ABSTRACT
Although the road safety in China has made great achievement, the current situation is still not optimistic. The new situations and challenges of road safety in China are analyzed. There are still many factors affecting road traffic safety, and the foundation of road safety is still weak. Currently, the accidents are likely to relapse, the accident rate and lethality rate are very high, the road safety in rural areas is not optimistic, the accidents caused by commercial vehicles frequently happened, and the devastating accidents with group deaths and injuries are still very frequent. The challenges include: the hidden dangers are prominent, the safety awareness of citizens is very poor, and the management, enforcement of road safety and emergency rescue skills are low.

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. Although the road traffic safety has been keeping a relatively stable level, there are still many factors affecting road traffic safety, and the foundation of road safety is still weak.

1 CURRENT SITUATIONS OF ROAD SAFETY

1.1 Accidents are likely to relapse
China’s road accidents have been keeping a decreasing trend since 2005 with an annual drop of 8.61%, a period witnessing the most rapid and biggest drop. But one can’t deny that China is still at a stage of high frequency of road accidents with annual fatalities ranking the 2nd in the world. It is an uphill battle to improve road safety. China is still at the early stage of motorization. Contradiction between increasing transport demand and road infrastructure is still unchanged and unsafe road elements still exist. Seen from the experiences of developed countries, per capita GDP is around 8600 USD (based on USD international price in 1985) (Koppits E., 2005), fatality rate of road accidents will reach to the peak. China’s per capita
GDP was only 5,432 USD in 2011 (National Bureau of Statistics of China, 2012), meaning that fatality rate of road accidents in China is likely to increase. The pending existing road safety problems and lack of overall cultural quality and road safety awareness of citizens make the foundation of improving road safety very weak. 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.

1.2 High accident rate and lethality rate
Though China has made a long way in improving road safety, accident rate per 100 million vehicle kilometers traveled and fatality rate per 100 million vehicle kilometers traveled on national highway network and expressways have been dropped obviously. But without doubt, compared with developed countries, China’s road accident rate is relatively high, such as accident rate per 100 million vehicle kilometers traveled and fatality rate per 100 million vehicle kilometers traveled are much higher than that of US, Japan, and Britain. Therefore, China’s road safety situation is not that optimistic.

China’s accident lethality rate is relatively high. According to data released by Ministry of Public Security, China’s lethality rate is increasing in recent years. In 2011, China’s road accident fatality rate reached to 5.15%, meaning that 1 would die among 20 injuries. China’s lethality rate is higher than that of developed countries, shown in Figure 1. China’s accident fatality rate is almost 4-9 times of its developed counterparts.

![Figure 1: Lethality rate of road accident in China, US, Japan, and Britain (Source: OECD, 2012; Zhang J., 2012)](image-url)
China’s accident lethality rate is much higher than that of developed countries, a fact showing that China’s accident emergency rescue and medical skill can’t meet needs and lags behind of developed countries, making injured persons die or disable because of missing the best cure time, hence high lethality rate and disable rate. Therefore, China’s emergency rescue and capacity building of medical rescue of road accidents should be established faster.

1.3 Road safety in rural areas is not optimistic

Accidents on rural roads are high in proportion. In recent years, with the decrease of China’s road accidents, number of accidents on rural roads has also dropped. Although the number of road accidents on rural roads has been declining, the proportion of accidents has been very high. Recently, this proportion is climbing (that of 2010 is lower than 2009), shown in Figure 2. In 2011, the number of accidents on rural roads, fatalities and injuries was 40.14%, 31.82% and 39.81% respectively. That is to say, among 3 fatalities in the accidents happened on highways, 1 is died in accidents on rural roads. Compared with 2005, number of accidents on rural roads, fatalities and injuries has been increased by 6.05, 3.44 and 4.41 percentage points.

![Figure 2: Proportion of fatalities on rural roads in that of highway accidents (2005-2011)
(Source: Traffic Administrator Bureau, 2005-2011)](image)

Accidents with group deaths and group injuries are often on rural roads. From 2005 to 2011, 51 accidents with over 10 deaths in one accident happened on rural roads, killing 704 persons and injuring 640 persons. In the recent 7 years, the number of accidents, fatalities, injuries with over 10 deaths in one accident on rural roads accounts for 22.67%, 20.26% and 19.38% of devastating accidents with over 10 fatalities in one accident (Zhang J., 2012).
Among the devastating accidents with over 10 fatalities in one accident on rural roads, the run-off-road accidents including falling to cliffs, rivers, gouges and bridges are the most prevalent. From 2005 to 2011, among the 51 devastating road accidents with over 10 fatalities in one accident, 36 were the run-off-road accident, accounting for 70.59%, shown in Figure 3. The run-off-road accident has made accident more serious and it should be prevented. The run-off-road accidents are highly frequent on rural roads, which is relating to lack of safety facilities. In recent years, China’s rural road construction has made great achievements with vehicle mileage increasing fast, road surface level and quality improving greatly, but some of rural roads lack of safety facilities due to fund strait and development concept. So the run-off-road accidents are very likely to happen due to absence of safety facilities despite of improved road conditions and increased travelling speed.

Figure 3: Devastating accidents with over 10 fatalities in one accident on rural roads (2005-2011) (Source: Traffic Administrator Bureau, 2005-2011)

1.4 Frequent accidents caused by commercial vehicles
Accidents caused by commercial vehicles are still very frequent. In recent years, the total number of accidents caused by commercial vehicles has been declining year on year, same with fatalities and injuries. At the same time, the proportion of accidents caused by commercial vehicles has also been decreasing though it is still very high. In 2011, 53,950 accidents caused by commercial vehicles happened, killing 22,432 persons and injuring 58,886, accounting for 27.23%, 37.60% and 26.22% respectively. In the same year, China had over 21.95 million units of commercial vehicles, only taking up 9.77% of all motor vehicles.
Although number of accidents caused by commercial vehicles is declining, it is still high compared with population of the vehicles. Therefore, containing and preventing accidents caused by commercial vehicles should be one of the highlights to improve road safety.

Commercial vehicles are still the major perpetrator of accidents with group fatalities and injuries. In the recent 7 years, number of devastating accidents with over 10 fatalities in one accident caused by commercial vehicles has been declining generally. In 2005, number of devastating accidents with over 10 fatalities caused by commercial vehicles was 43, which was reduced to 18 in 2009 with a decrease rate of 58.41%, but it was increased by 6 to 24 in 2010, and it was decreased to 19 in 2011. In the devastating accidents with over 10 fatalities, proportion of accidents caused by commercial vehicles is still very high though it has been declining, reaching to as high as 91.49% in 2005 and 70.37% in 2011, shown in Figure 4. Commercial vehicles are one of the main reasons behind devastating accidents, and should be prevented.

Figure 4: Devastating accidents with over 10 fatalities in one accident caused by commercial vehicles (2005-2011) (Source: Traffic Administrator Bureau, 2005-2011)

Among the devastating accidents with over 10 fatalities in one accident caused by commercial vehicles, most of them were caused by passenger vehicles. In the recent 6 years, among the devastating accidents with over 10 fatalities in one accident caused by commercial vehicles, 3/4 were caused by passenger vehicles, 1/4 by cargo vehicles. Major reason is that former has more passengers, which is likely to lead to group deaths and group injuries if there has an accident.
1.5 Devastating accidents with group deaths and injuries are still very frequent

The prevention of the devastating road accidents with group deaths and injuries is always one of the important works of the road traffic safety management because of lots of fatalities and the serious social impact. Among the devastating road accidents, the accident with over 10 fatalities in one accident is extraordinarily serious. Since 1990s, the number of devastating accidents with over 10 deaths in one accident every year has decreased after increasing with two obvious peaks, shown in Figure 5. 1996 witnessed 80 devastating accidents with over 10 fatalities in one accident, killing 1,279 and injuring 1,495. 2004 witnessed 55 devastating accidents with over 10 fatalities in one accident, killing 852 and injuring 877. From 2005 to 2007, with the improvement of China’s overall road safety, number of devastating accidents over 10 fatalities in one accident has decreased greatly. Since 2008, the accidents with over 10 fatalities in one accident and injuries took on the trend of waves. In 2009, 24 devastating accidents with over 10 fatalities in one accident happened, killing 329 and injuring 345. Number of accidents, fatalities and injuries was the historical low in 2009. But in 2010, that number surged to 34 with 461 fatalities and 432 injuries, and in 2011, that number surged to 27 with 455 fatalities and 404 injuries. The frequent accidents show that China is standing at a high frequent stage of road accidents, and more efforts are needed to make improvement.

![Figure 5: Accidents with over 10 fatalities in one accident (1990-2011) (Source: Traffic Administrator Bureau, 2005-2011)](image)

Accidents have many patterns with the run-off-road accident as the majority. Devastating accidents with over 10 fatalities in one accident have many patterns, including head-on collision, offset collision, facing scrape, turnover, rolling compaction, rear-end collision, hit fixed objects, fire, explosion and run-off-road collision, etc. Of which, the run-off-road accidents including falling to cliffs, valleys, rivers and bridges are the majority, accounting
for 49.33% of accidents with over 10 fatalities in one accident from 2005 to 2011, shown in Figure 6.

![Figure 6: Run-off-road accidents with over 10 fatalities in one accident (2005-2011) (Source: Traffic Administrator Bureau, 2005-2011; Zhang J., 2012)](image)

The run-off-road accident aggravates road accidents’ severity, killing and injuring more people. So prevention of run-off-road accidents should be strengthened to contain devastating accidents with group deaths and accidents. At the same time, frequent run-off-road accidents show that the road sections lack protective facilities or the grade of protection needs to be upgraded. Therefore, efforts should be made to step up setting up of roadside protection facilities in the accident prone sections, add protective facilities and improve their protective grade.

2 CHALLENGES OF ROAD SAFETY

2.1 Hidden dangers are prominent

Hidden dangers brought by rapid development of motorization. By the end of 2011, China’s motor vehicle ownership has increased to 225 million units, recording an annual growth rate of 11.06% from 2004 to 2011. Motor vehicle per 1,000 persons increased from 83 in 2004 to 167 in 2011. The rapid development of motorization will certainly bring hidden danger for safety. China’s motorization needs to be improved greatly. Compared with developed countries, China’s motorization is still underdeveloped, standing in the infancy. In 2010, motor vehicle per 1,000 persons was 155 in China, but 832 in US, 646 in Japan, 565 in Britain and 584 in Sweden. China’s motorization needs to be improved greatly, which will bring a long-term influence for China’s road safety.

Hidden dangers brought by huge number of motorcycles. Motorcycles have been dominant in China’s motor vehicles, reaching to as high as 62.63% of the total against 33.28% of
automobiles. With China’s fast economic development, more and more people choose automobiles, making automobile ownership increasing constantly while that of motorcycle decreasing. By the end of 2010, the proportion of the motorcycle ownership was reduced to 48.30%, and that of the automobile increased to 43.88%. Despite to the changes, motorcycles are more than automobiles in absolute numbers. By the end of 2010, China had 100 million motorcycles. It is predictable that the motorcycle ownership will continue to increase in the future.

Most of motorcycles are used in middle and small cities and rural areas, becoming major vehicle for farmers to travel and transport living materials in rural roads. However, the huge number of motorcycles has brought hidden dangers in rural areas, such as violated driving and no license driving, leading to many accidents and hidden dangers. In addition, the big number of re-fitted motorcycles which safety performance can’t be guaranteed. According to statistics of Ministry of Public Security, in 2011, 46,749 accidents were caused by motorcycles, killing 11,070 and injuring 59,455, accounting for 22.18%, 17.74% and 25.04%.

Road infrastructure has hidden dangers. Constraint by fund, environment and concept, some of the roads built in mountain areas at early times are steep and bumpy with rivers or gouges along, poor driving environment and frequent accidents. Though the Highway Safety Enhance Project (HSEP) has been underway for many years, lack of money leaves many sections unrepaird. Despite of rapid development of rural roads, most of rural roads are low in standard lacking necessary safety protection facilities. Due to poor traffic safety management of rural roads, the road accidents happen frequently.

2.2 Poor safety awareness of citizens
Traffic violations by motor vehicles are prominent. In recent years, the number of irregular driving, drivers educated and punished has been keeping high. In 2011, the numbers stood at 302 million, 55.79 million and 246 million, demonstrating that traffic violations were prevalent and big in numbers. The most prevalent and prominent irregularities are speeding, cargo overloading, driving with no license, drinking driving, overloading of passenger vehicles and drunk driving. Traffic violations of motor vehicles have led to increase the proportion of the road accidents caused by traffic violations year on year. Statistics from Ministry of Public Security show that number of accidents, fatalities and injuries in accidents caused by traffic violations of motor vehicles stood at 90.86%, 92.51% and 91.45% respectively (Traffic Administrator Bureau, 2011).

Non-motor vehicles, pedestrians and passengers lack awareness of abiding by traffic regulations. Like violations made by motor vehicles, the number of punished non-motor vehicles, pedestrians and passengers, and persons to be educated and punished has changed a lot and relatively big in absolute numbers. In 2011, these numbers stood at 25.65 million, 17.46 million and 8.19 million respectively. The number of punished pedestrians and passengers, persons to be educated and punished was 25.18 million, 18.63 million and 6.54 million.

2.3 Management, enforcement and emergency rescue skills are low
China’s concept, mechanism, tools, methods of traffic management and management personnel’s quality and capacity can’t adapt to social and economic development. Especially lack of police for traffic safety is prominent. By the end of 2009, China’s rural roads reached to 3.336 million kilometers, but only 21,000 policemen managing rural roads, namely 160
kilometers per policeman, leaving some of rural roads no management (Meng J. 2010). Number of policemen can’t catch up with the development of newly built expressways.

In recent years, despite of great achievements, China has made a long way in accident rescue; the accident emergency rescue skill is still in the infancy, leading to high lethality rate and disable rate, and more losses and social burden. Therefore, necessary trainings of medical emergent rescue for drivers should be available, making them master basic skills to rescue injured persons on the spot of accidents, strengthen “half hour in the prime time” rescue system and improve emergency rescue skills.

3 CONCLUSIONS

The road safety in China is facing the new situations and challenges with the decline of accidents and fatalities. The road safety in rural areas is not optimistic, the accidents caused by commercial vehicles frequently happened, and the devastating accidents with group deaths and injuries are still very frequent. These influence the continuous improvement of road safety in China. And any negligence will make road accidents relapse strongly. Meanwhile, the accident rate and lethality rate is still very high. The foundation of road safety is still weak. The hidden dangers are prominent, the safety awareness of citizens is very poor, and the skills of the management, enforcement and emergency rescue are poor. And the further efforts should be made to further improve the road safety in China.

REFERENCES


