

# Road Safety in China

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China is in the early stages of motorization. The road safety issues that arise are interesting since they indicate that although a few are unique to early motorization, many are associated with more motorized countries such as Canada. The 1.2 billion Chinese are concentrated in roughly the eastern third of the country. Recent economic reforms have greatly expanded the motorized vehicle fleet to 16 million but have done little for the road system. Bicycles dominate personal transport and number over 300 million. There were 49,271 reported highway fatalities in China during 1990. The fatality rate per 10,000 motor vehicles is 48, roughly 19 times that of Canada. Cyclists and pedestrians account for about 60 percent of the fatalities. The majority of accidents may be attributed to a driver's violation of laws, carelessness, vehicle mechanical faults, and poor road facilities. An interesting question for road safety professionals is Can China avoid an enormous carnage on its highways by adopting Western road safety programs? Lives saved could number up to half a million a year.

The characteristics of China's traffic safety record are those associated with early motorization. They result from many unique factors, yet certain similarities to other motorized countries exist.

China is divided into 27 provinces and three city districts (1). The country's area is slightly larger than that of the United States, and the population of 1.2 billion is about four times that of the United States. Two-thirds of the country is mountainous or semi-desert. The eastern regions are fertile plains and are densely populated. The densest areas have more than 500 people/km<sup>2</sup> and include the largest cities of Shanghai, Beijing, and Tianjin.

Since the end of the Cultural Revolution of 1966 to 1976, China has concentrated its efforts on economic development. The gross national product (gnp) per capita in 1988 of U.S. \$320 does not yet reflect the effects of the new policies. Color television, refrigerators, private motorcycles, and private four-wheel "agricultural" tractors are now pouring into the market.

Chinese cities normally administer not only their urban districts but also the surrounding rural districts. The city is the commercial center. Suburban and rural areas have the role of providing agricultural products and major industrial sites. However, many rural industrial sites find themselves surrounded by rapidly expanding urban development.

Because of the fast pace of development, the demand for mobility by both people and goods has become greater. Roadway capacity cannot match the rapid growth in the number of vehicles. Road capacity growth is less than 5 percent, whereas motor vehicle growth is at 20 to 25 percent annually (2). Figure 1 presents the expansion of capacity compared with the number of vehicles in Beijing (3). In many cities, traffic volumes have exceeded the design capacities of existing road facilities, and congestion is common.

The mixing of motor vehicles and nonmotor vehicles is characteristic of China, and another is the mixed traffic of ordinary motor vehicles and slow-moving vehicles, such as tractors. More commercial vehicles than passenger cars use the roads. The proportion of motor vehicles in China (4) was as follows (in thousands): cars, 845; commercial vehicles, such as trucks, 3,367, buses, 439, and other, 607; tractors, 6,367; and motorcycles, 4,141. The number of bicycles is given in Table 1. Buses and bicycles are the major modes of personal travel in urban China. Passenger cars are largely government owned or taxis. Trucks comprise the majority of the motor vehicles. Most trucks weigh between 4000 and 5000 kg and are manufactured in China. Trucks also are used frequently to transport people in the cargo area, although this practice is illegal. To relieve congestion, trucks often are prohibited from entering major downtown streets during the day.

The volume of goods transported and the number of passengers who traveled by agricultural tractors (with tires) are quite significant, although the relevant data in China do not always include those tractor-related trips. Tractors often are banned on major streets in central urban areas.

The majority of motor vehicles are owned by the government and driven by professional drivers. Driving is a job position in China. Recent policies allowed for the private ownership of motor vehicles, such as tractors and motorcycles. A total of 43 percent of the 6.89 million tractors and 42 percent of the 5.24 million motorcycles were privately owned in 1988 (4). A few trucks and buses are owned by private companies or individuals, but they tend to be in poor repair.

## ACCIDENT SEVERITY IN CHINA

China has a very high rate of road accident deaths. During 1988, China had 54,814 roadway deaths, the highest among the four largest-population countries on the planet (1,5,6) (see Figure 2). The rate of deaths per 10,000 motor vehicles in 1985 was 48, which was about 19 times that of Canada or the United States, and is similar to that of India, another early motorized country (5-7).

The absolute numbers of reported accidents and casualties in all of China are given in Table 2 (8). Note that the number-of-deaths peak was 54,814 in 1988, the injury peak was 187,399 in 1987, and the accident peak was 298,147 in 1987. The same indexes in urban China have similar trends. In 1988, 136,926 (50 percent) of the total 276,071 accidents; 20,214 (37 percent) of the total 54,814 deaths; and 75,077 (44 percent) of the 170,598 injured in China happened in urban areas.

The accident rates in several large cities (nationwide urban rates are unavailable) revealed the severity of accidents in urban China. Table 3 lists some major indexes from 1982 of roadway safety in 10 major cities (9). In 1982, the average ratio of deaths per 10,000

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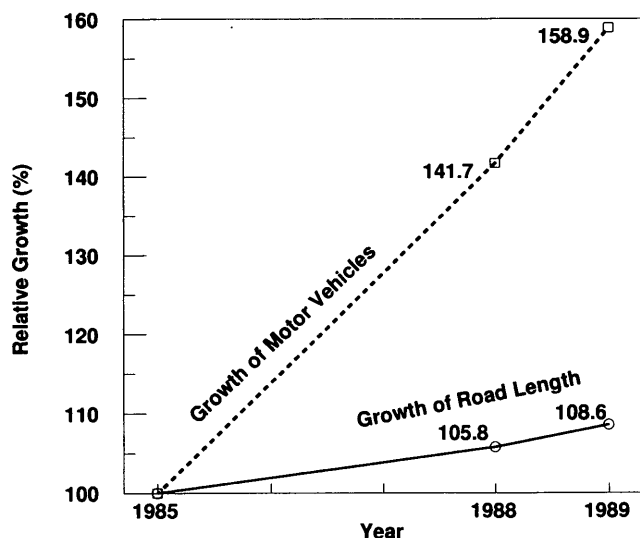


FIGURE 1 Comparison of growth rates between motor vehicles and road length in Beijing (3).

registered motor vehicles was 46; the average ratio of deaths per 100,000 people was 8; and the motorization ratio of number of motor vehicles per 1,000 people was 17.

### ACCIDENT CHARACTERISTICS

Bicycles are involved in a high proportion of accidents in urban China. Shanghai's statistics give the 5-year trend of bicycle-involved accidents (Table 4). According to the Shanghai Statistics Bureau Shanghai's cyclists were involved in 42.4 to 27.2 percent of the total accidents, 36.2 to 30.6 percent of the total deaths, and 44.5 to 38.9 percent of the total injuries. The Beijing Statistics Bureau shows that nonmotor vehicle users (mainly cyclists) and vehicle occupants were the two major classes of casualties (each had similar shares), whereas pedestrian victims had only a minor share, as shown in Table 5.

India, another developing country, has a level of motorization similar to that of China. The reported traffic safety rate of 15 deaths per 10,000 vehicles is much lower than the 46 in China. Studies in India reveal that 45 percent of the victims in a city are pedestrians (15.6 percent, Beijing), 19 percent are cyclists (38.7 percent, Beijing), and 16 percent are motorcyclists (6). These differences probably reflect the significantly different urban traffic situations in the cities of these two countries. One significant difference is that China had 224 million bicycles, 7.2 times that of

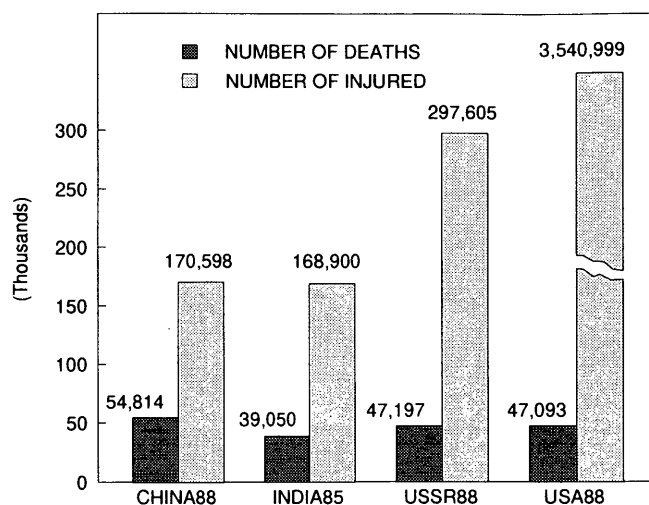


FIGURE 2 Casualties in largest-population countries (1,5,6,7).

India (31 million) in 1985, whereas China's population was 1,045 million, just 1.4 times that of India (749 million) (4,6).

Urban statistics showed that most accidents happened on road sections away from intersections. In 1985 in the cities of Beijing, Guangzhou, Changchun, and Tianjin (1) between 71 and 80 percent of traffic fatalities occurred on nonintersection parts of streets, and only 20 to 29 percent occurred at intersections. In Beijing most fatalities occurred on arterial streets and very few occurred on small alleys (*Hu Tong* in Chinese). Changchun's data revealed that the most frequent accident locations were at those road sections adjacent to the entrance or exit gates of large units. Units in China are best described as compounds and are locations where people go for their work, school, and recreation, and related activities. These compounds often have a main gate that handles the majority of access to and from the urban roads. The gates are usually away from the intersections. Among 14 frequent-accident locations in Changchun, 12 of them are at such gate locations and only 2 are at intersections. Drivers' carelessness often contributes to accidents at these gate locations. Unlike intersections, where drivers are aware of the presence of police and of the potential dangers of accidents, drivers are often oblivious of the potential dangers on roads between intersections and especially at the entrance-exit gates of large units.

The casualty accidents in Beijing from 1981 to 1985 as given in Table 5 indicate that among urban, suburban, and far-suburban areas, each had about one-third of the accidents. However, the fatal accident number indicates that they happened in far-suburban and suburban areas and only 12.3 percent happened in urban areas. The more mixed-traffic stream and higher-speed differences are

TABLE 1 Bicycles and Motor Vehicles in China (in thousands) (4)

Year	Number of Motor Vehicles*	Number of Bicycles
1985	9,242	223,640
1986	11,930	258,030
1987	15,766	293,130
1988	N.A.	333,120

\* Motor vehicles also include tractors (tired) and motorcycles

TABLE 2 Accident Data in China (8)

Year	Number of Accidents	Number of Injuries	Number of Deaths
1985	202,394	136,829	40,906
1986	221,948 (105,880)	144,200 (63,443)	42,237 (12,579)
1987	298,147 (199,568)	187,399 (80,612)	53,439 (18,293)
1988	276,071 (136,926)	170,598 (75,077)	54,814 (20,214)
1989	258,030 (128,570)	159,021 (70,784)	50,441 (19,148)
1990	250,297	155,072	49,271

TABLE 3 Road Safety Indexes in 10 Chinese Cities, 1982 (9)

Cities	No. of Motor Vehicles per 1,000 People	Deaths per 1000 Vehicles	Deaths per 100,000 People	Deaths per 1,000 km of Road
Beijing	25.81	38.63	9.97	208
Shanghai	12.94	55.66	7.20	473
Tianjin	14.97	55.30	8.28	393
Shenyang	13.61	43.57	5.93	179
Wuhan	14.51	56.22	8.16	185
Guangzhou	19.89	30.06	5.98	360
Haerbin	14.45	44.43	6.42	194
Chuangqing	13.75	60.14	8.27	185
Najing	21.05	40.53	8.53	230
Xian	20.73	49.07	10.17	362
Average	16.99	46.39	7.88	257

TABLE 4 Bicycle Accidents in Shanghai

Year	Bicycle Accidents		Injuries of Cyclists		Deaths of Cyclists	
	Number	% of Total	Number	% of Total	Number	% of Total
1984	3,445	41.4	3,348	44.5	167	33.1
1985	2,459	34.5	2,267	39.6	211	30.6
1986	2,596	30.8	2,414	39.2	224	33.0
1987	2,658	26.3	2,620	38.9	254	31.3
1988	2,422	27.2	2,194	39.6	256	36.2

TABLE 5 Traffic Accidents in Beijing, 1981-1985

	Vehicles %			Area		
	Vehicle Drivers	Cyclists*	Pedestrian	Urban	Sub-urban	Far-urban
Accidents	-	-	-	32.7	37.9	29.4
Injuries	41.6	45.7	12.7	36.3	36.0	27.7
Deaths	45.7	38.7	15.6	12.3	34.0	53.7

\* Includes small percentage of other non-motor user victims.

TABLE 6 Accident Deaths by Career in Beijing, 1985

Victim Class	Number of Deaths	Percentage of Total
Peasants	305	40.2%
Workers	178	23.5%
Non-classified Residents*	79	10.4%
Office Personnel**	78	10.3%
Students***	34	4.5%
Drivers	34	4.5%
Others	51	6.6%
Total	759	100.0%

\* "Shi-Min": city residents who do not work.

\*\* "Gan-Bu": "Cadres" - those doing office work.

\*\*\* Students: elementary and secondary school students.

the major causes of casualties in suburban areas, where inexperienced peasant cyclists and drivers of slow-moving, less-safe tractors are sharing the narrow highway with high-speed and high-volume traffic.

Three factors come together to cause the severe safety problem in China: poor road conditions on roads at city boundary sections; risky driving of low-speed tractors and high-speed vehicles; and peasants.

Roads at the city boundary very often have no agency that is clearly responsible for their management. The city is managed by urban development management bureaus and rural sections by provincial highway departments. There is lack of coordination between the two departments in designing and managing the connections, and road facilities in these places are usually poorly maintained. In addition, there are always high demands of mixed traffic volumes. For example, the east gate in Xian during 1980 (10) had an average volume of 8,657 bikes and 4,599 motor vehicles (including tractors and motorcycles) per hour in two directions, on a road 12 m wide. This volume was counted during a 14-hr observation period. At the west location, average volumes of 6,426 bikes and 3,369 motor vehicles per hour were counted on a 10- to 11-m wide road during 13.5 hr of observation. These volumes far exceeded the design capacity of the roads. Similar situations exist in many other Chinese cities. Bicycle-related accidents are dominant at these boundary points. At Xian's west connecting point, 65.5 percent of total accidents were bicycle related from 1976 to 1980 (10).

The mix of slow and fast motor vehicles in suburban areas creates many potential conflicts. Higher volumes of tractor traffic exist with other motor vehicles, as well as cyclists, animal-drawn carts, and pedestrians. Since tractors are slow vehicles, the frequent passes by high-speed vehicles on the narrow roads impose extra dangers on tractors, cyclists, and pedestrians, as well as the drivers themselves. In 1987, tractors in China caused 15,922 (registered) accidents, 4,215 deaths, and 10,804 injuries. The corresponding increases from 1986 were 5.3, 7.9, and 5.8 percent. The fatality rate, measured as rate of death per casualty, was very high at 28 percent (1).

Private vehicles also cause serious safety problems in China. Unlike government-owned companies, private companies are concerned about their productivity and tend to ignore safety. Having poor vehicles and a limited budget, they willingly risk lives to make quick and temporary benefits by cutting maintenance and other operating costs. Often overloaded, these vehicles always rush to their destinations at speeds much higher than are safe

speed limits on narrow roads in poor condition. The potential for severe accidents is especially high in rural areas.

Accident deaths of peasants accounted for 40.2 percent of the total in Beijing during 1985 (see Table 6). The national census of 1990 shows that Beijing's rural population was 26.92 percent of the total (1), and deaths of peasants in 1985 overrepresented their population. Peasants reside in suburban or rural areas and are often unfamiliar with the urban streets that they visit. More importantly, they are unfamiliar with the traffic regulations. Even city residents may not know enough of those rules to be safe. Moreover, peasant cyclists are not very experienced in dealing with high volumes of mixed traffic, and it is difficult to handle bicycles if they carry big racks of agricultural goods—a common scene. In an emergency, peasants may hesitate to take actions to avoid accidents, be unable to stop immediately with control, or make sudden turns to avoid collisions with other bicycles, hence finding themselves facing a severe collision with a motor vehicle.

## ACCIDENT CAUSES

Most traffic accidents in China are caused by motor vehicle drivers, and a significant number are also caused by cyclists, who are the second largest group of road users causing accidents. Shown in Figure 3 are those responsible for Beijing's accidents (11). The

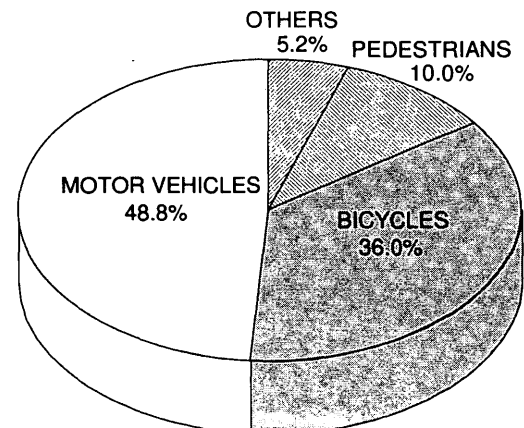


FIGURE 3 Casualty accidents caused by road users in Beijing (1986-1990) (11).

same is true for many other Chinese cities, although the accidents caused by cyclists may vary slightly. For instance, in Changchun between 1987 and 1988, drivers alone were responsible for about 70 percent of all accidents, whereas cyclists among the nondriver factors caused the majority of accidents (Figure 4).

The accidents in Changchun caused by road users other than motor vehicle drivers are shown in Figure 5, and similar results for Beijing are shown in Figure 6. In Xian between 1980 and 1981, cyclists were responsible for 26 to 29 percent of the total accidents, and in 1981 they were responsible for 16.3 percent of the total 147 deaths and 33.7 percent of the total injuries (10). Cities highlight four causes of accidents: drivers' violation of traffic laws and regulations; drivers' carelessness and misjudgment; vehicles' mechanical faults; and problems in the road facility and management.

Violations of traffic laws and regulations by drivers in China are the major causes of accidents. Drivers are supposed to have knowledge of traffic regulations and are required to abide by these regulations. Many drivers do not obey traffic regulations. The Changchun Statistics Bureau lists as typical driving offenses (Figure 5) "driving against regulations," "operating vehicles against regulations," "exceeding speed limits," "drinking and driving," "driving without a driver's license," and "overtaking illegally."

The Chinese have the impression that many drivers (the majority of whom are men) like drinking. Alcoholic drinks can be bought easily in stores and restaurants. Furthermore, beer and wine are regarded as almost nonalcoholic or less-alcoholic drinks when compared with liquors of high alcohol content, which are more popular among men. The percentage of alcohol content is normally higher than that in North America.

Drivers also overestimate the capability of their vehicles and their driving skills in complex situations. Included in this category are careless driving, overtaking in the opposing traffic lanes, overtaking illegally, and trying to go first without yielding. Drivers are normally required to have 3 to 6 months of training in traffic safety. The complexity of the human-road-vehicle-environment system in China, such as mixed traffic and the road users' behavior, makes any carelessness and misjudgment extremely danger-

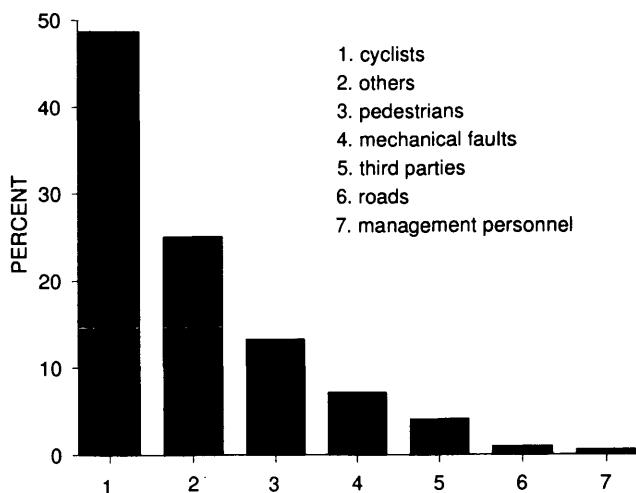


FIGURE 4 Accidents caused by nondriver (statistics of Changchun in 1987-1988).

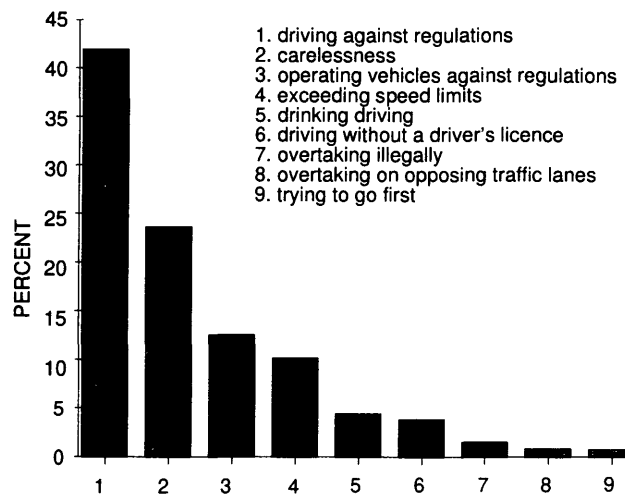


FIGURE 5 Accidents caused by drivers (statistics of Changchun in 1987-1988).

ous, as determined by the Beijing Traffic Engineering Institute (12).

"Driving against regulations" accounts for about 42 percent of the driver-error accidents and includes going through red lights and disobeying stop signs. Beijing's statistics present more detailed causes, such as "driving on the wrong side of roads" and "overtaking illegally," which cause three out of four major accidents. Traffic signals and signs are not respected when traffic police are off duty in the evenings as they are in most Chinese cities. Drivers tend not to wait at intersections for green signals. Stop signs are not obeyed because it is common knowledge that the chance of police coverage is minimal.

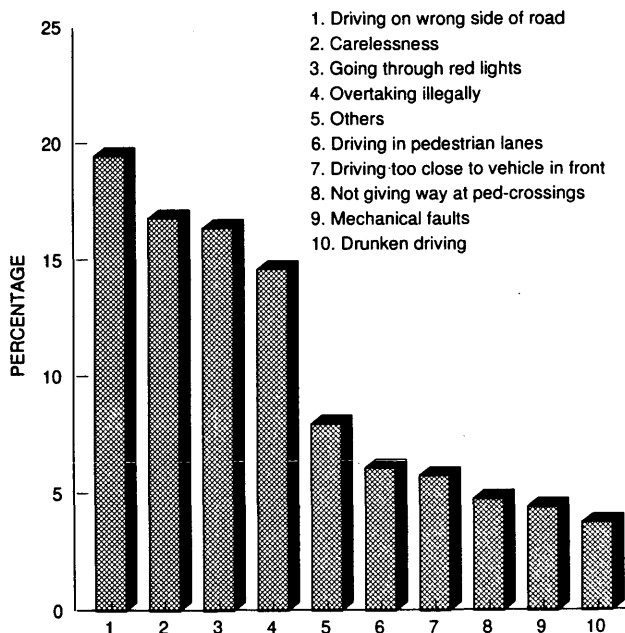


FIGURE 6 Major cause of casualty accidents in Beijing by motor vehicles (1986-1990) (11).

Drinking and driving is not yet a major problem compared with many other causes of accidents. However, there is a lack of awareness about the extent of alcohol's effects on drivers. No optimism can be assumed in China's ability to solve this problem, which has resisted solution elsewhere.

Beijing's statistics show that disobeying traffic regulations by cyclists is the major cause of accidents compared with the other cyclists' faults (see Figure 7). Included in this category are the causes "going through red lights," "turning without signaling," "cycling in pedestrian lanes," "cycling on the wrong side of the street," "cycling in motor vehicle lanes," and "carrying passengers on the back seat." It is illegal to carry passengers on the back seat of a bicycle in China but, as can be seen from many photos, this law is often ignored. Education and enforcement of traffic regulations have not yet fully reached cyclists or pedestrians. It is a positive sign that cyclists have been forced to obey city traffic signals in recent years. Enforcement of bicycle traffic rules is mainly executed by organized citizen inspectors who are not taken seriously by cyclists.

Another cause of accidents worth noting is mechanical faults. The recent economic reform allows a situation that connects productivity with an individual's salary. When this reform is applied to transport companies, people tend to place more emphasis on making money and ignore vehicle maintenance.

The poor road conditions added to the vehicle mix of tractors and bicycles increase the potential for accidents. There is roughly 1.03 million km of roadway in China, about 80 percent of which is low quality or substandard. These substandard roads have no traffic control systems, no zebra crossings, and no lanes to separate the motor vehicles, bicycles, and other road users (12).

Often traffic signs, signals, and road markings are not informative or complete enough to get drivers through a potentially dangerous location. "Driving on the opposing traffic lanes," "carelessness," "overtaking illegally or on the opposing traffic lanes," "not giving way at pedestrian crossings," and "trying to go first" in Beijing's and Changchun's statistics imply that either there is a lack of concern for safety or insufficient information has been provided by the traffic control system.

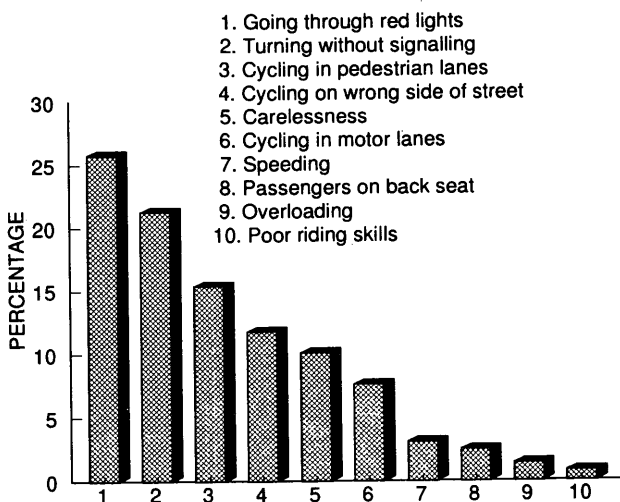


FIGURE 7 Major causes of casualty accidents in Beijing by bicycles (1986-1990) (11).

Among the road users, there are conflicting attitudes toward each other and a lack of courtesy such as yielding. Cyclist and pedestrian attitudes toward drivers usually assume that drivers dare not hit them. Cyclists may cycle and make sudden turns wherever and whenever they wish, whereas drivers seldom yield to the nonmotor vehicle users and take it for granted that others should get out of their way. Because of these conflicting attitudes, some road users ignore the others and do whatever they wish. Turning without signaling (sudden sharp turning without even careful observation) and cycling in wrong places for a cyclist's own convenience (cycling in pedestrian lanes, on the wrong side of the street, and in motor vehicle lanes, etc.) are a few typical examples.

Pedestrians also are very vulnerable to severe accidents in China, although the percentage of pedestrian victims is small compared with the large number of cyclist victims. Pedestrians have not been forced to follow traffic signals in most cities and they cross streets wherever they wish. China has so many people that drivers do not yield to pedestrians, as is the practice in some North American cities. Motor vehicle drivers have to zigzag skillfully through the crowds of cyclists and pedestrians using loud horns, but few stop or yield.

#### SAFETY COUNTERMEASURES

China has realized that the roadway system must be run by laws. A large proportion of accidents occur because traffic laws are disobeyed. To counter this problem, three things are being attempted. First, the traffic control systems are being completed and traffic regulations are being clarified. Second, road users are being educated on traffic systems and regulations. Third, the law violators are being challenged.

Traffic regulations must be known and understood by all. Education includes first letting ordinary people know the traffic regulations and second letting people know the dangers of violating them (13). The official news medium is involved so that major traffic accidents are reported by television news; street posters are used; TV programs and fictional movies involving traffic safety education have been made; and the newspaper *Chinese Traffic Safety* is available free to drivers in some areas (14). However, only vehicle drivers must know the meaning of traffic signs.

To challenge traffic law violators, a large number of urban citizens are being organized both by conscription and voluntarily by local governments to help police enforce traffic laws. For example, in 1989 in Beijing, 12.47 million traffic law violators were stopped at a rate of 30,000 a day (13.5 percent increase from 1988). Among them, 10.19 million were fined (20.6 percent increase from 1988). Statistics are inflated relative to moving violations because they include many bicycle-related incidents, such as illegal bicycle parking. Furthermore, 50 violators causing accidents were sentenced and an additional 150 were arrested by the police (15). Substantial improvement to the people's respect of traffic laws cannot be expected soon. In the West, the traffic systems work well by relying on the trust that the vast majority of road users will obey traffic control systems rules. For example, most people obey traffic signals at intersections without constant police surveillance. In China, many of the road users do not have such a concept of either trusting or willingly obeying a traffic control system. They are accustomed to enduring certain risks of potential traffic accidents. With luck and the fact that there are

not many motor vehicles, they often avoid accidents. However, as traffic increases, their chances of avoiding accidents decrease.

Roadway vehicles including cars, trucks, and rubber-tired tractors are such modern machines that the majority of citizens has little knowledge of their safe use. The fact that this machinery is being run without knowledge of or compliance with safety procedures causes a large number of deaths. For this reason, both developing and developed countries should share not only the hardware technology but also the concept of using it safely.

The establishment of a comprehensive evaluation system of roadway traffic safety has been proposed, according to the Beijing Statistics Bureau. Research on traffic accidents is being conducted extensively in many Chinese academic institutions and traffic departments. Accident characteristics and countermeasures suitable to China, as well as the technology and experience from countries, also are being studied. For example, the suitability of a person for driving a motor vehicle is being researched. Because most drivers in China are professional, it is possible to use some appropriate scientific methods to evaluate drivers and to hire only those having good physical and psychological profiles.

The knowledge of safety management personnel is being updated. Many training programs are available in academic institutions and some other organizations. Courses are also being given to university and college students. Traffic police are being equipped with more vehicles, telecommunications networks, alcohol detectors, speed detectors, and video equipment. However, the levels of their mobility and communication are still at an early stage, and much must be learned to make them completely effective in China (14).

In urban areas, China is trying to separate bicycle traffic from the motor vehicle traffic. Wherever possible, either lane fences or lane markings are used to separate the two traffic streams.

The bicycle will remain the major personal transportation mode for a long time. China should make greater efforts to modify bicycle safety features. For the near future, mandatory installation of bicycle reflectors and lights could be a practical option in urban areas. For the long run, bicycle brakes, turning signals, reflectors, light systems, and other built-in safety features should be studied and redesigned if necessary. Bicycle design and manufacture should be part of a traffic management system. Even though many people in China can now afford color televisions, which cost about 10 times more than a bicycle, they continue to ride a poorly maintained bicycle. No one bothers to wear helmets when riding a bicycle. Only motorcyclists are required by Chinese law to wear helmets.

Although human errors caused most accidents, improved roadway facilities and traffic environments, together with appropriate traffic control measures, should be able to reduce the potential and consequence of accidents. Accident sites should be analyzed to determine the safety-related problems in design, construction, and maintenance. This is particularly true at frequent-accident locations.

In addition, measures should be taken before accidents occur. Many road users are experiencing similar traffic situations routinely and their voices requesting safer traffic are valuable. The questionable locations they identify should be studied by safety experts so that timely corrective measures can be taken. It is very difficult in China for individuals to communicate directly with management departments. Those individuals who care for the "public's business" have no incentives; therefore, it is important that road users can easily contact officials in traffic safety

branches. For example, because of the limited budget, not all of the intersections and the entrance and exit gates of trip-generating units are equipped with traffic signs or signals. Lobbying by road users may help decision makers identify and solve some of these safety problems.

Information and statistics on traffic accidents should be more easily and more fully utilized. China has been collecting accident statistics at various levels of government for a number of years. A great amount of work on safety and accidents already has occurred by departments and organizations, but the information is not widely distributed.

Traffic accidents in China have to be solved relevant to the Chinese situation, which is challenging to the Chinese as well as to foreign experts who come to help. Traffic accidents are a worldwide phenomenon, and information exchange on accident statistics and countermeasures with international organizations is beneficial to all communities. Not only will China benefit from the experiences of other countries, but the others, especially countries with similar situations, may benefit from China's experiences as well. The actual success of any new road safety countermeasures will depend very much on how well they are adjusted to fit the needs of China.

## CONCLUSIONS

China's road safety problem is enormous in part because the country contains about a quarter of the world's population but also because of its early stage of motorization. The need to develop an efficient road transport system is well known; less apparent is the need to develop a reasonably safe system. This paper has brought together the available road safety statistics from throughout the country and made a number of suggestions for countermeasures.

If China can implement effective road safety measures, it could save the lives of roughly half a million people a year.

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