



## International Course

The Transportation Research and Injury Prevention Programme (TRIPP) at the Indian Institute of Technology, Delhi organized a eight day International Course on Transportation Planning and Safety from 6-13 December 2008 at the Indian Institute of Technology Delhi. The course was co-sponsored by the Volvo Research and Educational Foundations, INRETS, France, World Health Organisation, Bajaj Auto Ltd. and the Ministry of Road Transport and Highways. The course (an annual feature for the last 18 years), was attended by 61 participants from 12 countries. The faculty members included Anoop Chawla (IIT Delhi), Dinesh Mohan (IIT Delhi), Farida Saad (INRETS, France), Geetam Tiwari (IIT Delhi), Harald Zellmer (Autoliv, Germany), Hermann Knoflachner (Technical University of Vienna), Janusz Kajzer (Chalmers University, Sweden), Jeff R Crandall (University of Virginia, USA), Kavi Bhalla (Harvard Centre for Population & Development Studies, USA), Marie-Chantal Jayet (INRETS, France), Mathew Varghese (St. Stephen's Hospital, Delhi), Nicole Muhlrud (INRETS, France), Shrikant Bangdiwala (University of North Carolina, USA), Sudipto Mukherjee (IIT Delhi), Sylvain Lassarre (INRETS, France).



## Cycling in Asia

A bicycle partnership programme (BPP) has been sponsored by the Interface for Cycling Expertise (I-CE) in The Netherlands. TRIPP at IIT Delhi coordinated a project to prepare preliminary study of cycling in six countries in Asia: Bangladesh, China, India, Sri Lanka, Singapore and Taiwan.

This report presents excerpts from the project document, "Cycling in Asia". Walking and cycling are the two most common modes of mobility in Asia.

From its positive impact on health to its non-polluting qualities, there is no better mode of mechanical transportation than cycling which operates on a human scale. The countries of this region are extremely varied in their cultural, geographical and socio-economic profiles which have a direct bearing on their transportation systems. The modal share of cycling trips in these six countries, particularly in the smaller cities, is substantial; but what is alarming is that the modal trip rate is diminishing in the entire region.

## Bangladesh

The transport system of Bangladesh consists of roads, inland waterways and railway. The transportation system is predominantly road based. Despite the growth in motorised vehicles, the country's travel demand is still largely met by non-motorised modes like walking, rickshaws and bicycles. According to the most recent study roadways carry about 73 percent of passengers and 65 percent of freight. Pedestrians clearly form by far the single largest group of road users in Bangladesh. Bicycles operating in the streets include both personal cycling and rickshaw 'taxi-like' services.



The cycle rickshaws are available for door to door services and are very flexible



servicing neighborhoods where road width is too narrow to accommodate larger modes of transport. They are ideal for short and medium length trips, Rickshaws are the most efficient means of public transit over short distances in cities. Both bicycles and rickshaws occupy less road and parking space. Investment and operating costs are low and without

input of foreign exchange. They also do not contribute to air and noise pollution, are environmentally sound and contribute least to roadway damage. They provide earning opportunities for a significant proportion of low income urban residents having no alternative means of survival. Rickshaws play a further role in supplementing the congested public transport services. ( Md. Mazharul Hoque, S. M. Sohel Mahmud and Abdus Shakur Qazi)



The Transportation Research and Injury Prevention Programme (TRIPP) at the Indian Institute of Technology Delhi, is an interdisciplinary programme focussing on the reduction of adverse health effects of road transport. TRIPP attempts to integrate all issues concerned with transportation in order to promote safety, cleaner air, and energy conservation. Faculty members are involved in planning safer urban and inter-city transportation systems, and developing designs for vehicles, safety equipment and infrastructure for the future. Activities include applied research projects, special courses and workshops, and supervision of student projects at postgraduate and undergraduate levels. Projects are done in collaboration with associated departments and centres at IIT Delhi, government departments, industry and international agencies.



## Cycling in Asia

### China

With the rapid economic and social development of China in the 21st century, cities have seen urban development on an unprecedented scale. The larger challenge facing the urban transport system in Chinese cities is that the modal share of public transport and non-motorised transport modes is decreasing gradually, while private vehicle trips increase rapidly.



The electric bicycle as a renovation of the traditional bicycle is becoming more popular, but it also brought many disputes. The development of the e-bicycle is presently in an awkward situation owing to policy disunity in different areas. Some cities have already forbidden or restricted the use of the e-bicycle, because of reasons like interfering with regular transport, weak safety, producing pollution of

batteries, etc. The law of the People's Republic of China on Road Traffic Safety has officially prescribed standardized e-bicycle as a non-motorized vehicle administrated by corresponding regulations. The electric bicycle itself has many advantages: low energy consumption, low pollution (compared to motorized vehicles), low accident rate, low cost, high operating efficiency and high mobility.

Statistics show that 80% of electric bicycle users used to be bicycle users. They are mainly self employed, labour and service workers, and ordinary staff with low and middle incomes in enterprises, etc. Professional women middle aged and elderly people make up the majority of e-bicycle users, who may have less strength, more daily trips, with a higher demand for travel. (Prepared from the report "Sustainable Transport Development in Chinese Cities: Challenges and Options" published by China Communications Press)



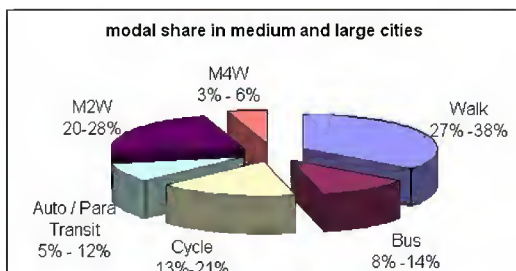
### India

Most of the medium and large cities in India have about 56% to 72% trips which are short trips (below 5km trip length), offering a huge potential for bicycle use. The close vicinity of academic institutions (mostly 3-4 km), easy rider-ship, no license requirement and no fuel requirement are all factors which make it an attractive mode of travel for students. Parking facilities, safety and ease of traveling are some of the most important factors which seem to govern female bicycle rider-ship. One of the reasons for the small share of bicycle trips in large cities is the presence of hostile conditions for cyclists. Communities in these cities have a latent demand for bicycles and walking trips, which can be realized with suitable facilities and resources. More bicycle trips will be attracted with a coherent, direct and safe bicycle infrastructure. However, the absence of safe infrastructure and high cycle fatalities deter these potential groups from shifting to bicycle use in large Indian cities.



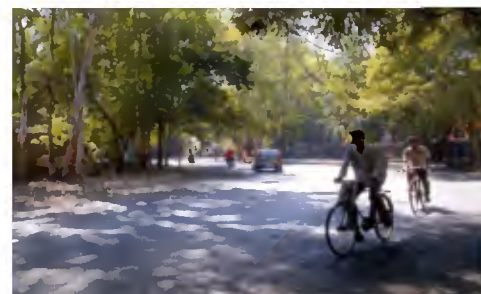
It is found in the comparative study of cities that most of the medium and large cities have about 50-75% trips below 5km trip length. That means there is a considerable number of trips which have the potential to be shifted to the cycle. Even in Delhi it is estimated that more than 45% of the trips of privately owned modes and 38% of the trips by public mode are less than 5 km. The conversion of potential cycle trips from other modes is highly likely, if a favorable cycling infrastructure is made available.

The major shortcoming of almost all the development proposals in Indian cities is that the bicycle tracks have not been planned as an integral part of the road networks. Bicycle routes if planned have not been integrated at junctions. Few attempts had been made to identify the complete bicycle network.



The Tenth 5 Year Plan (2003-07), National Urban Transport Policy (NUTP, 2005) provides guidelines for the other regional and city level policy documents. They acknowledge the fact that there are

non-motorized commuter groups with mobility and safety concerns which needs to be addressed by encouraging the construction of segregated rights of way for bicycles. City development and transportation plans / projects, fail to integrate bicycle planning.



At most of the intersections and junctions, the stop line for bicyclists is not in front of the other motorized vehicles to give them an early start which would be desirable. The reluctance of the city traffic police in restricting free left turns for motorised traffic to

protect the bicyclists on the curb-side has led to high risk for cyclists. An all red phase at the signals can also prove to be beneficial. Restriction of speeds for motorised traffic in residential areas or other dense areas have not been implemented in most of the cities. The high speed of motorised vehicles on major roads increases the fatality risk for cyclists exponentially. Hence it is extremely important that bicycle travel be considered early on in the design of transportation or city development projects in Indian cities. (Geetam Tiwari, Himani Jain).



## Singapore

Bicycle users appear to be over-represented among road fatalities in Singapore relative to their role in the transport system. Bicycle users were 7.2% of all road fatalities in the whole period 1990 to 2006. This compares unfavourably with a work-trip mode share of roughly 1% through most of this period. The data on the bicycle share of all trips seems unlikely to be more than 2%.



Urban transport policy in Singapore has generally not taken bicycles very seriously. Despite this neglect, cycling has not died out. In fact, it appears now to be growing in importance again. However, a lack of appropriate policy settings makes such an

increase problematic for everyone, since the system as it is currently designed cannot easily accommodate increasing numbers of bicycles. The officially-stated belief is that a network of routes for bicycles cannot be developed because of land scarcity and because bicycles must not be allowed to interfere with the central priority of providing for mass movement in space-efficient public transport. This view will certainly strike international bicycle infrastructure experts as odd, since the space-efficiency of providing for bicycle transport, relative to provision for cars, is usually seen as a positive. There would appear to be a strong case for the land transport authorities in Singapore to take the potential role of bicycles more seriously, in order to transport them from a problem into an opportunity. (PaulA. Barter)



## Sri Lanka

Sri Lanka's average population density is 317 persons per 2 km, which is sparser when it comes to rural areas. The main livelihood is subsistence farming and over 70% of the population lives in rural areas.



This island nation has a satisfactory network of nearly 91,907 km of roads. This is on average 217 persons sharing a 1 km length of road. However, when it comes to the rural areas, the road network becomes very weak. In 2005, it was estimated that there were 3.2 million bicycles in Sri Lanka. In addition to bicycles being merely used, occasionally value additions to bicycles are found, such as extended bicycle, bicycle trailer and bicycle passenger carrier side car. As in countries like India and Bangladesh, bicycle rickshaws are not found in Sri Lanka. Almost 62% of the country's total road network falls under the category of rural roads and these are not yet classified.

Currently, there is no national policy for bicycling in Sri Lanka. In the year 2000, of the total number of road fatalities (2058), there were 306 cyclists. These figures reveal the risk faced by bicyclists in Sri Lanka. It being considered a slow moving mode of transport, the attention given to the bicycles both by the other drivers and the authorities including the police appear to be not up to expectations. (Namiz Musaffer)



## Taiwan

Analyzing the bicycle manufacturers, we see that more than 95% of bicycles made in Taiwan are exported, and less than 5% are demanded by internal markets. Currently Taiwan has 23 million residents and is one of the highest population densities around the world. There has been a growing dependence on private motorised transportation, evidenced by the presence of 5.7 million cars and 12 million motorcycles. Vehicles with internal combustion engines have, therefore, become an inseparable way of life in Taiwan and a staple of its economy; despite the fact it is also the cradle of the third largest multinational maker of bicycles in the world. Fortunately, the government of Taiwan has taken notice of this situation and, after neglecting walking, cycling, and public transportation systems for long time, has started promoting these strategies and encouraging citizens to use them. Since May 2008, the new government has officially announced development of a low carbon and energy saving society. Policy on national land development, housing, industry, as well as transportation will be formulated. Development of a world class cycling environment has been considered as one crucial element in this 5 year national project.



Taiwan plans to build a bicycle industrial park and enable people to cycle round the whole country along the coastal roads. It also plans to increase the intercity connectivity with cycle paths. The government must decide the best way of allocating the road space through a package of regulations. This is also essential to provide a smooth and safe cycling experience and a healthy high-quality standard of life for all Taiwanese citizens. (S.K. Jason Chang, H.W. Chang and Y.K. Lee)





## News

### Age and pedestrian injury severity in motor-vehicle crashes

Walking is one of the most basic and necessary modes of transportation. Hence, it is important to contribute to a safer pedestrian environment which would encourage people to walk more often. This study analyzed factors associated with pedestrian injury severity in pedestrian-vehicle crashes. The results show that a pedestrian's age was a significant contributor to heteroskedasticity by increasing the variance in the error terms across pedestrians with age, but that gender did not affect the variation. The results showed that the age-specific heteroskedasticity becomes increasingly important past age 65.

The results also identify important factors that significantly increase the probability of fatal injury for pedestrians: intoxicated driver, darkness with or without streetlights, greater pedestrian age, sport-utility vehicle, truck, and freeway. US route, safe route, and speeding-involved. Important variables that decrease the probability of fatal injury for pedestrians are the PM peak (15:00-17:59), traffic signal control, and inclement weather.

This study provides direct policy recommendations to promote pedestrian safety. Darkness is associated with greater severity. Reflectors are therefore not only helpful to reduce the probability of a crash in the first place but also to reduce severity. Successful campaigns to increase pedestrian use of reflectors are likely to have significant benefits for safety. Drunk drivers are an important issue. Not only from a crash frequency standpoint, but as shown here, intoxicated drivers are strongly associated with greater severity in pedestrian crashes. Commercial areas need to be targeted to improve pedestrian safety. Also, pedestrian-vehicle crashes off roadways (such as in parking lots, driveways, etc.) need to receive more attention. Separation between pedestrian traffic and truck corridors is important due to the significantly greater severity in pedestrian-truck crashes, compared to pedestrian-car crashes. The greater fatality probabilities associated with support-utility vehicles indicate that passenger vehicle safety should in part be determined by the effect the vehicle has on pedestrians, not only vehicle occupants.

Chris Lee, Mohamed Abdel-Aty (2008), *Accident Analysis and Prevention*, 40, 1703-1712.

### You can hear a pin drop

A new report by the Institute's former chief scientist, Allan Williams, summarizes variations in countries' licensing policies, focusing on the costs in terms of lives of allowing licensure sooner rather than later. The main message is that licensing at later ages would substantially reduce crashes involving teen drivers.

A basic question is whether the risk associated with beginning drivers stems from their youth and immaturity or from their inexperience behind the wheel. If it's mainly immaturity, then it would pay to put off licensure until teenagers get a little older. But if the problem is mostly inexperience, then delaying licensure would simply put off the toll of beginner's crashes.

A review of 11 studies published since 1990 also separates the relative contributions of driver age and inexperience to beginner's crashes. The upshot of this Institute study is that new drivers who are 16 years old have higher crash rates than older teenagers who also are new drivers.

"Apart from the effects of age or experience, delaying driver licensure reduces crash rates by reducing the amount young people drive."  
*Status Report, 43(7), September 9, 2008*

### Tips to reduce on-the-job in-vehicle driver distractions

Here are 10 suggestions that companies can use to reduce the impact of in-vehicle distractions among employee drivers.

Establish and enforce policies requiring drivers to safely pull out of traffic when responding to or initiating e-mail, faxes, or other communications with devices that require key strokes.

Include the hazards of driver distraction as a topic during employee training, re-training, and indoctrination programs.

Install business-related technologies that utilize a display screen as close as possible to the driver's line of sight.

Prohibit the installation of video entertainment systems in vehicles that are used for company business.

Require and provide hands-free cell phone interfaces, even though hands-free devices do not mitigate driver distraction.

Purchase vehicles with technologies activated by voice recognition systems (including cell phones, navigation systems, etc.).

Deliver automated communications to drivers only when the vehicle is stopped, unless it is an emergency message.

When placing a call, employees should ask if the call recipient is driving and offer to call back, especially if the call requires lengthy or complex discussion.

Require employees to inform callers when they are talking on a cell phone while driving.

Investigate to determine if driver distraction is a factor when crashes or near misses occur. Keep in mind that people often do not admit to performing a distracting task just prior to a vehicle crash.

#### Advise employees to:

Adjust seat positions, climate controls, sound systems, and other devices while the vehicle is stopped.

If operating an unfamiliar vehicle, take time to learn how vehicle controls work. Use presets for radio and climate control.

Pull over and stop in a safe and secure place to eat or drink.

Read maps and check traffic conditions before leaving for a destination.

Let incoming calls bounce to voicemail for safe retrieval when the driving situation improves.

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