TRIPP BULLETIN
VOL 6. NO.1 SUMMER 2009
TRANSPORTATION RESEARCH & INJURY PREVENTION PROGRAMME
INDIAN INSTITUTE OF TECHNOLOGY DELHI

Publications

Farm hand tools injuries: A case study from northern India
Adarsh Kumar, J.K. Singh, Dinesh Mohan and Mathew Varghese *(2008)*
Safety Science, (46), 54-65.

Effect of active muscle forces on knee injury risks for pedestrian standing posture at low-speed impacts
Chawla, A., Mukherjee, S., and Malhotra, R.(2008)
Traffic Injury Prevention, vol. 9, no. 6, pp. 544-551.

Financing urban public transport
Kharola, P.S. (2008)
Urban Transport Journal, 7:2, 70-83.

Urban public transport systems: are the taxation policies congenial for their survival and growth?
Kharola, P.S. and G. Tiwari (2008)
Economic and Political Weekly, Vol XLIII No. 41, 41-47.

Road traffic injuries: a stocktaking
Mohan, D. (2008)
Best Practice & Research Clinical Rheumatology, 22:4, 725-739.

Traffic safety and city structure: lessons for the future
Mohan, D. (2008)
Salud Pública de México, 50:S1, S93-S100.

Mythologies, metro rail systems and future urban transport
Mohan, D. (2008)
Economic and Political Weekly, 43, 41-53.

Three-wheeled scooter taxi: problems and solutions for an efficient mode of transport
Mohan, D.(2008)
Urban Transport Journal, 7:2, 52-58.

New motorcycle helmets with metal foam shell
Pinnoji, P.K., Bourdet, N. and Mahajan, P. (2008)
IRCOBI Conference Proceedings. Zurich, pp. 449-452.

Design of ventilated helmets: computational fluid and impact dynamics analysis
Pinnoji, P.K., Haider, Z. and Mahajan, P. (2008)
Int. J of Crashworthiness, 13(3), 265-278.

Response of lower extremity in car-pedestrian impact-influence of muscle contraction
Soni, A., Chawla, A. and Mukherjee, S. (2008)
IRCOBI Conference Proceedings. Zurich, pp. 469-472.

Continuity equation validation for non-homogeneous traffic
Tiwari, G., J. Fazio, S. Gaurav, N. Chatterjee. (2008)
Journal of Transportation Engineering, 134:3, 118-127.

Bicycles in urban India
Tiwari, G. Himani Jain (2008)
Urban Transport Journal, 7:2, 59-68.

Research & Consultancy Projects

Sustainable Urban Transport in Less Motorised Countries: Research and Training
Sponsor *Volvo Research & Educational Foundations*
Team *D. Mohan, G. Tiwari, A. Chawla, S. Mukherjee, S.R. Kale, P. Mahajan, S. Sanghi, and N. Chatterjee*

Planning and Implementation of BRTs Project in Indore.
Sponsor *Indore City Transport Services Limited.*
Team *G. Tiwari and D. Mohan*

Safer Bus Design
Sponsor *Ashok Leyland Ltd.*
Team *D. Mohan, S. Mukherjee and A. Chawla*

Bicycle Partnership Programme (BPP)
Sponsor *Interface for Cycling Expertise, The Netherlands*
Team *G. Tiwari and D. Mohan*

Design Manual for BRT Systems in Indian Cities
Sponsor *UNDP and Ministry of Urban Development*
Team *G. Tiwari*

Bus Rapid Transit System in Hyderabad
Sponsor *Hyderabad Municipal Corporation*
Team *G. Tiwari and D. Mohan*

Estimation of Emissions and Fuel Consumption of in-use Vehicles in Different Driving Conditions.
Sponsor *Petroleum Conservation Research Association*
Team G Tiwari, S.R. Kale, R.R. Kalaga and D. Mohan

Master Plan for Bus Rapid Transit System Integrated with Bicycle Network in Pune.
Sponsor *Pimpri Chinchwad Municipal Corporation.*
Team *G. Tiwari and D. Mohan*

Small, Low Cost High Efficiency Vehicles and Future Urban Transport.
Sponsor *Bajaj Auto Limited.*
Team *D. Mohan, G. Tiwari, S. Mukherjee and M. Mackay*

Comprehensive Mobility Plan for Patna in the State of Bihar
Sponsor *Bihar Rajya Pul Nirman Nigam Ltd.*
Team *G. Tiwari*

Scholarships

Ms. Himani Jain - Ph.D. Scholar awarded Volvo Foundation Research Scholarship for the period 1-8-2008 to 31-07-2009

Mr Anurag Soni - Ph.D. Scholar awarded Volvo Foundation Research Scholarship for the period 1-8-2008 to 31-07-2009

Mr. Dhaval Ashvinkumar Jani - Ph.D. Scholar awarded Sumant Moolgaokar Research Scholarship for the period 1-8-2008 to 31-07-2009

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.

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Anatomy of a City

Enrique Peñalosa,
Former Mayor of Bogotá, Columbia

What is the nature of the relationship between ideology and the city?

City creation is an ideological task. Our conception of how a city should be is profoundly ideological. Ideology is a bit like taste, different from science, cannot be proven. It is more akin to art than to science. It has to do with principles that emanate from the soul. Ideological principles cannot be proven to be right or wrong. Equality as a goal, for example, is an ideological principle; preferring a city more respectful of pedestrians and friendlier to them than to cars, is another one. We cannot prove that 6 storey apartment buildings are better for a certain urban environment than 50 storey ones; we cannot prove a 10 meter wide sidewalk is better than a 2 meter wide one. Yet we must construct an urban vision and make regulations and decisions, based on our ideology. We live at a time in which Adam Smith's market principles are widely accepted as the best way to regulate human interactions. It is accepted that each person seeking his selfish goals, benefits society with better and cheaper goods and services. We assume that what is best for an individual tends to be best for society as well. Yet such principles are not always valid: if each one of the survivors in a shipwreck tries to climb aboard the closest lifeboat, they will sink it. It may be rational at an individual level to drive a private car to work, yet if all citizens do the same, the city traffic will collapse. Contrary to market tenets, in cities there are often conflicts between individual and collective objectives. We cannot let developers build tenements to any height they may wish, or decide for themselves the width of sidewalks or the quantum of land to be reserved for parks. A city is a collective creation that requires countless regulations, yet most of them are not technical or scientific regulations; rather they are ideological. Urban design and regulations have more to do with the way we choose to live. A city is a means to a way of life, and we have to decide what kind of life makes us happier; and hence we must decide what kind of city is most apropriate for such a life.

What are the roles of equity and inclusion in the construction of the city?

Many thought that the demise of communism marked the end of equality as a social goal. Accordingly we should only concern ourselves with economic growth and everything else would fall into place by itself. I don't agree. Equality was the root of Western civilization, since the time of the Greeks and the Romans. This is one of the principles at the root of concepts like property rights and democracy; it freed self-esteem and creativity for countless endeavors. Over the last 300 years equality has been the motivation for most social conflicts and revolutions. Millions died for it. It cannot suddenly disappear as a social goal.

The equality we can realistically strive for today is not income equality. Most of us agree today that private property and the market are the best way to manage most of society's resources. But the market necessarily generates income inequality: Some companies succeed, others go broke and some people have higher salaries than others. What kind of equality can we hope for today in the post-communism era? We can hope for at least 2 kinds of equality: First equality of quality of life, particularly for children. All children should, for example, have access to green spaces without needing to be country club members; they should be able to acess sport facilities or music classes like all the other children. The second kind of equality we should achieve today stems from a basic democratic principle that "All citizens are equal before the Law"; and that, public good prevails over private interest. Regardless of whether it is explicit or implicit, it is a fundamental democratic principle. And it is not just poetry. It has powerful practical implications. It means, for example, that there should not be private waterfronts, as society's happiness increases if all have access to the joy of waterfronts; it also means that road space should first be allocated to public transport and only if there is space left, should it go to private cars. Beyond survival needs such as housing and clean water, we humans have what could be described as happiness needs. For example we need to walk, we need to be with others, we need to play and we need to not feel inferior. Feeling inferior and excluded is painful. A good city provides many places where all citizens meet as equals regardless of income.

What is the kinship between public space and social justice in the urban landscape? What specific measures would help in striking a balance between the two?

Is public pedestrian space a frivolity in a poor developing country with many needs? No, in such a society public space is even more important. During work time a high income executive and the lowest paid employee in a corporation enjoy a similar level of satisfaction, or dissatisfaction. They meet friends and work mates and do their work. It is in their leisure time when a wide schism opens up between them: the upper income person goes to a large home, has access to gardens, country clubs, country houses, vacations, restaurants and theaters. The low income worker goes to a very small home, often only a rented room, and the only leisure time alternative to television for him or her and his children is public pedestrian space. Quality sidewalks, pedestrian promenades, protected bicycle-ways, parks or plazas begin at least to compensate for society's inequality. Upper income people often meet low income citizens: corporate presidents meet those who serve them tea, or are doormen at their buildings. But, they are usually separated by hierarchies. But if a company president and his family encounter a street sweeper's family in a park, they meet as equals. The mark of an advanced city is that high income and low income citizens meet as equals on footpaths, in parks, and in public transport. All citizens meet as equals in public pedestrian spaces. A great city must have at least one great public space, which is so wonderful that even the richest members of society cannot avoid enjoying it. Access to green spaces and sports fields may be the main source of exclusion in the future. Fifty years ago nobody in developing countries dreamed low income people would have color televisions, sound equipment, mobile phones or their equivalents. In the future low income people will have many goods which today seem inaccessible to them such as computers or IPods. What they will not have is access to green spaces; unless governments act today and reserve the necessary land for it.

In backward cities upper income citizens live in private spaces. They hop between such spaces in capsules called cars: from the parking lot at home, to the parking lot at the office, to the parking lot at the supermarket, the parking at the mall, or the parking at the country club. They can go for months without walking one block of city streets. Car owning, higher income citizens in developing countries concentrate political power in their hands and clamour for ever bigger roads with little regard or complete disregard for pedestrians and bicyclists. There is a conflict for road space and for funds between car owning groups demanding ever more road investments and the needs of the lower income citizens. Upper income groups in developing country cities never use public education or public hospitals. All they demand from government is traffic free road infrastructure. They are also belligerent promoters of metro systems. Not because they have the slightest intention of using it, but in order to get lower income citizens off their road space. In any developing country, less than half of the

households own cars, often only a very small minority. In such places cars are a mark of status.
Lack of quality footpaths or cars parked on sidewalks are a symbol of lack of respect for pedestrians and low income groups. On the contrary, quality public pedestrian space, wide tree lined footpaths, formidable dedicated pedestrian-and-bicycle-only promenades show respect for all citizens and are particularly protective of the most vulnerable ones: children, the elderly, the poor and the handicapped. A well designed physically protected bicycle path network gives a citizen on a $ 30 bicycle the same importance as one on a $ 30,000 car. A great city provides many free joys of which the first and foremost is what the public space yields. Public pedestrian space is a magical good which maintains through time its capacity to produce joy: pleasure derived from goods we buy at shops begin to diminish almost as soon as we walk out of the store and continue diminishing through time. But the joy provided by a park, a plaza or a magnificent tree lined pedestrian promenade never wears out. Most government- provided goods and services are means to eventual well-being: for example an irrigation canal or a road will make society more productive and thus richer and such wealth should eventually make us happier. Public space is not a means to anything; it is an end. A park is a joy in itself.

Slums and shanty towns grow even faster than the imploding population in the city. How can they be made seamless parts of an urban whole?

Most slums can be radically improved. Almost always it is better to improve them than to replace them with something else. Slums can be improved with good water supply, sewage systems, great schools, libraries, cultural centers, opening up important streets, quality sidewalks, pedestrian promenades, protected bicycle-ways, sports facilities, parks and plazas. A great bus-way through a slum can integrate it efficiently with the rest of the city. Slum dwellers themselves will find means to improve their buildings but governments can help with technical assistance and lines of credit.

In the matter of transport mobility what measures should a caring, democratic government take to improve the quality of life of its citizens?

The first article in all Constitutions states that all citizens are equal before the law. A logical consequence of this principle, explicit in some Constitutions, implicit in all others, is that public good prevails over private interest. In a democracy road space should be allocated first to public transport and only if there is space left over, should it be allocated to private cars. Any given city has thousands of kilometers of streets. Buses on exclusive lanes with free transfers between buses, can constitute a low cost, high velocity, efficient transport system. Car users generate large economic and social costs. Car use should be made expensive to the car owner. Charges to car use, be it through high fuel taxes or other means, should go to construct and maintain road infrastructure, including bus ways and quality footpaths and protected bicycleways. Car use taxes should subsidize an ever better public transport system: comfortable, clean, air-conditioned and fast. Quality pedestrian and bicycle infrastructure is not a cute architectural feature, but a basic right; unless we believe that only citizens with motor vehicles have a right to mobility without the risk of getting killed. Footpaths are also an integral part of public transport systems, as trips almost always begin and end by walking in public space.

What should city governments do about the limited supply of urban land?

The market does not work in the case of land around growing cities. The essence and beauty of capitalism and the market is that supply increases as a response to higher prices and thus brings prices back down. This is not valid in the case of markets for land around growing cities. Prices can increase indefinitely and the supply of land will stay fixed: particularly land accessible to water and sewage systems, to transport, schools and jobs.
Privately owned land will always be out of the reach of low income citizens, regardless of interest rate levels, housing subsidies or increases in the incomes of the poor. If incomes increase, land prices will increase as well, and land adequate for housing will always remain outside of the poor's reach. While slums in Asia tended to be well located in central areas, in the future they are likely be like Latin American slums, on the outskirts of the cities, in the most inconvenient locations, often in places subject to the risk of floods or landslides. Such developments will not have quality public spaces of any kind. It is difficult to plan great cities on private land. It is much easier to incorporate great parks and greenways, bus-ways and pedestrian promenades in publicly owned lands. In Scandinavian countries such as Sweden or Finland, land around cities have been acquired by municipalities since the beginning of the 20th Century.

How do we build the ideal city?

The ideal city is one that gives its citizens the greatest human happiness. Beyond survival needs such as housing and clean water, what is it that we need? We need for example to walk; to play; to have contact with nature, be it trees, or water; we need to be with people, both those we love and also those we do not know; and to whom we need not feel inferior. An ideal city should be built to take care of all such needs. We are all pedestrians, walking animals. A good city is one in which it is extremely safe and pleasant to walk in, or cycle through. In a good city citizens of all incomes meet as equals in public spaces, public transport, and at cultural events. In a democracy an ideal city should be built and organized based on the principle that public good prevails over private interest: private speculators should not be allowed to profit from the increase in prices of land around growing cities which force the poor into slums; some country clubs may have to be turned into parks, some road lanes must be given to pedestrians, bicycles and buses; waterfronts must be part of the public space and be dotted with pedestrian and bicycle infrastructure.

An ideal city is good for the most vulnerable of its citizens: children, the elderly, the handicapped, the and the poor. If it is safe and pleasant for them, it will be so, for all others. Unfortunately such groups are not represented among decision makers in cities. There is a conflict between a city very friendly to cars and one very friendly to people. It is not pleasant to be near high velocity roads, particularly if we are with children. Such roads are like fences in a cow pasture: they enclose us, block our way. And if they are elevated roads, they block the sky and darken our city. Indeed there are two very effective ways to destroy cities: one is an atomic bomb; the other is the construction of elevated highways. Asian cities will multiply several-fold over the next few decades. In other words, totally new cities will be created. Those cities could be the world's best. If that is to occur governments must buy up most of the land around those cities. New cities could incorporate totally different concepts: hundreds of kilometers of pedestrian-and-bicycle-only promenades and greenways; networks of for-buses-only roads, functioning as a sort of railroad through the new settlements; it would have abundant parks, sport facilities and wide footpaths and protected bicycle-ways in all its streets.

How does one choose an appropriate transport technology which tackles the problems of congestion and safety?

We have to begin free of any biases or prejudices. As cities were built, the roads were left as public spaces for its citizens' mobility. All cities have thousands of kilometers of roads. The question is: how can such a formidable infrastructure best serve a city's mobility? And in order to answer that, if we are a democracy, we have to assume that all citizens have equal rights. In a democracy, all citizens have the same right to road space. In cities where a majority of citizens do not even have cars, it seems evident that road space should first be allocated to pedestrian, bicycle and bus infrastructure. Trucks and other commercial vehicles need to be accommodated as well, as their efficient mobility is essential to the city's productivity. Taxis should come after in the hierarchy of right to road use; and if there is space left, private cars can be accommodated as well. Even in the richest cities buses must have priority in the use of road space and enjoy the use of exclusive lanes in order to move at higher speeds than the rest of the traffic. This is simple, mathematical logic when it comes to seeking mobility solutions at the lowest possible cost. But the case goes beyond mathematics into equity, when we are in a developing city context. Let us imagine for an instant that private cars were totally banned from streets during 3 peak hours in the morning and 3 peak hours in the afternoon. All citizens would have to walk, bicycle or resort to public transport. There would be a formidable pedestrian and bicycle infrastructure. It is very clear that we would have a very efficient, fast, low cost transport system. All of which goes to prove that mobility is not a technical, but a political issue.

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Designation of TRIPP as a Centre of Excellence

The Ministry of Urban Development of the Government of India has designated TRIPP, Indian Institute of Technology Delhi, as a National Centre of Excellence for Research and Training in Urban Transport. This entails a grant to be disbursed over the next four years for Chairs, infrastructure, research and training courses. An extract from the notification: The Ministry of Urban Development, Government of India, has sanctioned a grant-in-aid to Indian Institute of Technology Delhi (TRIPP) towards setting up and functioning of a Centre of Excellence in the area of urban transport. (a) The Centre of Excellence at IIT-Delhi will focus on applied research in the following areas: (i) Public transit planning, design and optimization with special focus on BRT; Integration of urban planning, traffic flow, use of ITS, impacts/benefits to environment including non-motorised transport (ii) Road safety factors in urban areas. (b) Towards carrying out applied research, the COE shall have to work with cities. (c) In the field of education, the following activities would be taken by the centre: Strengthening of existing programme, adding three faculty Chairs, five additional scholarships for M.Tech. & Ph.D. students and upgrading laboratory facilities.

2nd TRIPP Annual Lecture

The Transport Research and Injury Prevention Programme, Indian Institute of Technology Delhi established an annual lecture series on sustainable transport in 2007 with endowment funding from the Volvo Research and Educational Foundations. The objective of the Lecture is to honour a researcher who has made significant contributions in the field of sustainable transportation and is recognised internationally for the same. The second annual lecture was delivered by Professor David Banister of Oxford University on "Cities, mobility and climate change" on 16th of March 2009.

Professor Banister said that, "We all like talking about sustainable transport, but we are also not very keen about changing the way that we actually travel. We look at technological innovation as the way forward so that we can travel more and emit less carbon. But the reality is different. We need to move away from a technological fix, as this is really only a continuation of the high carbon energy future that is unsustainable. The challenge of travel growth in a car dependent society must be confronted, so that people travel less not more". Professor Banister suggested that "cities should make over 50% of all trips by walk and cycling, as is the case in many European cities, and the target could be even higher". He said "that all public transport should be powered by renewable energy, using trams, buses, bus rapid transit and flexible minibus transport".

Commenting on Prof Bannister's lecture, Mr. Nitin Desai, focused on the need for innovation in transportation and urban design to secure the massive increases in carbon productivity that will be required to cope with the risks of climate change. He asked Indian town planners to reconsider their imitative reproduction of urban patterns from an energy-profligate past. The densely packed traditional inner cities of India did not require people to travel long distances for work, shopping or entertainment and were therefore much more climate friendly than the urban sprawl of our mega cities. We should learn more from the sociology and economics of this traditional pattern of urbanization, he said.

[*Professor David Banister is Professor of Transport Studies at Oxford University and Director of the Transport Studies Unit. Until 2006, he was Professor of Transport Planning at University College London. He has also been Research Fellow at the Warren Centre in the University of Sydney (2001-2002) on the Sustainable Transport for a Sustainable City project and was Visiting VSB Professor at the Tinbergen Institute in Amsterdam (1994-1997). He was a visiting Professor at the University of Bodenkultur in Vienna in 2007. Author and editor of 18 research books, including (2007) Land Use and Transport Planning – European Perspectives on Integrated Policies, Unsustainable Transport: City Transport in the 21st Century (2005), Transport Planning (2002), European Transport Policy and Sustainable Mobility (2000), Encouraging Transport Alternatives: Good Practice in Reducing Travel (2000), Transport Investment and Economic Development (2000), Environment, Land Use and Urban Policy (1999), Transport Policy and the Environment (1998), Telematics and Transport Behaviour (1996), Transport and Urban Development (1995), European Transport and Communications Networks: Policy Evolution and Change (1995). He is the (co)author of more than 150 papers in international refereed journals, and he has published a further 100 papers in journals or as chapters in books.*]

[Full paper, Cities Mobility and Climate Change" available at : http://www.iit.ac.in/~tripp]

Course Announcement

The Transportation Research and Injury Prevention Programme (TRIPP) at the Indian Institute of Technology Delhi, is organizing an eight day **"International Course on Transportation Planning and Safety"**. The course will be held in New Delhi, India, from 30 November - 7 December 2009. The course will have a common component for the first three days, followed by two parallel modules on Traffic Safety and Biomechanics and Crashworthiness.

Details of the course can be accessed from - www.iitd.ac.in/tripp

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Endowments for perpetual Chairs
CONFER, India: TRIPP Chair for Transportation Planning
Volvo Research and Education Foundations: Volvo Chair for Transportation Planning for Control of Accident and Pollution

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