TRIPP BULLETIN
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TRANSPORTATION RESEARCH & INJURY PREVENTION PROGRAMME
INDIAN INSTITUTE OF TECHNOLOGY DELHI

TRIPP

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 post graduate and undergraduate levels. Projects are done in collaboration with associated departments and centres at IIT Delhi, government departments, industry and international agencies.

Current Projects

Sustainable Urban Transport in Less Motorised Countries Research and Training
Sponsor *Volvo Research and Educational Foundations (VREF)*
Team *D. Mohan, G. Tiwari, A. Chawla, S. Mukherjee, S. R. Kale, P. Mahajan & S. Sanghi, R. Ravi, Dunu Roy, M. Varghese, S. Das, H. Narang, A.Anand, G. Dutt, S. Gaurav, S. Srivastava, Kavita, A. Jain, H. Punekar, A. Srivastava, V. Kumar and F. Ahmed.*

Implementation of High Capacity Bus System/Electric Trolley Bus Corridors
Sponsor *Government of National Capital Territory of Delhi*
Team *G. Tiwari, D. Mohan, V. Soni, T. Pujara, M. Virat, and IPAN.*

Measuring Impact Properties of Human Body Parts
Sponsor *Department of Science and Technology*
Team *A. Chawla, S. Mukherjee, D. Mohan, M. Varghese, S. Jain, A. Parihar and Karthikayan.*

Development of Methodology for Modelling of Airbags
Sponsor *Japan Automobile Research Institute*
Team *A. Chawla, S. Mukherjee, D. Mohan, A. Srivastava and A. Sharma.*

Technological Evaluation of RTVs
Sponsor *Government of National Capital Territory of Delhi*
Team *D. Mohan, S. Mukherjee and A. Chawla.*

India Liveable Communities Initiative
Sponsor *Institute for Transportation and Development Policy (ITDP), USA*
Team *G. Tiwari, D. Mohan, S. Gandhi, V. Patankar, M. Kumar, V. Koshti, R. Kumar, A. Singh, V. Bharati, D. Gupta, N. Bansal, and D. Paretha.*

Development of a Training Manual for Road Traffic Injury Prevention
Sponsor *W.H.O.*
Team *D. Mohan and G. Tiwari.*

Traffic Management Plan for Indira Gandhi International Airport
Sponsor *Airport Authority of India*
Team *G. Tiwari, D. Mohan, S. Gandhi and Y. Sarfaraz.*

Low Cost Mobility Initiative
Sponsor *1-CE, The Netherlands*
Team *G. Tiwari, D. Mohan and M. Virat*

Publications

Prediction of crushing behaviour of honeycomb structures
Chawla, A., Mukherjee, S., Kumar, D., Nakatani, T., and Ueno, M. (2003) International Journal of Crashworthiness [8, 81-88]

FE simulations of motorcycle - car frontal crashes, validation and observations. In proceedings 18th international technical conference on the enhanced safety of vehicles (ESV)
Chawla, A., Mukherjee, S., Mohan, D., Bose, D., Rawat, P., Sakurai, M., & Nakatani T. (2003) DOT HS 809 543 National Highway Traffic Safety Administration, Washington DC.

Crash simulations of three wheeled scooter taxi (TST) In proceedings 18th international technical conference on the enhanced safety of vehicles (ESV)
Chawla, A., Mukherjee, S., Mohan, D., Singh, J., and Rizvi, N. (2003) DOT HS 809 543. National Highway Traffic Safety Administration, Washington DC.

Road traffic injuries - a neglected pandemic
Mohan, D. (2003) , Bulletin of the World Health Organization 81, 684-685.

Auto rickshaw drivers in Delhi: efficiency of dialogue with service-provider
Anand, A. and Ravi, R. (2003) Economic & Political Weekly 38(34), 3544-3545.

Transport and land-use policies in Delhi
Tiwari, G. (2003) Bull World Health Organ 81(6), 444-450.

Safety as a human right
Mohan,D. (2003) Health and Human Rights 6, 161-167.

Complexity in planning urban transport: safety and environmental issues
Mohan,D. (2003) In proceedings CODATU X, Lome (Togo); Urban Mobility for All. Eds: Godard, X. and Fantonzoun, I. A.A. Balkema Publishers, 503-510.

Low cost means of transport in cities: The critical element in city transport systems in low income countries
Tiwari, G. (2003) In proceedings CODATU X, Lome (Togo); Urban Mobility for All Eds: Godard, X. and Fantonzoun, I. A.A. Balkema Publishers, 215-220.

Reports

Injuries in the South-East Asia region : Priorities for policy and action.
Mohan,D., Varghese,M. SEA/Injuries/A1, New Delhi: World Health Organization, SEARO; 2002. Pp 1-19.

Dilli Kiski Hai? Yojana Ki Raajneeti Aur Aniyojit Ka Hastakshep.
Dunu Roy and Lalit Batra, (Eds.) New Delhi: Hazard Centre, Sanchal Foundation in association with TRIPP, IIT Delhi ; 2003. Pp 1-219.

Riksha Ek Mahagatha: Pahachaan, Sangharsh Aur Davedari.
Rajendra Ravi. New Delhi: Lokayan in association with TRIPP, IIT Delhi, 2004. Pp 1-228.

Dialogue with Dr. Geetam Tiwari

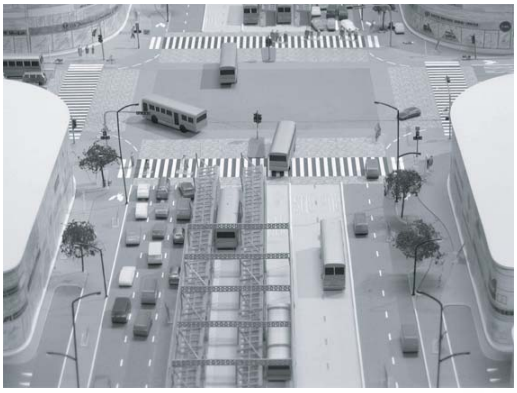
TRIPP Chair Associate Professor of Transportation Planning, IIT Delhi.

What is a High Capacity Bus System or Bus Rapid Transit System?

First of all it is important to understand that the HCBS or BRTS is a total system. It is safe, fast, comfortable, and comparatively affordable and makes the best use of the available road space.

The road is designed and engineered with dedicated bus lanes on which no other vehicles encroach. Likewise there are separate lanes for cyclists, motorized vehicles and pedestrians. This set-up makes for safety and speed.

These urban buses are low-slung with wide doors. This makes it easier and faster for the passengers to get on and off the bus. The doors on these buses open only when the bus comes to a complete halt which increases the safety for all travelers. Terminals and bus-stops are so constructed that their platforms are level or nearly level with the floors of the buses making for easy and safe access to all passengers. These buses are fitted with power steering, automatic transmission and rear-engine placement which combine to reduce driver fatigue and pollution and increase fuel efficiency and safety. Another feature of these urban buses is that they are fitted with an automatic vehicle tracking system which enables real-time monitoring of individual buses. Special lanes are provided for pedestrians and every other kind of motorized and non-motorized transport; the turnaround time on a bus corridor for an urban bus will be minimal; in addition to this, space is made available for hawkers and vendors near the bus stations.



How is the HCBS brought into being? Who will the players be?

The government will provide a specialized infrastructure: A newly created Public Authority will be in charge of planning, promoting and controlling the system; the other stakeholders in the undertaking will be a private concessionaire who will operate a state-of-the-art fare collection system; and all other operations will be provided by private companies. In planning the HCBS for an entire city, various players will be consulted even at the initial stage; they would involve municipal departments, traffic police, relevant national agencies, non-governmental organizations, transport associations, drivers unions, etc.

In which part of the world has the HCBS been tried out?

It has been successfully operating in 10 cities (Belo Horizonte, Bogota, Campinas, Curtiba, Goiania, Lima, Porto Allegre, Quito, Recife, Sao Paulo) in Latin America, 7 cities (Claremont Ferrand, Eindhoven, Essen, Ipswich, Leeds, Nancy, Rouen) in Europe, 6 cities (Honolulu, Los Angeles, Miami, Ottawa, Pittsburgh, Vancouver) in America, 10 cities (Akita, Fukuoka, Gifu, Kanazuwa, Kunming, Miyazaki, Nagaoka, Nagoya, Nigata, Taipie) in Asia and 2 cities (Adelaide, Brisbane) in Australia.

How does it compare with other forms of rapid transit systems?

The HCBS is a low-cost, flexible, mass transportation system that costs 50 times less than a Metro system and can serve as much as 100 times the area of a rail-based system. The HCBS infrastructure of about 20 kms can be built in less than 18 months while a metro is likely to take 7 years; also, the project development and planning process is much quicker. The HCBS would cost Rs. 5 to 50 crores ($ 1-10 million) per km, while the metro would cost Rs. 100 to 1000 crores ($20-200 million) per km.

Other considerations are: The Metro is rigid and has no flexibility while the HCBS can be altered, added-to, subtracted from and redesigned at low-cost and at short notice; also unlike the Metro, the HCBS can reach every part of every city and make itself accessible to other modes of feeder-transport like cycle rickshaws and three-wheelers scooters. There is a minimal need for staircases in some instances in the BRT System while it is essential in all cases for metro stations. The bus stop does not entail a long walk for the commuter unlike the metro station; these factors make the HCBS user-friendly.

What are the special benefits to the commuter?

The segregated bus lanes make for faster travel of commuters in the HCBS; it improves traffic management in general and as such, improves the driving conditions of all other vehicles on the road as well. The segregated bus lane is designed in such a manner that it claims to reduce injury accidents by 40% and fatalities by 50%.

The urban buses of the HCBS are high speed vehicles, sometimes articulated and always very comfortable with wide doors and low floors, level with the platforms of the bus stops and with a carrying capacity of over a hundred passengers. This system, as a whole, produces a decreased load of pollution.

Security, cleanliness, easy access, customer comfort, and minimal stoppage time, all combine to make for increased efficiency. Prominent and clear displays of arrival and departure timings create added value and minimize waiting anxiety. Such real-time information displays and clear signages generate a sense of customer security. The whole system is disabled-friendly with ramps and platforms and is a boon to the infirm and the old. Time-saving and efficient fare-collection is made possible at the bus station prior to boarding the vehicle.

What would you say is the social impact of the HCBS on society as distinct from other mass rapid transit systems such as the metro and the skybus?

Both the metro and the skybus are capital-intensive and not as context-relevant as the HCBS. I shall, therefore, confine my views to the HCBS. We must realize that not only is urbanization here to stay, but that it seems to be the way of the future. Urbanization makes for diversity and heterogenity in socio-economic conditions with multiple economies operating in close proximity to each other. The formal sector can keep on operating only as long as there is an informal sector for it to feed on. The latter is always larger because it serves both, the former and itself. If this is clearly recognized by our city-planners and policy-makers they would handle the challenge of urban travel and transportation with vision and empathy for all. The HCBS is the most suitable system in promoting modal shifts to a more efficient and less polluting form of transportation.

Often, nearly fifty per cent of the inner city's population lives in low income houses (slums or shanty towns). The urban transport system must cater equally to all segments of society. If the transport infrastructure design ignores the needs of pedestrians, cyclists and public transport passengers, the latter will be forced to defy the law, exposing themselves to high risks on the road; motorized vehicles are then forced to operate at sub-optimal levels. To a large extent, from all the choices available to us, it would appear that the HCBS is the one single operating mass transit system that comes close to best addressing all the relevant issues involved.

News

Seoul to Raze Elevated Highway

Seoul is the newest addition to a growing list of cities actually tearing down urban highways to make room for a more human environment. San Francisco, Portland and Toronto have already finished these projects, Milwaukee is in the process of doing so and other cities, including Akron and New York, may soon follow suit.

The Bulletin of the Institute for Transportation & Development Policy, No.6 May 2003

China Cancels Metro Projects

China's State Council froze all future metro projects at the end of January, citing their high cost. Subway projects in at least 20 cities across China have been suspended indefinitely including projects in Hangzhou, Shenyang and Shanghai.

Subway lines built over the last decade in Beijing, Shanghai and Guangzhou cost an average of US$72 million to US$96 million per kilometer. Shanghai also recently opened its US$1.6 billion magnetic levitation train, which runs from a new international airport into the city.

The Bulletin of the Institute for Transportation & Development Policy, No.4 February 2003

More Cities Adopt Bus Rapid Transit

Mexico City: In early February, Mexico City Mayor Andrés Manuel López Obrador announced that the city has approved a five-year project to build 11 Bus Rapid Transit corridors on the city's main arteries.

The Bulletin of the Institute for Transportation & Development Policy, No.5 March 2003

Jakarta: To address the city's mounting congestion and air pollution problems, Jakarta opened Asia's first fully closed, Bogotá-style Bus Rapid Transit (BRT) corridor on January 15. The 12.9km exclusive bus way connects the city's Block M Bus Station to the Kota Railway station, running along one of Jakarta's most congested thoroughfares.

The Bulletin of the Institute for Transportation & Development Policy, No.12 February 2004

Narrow Urban Lanes Safer

Increasing the lane widths of roads is normally seen as a strategy for reducing accidents. Those states with more arterials with lane widths of 9 ft or less have fewer traffic injuries, as is shown by the statistical significance of the coefficient in models ….

While it is not clear from these results whether there is some optimal "safest" lane width, there does seem to be evidence that lane widths of over 11 ft do not contribute to a safer road environment…..

These results are quite surprising as it is general practice to improve the safety of roads by increasing lane widths. The underlying engineering hypothesis is that road infrastructure "improvements" will reduce both fatalities and injuries. However, it is not found that this hypothesis can be supported. Results actually tend to suggest the counter-intuitive hypothesis that these types of road "safety improvements" actually lead to statistically significant, though small, increases in total fatalities and injuries, all else being equal. This result, while considered surprising, is not inconsistent with other literature using aggregate safety data. The effects of changes in infrastructure have resulted in about 1700 more fatalities in 1997 relative to 1985; about 900 of these fatalities are associated with changes in lane widths.

Robert B. Noland: "Traffic Fatalities and Injuries: The Effect of Changes in Infrastructure and Other Trends" in Accident Analysis and Prevention, 35(2003) 599-611.

Future Events

AAAM: Car Crashes and Occupant Injuries: A Team Approach to Crash Investigation,
April 19-20, 2004, Tempe, Arizona. http://www.aaam.org/

Urban Transport , 19 May 2004, Dresden, Germany.
http://www.wessex.ac.uk/conferences/2004/urbantransport04/index.html

TRANSED 2004: 10th Conference on Mobility and Transport for Elderly and Disabled People,
May 23-26, 2004, Hamamatsu, Japan. http://transed.jp/

30th FISITA World Automotive Congress,
May 23-27, 2004, Barcelona, Spain. http://www.fisita2004.com/home

8th International Conference on Application of Advanced Technologies in Transportation Engineering,
May 26-28, 2004, Beijing, China., http://www.jtzx.net.cn/aatt8.htm

13th International Safe Communities Conference,
June 2-4, 2004, Prague, Czech Republic., mailto:tesarova@cbtravel.cz

7th World Conference on Injury Prevention and Safety Promotion,
June 6-9, 2004, Vienna, Austria. http://www.safety2004.info/

World Conference on Transport Research (10.WCTR),
4 July 2004, Istanbul, Turkey. http://www.wctr2004.org.tr/

Sustainable Communities,
14 to 18 July 2004, Burlington, Vermont, United States,
http://www.global-community.org/conference

17th International Conference on Alcohol, Drugs and Traffic Safety,
August 8-13, 2004, Glasgow, United Kingdom. http://www.icadts2004.com

20th World Congress: The International Traffic Medicine Association (ITMA),
September, 2004, Cape Town, South Africa. http://www.trafficmedicine.org/

Expert Symposium on Accident Research - ESAR, September 3-4, 2004, Hannover, Germany.
http://www.mh-hannover.de/forschung/unfallforschung/esar.htm

3rd International Conference on Traffic & Transport Psychology,
September 5-9, 2004, Nottingham, United Kingdom. http://www.icttp.com/

48th Annual Conference of the Association for the Advancement of Automotive Medicine,
September 12-15, 2004, Miami, Florida., http://www.aaam.org/

IRCOBI: Conference on the Biomechanics of Impact,
September 22-24, 2004, Graz, Austria. http://www.ircobi.org/default.htm

13th World Clean Air & Environmental Protection Congress & Exhibition,
22 to 27 September 2004, London, United Kingdom, http://www.kenes.com/cleanair//

48th Stapp Car Crash Conference,
November 1-3, 2004, Nashville, Tennessee, USA. http://www.stapp.org/

TRB Conference for Research on Women's Transportation Issues,
November 18-20, 2004, Chicago, Illinois.
http://gulliver.trb.org/news/blurb_detail.asp?id=2224

IMechE Conference: Vehicle Safety 2004,
December 14-15, 2004, One Birdcage Walk, London, England.
http://www.imeche.org.uk/conferencesandevents/imeche.asp?page=eventhome.asp&ProductId=196

Transportation Research Board 84th Annual Meeting,
January 9-13, 2005, Washington, D.C. http://www4.nationalacademies.org/trb/annual.nsf

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