, and 6,327 school buses were found to be operating illegally. Violations of traffic laws, such as overloading (7,095 incidents), speeding (3,268 incidents), and fatigue driving and drunk driving (58,813 times) were punished.

In August 2007, the Ministry of Education, the Ministry of Public Security and the National Safety Supervision Bureau issued the *Notice of Improving the School Trip Safety for Primary and Middle School Students and Kindergartens in Rural Areas*. The following measures were proposed:

- 1) Improve safety management of trips to and from schools in rural areas in conformity with the relevant laws and regulations.
- 2) The government should take more responsibility and enhance cooperation among different departments.
- 3) Continue to conduct examination and inspection of the school buses.
- 4) Reinforce the role of education and propaganda on road traffic safety.
- 5) School buses that are illegally operated should be banned.

2.4 Improvement of Driving Skills

The human factor is one of the major causes of road traffic accidents. Therefore, improving drivers' safety awareness and knowledge is of great importance in the reduction of traffic accidents and

casualties. In recent years, transportation departments have adopted many measures to improve drivers' driving techniques and traffic safety awareness.

(1) Enhance supervision of driving schools

The qualifications of the driving schools as well as the coaches were examined to ensure the quality of training. Violations of relevant laws and regulations during training or testing would be investigated and dealt with accordingly. During 2004 and 2008, about 1,900 driving schools were below the standard and canceled; more than 9,700 coaches were found to be unqualified and dismissed.

(2) Enhancement of driver education

Taking lessons from the advanced experience and practices in developed countries, the transportation departments formulated a syllabus for drivers' training in China. In September 2007, the Ministry of Transportation issued the revised syllabus for training motor vehicle drivers. According to the syllabus, there are four steps to the training: the first step is teaching the laws, regulations, and theoretical knowledge of driving; the second is training basic driving skills; the third is practicing the practical driving skills on roads, and the last step is giving instruction on the handling of malfunctions and then prevention of traffic accidents. The four steps are correlated with each other and constitute a complete training system.

Meanwhile, a book series called *Safe Driving Starts Here* was published in March 2005. This book series is suitable for all kinds of people, regardless of whether or not they are drivers. It plays a positive role in promoting traffic safety awareness across society.

Transportation department personnel went to schools, businesses, libraries, and homes to publicize the concept of safe driving and give away *Safe Driving Starts Here* book series, so as to formulate strong awareness of traffic safety across society.

2.5 Enhancement of the Management of Transportation Corporations

(1) Overloaded vehicles

Since the 1990s, overloaded vehicles on the roads have become a serious problem in China, particularly for having caused many traffic accidents. In 2004, the Ministry of Transportation and the Ministry of Public Security proposed a variety of measures regarding policies, economy, law enforcement and propaganda and education. These measures proved to be effective with the overloaded vehicle rate decreasing significantly.

➤ Principles:

- 1) Propose both short- and long-term measures to prohibit overloaded vehicles.
- 2) Carry out a nationwide campaign to implement the measures and strengthen coordination among

different departments and regions.

- 3) Reasonably consider the freight transport market's level of acceptance.
- 4) Conduct propaganda in advance and then carry implementation of the measure forward.

➤ Goal:

Create a healthy, standardized, fair, and orderly transport market. In about one year's time, effectively reduce the number of overloaded and oversized vehicles on the road; in three years, basically eliminate the overloaded and oversized vehicles, establish a reasonable pricing system and build an open, fair and healthy market.

➤ Actions:

- 1) Conduct large-scale propaganda.
- 2) Prohibit illegal reconfiguration of the vehicles.
- 3) Prohibit overloaded vehicles.
- 4) Take economic measures to balance the relationship between cost of transportation and benefit of overloading.
- 5) Promote an orderly transport market.

The following criteria were used to decide whether a vehicle was overloaded:

- 1) For two-axle vehicles, the total weight of vehicle and freight was over 20 tons;
- 2) For three-axle vehicles, the total weight of vehicle and freight was over 30 tons;
- 3) For four-axle vehicles, the total weight of vehicle and freight was over 40 tons;
- 4) For five-axle vehicles, the total weight of vehicle and freight was over 50 tons;
- 5) For vehicles with six or more axles, the total weight of vehicle and freight was over 55 tons;
- 6) The total weight of vehicle and freight was more than permitted on the license of transport.

➤ Results:

Between 2004 and 2007, the transport market witnessed the following results:

- 1) The number of overloaded vehicles declined dramatically. The overloaded vehicle rate decreased from 80% to less than 10%. In Beijing and many other cities, the rate was brought below 3%.
- 2) Road traffic safety improved. Although the total number of motor vehicles increased by 15% annually, the accident rate decreased by about 15% per annum. The number of accidents caused

by freight vehicles was reduced significantly.

- 3) The production and reconfiguration of motor vehicles was further standardized.
- 4) Road infrastructure was protected and road quality improved. The mitigation of overloaded vehicle damage to highways and bridges reduced the economic losses by 16 billion yuan every year.
- 5) Highway capacity increased and the average operational speed of freight vehicles rose by 20%.
- 6) The number of multi-axle and large-tonnage freight vehicles increased continuously. In 2006, the sales of heavy trucks reached 0.28 million, climbing by 15% from 2005. In the first half of 2007, the rate even surpassed 60%.

In October 2007, nine ministries of the State Council issued the *Notice of Long-Term Measures to Reduce Overloaded Vehicles*, which proposed the creation of a long-term mechanism to reduce overloaded vehicles over the subsequent three years.

(2) Transport of Dangerous Goods

Traffic accidents involving vehicles transporting dangerous goods pose enormous risks, including endangerment of people's lives and contamination of the environment. To counter these risks, the Ministry of Transport released three national and industry standards: the *Rules on Transport of Dangerous Goods*, the *Regulations of Transport and Loading of Dangerous Goods*, and the *Symbol of Motor Vehicles Transporting Dangerous Goods*. Personnel in charge of the transport of dangerous goods are required to be trained and assessed for their qualifications. Businesses with an incomplete safety system, motor vehicles not meeting the technical requirements, and unqualified personnel are not allowed to transport dangerous goods.

The Ministry of Transportation and related departments carried out nationwide inspections targeting dangerous goods transportation five times, resulting in revocation of the operating licenses of 25,186 unqualified transport corporations. As of April 2006, there were 6,038 corporations qualified for transporting dangerous goods, with 130,478 certified motor vehicles and 0.35 million licensed employees.

2.6 Improvement of Motor Vehicle Performance

(1) Prohibit production and sale of substandard counterfeit motor vehicle parts

On December 2003, the Ministry of Commerce, the Ministry of Public Security, and some other ministries issued the *Notice on Management of Motor Vehicle Market*, which requires that illegal production and sale of counterfeit vehicle parts be prohibited and punished according to the relevant laws and regulations.

(2) Adjustment of the composition of motor vehicle types

The Ministry of Transportation promoted the evaluation system for operational passenger vehicles to upgrade the passenger vehicles on the roads. The toll for large-tonnage vehicles and

container-transport vehicles was lowered. The composition of freight vehicle types was adjusted to reduce energy consumption and improve transport efficiency and safety.

(3) Vehicle inspection

On February 2006, the National Quality Inspection and Quarantine issued the *Regulation on the Safety Inspection Agencies of Motor Vehicles*, which took effect in the following May. The aim of the regulation is to supervise the motor vehicle inspection agencies to ensure the authenticity of the inspection results.

(4) Management of vehicles used for agricultural purposes

On October 2007, the Ministry of Agriculture issued the *Proposal on Strengthening the Supervision of Vehicles for Agricultural Purposes*. This is aimed at improving the technical skills of drivers of vehicles for agriculture purposes, enhancing the mechanical safety of agricultural machines, and increasing the registration rate of agricultural vehicles.

(5) Establishment of the China New Car Assessment Program (C-NCAP)

The China New Car Assessment Program was established by the China Automobile Technical Research Center. Every year, the center selects candidate car models for assessment through a battery of tests, including fuel consumption and crash tests. The results are released to the public to guide consumers' choices. The program operates under rigorous assessment rules, and assigns each car model examined a star rating based on the testing results, with 5+ being the highest and 1 the lowest. It provides consumers with useful information and encourages car manufacturers to design and produce cars with higher safety standards. As a result, the program has the potential to reduce both the incidence of traffic accidents and the damage they cause.

(6) Establishment of a defective car recall system

On March 2004, the National Quality Inspection and Quarantine, the National Commission of Development and Reform, the Ministry of Commerce, and the General Administration of Customs jointly issued the *Regulation on Recall Management of Defective Motor Vehicles* to establish a recall system for defective motor vehicles in China. Since 2004 about 3.2 million motor vehicles were recalled due to potential safety defects.

2.7 Improvement of Road Infrastructure

(1) Highway Safety Enhancement Project

In December 2003, the Ministry of Public Security and the National Safety Supervision Bureau urged the improvement of dangerous highway segments. In 2004, the Ministry of Transportation launched a three-year Highway Safety Enhancement Project, and expanded the program in 2007 to include county and rural roads. Between 2004 and 2006, the investment in the program reached 9.01 billion yuan.

Approximately 278,000 road segments with a cumulative length of 83,000 kilometers were improved. In 2007 and 2008, a further 4.85 billion yuan was invested into the program to improve 163,000 road segments totaling 55,000 kilometers in length. As a result, the program has effectively enhanced highway safety. Furthermore, in 2007, the Technical Research of China's Road Safety Program received the second-place award of the European Road Safety Prize bestowed by the International Road Federation (IRF).

(2) Reconstruction of dangerous bridges

At the end of 2009, there were 621,900 highway bridges in China, most of which were constructed in the preceding two decades. Some bridges had become dangerous due to aging, structural damage and the relatively low design standards of the past. Improving the safety of these bridges was made the top-priority mission of road safety authorities. Between 2001 and 2005, the Ministry of Transportation invested 1.5 billion yuan to reconstruct 7,000 dangerous bridges, and issued the new *Highway Bridge Maintenance Regulations* to require highway administrative agencies to inspect and assess bridge conditions on a regular basis. In 2007, the Ministry of Transportation decided to further its efforts by setting the goal of basically completing, in the three years from 2008 to 2010, the reconstruction of all dangerous bridges on national and provincial highways, as well as important ones on county and rural roads.

2.8 Emergency Management

(1) Forecast of severe weather conditions

Road traffic safety can be greatly affected by adverse weather conditions (such as fog, snowstorms and torrential rain) and natural disasters (such as mud-rock flows and landslides in mountainous areas, and floods). On July 2005, the Ministry of Transportation and the Bureau of Weather Forecast signed a memorandum pledging to jointly carry out highway weather forecasts. According to the memorandum, relevant weather information would be released in advance based on rain forecasts in the rainy season and inspection of fog conditions along the highways. The relevant emergency response, information feedback and evaluation mechanisms were established.

On January 2007, the Ministry of Public Security and the Bureau of Weather Forecast issued the *Notice of Establishing a Road Traffic Weather Information Exchange and Release System*, which requires weather forecast agencies and public security agencies to: share information on road traffic and weather; establish a channel for information exchange; and create a system for broadcasting advisories, traffic management information and travel safety information via media such as television, the Internet, short message services and display screens.

(2) Pre-planning for emergencies

Since 2003, public security agencies have been establishing plans for emergencies of different levels based on different road traffic situations. To date, all provinces, 97.9% of all cities and 92.8% of all

counties have established about 1,813 plans for traffic management during emergencies to reduce the adverse impact of severe weather and unexpected incidents. The Ministry of Public Security formulated the a plan for freeway emergency rescue, established an emergency rescue team consisting of mainly firefighters and police officers, and promoted coordination and cooperation among different departments. In 2008, 25,000 traffic accident victims were saved due to prompt rescue. Transportation agencies established the ministerial and provincial highway network emergency management platform for the network supervision and traffic information broadcasting.

2.9 Traffic Safety Propaganda and Education

From October 2004 to February 2005, the Ministry of Public Security conducted nationwide traffic safety awareness campaign themed “Care for your life and have a safe trip.” Traffic safety propaganda and education were positioned as key measures for preventing road traffic accidents.

In April 2006, the Ministry of Propaganda, the Ministry of Public Security, the Ministry of Education, the Ministry of Law, and the Bureau of Safety Production Supervision decided to conduct the nationwide propaganda and education project “Protect life and have a safe trip” from 2006 to 2008. The goal of the three-year effort was to: formulate a mechanism for traffic safety propaganda involving various departments, including public security, education, law administration and safety supervision at the provincial, city and county levels; carry out propaganda in rural areas, communities, businesses, schools and homes; reduce significantly traffic violations such as unlicensed driving, fatigue driving, speeding, overloading, drunk driving and so on. The project for 2006 was themed “Pay attention to the traffic and protect people’s lives” and was mostly targeted at conducting propaganda and education on road traffic safety laws and regulations, and on basic safety knowledge. In 2007, an “Obey the law anytime anywhere” project was implemented to focus mainly on deterring traffic violations and creating a safe, convenient and sustainable traffic environment. The project for 2008 was “Welcome the Beijing Olympics and be civilized,” which promoted civilized and safe road travel under the circumstances of the Beijing Olympic Games.

2.10 Traffic Safety Technology

In order to reduce the trend of increasing accidents and provide technical support to road safety improvement in China, the Ministry of Transportation organized and carried out a series of basic studies on traffic safety, and then applied the findings to road safety improvement. In 2004, the “Highway Traffic Safety Technology Research” project was conducted to solve the most significant technology issues at that time and to develop safety design methods for improving road traffic safety. The project focused on the following technical needs in China:

- Research for creating a highway safety manual
- Highway safety database technology
- Safety technology for roads with long, steep slopes

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- Safety technology for fog areas on freeways
 - Development and testing of highway protective facilities
 - Formulation of methods for roadside safety evaluation and protection
 - Safety analysis of highway tunnel entrances
 - Safety analysis of tourist highways in forested areas
 - Intersection safety improvement technology
 - Improvement of sign legibility and the effectiveness of supporting facilities
 - Import of foreign standards and specifications
 - Development of test standards and regulations for highway traffic engineering projects
 - Establishment of traffic management information system standards for highways in western China

On February 2008, the Ministry of Science and Technology, the Ministry of Public Security and the Ministry of Transportation launched a program entitled “Science and Technology Action Program for National Road Traffic Safety.” This program integrated the resources of the Ministry of Transportation and the Ministry of Public Security for the first time and established a mechanism for data and resource sharing. As the largest cooperative program for road traffic safety in China, its goal was to improve road accident prevention, advance warning and emergency rescue for road traffic accidents and effectively prevent severe traffic accidents causing more than ten fatalities. The key technology research and demonstration projects are listed below.

- Intervention technology for road users, including behavioral analysis of road users, supervision and prevention of risky behavior, abnormal behavior identification and advance warning, driver adaptation to the environment and so on.
- Vehicle safety and transportation operational technology, including vehicle surveillance, overloading control, active and passive safety technology for vehicles, supervision of dangerous goods transportation and so on.
- Road infrastructure safety technology, including safety design, operation and evaluation of road infrastructure, surveillance, advance warning and improvement of bridges and tunnels, and surveillance of traffic operations under severe weather conditions.
- Road traffic management and safety technology, including the handling of traffic accidents, emergency management, traffic information broadcasting, traffic guidance on dangerous road segment, traffic operations under abnormal conditions, traffic accident analysis, identification of restricted vehicles and information exchange and control.

Following the launch of this program, a task force consisting of senior experts decided that the first phase would focus on implementation of the “Severe Road Traffic Accident Prevention and Treatment Technology Development” project to target the following key technologies:

- Traffic Safety information integration and analysis platform
- Safety technology for highway networks in mountainous areas
- Freeway safety technology

- Commercial vehicle safety technology
- Human behavior and traffic safety
- Regional highway network safety surveillance and evaluation, and emergency management
- Road traffic law enforcement technology

The project seeks to develop a mountain highway safety system that will reduce traffic accidents by 30% and severe traffic accidents by 50% on the demonstration highway segments. Also, a freeway safety system is being created to realize traffic guidance and weather services over distances longer than 100 km and with response times less than 15 minutes. At the same time, the project is developing a traffic law enforcement and emergency management system covering more than 1,000 km, and an interactive long-distance traffic safety education system.

Using existing databases of the public security and transportation departments, the project team is conducting research on a mechanism for data sharing and exchange, designing a traffic safety sharing and exchange system, and developing a traffic safety analysis and decision support system for the aiding the formulation of policies, laws, regulations and safety measures.

It is expected that implementation of the first phase of the project will lead to annual decreases in the number of traffic accident fatalities, bringing the fatality rate per 10,000 vehicles close to the level of developed countries.

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