Proceeding

of

UMI 2014

INSTITUTE OF URBAN TRANSPORT (INDIA)

7th Urban Mobility India Conference & Expo 2014

Sustainable Transport for Sustainable Cities

November 25 – 28, 2014, New Delhi

www.urbanmobilityindia.in

Preface

The National Urban Transport Policy of the Government of India, 2006 (NUTP), inter-alia, lays strong emphasis on building capabilities at the state and city level to address problems associated with urban transport and lays down the guidelines for develo000000ping sustainable urban transport systems as well. As part of NUTP enunciations, the Ministry of Urban Development, Government of India has taken two important steps to develop capacity of the officials in the cities for improving the urban Mobility in the cites.

- Organizing an Annual Conference-cum-Exhibition on 'Urban Mobility' at New Delhi every year under the brand Urban Mobility India (UMI) for dissemination of information and to facilitate exchange of ideas;
- According recognition to good urban transport initiatives taken by cities / other agencies by giving awards to selected good practice projects.

The 7th edition of the Urban Mobility India (UMI) Conference was held from 25th to 28th November, 2014. The theme of the conference was "Sustainable Transport of Sustainable City". The event was organized at the Manekshaw Centre, Dhaula Kuan, New Delhi, by the Institute of Urban Transport (India) New Delhi. It was attended by more than 1000 participants, including about 100 foreigners, comprising urban transport experts, practitioners, resource persons, researchers, scholars and senior government officials from India and from 25 foreign countries including the United States of America, Australia, Singapore, France, Germany, Netherland, Japan, Canada, Austria, France, Spain, Sweden, Republic of Korea etc. Representatives from 20 state governments, several urban local bodies, parastatals as well as academia, students, non-governmental organizations (NGOs) and private sector participated in the conference. About 12% of participants were foreign nationals, 25% students, 13% from private sector and 50% from government organizations.

As part of the Conference, IUT also coordinated a Research Symposium was organized on 26th and 27th of November in which selected research work in the field of urban transport was disseminated through 20 presentations.

An exhibition was also organized as a part of the event at which 24 exhibitors participated. The participating organization showcased their best practice. The participating manufacturing companies showcased latest technologies & state of the art products on Urban Transport.

The Conference and Expo was inaugurated on 25th of November by Shri M. Venkaiah Naidu, Hon'ble Minister for Urban Development, Housing & Urban Poverty Alleviation and Parliamentary Affairs, Government of India. He delivered an inspiring inaugural address. Key Note address was delivered by Mr. Jamshyd. N. Godrej, Chairman & Managing Director, Godrej & Boyce Manufacturing Company Ltd. Shri Babul Supriyo, Hon'ble Minister of State for Urban Development, Housing and Urban Poverty Alleviation and Mr. Shankar Agarwal, Secretary (UD) addressed the gathering at inaugural session. After the inaugural session, a Special Session for invited delegates from State Govts. on Smart Mobility for Smart Cities was organized by the MoUD. It was Chaired by Shri Babul Supriyo, Hon'ble Minister of State for Urban Development, Housing and Urban Poverty Alleviation, Govt. of India.

After 4 day of knowledge sharing and exchange of ideas through 9 Technical Sessions, 11 Round Table Discussions, 3 Plenary Sessions and 2 Panel Discussions, the conference concluded on 28th of November, 2014. The Valedictory function was graced by Shri Babul Supriyo, Hon'ble Minister of

State for Urban Development, Housing and Urban Poverty Alleviation Government of India. The following events added attraction to the conference.

I) A Quiz Competition on Urban Transport issues was organized for the first time for students as well as delegates on second and third day of the conference.

II) Everyday a multi-coloured Newsletter containing highlights of the previous day; deliberations and pictorial view of participations was published and circulated in the conference

III) In all the Technical Sessions, Round Table Discussions, Plenary Session and Panel Discussions 4-5 standard questions related to the theme / sub-theme of each session were posed to the audience at the end of each session to seek their opinion. Answers were received through voting slips to compile the results.

All these exercises generated a lot of enthusiasm and were appreciated by the participants.

The Conference and Expo was well received by the participants and sponsors. In the valedictory session, Awards for Excellence in urban transport projects planned and implemented by city and state authorities were given away by the Hon'ble Minister of State for Urban Development and Housing & Urban Poverty Alleviation, Govt. of Inida. Proceedings and outcome of the conference including results of the audience poll are presented in this document. Detailed presentation of technical papers / UMI pictures and proceedings are available at www.urbanmobilityindia.in

(C.L.Kaul)
Executive Secretary & Officiating DG
Institute of Urban Transport (India)
January, 2015

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A. Important Outcomes

UMI-2014
Sustainable Transport For Sustainable Cities
(Outcomes and Proposed Action)

S. No	Outcomes	Action needed
1.	Priority attention in Urban Transport should be paid to tier-II cities if they are to avoid the kind of problems that the bigger cities are facing today.	Advisory by MoUD
2.	Comprehensive Mobility Plans be prepared for all cities of more than one lakh population.	Advisory by MoUD
3.	For smart cities efficient and sustainable transport system should be planned at the initial stage.	Inclusive in MoUD guidelines
4.	Demand Management should be given priority over construction of new roads/flyovers.	Advisory by MoUD
5.	Pilot projects should be taken up to develop database for some cities using latest technology for wider replication.	MoUD/IUT
6.	Media should be kept abreast of the developments and challenges of urban transport for dissemination of best practices.	MoUD/IUT
7.	Land use and transport be integrated properly by following the concept of TOD.	Advisory by MoUD
8.	Services Level Benchmarks for urban transport need to be reviewed and modified in the context of future smart cities.	MoUD/IUT
9.	National urban Transport Policy 2006 should be given legal backing for wider enforcement.	MoUD
10.	Social, economic and environmental benefits should be considered along with feasibility reports while appraising and evaluating the urban transport projects.	MoUD/IUT
11.	For improving the efficiency of Public Transport System and Regulation of traffic full potentials of ITS should be utilised.	State/City Authorities
12.	Funding in housing and other urban development activities should be appropriately converged with urban transport.	MoUD/State Govt.

13.	Capacity building programme in urban transport should be taken up in a mission mode at central/state/city level.	MoUD/IUT
14.	Public transport in the city should be inclusive for all sections of the society and particularly be sensitive to gender issues.	Advisory by MoUD
15.	National level transport survey similar to census need to be undertaken periodically to collect essential transport data.	MoUD/IUT
16.	PPP mode for operation of city bus services need to be reviewed and redesigned to make partnership sustainable.	MoUD/State Govt.
17.	For promotion of NMT, steps should be taken to declare some part of the city as vehicle free zone.	City Authorities
18.	For financing urban transport three actions are important i.e. cost reduction, optimising revenues and generating additional revenues from direct and indirect beneficiaries of public transport.	Advisory by MoUD
19.	There is an urgent need to increase the number of urban transport professionals to meet the demand of urban transport planning and development in major urban centres.	MoUD/States/IUT
20.	Universal accessibility should be mandated in all transport/engineering projects.	MoUD/States

B. Inaugural Session

Guest arriving at the session

The Urban Mobility India (UMI) 2014 was inaugurated on 25th November, 2014. While welcoming the participants, Shri C. K. Khaitan, Joint Secretary (Urban Transport), Ministry of Urban Development (MoUD), Government of India gave a brief background of the annual Conference cum Expo, organized by IUT and supported by MoUD with the aim of strengthening the government's capacity building efforts in the country. He highlighted the theme of the conference "Sustainable Transport for Sustainable cities" and the sub-themes which were to be deliberated upon in 3 Plenary Sessions, 2 Panel Discussions, 9 Technical Sessions and 11 Round Table Discussions during the 4 day conference *(Conference Programme at Annexure 1)*. He also mentioned that a Research Symposium having six concurrent Sessions will also be organized where budding transport professionals and researchers from the academic field will make presentations on the well-researched subjects of topical interest. He added that a Leaders Forum of the city officials will make a presentation on live urban transport projects which will be reviewed by experts. He elaborated that one of the key features of the event would be conducting Quiz Competition for students as well as delegates during the coffee breaks and that at the end of each session audience poll will be taken to have the views of the participants on important issues related to the session topic.

Hon'ble Minister inaugurating the Exhibition

Hon'ble Minister meeting the guests

In his address Shri D. S. Misra Addl. Secretary (Urban Development), MoUD mentioned about the challenges posed by the rapid increase of urban population. He said that urban population will be more than rural population in the country by 2051 and as such our efforts should address the urban transport issues in that perspective. He mentioned that the Government is going to launch various schemes including 100 smart cities and housing programmes which will add value to the emerging urban scene. He suggested that the deliberations at the event should focus on successfully proved new and innovative technologies. He added that while the Ministry has already sanctioned metro rail in 9 metropolitan cities, and many more are coming up.

Hon'ble Minister proceeding to Main Hall

Shri Shankar Aggarwal, Secretary, (Urban Development), MoUD stated in his address that the time has come for transformation of our cities as there is a strong political will for the same. He mentioned that there are huge challenges for tackling the urbanization and transportation issues but with the

existing political and administrative support the Ministry is confident enough to make our cities beautiful and liveable.

A brief presentation was made by Dr. O. P. Agarwal, Director General, Institute of Urban Transport (India) on the urban transport scenario in India so as to contextualize the discussion in the next 4 days. In his presentation, he highlighted the global urbanization trends and the pattern of urbanization and motorization emerging in India and elaborated on the impact of such growth on urban transport.

DG-IUT making a presentation

Key note address was delivered by Shri Jamshyd N. Godrej, Chairman and Managing Director, Godrej and Boyce Manufacturing Company Ltd. He elaborated on the issue of sustainability including urban mobility necessary for rapid economic growth. He said that outdoor air pollution and fatalities on the road are critical areas which need to be addressed in right earnest. Road safety is a major risk in the cities and cause many road crashes. He expressed satisfaction that the recent Transport and Road Safety Bill, 2014 prepared by the Govt. of India has recognized all such issues which have clear links with sustainable transport. He also mentioned that non-motorized transport alongwith public transport should be encouraged. Agenda for urban roads should give priority to public transport and all the major cities should go for BRTS. There is a need for complete network of roads designed for all modes including pedestrians and cyclists. Efforts should be made to use smart cards and smart phone technology to improve efficiency of urban transport system. Better planning of urban areas integrated with sustainable mobility and multiple modes would go a long way for developing sustainable transport and improving accessibility in cities. He also suggested improvement of diesel driven vehicles technology and reclaiming of streets to move towards the agenda of sustainable urban transport.

Key note speaker addressing the session

In his brief talk Hon'ble Minister of State for Urban Development and Housing and Urban Poverty Alleviation, Shri Babul Supriyo stated that we have to change with the time and the impossible tasks need to be made possible for improving urban transport systems in smart cities.

Hon'ble Minister of State for Urban Development addressing the gathring

Inaugurating the 7th Urban Mobility India Conference cum Exhibition on Sustainable Transport for Sustainable Cites, Shri M. Venkaiah Naidu Hon'ble Minister of Urban Development, Housing & Urban Poverty Alleviation and Parliamentary Affairs Govt. of India, said that urbanization is taking place at a very rapid pace in India which reflects the growth trends in economic development in the country. India is projected to add 500 million people to its urban population by the middle of 21st Century which indicates that next one generation alone will see almost doubling of urban population. Present urban population of about 31% is contributing

Audience at Inaugural Session

more than 60% of India's GDP which is projected to rise to 75% of the national GDP by the year 2031. He emphasised that economic development per se will not produce good cities rather good cities will lead to better economic development. It is in this context it becomes imperative to make our cities smart cities. A direct consequence of increasing urban population would be the need for efficient urban mobility. The statistics reveal that during 1981-2011 population of six major cities in India went up by 2.5 times while the number of registered motor vehicles have gone up by nearly 20 times. This shows that growth of motor vehicles has been much faster than the growth of urban population having adverse impact on environment as well as creating congestion on roads. Another major area of serious concern is the impact of motorization on health of citizens and increasing number of traffic accidents. The number of road accidents increased by about 60% during 2003-2013 which need to be analyzed for improving the situation. He further emphasized that in this context non-motorized transport including walking and cycling should be encouraged in the cities which are not only safe and environment friendly but also help in physical fitness and health of citizens and are low cost modes. Improving road capacity alone may not be helpful rather a holistic approach for urban mobility planning need to be adopted with comprehensive set of well integrated regulatory measures. He highlighted that realising the importance of transportation for the vibrancy of economy and social unity, the Government has undertaken development of public transport system in many large cities on priority basis. Attention is also being given to tier-II and smaller cities. He also pointed out that along with development of Mass Rapid Transit System, last mile connectivity deserves to be given due attention in the transport planning. Since most of the cities in India are still at the nascent stage of urbanization it gives lot of opportunities to develop them as sustainable and smart cities. He elaborated upon the recent initiative of the Hon'ble Prime Minister for setting up of 100 smart cities which are being taken up in all its seriousness. Development of smart cities would be driven by ICT where urban mobility has to be a key area for improvement. Smart cities would provide good infrastructure in terms of water supply, sanitation, health care as well as good governance so that they could attract investment and have world class facilities. Sustainability of cities has to be seen in terms of financial, social, environmental and institutional aspects. He mentioned that developing smart cities and addressing the issues relating to urban transport planning will need a large number of transport professionals and urban managers in the country. As such capacity building programme on a large scale will have to be taken up for which funding by Government of India for organizing training programmes at different levels through the well-established institutions including Institute of Urban Transport (India) is provided. Contextual research on live projects will be another area for sustainable urban mobility planning. He expected that a large number of delegates, experts, policy makers participating in the conference would come out with meaningful recommendations at the

Hon'ble Minister releasing IUT Publications

Inaugural Address by the Hon'ble Minister

end of the conference and assured the delegates that Ministry of Urban Development would take appropriate action accordingly. Earlier the Hon'ble Minister inaugurated the exhibition and visited various pavilion.

On this occasion the under-mentioned publications were released by the Hon'ble Minister:-

i. Improving and Upgrading IPT Vehicles and Services – A Study.

ii. Preparing a Comprehensive Mobility Plan (CMP) - A Toolkit.

iii. Review of Urban Transport in India.

iv. Decongesting Delhi.

Shri Mukund Kumar Sinha, Officer on Special Duty ex-officio Jt. Secretary, Ministry of Urban Development proposed a vote of thanks. He thanked all the dignitaries, delegates, participants as well as the members of the Organizing Committee *(Composition of the Organizing Committee is given at Annexure II)* of the conference.

C. Special Session on Smart Mobility for Smart Cities

After the inaugural session, a Special Session was organized on "Smart Mobility for Smart Cities" by the Ministry of Urban Development in which urban development and local self-government ministers / officials from various states participated. The session was chaired by Shri Babul Supriyo Hon'ble Minister of State for Urban Development, Housing and Urban Poverty Alleviation, Govt. of India. In his opening remarks the Hon'ble Minister stated that the development of 100 smart cites has been taken up by the Govt. of India. The Prime Minister desired that these smart cities be developed as true engines of economic growth to help the country to move on a fast trajectory of growth. He highlighted that a smart city encompasses many dimensions of which a reliable, affordable and sustainable transport system is at its core. It is being recognized all over the world that smart mobility involves emphasis on public transport and non-motorized modes of travel. All these modes cause less congestion, emit less pollution, consume less energy and result in fewer accidents. That is why, cities all over the world are working towards development of efficient public transport systems and restricting the use of personal motor vehicles. All our endeovours should be on designing the smart mobility systems in smart cities. He emphasized that along with public transport system development of last mile connectivity is necessary for optimal utilization of mass transit system. It is for this reason that the smart cities around the world think about urban transport in a comprehensive manner to improve accessibility and mobility. In this session, a presentation was made on the role of mobility in smart cites which highlighted the emerging urbanization scenario in India followed by motorization. It also highlighted the availability of public transport system in Indian cities. Various components of smart cities comprising smart mobility, smart economy, smart environment, smart infrastructure, smart governance etc. were touched briefly in the presentation. In his welcome address, Secretary, Ministry of Urban Development highlighted the purpose of the special session as well as discussions with the state ministers and officials to work out modalities for implementation of smart cites scheme. Joint Secretary (Urban Transport), MoUD proposed a vote of thanks in the session.

Hon'ble Minister of State addressing the Special Session

View of Special Session

D. Plenary Sessions

Plenary Session 1:- Safety and Security Issues in Urban Mobility

Globally, India witnesses the highest number of deaths due to road accidents. About 1 lakh lives are lost due to road fatalities while number of injuries recorded every year are even higher. The fatalities have been increasing at a rate of 8-9% every year during the last one decade. In 2011, the number of deaths due to road accidents were as high as 1.4 lakh showing a sharp increase from 1.25 lakh in 2009 at a rate of 28% in one year. The issues of security for women, security against terrorism, vandalism, fire accidents of buses, metros etc. need special attention as the rate of such accidents has been on the rise every year. The session had a special focus on safety and security issues followed by discussion by the panelist to highlight the crucial points in this regard.

Moderator - **Ms. Debashree Mukherjee, Chairperson, Delhi Transport Corporation**

Presenter - **Mr. Ashish Rao Ghorpare, Regional Executive Manager, ICLEI**

Panelists -

- Dr. Geetam Tiwari , TRIPP Chair, IIT – Delhi
- Mr. Partha Roy, Nitin Fire Protection Industries Ltd.
- Mr. Anil Shukla, Addl. Commissioner (Traffic) Delhi Traffic Police

Rapporteur - **Mr. Vedant Goyal**

Highlights of Discussion

- In some of the major metropolitan cities the fatality rate increased by 2-3 times during 2001-2011.
- Trucks, buses and cars are mainly involved in killing of pedestrians and cyclists.
- Areas away from the junctions are prone to accidents involving mostly old people
- Cyclists and pedestrians account for over half of all road fatalities.
- Since footpaths and cycle tracks are not covered under present Motor Vehicle Act, the traffic police find it difficult to enforce the measures for checking the encroachment in these areas.
- Arterial roads occupy 20-25% of the total network area in the cities.
- India has only 1% of world vehicles, whereas it accounts for 6% of the accidents and 10% fatalities.

- Total economic loss to society on account of road accidents is estimated at about 3% of GDP per annum.
- Despite inadequacy of pedestrian infrastructure walking stands as predominant mode.
- In Delhi, cars occupy 90% of the road space but transport less than 13% of Delhi's commuters.
- As per WHO study 13 of the 20 polluted cities worldwide are in India.
- Personal security in transport is of four types viz – theft by stealth, theft by force, sexual harassment, and political and social violence.
- Poor Quality of infrastructure, lack of enforcement of traffic rules, mixed traffic, unsafe driving behaviour, fake driving licenses, poor traffic management, overlapping institutional jurisdictions are some of the factors which cause road accidents.

Key issues

- Speed should be managed by design such as traffic calming measures.
- Roads with ROW of 30 m and above should have segregated bus lanes while roads with ROW of more than 45 m or above should have service lanes and parking facilities.
- Safer roads reduce crash likelihood as such pedestrian and cyclist lane should have protective barrier.
- Coordination in various sectors like transport, health, insurance, automobile manufacturers, legal, civic agencies, road designers is needed for the rescue in transportation, relief, investigation and compilation of data to achieve total road safety in the interest of road users.
- Draft Road Transport and Safety Bill 2014 needs to be approved expeditiously.
- Safety professionals be also involved in Road Construction Department.
- Promote rights of all road users by using local media and involving civil society.
- Promote research and development on road safety.

Participants at the session

Panelist making presentation

Plenary Session 2:- Challenges of Tier – II Cities.

As per Census 2011, 44 cities are in the bracket of tier – II cities which are mainly million plus cities excluding mega cities. These cities contain about 61% of urban population of the country. Tier II cities are experiencing explosive decadal population growth ranging from 30% to 60% alongwith rapid economic growth. The massive growth in these cities have put a severe strain on the basic infrastructure. The local authorities could not keep pace with the required support infrastructure. As a result these cities do not have an integrated land use transportation plan and also face problems of fragmented institutional structure, lack of required manpower capacity and financial resources. This calls for major policy interventions for sustainable development of these cities. The session made an attempt to understand various challenges being faced by these cities and suggested key measures for resolving the issues in tier II cities.

Moderator - **Dr. O. P. Agarwal, Director General, Institute of Urban Transport (India)**

Presenter - **Mr. Gaurav Dubey, Institute of Urban Transport (India)**

Panelists -

- Mr. Tejaswi S. Naik, Commissioner Bhopal Municipal Corporation and Managing Director, Bhopal City Link Ltd.
- Mr. Ajay Suri, Regional Advisor (Asia) Cities Alliance.
- Mr. S. S. Bajaj, Naya Raipur Development Authority

Rapporteur - **Ms. Sirisha Sanagapalli**

Highlights of Discussion

- Population is growing faster in tier II cities than big metropolises.
- These towns face a number of problems but also have wide development opportunities.
- Traffic congestion, unsafe environment, no fixed stopping points for IPT and public transport, unregulated parking, encroachment on carriageway, poor road quality, poor enforcement of safety measures, absence of footpaths, poor street lighting, polluting vehicles are some of the major transport problems in these cities.
- Absence of upto date master plans, conflicting land use such as location of wholesale markets and *mandies* in the core areas of the city, insufficient carriageway of main roads, mixing of local and regional traffic, lack of institutional capacity, inadequate data and poor planning are some of the key planning and development problems in these cities.

Key Issues

- There is a need to cap the limit of IPT permits based on city size and volume of traffic on selected routes.
- Pedestrian infrastructure should be provided on priority.
- Comprehensive Mobility Plan integrated with Master Plan needs to be prepared on urgent basis.
- Traffic regulations should be properly enforced.

Speaker making presentation

Audience at the session

Interaction by the participants

Plenary Session 3:- Creating Sustainable Cities through Sustainable Transport – Best Practices

India has been experiencing rapid urban and economic growth. This has led to significant rise in vehicle ownership especially in urban areas. It resulted in traffic congestion, lack of safety for pedestrian and NMT modes, increasing pollution, increase in travel time and so on. Infact, car oriented growth is instrumental in deteriorating the overall mobility and quality of life. For minimizing these problems, sustainable approach for urban transport planning is required. Several cities around the world have succeeded in transforming through sustainable transportation interventions.

This session deliberated on the techniques and methodologies that have been used in some cities in other countries to achieve social, economic and environmental sustainability in the transport sector so as to replicate the same in the Indian context.

Moderator - **Mr. Anil Baijal, Chairman, IDFC (Former Secretary, Ministry of Urban Development)**

Presenter -

- Mr. Mohinder Singh, Dean, LTA, Singapore
- Dr. G. C. Kim, Ex. President, Korea Transportation Research Institute.
- Mr. Michel Labardin, Vice President – CUB (Communauté Urbaine de Bordeaux)
- Mr. Jose Luis Irigoyen, Head Urban Transport, Director (Transport, Water, Information and Communication Technologies) World Bank.

Rapporteur - **Mr. Kartik Kumar**

Highlights of Discussion

- In Singapore public transport share is 63% of the total trips particularly during peak hours.
- Land transport policy and strategies in Singapore focus on integrated transport and land use planning, managing private transport demand and development of public transport.
- Concept plan for integrating transport and land use has continuously been updated since 1972 as per the needs of Singapore.
- Benefits of integrated long range planning are clearly visible in Singapore in terms of increased commuters walkability and accessibility, reduction in trip rates and car dependency, promoting high density compact public transport centric urban fabric and safeguarding future transport corridors.

- Land Transport Authority of Singapore is a single authority to coordinate Singapore's transport plan both private and public transport and infrastructure building.
- Demand management is through ownership measures such as vehicles quota system, additional registration fee, excise duty, road tax as well as through usage measures like road pricing, etc.
- Public transport system is integrated in terms of physical integration, integration of transport modes, fare integration, information integration, network and operation integration, etc.
- Public transport system is also integrated with spatial development by having a mixed land use, high density, good connectivity, transportation choices and high quality design.
- In Seoul, policy integration in transportation includes push and pull measures. Pull includes bus priority infrastructure while push emphasis is on remote surveillance – (CCTV), ITS, car space reduction (road diet), passenger car restrain, etc.
- In Seoul, public transport is made attractive by providing internet free Wi-Fi on Board to avoid commuting as dead time.
- Credit card and mobile phones are frequently used for payment in public transport.
- There is a functional hierarchy in four types of buses i. e. red buses from downtown to major sub-centers, blue buses on major trunk roads, green buses from subway to nearby residential areas, and yellow buses are circular in downtown or sub-centers.
- The emerging trends make sustainable transport a local, national and global issue. Global issues relate to green-house gas effect, energy security, fuel prices. National issues are concerned with financial liabilities and convertion of agricultural land while local issues are traffic accidents, traffic congestion and air pollution.
- Technology enables full integration which maximizes user impact and rationalise the supply like smart card, smart phone, etc.

Key Issues

- Transport demand should be managed by raising the cost of vehicle ownership and charging for road usages instead of building additional roads to meet the ever increasing demand.
- Integrated Public Transport hubs should be developed.
- There is a need for multi-modal and multi-policy integration in urban transportation.
- Public transport systems should be competitive in the city.
- Multimodal integration should have legal support for its effectiveness.
- In view of the challenges, the time is ripe for bold action in sustainable transport before the cities lock into inefficient, unsustainable development path.

- The need is to focus on fast growing mid-sized cities.
- Effective and accountable city level institutions are required for successful coordination of policies on land use, road provisions, traffic management, public transport, parking policies, etc.

Presentation by the Panelists

Audience View in the session

Panelists in Discussion mode

E. Panel Discussions

Panel Discussion 1:- Data Collection and Management

Transportation related data on transport facilities, services, vehicles, activities, impacts, etc. are essential for transport policy analysis, planning and research. Currently, in India the quality, quantity and availability of data, leave much to be desired. For building new infrastructure and strengthening the existing infrastructure in urban transport it is imperative that these investment decisions are based on analysis of appropriate data on the existing situation and emerging trends so that infrastructure being developed today will remain relevant to meet the future demand. A variety of new technologies such as smart phones, GPS, internet, etc. can be used to collect better quality of data at a lesser cost. This session focused on the usefulness of new technologies for data collection in the Indian context and discussed about a road map and strategy for data collection.

Moderator - **Dr. M. Ramachandran, Ex-Secretary, MoUD**

Presenter - **Mr. Adnan Rehman, Director Cambridge Systematics International**

Panelists -

- Shri Ajay Mathur, MD, Urban Mass Transit Company
- Shri Anirudh Kumar Bharati, Director (Urban Transport), MoUD
- Dr. O.P. Agarwal, Director General, IUT
- Mr. Tony Dufays. Director Regional Offices and Services & CTE International Association of Public Transport (UITP)

Rapporteur - **Mr. Ranjith Parvathapuram**

Highlights of Discussion

- There is a large gap in data needs and availability almost on all aspects of urban transport sector.
- Data needs are huge, particularly for transport planning, project preparation, project finance, prioritising investments, project feasibility, project evaluation, etc. but data availability is very limited.
- Current data collection techniques are expensive and also have some inherent drawbacks.
- Smart data is required to support smart mobility through smartphone App/Mobile Device in terms of Wi-Fi, GSM, GPS, and Accelerometer, etc. Data through such devices will cover all transport modes, 24 X 7 and 365 days coverage, accurate, inexpensive and will capture travel choices and behaviours.

- For establishing a proper data set, the steps that should be followed are: – identification of planning and policy needs, existing sources and gaps, design data program, prioritise data collection needs, implementation and evaluation.

Key Issues

- Good data is essential for transport planning.
- Multiple technologies should be used for data collection, no-one-size-fits all. Use FMS platform to incorporate data from HITS and telecom as is being done in Singapore.
- There is a need to set up sustainable data programme like knowledge Management Centre in IUT.
- Data principles should be to create data once, store once and use many times.
- Build capability and commitment to ensure quality information and analysis that are used to make decisions.
- As part of data management, develop metadata for the data with specific definitions.
- National level transport survey similar to Census needs to be undertaken to collect essential transport data.
- City level authority can take lead in collection of city level transport data.

Panelists in Discussion mode

Moderator presenting a memento to panelist

Panel Discussion 2:- Multimodal Integration for City Wide Public Transport Networks

There has been a phenomenal change in urban transport scenario during the last decade in India. Various programmes and policies initiated by the Government recognised the need for an organized and planned public transport for cities as reflected in the emerging transport scenario. However, lack of multi-modality led to an unsustainable development of public transport system. Major issues related to public transport in cities are lack of citywide coverage, poor first and last mile connectivity, lack of single ticketing system for different public transport systems, no integration at infrastructural level, lack of coordination among multiple agencies planning and implementing public transport projects, etc. Hence there is an urgent need to guide cities about various aspects of multi-modal public transport network. This session dwelt on smart solutions for planning and design of multi-modal public transport system taking some good examples of Seoul and Singapore and their possible replicability in India.

Moderator - **Ms. Naini Jayseelan, Member Secretary, NCRPB**

Presenters - **Mr. Mohinder Singh, Dean, LTA Singapore**

Dr. G.C. Kim, Ex-President Korea Transportation Research Institute (KOTI)

Panelists -

- Shri N.V.S. Reddy, M.D., Hyderabad Metro Rail Corporation.
- Shri Anjum Parwez, Chairman, Bangalore Water Supply and Sewerage Board.
- Shri Rajender Kumar Kataria, MD, KSRTC, Bangalore

Rapporteur - **Mr. Vedant Goyal**

Highlights of Discussion

- In nineties Seoul witnessed a regular gridlock in the city leading to increase in air pollution, cancer occurrence, high energy consumption, traffic accidents, discomforts, etc.
- Now Seoul with paradigm shift has developed sustainable urban transport and has 65% trips share in favour of public transport.
- Six key factors contributing to this change are: (i) Car space reduction policy by urban railway network expansion, demolition of flyovers, restoration in demolition areas. (ii) Preparing bus reform Comprehensive Master Plan through integrated administration for a nationwide integrated transport system and Urban Transport Improvement Act. (iii) Establishing a strong authority and think tank for setting vision, goal and mission statement

e.g. reducing parking lots at city hall, Monday mass transit day, increasing parking fee etc. (iv) Providing solid budget by reviewing oil taxation Vs oil subsidy and using gasoline tax for operation cost of public transport and infrastructure, (v) Introducing ITC based scientific administration using national data based center, and (vi) Strong political leadership taking lessons from best practices in the world and through consensus building.

- Now the Seoul is a sustainable city where the rich and poor use public transport and NMT and has good public transport service.
- In Singapore, during sixties there was severe traffic congestion, rising travel demand and unreliable bus services.
- In order to improve the situation, land transport policy and strategy was reoriented towards integrated transport and land use planning, managing private transport demand and developing public transport.
- Integrated long range planning helped in increasing commuters walkability and accessibility, reducing car dependency, promoting high density, compact public transport centric urban fabric and safeguarding future transport corridor.
- An integrated Land Transport Authority (LTA) was set up in 1995 by merging Mass Rapid Transit Corp, Public Works Development, Registry of Vehicles and Ministry of Communication with an objective to integrate all relevant areas of land transport into one body so as to improve communication between the different transport agencies and ultimately the efficiency of Singapore's land transport system and operations.
- In Singapore under Vehicle Quota System implemented in 1990, Certificate of Entitlement (COE) is required to register a new vehicle valid for 10 years.
- Area licensing system implemented in 1975 reduces the traffic entering the restricted zone.
- Electronic Road Pricing (ERP) implemented in 1998 is a congestion management tool which optimises the use of road capacity through the pricing of roads.
- As part of financing framework partnership approach is followed wherein government builds and pays for infrastructure, operators recover cost from operating revenue (fare, advertising etc.) and commuters pay for services.
- Fare and service standards of bus operator's service are regulated. These buses serve feeder to /from MRT, ply long-haul journeys in those corridors which are not well served by MRT and serve local needs and short journeys.
- Thrust of Land Transport Master Plan is on making public transport a choice mode, managing road space, meeting the diverse needs of the people. The focus of the plan is on

three key areas namely more connections, better service and liveable & inclusive community.

Key Issues

- Holistic planning approach, ICT based integration, paradigm shift towards TDM and land use plan, strong authority and think tank for implementation, strong-leadership and political will are some of the key areas necessary for efficient multi-modal integration.
- Building of roads to meet the ever increasing demand for road space are neither economically nor environmentally sustainable.
- Public Transport should not merely be considered as profit making entity rather it is necessary to provide mobility to the people.

Presentation by the panelist

Audience in the session

Technical Session 1:- Planning for New City Bus Service

Public transport systems have not been able to keep pace with the rapid increase in demand over the past few decades in smaller cities. Bus based public transport system plays a key role in cities, sub-urban areas, inter-city level as well as in rural areas. However, the bus services in general have deteriorated and most of the commuters have turned to personalized modes and intermediate public transport (IPT) (such as auto rickshaws, jeeps, taxis, tempos, mini buses, etc.) There is growing need for improved, efficient and safe public bus transport system in India.

Most of the small cities don't have organized city bus service. People are mainly dependent on IPT system. These cities do not have the required capacity, experience and infrastructure to operate and maintain new bus system. Even in some cities having some kind of bus service the same is mainly being operated by State Transport Undertakings which are incurring losses. There is a need to involve private sector to increase the efficiency of the system. This session highlighted the role of private sector in improving the efficiency of public bus transport system. The session also deliberated on how the operation and maintenance of new bus system could be improved in smaller cities by running it on PPP modes, proper route networks planning, infrastructure development, use of ITS, appropriate fare fixation and analyzing the cost-benefit ratio.

Moderator - **Shri R. K. Singh, Director (Urban Transport), MoUD**

Presenters -

- Shri Prasanna Patwardhan, CMD, Prasana Purple Mobility Solutions Private Ltd.
- Shri Visweswara Rao G. Associate, IBI Group-India
- Shri Abhijeet Sarkar, Chief (Road Transport), DIMTS.

Rapporteur - **Shri Gaurav Dubey**

Highlights of Discussion

- A comparison of private and public bus service in Pune reveals that private operation bus service is better than the bus service operated by public agencies in terms of proportion of buses out of total buses on road, staff bus ratio and cost of maintenance.
- Major State Transport Undertakings operating bus services in cities like Delhi, Mumbai, Kolkata, Chennai, Bengaluru, Ahmedabad, Thane, Pune, etc. are running under losses.

- Presentations revealed that private participation in operation of city bus service will be beneficial in terms of reduction in cost, better entrepreneurship, improving efficiency, outsourcing manpower and focus on customer services.
- To make BRT system efficient a minimum of 10,000 PPHPD is required as such it may not be feasible in smaller cities.
- At present, 62 member organizations are registered with ASRTU including STUs and SPVs. Urban STUs/SPVs carry around 21 million passengers daily with an average trip length of 9.5 kilometers.
- Information compiled by ASRTU reveal that around Rs.20 is incurred as loss for operation of each km of city bus service. About 84% fleet is utilized with low level of technology penetration.
- In view of large proportion of dead km., low fleet utilization, less number of passenger per operated bus per day, reducing age of bus in operation, increasing number of break down, low average per km etc. there is a need for modernization of city bus service.
- Different agencies operating city bus service have overlapping jurisdictions.
- Introduction of Cluster Bus System in Delhi is part of reforms in public transport system.
- In the new system public and private operators share equal ratio of fleet on certain routes, follow unified time-table, and are under efficient management including revenue.
- Bus management system in Delhi is based on comprehensive IT backbone.
- Bus contracting model in Delhi based on quality incentivized, gross cost, contracting system (private sector companies) is operating satisfactorily.
- Private operators regulated by Gross Cost reach the highest efficiency level.

Key Issues

- For PPP mode in operation of city bus service a more balanced type needs to be designed to make partnership sustainable.
- Improvement in city bus service is required in terms of policy and planning, operations, infrastructure, technology, institutional arrangement, capacity building, public private partnership mode, etc.
- Bus system modernization strategy should be a continuous process from planning to evaluation and re-planning.
- Bigger STUs should be made main STU for knowledge sharing and hand holdings.
- Benchmarking of STUs should be done annually.

- Government needs to appoint an agency which should have sectoral expertise acceptable to private operators as the moderator.

Panelists responding to participant query

Participants at the session

Technical Session 2:- Non Motorized Transport

Bicycle and pedestrian transportation play a key role in preserving environmental quality. If proper infrastructure is provided people are willing to walk and cycle to work. Problem arises when the relevant infrastructure is not provided. As of today, millions of Indians are cycling 10 km, if not more, to work or walking 1-2 km to work. Biking and walking are efficient, low impact modes of travel that do not contribute to air pollution and can alleviate traffic congestion. Safe cycling and walking can provide varying level of accessibility and mobility to everyone including the young, elderly, physically challenged and poor people. Well designed strategically located bicycle and pedestrian facilities can also provide increased and safer access to transit for more people. Bicycle and pedestrian trails are important community amenities that can lead to economic development, cleaner and greener spaces for social interaction. This session deliberated on various NMT projects which have either been implemented or under implementation in India and abroad and promoted NMT modes in the cities.

Moderator - Dr. P. S. Rana, Ex. CMD, HUDCO Patron, IUT

Presenter -

- Mr. Jagdish Pate, Ahmedabad
- Mr. B. V. Babu, Ex. Engineer, Corporation of Chennai
- Mr. Christopher Kost, ITDP
- Ms. Bhawna Garg, Special Secretary, Transport, Chandigarh UT Administration
- Ms. Sarika Bhatt, Urban Development Expert, Embarq India
- Mr. K. K. Joardder, Addl. Chief Planner, TCPO, New Delhi

Rapporteur - Mr. Vedant Goyal

Highlights of Discussion

- Cycle sharing is a personal public transport service.
- Cycle sharing and cycle rental are two different things. While in cycle sharing one can get a cycle at one location and drop it off at another and in cycle rental it has to be returned to the same location.
- Improvement in the image of cycling can reduce overcrowding in public transport.
- At Barcelona there are at least 10 cycle stations per sq. km.
- Cycle sharing systems in Indian cities are too small.
- Chennai cycle sharing system is integrated with city bus, MRTS and metro.
- NMT is economical, inclusive, low carbon footprints and helps in community building.

- There are various obstructions which discourage NMT modes in Indian cities like poor design and maintenance of footpaths, obstruction elements, discontinuity, faulty lane marking, absence of traffic calming measures, etc.
- Public open spaces are important in city for community interaction and promotion of NMT modes.
- Public spaces support local economy, attract business investment, improve public health, provide cultural opportunities, improve pedestrian safety and increase use of public transportation.
- Survey in Chandigarh brought out an important fact where majority of the people want fast action to increase public transport and non-motorized infrastructure.
- Chandigarh has taken initiative in promotion of NMT by Organizing Raahgiri Day, deciding vehicle free zone in Sector -17 (main commercial area) and Sukhana Lake and promoting bike tourism.
- Benefits of vehicle free zone are safe and pleasant place for pedestrian, respite from noise and air pollution, transient markets good for tourists, use of plaza for street festivals and attraction for tourists.
- Key statistics show that roads with usable footpath are about 20 percent only.
- Raahgiri day giving streets back to people has been a successful experience in Gurgaon with people's participation and involvement of political leaders, councilors, RWAs and industry leaders.
- Observance of Raahgiri day has a good impact on NMT users, increase in local business, reduction in air and noise pollution and improved road safety.
- Statistics show about 87% have started walking / cycling for short trips.
- Raahgiri movement is spreading in many other Indian cities.

Key Issues

- Car free zone in the city center can be potential area for attracting tourists and social gatherings.
- Cycle sharing improves last mile connectivity to BRTS and Metro.
- Cycle station density and size of the system (No. of cycle at each station) has to be reasonably good for success of cycle sharing system.
- IT backbone is critical for security of the system by tracking the identity of the user and the cycle.
- There is need for high quality cycles with adjustable key functions.
- The existing NMT infrastructure can be improved by retrofitting the required facilities.

- For promotion of NMT, steps should be taken to declare some part of the city as vehicle free zone.

Panelists making presentation in the session

Participant interaction in the session

Audience in the Session

Technical Session 3:- Planning Rail Transit Systems

Indian cites are witnessing tremendous growth and urban population is expected to be about 473 million by 2021. Such a massive growth generates high travel demand in cities. But the situation is not that rosy. Due to poor quality of public transport, its modal share is declining and use of personal vehicles is increasing. This causes higher pollution and also leads to increasing number of accidents. In order to support high level of travel demand there is a need to develop sustainable mass transit systems in cities. Rail technologies like metro, mono and light rail are the most cost intensive mass transit systems in the world. In India the first metro rail system was developed in the year 1980 in Kolkata, followed by Delhi. Since then a number of metro rail projects have become operational or are under construction each providing better mobility for the citizens. Metro Rail is also being planned in more metro cities. Given the important role that metro rail plays and the interest shown by a number of urban local bodies in introducing the system in their cities it is imperative to work out the appropriate strategy for the future development of metro system. This session focused on the issues to be considered for planning of metro / mono rail in a city, relative benefits from the system, route planning and selection of appropriate system suiting to the needs of the concerned city. All other issues like planning, construction, operation and maintenance of metro rail system were also addressed in the session. The session also concentrated on integrated planning for feeder services of metro system and other modes of transport for providing seamless travel to commuters.

Moderator - **Mr. I. C. Sharma, National Project Manager, GEF-SUTP**

Presenters -

- Mr. Elias George, Managing Director, Kochi Metro Rail Ltd.
- Ms. K. Vijay Lakshmi Addl. Chief (Metro, Mono and UMMTA) MMRDA
- Shri Sharat Sharma, Director (Operation) DMRC

Rapporteur - **Mr. Gaurav Dubey**

Highlights of Discussion

- About 78% people travel by public transport in Mumbai mainly use Sub-urban rail and bus transport.
- Sub-urban rail traffic in Mumbai increased by 6 times during the last few decades while the capacity increased only by 2-3 times.
- About 5000 passengers travel per train against the carrying capacity of 1750 resulting in unbearable overcrowding.

- Monorail has been taken up in Mumbai mainly due to the following reasons:-
    - It is an intermediate capacity guided urban transit system
    - Requires less space/footprint
    - System uses 0.80 m wide beam to guide the train
    - Allows steeper gradients and negotiates sharp curves
    - Derailment proof
    - Serves as feeder service to metro and sub-urban systems.
    - Faster transit connectivity
- It is an elevated rail taken up in two phases of 8.93 km (Wadala to Chambur) and 10.24 km (Sant. Gadge Maharaj Chowk to Wadala).
- It has projected a PHPDT of 7400 in 2016 and 8300 in 2031, with a corridor ridership of 1.25 lakh in 2016 and 3.00 Lakh in 2031.
- Benefits of Monorail in Mumbai are as under:-
    - Faster connectivity between island city and eastern suburb
    - Reduced travel time by 50% compared to road travel
    - Impetus to growth along the corridor
    - Reduction in road congestion along the corridor
    - Faster travel by 1.5 to 3 lakh commuters per day initially
    - Environmental friendly comfortable ride.
- Seamless integration in public transport is necessary because passengers desire non-stop – non-transfer travel
- The integrated planning needs to consider low PHPDT by bus and high PHPDT by MRTS with unified ticketing.
- DMRC have made considerable efforts in encouraging multi-modal integration by introducing feeder bus service, deciding the routes of feeder buses and integration at bus terminals, railway stations, airports, as well as with Rapid Metro at Gurgaon.
- Traffic integration has also been introduced in front of metro station with NMT modes as well as information integration.
- Efforts are also being made to coordinate with PWD, local bodies and other agencies for improvement of approach roads to metro station, construction of foot-over bridges, etc.
- Public transport is yet to be a viable option for the better off especially in smaller cities.
- Last mile connectivity is not undertaken in a structured way in Indian cities.
- In Kochi, boat jetties are being developed and connected with metro stations.

- There is a great change in the perception of the people and enormous goodwill has been created for Kochi metro in Kerala. This will help to induce change in the city.

Key Issues

- There are a number of challenges in implementation of a monorail project in the existing built up area in mega city like Mumbai viz shifting and diversion of utilities, access facilities to station, availability of Right of Way, rehabilitation and resettlement of project affected persons, restricted working hours, approval / clearances from various agencies / stakeholders, etc.
- Different public transport modes should be complementary not the competitors.
- Seamless integration is imperative for success of public transport particularly metro / mono rail.
- Switchover between different modes should be without any time loss or discomforts.
- The principle should be to minimize the need to transfer but maximize the opportunity to transfer.
- Transport integration should consider planning, route, fare, institutional, information and financial integration for sustainable and responsive public transport.
- Green field metros need to integrate last mile connectivity to become viable.

Panelists discussing the issue

Audience at the session

Technical Session 4:- Green Transport

In today's context pollution has become a major cause of concern. The WHO statistics reveal that the Indian cities are the most polluted in the world and urban transport is one of the main contributors to the air pollution. There are several new technologies and alternate fuels that have helped reduce the pollution from urban transport. This session showcased various technologies and approaches to improve the fuel efficiency of public transport, experience with alternate fuels and benefits of electric vehicles in the Indian context. Promotion of hybrid vehicles in the cities was also discussed. The presentation made in the session shared the experiences of the cities that how they went about planning and implementation of green transport in the respective cities for replication of similar experience in other cities.

Moderator - **Mr. Krishan Dhawan, CEO, Shakti Foundation**

Presenters -

- Mr. Satish Chandra Sharma, Chief Project Manager, Indian Oil Corporation Ltd.
- Mr. K. K. Gandhi, Executive Director, Society of Indian Automobile Manufacturers.
- Mr. Rohit Netekar, Business Leader – ITS Programme and Head of Sales – KPIT Technologies Ltd.
- Mr. Sajid Mubashir, Member R&D National Automotive Board Department of Heavy Industries

Rapporteur - **Mr. Vijay Saini**

Highlights of Discussion

- Fuel efficiency norms are essential for energy security, climate change mitigation, economic growth, quality of life and individual user's fuel cost.
- There are about 1.3 million buses and 4.2 million trucks plying on the roads in India.
- Rising income, increasing focus of government on infrastructure development and increasing economic activities are the key drivers which are expected to fuel the demand for commercial vehicles in India.
- Total number of on-road buses and trucks is estimated to be around 23 million by 2025.
- In 2012-13 consumption of India's total petroleum products stood at about 157.1 MMT while diesel consumption stood at 69.0 MMT.
- Trucks and buses accounted for about 77% of the fuel consumed in road transport.

- There are many opportunities to reduce fuel consumption of heavy vehicles (including buses) by improving engine efficiency, reducing vehicle weight, reducing auxiliary loads, improving transmission and drivetrain efficiency, reducing rolling resistance etc.
- By volume 80% vehicles are two wheelers.
- By 2017 Bharat stage IV emission norms will be extended to the entire country.
- At present, CNG, LPG, Ethanol and bio-diesel are important alternative fuels in India.
- In future, Biogas, HCNG+, H_2 fuel, DME would be the alternative fuels in India.
- Government has focused more on CNG as automotive green fuel.
- Components of sustainable and smart mobility includes intelligent transport systems, internet of things, vehicles health and driver behavior monitoring, information management center, smart metering, electric mobility, infotainment, advance driver assistance systems etc.
- As part of sustainability, citizen satisfactory survey conducted in 234 cities in 32 countries reveals that only half the citizens are happy in terms of travel (55%) security (58%) sustainability (52%) and cleanliness (54%)

Key Issues

- One of the pre-requisites for development of fuel consumption standards is the baseline data for various modes of buses and trucks.
- Fuel efficiency norm for trucks and buses in India are necessary for enhancing energy security and mitigate emission to a great extent.
- No single option in fuel is either an absolute or complete solution for India. There is a need to develop multiple options.
- Challenges for alternative fuels in India are:-
    - Inadequate distribution infrastructure
    - Technology upgradation
    - Harmonization of regulations
    - Development of vehicles Institutional and Management programmes
    - Promotion of safety consciousness
    - Stricter enforcement in the field
    - Elimination of spurious kits
    - Stringent environmental regulations.
    - Fire safety

- Integrated approach for mobility would help in reduction of accidents, reduction in emission, fuel saving, faster travel and increased convenience.

Panelist making presentation

Participants at the session

Panelist making presentation

Technical Session 5:- Modern Technologies

Conventional transportation technologies usually involve the use of fossil fuels for vehicles propulsion. This results in increase of Co_2 and green-house gas emissions which in turn deteriorate the living environment. These harmful environmental effects coupled with rising fuel price are causing mainstream awareness and interest in alternative transport technology. As such, emphasis must be given to modern technologies to develop more sustainable transport in order to provide cheaper, faster and better (less polluting, quieter, safer, more reliable) transport services. Ropeways or Cable car gondolas evolved over the years present a reasonable and attractive proposition for mainstream urban public transport. Such technologies have been demonstrated in some cities in Algeria, Medellin in Colombia, Rio de Janeiro, London, Kohima, Shimla etc. Similarly, parking problems in most of the cities also contribute to congestion on roads, air pollution etc. Besides, cost of expanding traditional parking is frequently prohibitive. It calls for smart parking management technologies which may provide a cost effective tool to address parking constraints. The session discussed about the importance of modern technology in transportation and parking focusing on need, characteristics, elements and benefits as well as on best practices in terms of functional requirements, construction technology etc. It also discussed planning process, designing, implementation and execution, maintenance and social benefits from alternate modes of transport like motor cables, ropeways, ferries etc.

Moderator - **Dr. Johannes Fiedler, Head Research Doppelmayr Urban Solutions: Urban Ropeways**

Presenters -

- Ms. Priscille de Coninck, Sustainable Transport and Energy Director, AFD
- Mr. Lalit Chudhary
- Mr. Etienne Lhomet, Consultant - CODATU

Rapporteur - **Mr. Kartik Kumar**

Highlights of Discussion

- Modernization of public transportation in Medellin (Colombia) as part of integrated urban project includes cable cars, public electrical escalators connected to subway, buses and street cars networks.
- It also has social, cultural and leisure amenities i.e. libraries, stadiums, public parks within green corridors.
- Benefits of a cable transport systems as part of urban transport system are as under:

- It has no topographic constraints in crossing rivers, steep slopes, densily inhabited areas, etc.
- It requires limited ROW – only towers and few stations which can be developed quickly.
- It has a capacity up to 4500 PPHPD.

- Cable transports do have certain constraints. It requires straight lines. (unless turning stations and detachable gondolas)
- It can be operated in a limited length of 3-5 km. with few Stations. The number of stations is the main driver of the cost. Its visual impact is not very pleasing.
- Izmir (Turkey) sea transportation development project has helped in reducing the time to cross the bay only to 12 minutes instead of 24 hours before. It uses boats in carbon fiber with a smaller capacity of 450-850 passengers. The project has been executed by municipality of Izmir.
- Pros and cons of water transport system as part of urban transport system are as under:-
    - **Pros:** Adapted to geographically constrained cities like buses with limited investment cost.
    - **Cons:** Reliability on operation (Fixed headway)
- There are some external constraints such as circulation condition, military zones, harbor traffic etc. Operation and maintenance cost is based on specific maintenance center.
- Today's urban cable systems are nearer to the flying saucer in the past. Cable cars are popular in Rio-de janeiro, Portland, La Paz, London.
- Urban Cable overcomes physical barriers and runs independent from traffic conditions. They can be integrated with public transport system.
- They require little land and are energy efficient with low noise level.
- They can be implemented quickly with low capital cost.
- Urban cable is smooth, sustainable and social.
- It can move 10000 people in one hour.
- As part of technology device more than 50% of enterprise traffic is expected to originate on Wi-Fi by 2017.
- Instead of fragmented approach in silos, there is a need for smart and connected city where infrastructure services comprising transportation, utilities, public safety, environment, citizens services in terms of access and participation, city services comprising city information and planning and business service could be connected through Wi-Fi.

- Smart and connected city infrastructure management enables smart traffic, smart parking, smart public safety, smart street lighting, smart waste management, etc.
- LRT projects in Rabat and Casablanca cities (Morocco) are successful experience.

Key Issues

- Water transport system as in the case of Kochi can be developed as supplementary/complementary to MRT systems.
- Ropeways can be adapted to specific geographical conditions where there is constraint of urban space, or in hilly tracks, sea or river.
- Urban cable as planned in Kohima can create efficient access in difficult topographic conditions.
- It can help in upgrading transport system in informal settlement areas and enhance resilience against natural hazards.
- It can be an alternative for middle class mobility needs.
- LRTs in developing countries could be credible tool between MRTS and BRTS.
- For developing various modes, emphasis should be on synergy between modes rather than have competition.
- Transport planners, Transport Engineers and Urban Planners have to work in tandom for public transport project.
- Natural layer of environment and resources has to be protected and as such, "change mobility to change city".

Panelists making presentation

Technical Session 6:- Intelligent Transport System

Intelligent transport systems are advanced applications which aim at providing innovative services applicable to different modes of transport and traffic management. ITS also helps in data collection with some of its applications. These applications enable various users to be better informed while encouraging safer, coordinated and smarter use of transport networks. Considering the importance of ITS in improving the image of transport system, the session deliberated upon the overall applications of ITS in improving safety in public transport, modernizing the City Bus Services, integration of various modes, etc. Various case studies and specific examples of efficient ITS models implemented in some cities were presented suggesting the possible solutions addressing the issues in Indian context.

Moderator - **Mr. I. P. Gautam, Vice Chairman and Managing Director, Metro – Link Express for Gandhinagar and Ahmedabad(MEGA)**

Co-Moderator **Shri I. C. Sharma, NPM, PMU/SUTP**

Presenters -

- Dr. G. C. Kim, Ex. President, Korea Transportation Research Institute (KOTI)
- Mr. Ravi Prakash Gupta, Head, Information Technology Group DIMTS
- Mr. Manish Gupta, Vice President and Director, Xerox Research Center, India
- Mr. Chandramauli Shukla, Chief Executive Officer, Bhopal City Link Ltd.

Rapporteur - **Mr. Kartik Kumar**

Highlights of Discussion

- There was a chaos in Seoul during seventies in terms of congestion, air pollution, traffic accidents, discomfort, uncontrollable traffic, etc. Registered vehicles increased by about 50 times during 1970-2000.
- Experts found a solution in development of efficient public transport system using ITS.
- With the help of ITS, information on bus operations in terms of total bus kilometer operated, arrival and departure time and incident data was collected and compiled.
- GPS was installed for bus re-routing, fare integration, use of smart card for transfer of money functions, payment for public transport and for scientific administration.
- Remote surveillance through CCTV cameras and ICT based safety policies initiated.
- Bus and rail journey made attractive by providing internet free Wi-Fi on board.

- For high quality services, ICT based integration improved the network effect, equity promotion, cutting down cost, transparency which helped in reduction of fatalities.
- Intelligent transport road map includes smart transport planning, connected bus, personal travel assistance efficient transport operation, etc.
- Intelligent signaling system designed for 750 junctions covers entire city of Delhi.
- Delhi BRT system is one of the good example to use road space in more democratic and efficient way, it provides better facilities for cyclists and physically challenged persons.
- In Bhopal, ITS service provides for automated fare collection and revenue management system, video surveillance systems, management information systems reports, automatic vehicle location system, GIS based centralized monitoring and point of sales for smart cards.
- ITS is being used for managing traffic signals and deciding bus priority in Bhopal. All signals carry receivers fitted on poles and bus is detected 50 meters before the junction. On arrival at the primary pole the required bus is given priority. Pedestrian poles are fitted with push buttons.
- Authorized Radio Cab operated in the name of my cab by BCLL in Bhopal are integrated with BRTS, ITS infrastructure and is beneficial to both passengers and company.

Key Issues

- Success of ITS depends on good quality of data.
- For application of ITS, the problems need to be identified first and then the ITS be used for finding the solution.
- ITS is useful for efficient monitoring of public transport operations.
- ITS should be an integral part of national policy to complement transport system.
- ITS provides seamless transit option that encourages modal shift in favour of public transport.


Presentation by the Panelists

Technical Session 7:- Financing Strategies for Public Transport

With rapid urbanization, cities are facing a number of challenges. Development of sustainable public transport system to meet the mobility needs of the people has to be given priority. Public transport is a very important component of the city's mobility aspect. Being a mass rapid system it provides safe, secure and comfortable ride. However, it requires not only the large investments as capital cost but also significant operation and maintenance cost. Transport undertakings running mass transit system are not getting much profit while some of them are running in loss. Despite such situation public transport system are trying to sustain with the growth of cities across the world. The financial position of public transport undertakings provides some indicators to assess the sustainability of public transport. The transit agencies and concerned authorities need to evolve financing strategies in such manner that they could recover capital cost as well as operation and maintenance cost to make public transport services financially viable. This session discussed about the innovative steps which if taken in right earnest will make the public transport services financially viable and facilitate the agencies in implementation process also.

Moderator - **Ms. Jhanja Tripathi, Joint Secretary and Financial Advisor, MoUD**

Presenters -

- Dr. O. P. Agarwal, Director General, Institute of Urban Transport (India)
- Mr. Palash Shrivastva, Director Program, IDFC
- Mr. Julien Allaire , Executive Manager - CODATU

Rapporteur - **Mr. Gaurav Dubey**

Highlights of Discussion

- As per IDFC study about 15% of municipal revenue during 1998-99 to 2007-08 was from sale/lease of land by the development authorities in the cities of Kolkata, Bangalore, Jaipur and Ahmedabad.
- Potential revenue from land can be captured from new development and redensification in cities.
- Land value appreciation can be captured by giving additional FSI in redensification scheme.
- Urban transport systems have both direct and indirect beneficiaries. Users of public transport and users of individual modes are direct beneficiaries who pay the fare and fuel tax.

- Property owners, business people and employers are indirect beneficiaries in terms of land value capture, tax on pay rolls, contribution to transport passes.
- In France, employer's contribution by levying mandatory tax on pay roll is significant.

Key Issues

- Effectiveness of land based instruments for financing transport projects can be realized through greater value capture of land sale / lease, scale up charges in densification, inventorizing land to facilitate trading against infrastructure, etc.
- Part of fuel tax should be earmarked for urban transport. In California, 70% of the fuel tax is for roads and transport. In Colombia, 3 lines of transmilenio system were partially financed through fuel tax. In Germany, Bayern financed the rail with fuel tax.
- Urban Tolls can also be used for maintenance of transport infrastructure. San Francisco bridges were financed through urban tolls for maintenance and rehabilitation. Congestion charging helps in modal shift towards public transport as happened in London and Singapore.
- Parking fee and fines contribute substantially in urban transport fund as in case of San Francisco, Nantes (France) Sydney, Perth and Melbourne (Australia) Nottingham (England).
- For financing urban transport three actions are important e.g. cost reduction, optimizing revenues and generating additional revenues from direct and indirect beneficiaries of public transport.

Panelist making presentation

Panelist responding to question

Participant interaction with panelists

Technical Session 8:- Planning Bus Rapid Transit System

The tremendous growth in cities is generating a high travel demand. To support such high levels of travel demand, there is a need to develop mass transit systems in cities. BRTS is one of the most cost effective mass transit systems in the world. In India the first BRTS was developed in 2006 in Pune followed by Delhi. Since then, a number of BRTS have become operational, each providing better mobility for the citizen. Many more cities are planning for BRTS. In view of the important role that BRTS plays and the interest shown by a number of ULBs in introducing the system in their jurisdiction it is necessary to understand the complexities of the system. It is in this context, this session addressed the issues related to planning, construction, maintenance and operation of the BRT system. The session also deliberated on the suitable model for running the system in Indian cities. It also dwelt on the smart solutions to solve the urban transport problems in Indian cities.

Moderator - **Dr. Sudhir Krishna, Ex Secretary, MoUD**

Presenters -

- Mr. Iker Estebanez, Country Manager, GMV India
- Mr. Christoper Kost, ITDP
- Mr. Chandramauli Shukla, CEO, Bhopal City Link Ltd.
- Mr. Chintan Daftadar, Ahmedabad Janmarg

Rapporteur - **Gaurav Dubey**

Highlights of Discussion

- World over 156 cities have BRTS today with a total length of 4036 km.; 60% BRTS are in Europe and Latin America.
- Initiatives by Central Government under JNNURM (2005) and National Urban Transport Policy (2006) gave impetus to BRTS in India.
- Since then BRTS has become operational in Indore, Bhopal, Pune, Ahmedabad, Rajkot, Jaipur, Delhi, Surat while it is under implementation in Pimpri-Chinchwad, Vijaywada, Vishakhapatnam, Hubli-Dharwad, Naya Raipur and Amritsar.
- Progress in implementation of BRTS is slow. Except Ahmedabad no other city has increased network after initial operation.
- Development plans do not take into account specific needs of BRTS projects.
- Bus image has deteriorated over the last 40 years which is very difficult to change.
- Maintenance of the built infrastructure for bus system is poor.

- Bus share in major cities is more than 60% e.g. London (62%) Mexico (86%) Chennai (79%) Sao Paulo (63%) Singapore (61%).
- Web based tools help in fleet management system in term of detecting location of public transport bus, scheduling and rostering, real time passenger information system, fare collection system etc.
- Dedicated BRT lanes are critical to BRT system speed and capacity. Dedicated lanes for BRTS carry more passengers than mixed lanes.
- Kerb side alignment for BRTS does not work well because of road side parking, difficulty in turning movement which reduces the bus speed.
- Dedicated right-of-way, bus way alignment, off board collection, intersection treatments, platform-level boarding are the basis for success of BRTS.
- With the increase of population, registered vehicles, congestion on roads, pollution, BRTS is the best possible and sustainable solution in Bhopal.
- Bhopal is the only city in the country to operate its BRTS on net cost model.
- BRTS is bridge to old and new city.
- Public transport is not an obligatory function of urban local bodies as such urban local bodies are not involved in public transport system.
- There is no attempt to disincentives the private transport. On the contrary, cities are funding road projects (widening flyovers) through internal budgets.
- A pre-condition under JnNURM funding was that cities proposing to implement parking projects should have comprehensive parking policy but no city has such policy.

Key Issues

- There is lack of trained personnel to plan, design, implement and operate BRTS.
- There are very few bus manufacturers in India and we still do not have articulated bus manufactured in India.
- BRTS is unavoidable, we may build metro but the buses will always remain the backbone of the public transport system.
- Buses and metros must co-exist, compliment and support each other.
- Given population density and area under roads, BRTS is also inevitable.
- Speed, reliability, safety, accessibility and comfort are the key features for success of BRTS.




Presentation by Panelists

Technical Session 9:- LRT Innovations

Indian cities with a population of more than one million need a mass rapid transit system. AXONIS a light metro system, is a turnkey metro system solution designed to meet the needs of rapidly expanding cities that want to develop mass transit service in a faster and at less cost than what has so far been possible. To meet this goal, Alstom designed the innovative AXONIS metro system to carry between 10,000-45,000 passengers per hour per direction and to run on a line that can be configured from sections on viaduct, at grade and in tunnel. AXONIS is composed of industry – standard sub-systems. It allows upgrades and extensions to be done through a competitive tendering process unlike proprietary Monorail System.

Axonis combines long proven Alstom solutions with technical or optimized design process and construction method to meet as much as possible today's market expectation.

In this case, track is laid through accurate Appitrack technology on shorter time (4 times faster) compared to conventional methodology. It has 100% trains motorized and HESOP sub-station for optimizing energy efficiency and are capable to overpass 6% ramps on steel wheels. The session discussed about LRT innovations including Axonis system.

Moderator - Mr. Etienne Lhomet, Consultant, CODATU

Presenters -

- Mr. Pritam Ganguli, Custom Director, ALSTOM
- Mr. Robert Devices, Rolling Stock Project Director, ALSTOM, Bangalore
- Mr. Paramjit Singh Ghai, Project Manager, ALSTOM
- Mr. Swarup Chakraborty, Design Engineering Manager, ALSTOM

Rapporteur - ALSTOM

Highlights of Discussion

- Harmonic and Energy Saving Optimizer (HESOP) is an advanced sub-station for network from 600V DC to 1500V DC and from 900 KW to 4 MW which offers best energy efficiency and reduced requirement of infrastructure.
- Benefits of HESOP include less real estate and network deviations, less civil work and less power supply equipment.
- HESOP is also beneficial in tunnel and station ventilation, energy consumption, operation and environment protection.

- ALSTOM Transport in India has provided signaling system for line 1 and 2 and their extension in Delhi Metro Rail Service.
- For India on move, cities have to be on the move and mass transit system in cities will improve urban mobility.
- AXONIS system in metro rail is easy to insert, quick to build, driverless and has reduced life cycle cost.

Key Issues

- AXONIS provides mobility solution for smart cities.
- India being at the cusp of urban transformation, procurement models must change in order to avoid gridlock in our cities.

Panelists interacting with participants in the session

G. Round Table Discussions

Round Table 1:- Creating Manpower Capacity in Urban Transport

Cities are the engines of economic growth and major contributors to the GDP of the country. Transport systems are the life line of the cities. However, transport system in the cities in India is inadequate and unsustainable. Many steps have been taken by the city authorities to improve the efficiency of transport systems but the general trend is towards supply side and not for demand management. All this can be attributed to the lack of skilled and technical manpower in urban transport sector. With the launch of smart city scheme, smart mobility assumes greater importance and calls for creating adequate capability in transport planning in cities. This will be pre-requisite for better planning, management and implementation of urban transport policies and projects in sync with the overall plan for the city for sustainable transport. Discussion in the session focussed on the need and importance of technical manpower in urban transport sector in cities. It also discussed the ways and means to strengthen the capacity of city authorities in urban transport sector.

Moderator - **Dr. Kulwant Singh, Regional Advisor, UN-HABITAT**

Presenter - **Ms. Kanika Kalra, Urban Transport Expert, IUT**

Panelists -

- Mr. Ajay Kumar, Sr. Transport Economist, World Bank
- Mr. Mohinder Singh, Dean, LTA, Singapore

Rapporteur - **Mr. Ranjit Parvathapuram, ICLEI**

Highlights of Discussion

- 50% of the investment in urban development sector in the next one decade is expected to be in urban transport i.e. approximately Rs. 27,500 crore per annum.
- For such an enormous investment programme capacity building in urban transport at local and state level would have to be taken up on large scale.
- High Powered Expert Committee of the Govt. of India recommended 5% of total investment in urban sector for capacity building with a focus on state and city officials particularly in class I cities with a population of one lakh and above.
- Capacity Building Components include developing resource modules, guidelines, methodologies, reference manuals, etc.

- There is a need for developing online Knowledge portal with urban transport database, establishment of training centers, development of training and educational programmes, short term courses, undertaking research awareness programs, organizing conferences, publishing journals and newsletter.
- At present, it is estimated that about 500 urban transport professionals are available in the country both in government and private sector.

Key Issues

- There is an urgent need to increase the number of urban transport professionals to meet the demand of urban transport planning and development in major urban centers.
- A comprehensive study needs to be undertaken to assess the requirement of urban transport professionals in the next 20-25 years in the country.
- With initiative of developing municipal cadre, possibilities for creating a cadre for urban transport experts to be employed in govt. sector also need to be explored.

Presentation and Discussion in the session

Round Table 2:- Urban Freight: Role and Impact on Urban Transport

Urban freight transport plays important role in the functioning of the city and contribute substantially in the economy of the city. But in urban transport planning, as well as in city development, freight movement is not given priority attention. While freight transport for movement of goods and services is essential part of city system, it also impacts the urban mobility system. In order to address the problems of freight movement in the city there is a need to develop sustainable strategies for smooth movement of urban freight in and around the city. The strategy should dwell on mitigating the social, economic and environmental impacts of urban freight transport. While formulating the strategy, the policy makers should consult various stakeholders involved in this sector. It will help in smooth implementation of policy measures to tackle the problems of urban freight movement. It should also consider the likely difficulties faced by urban freight with rising population and expansion of cities. It is in this context that discussions in the session revolved around managing urban freight as an important component of urban transport.

Moderator - **Dr. Sanjay Gupta, School of Planning and Architecture, New Delhi**

Presenter - **Mr. Partha Bosu, India Director and South Asia Liaison, Clean Air Asia.**

Panelists -

- Mr. Manfred Breithaupt , GIZ
- Mr. Sudhir Gota, Consultant, ADB

Rapporteur - **Mr. Kartik Kumar**

Highlights of Discussion

- Cities across the world generate about 70% of greenhouse gases while occupy just 2% of world's land.
- Globally, transportation is responsible for about 13% of global greenhouse gas emissions, while industries are responsible for 19 percent.
- Logistic cost range between 15-25% of GDP in Asia while it is about 15% in India. This is significantly higher than US, Europe and other developed economies where it is below 10%.
- Reduction of logistics cost by 1% means saving of over $ 7.5 billion.
- There is a vicious cycle in road freight.

- Lack of awareness and training results in poor access to technologies and finance leading to old and inefficient trucks creating high emission with low efficiency and low profitability which is responsible for fragmented industry and lack of supportive policies.
- Freight exchange platform reduces empty trips and helps in achieving optimum loading.

Key Issues

- Shift from road to rail and shift from truck to cargo bikes and motorbikes as part of strategies for green freight.
- The need is to shift from vicious cycle to virtuous cycle for green freight. High awareness will help in better access to technology, finance and improve vehicles. As such there will be low emission and high efficiency. This will result in high profitability leading to consolidation of industry and proactive polices.
- Using NMT as last mile connectivity is a good delivery option.
- Freight transport planning should be made part of Mobility Plan vision statement.

Panelist discussing the issue

Audience at the session

Round Table 3:- Mass Transit Options for Medium Size Cities

The session was conducted by Hitachi Rail Company. The Transport Business wing of Hitachi Ltd. – is one of the few railway manufacturers of the world capable of providing not only the latest in rolling stock technology but also a full range of products and services in on-board components, signaling, traffic management, power distributions, station equipment and depot systems. Hitachi's extensive technical expertise in all E&M sub-system gives it a unique competitive edge in realizing seamless integration throughout the railways system.

Moderator - **Mr. Nripesh Kumar, Director, Capital Projects and Infrastructure, Price Waterhouse cooper, India**

Presenter - **Mr. Anand Kumar, CTO Rail System Company, Hitachi India Pvt. Ltd.**

Panelists -

- Mr. Subodh Jain Ex. General Manager and Member Engg., Indian Railways
- Mr. Hidetoshi Miura, Director, Global Strategy and International Business Management, Hitachi Rail Europe Ltd.
- Mr. Abhishek Goel, Associate Director, HSBC

Rapporteur - **Mr. Ito Kentatsu**

Highlights of Discussion

- Population of class I and class II towns is growing faster than big metropolises and they have increasing role in India's urban economy.
- Although there are problems in smaller towns they do have bigger opportunities
- Issues in small towns are mainly related to traffic congestion, proliferation of auto rickshaws and cycle rickshaws, lack of traffic regulations, unregulated and free parking, encroachment on carriageway, poor road quality, absence of road safety enforcement, absence of footpaths etc.
- There is lack of planning in these cities. Bus stands are generally located in core areas of the city and regional traffic pass through the city.
- There is weak institutional capacity and lack of coordination. Heavy motor vehicles move in the inner part of the town. Traffic signals are minimal as also the traffic police to regulate the traffic.

Key Issues

- To address the issue regarding traffic congestion, permits for IPT need to be capped and also they should be allowed to ply on selected routes.
- Pedestrian infrastructure should be provided at accident hotspots.
- Transport plans be prepared and integrated with master plans.
- There should be restriction on trucks and buses in the core areas of city and wherever necessary it should be one way traffic.
- Risk sharing scheme needs to be well designed to realize bankable PPP projects.

Panelist making the presentation

Audience at the session

Round Table 4:- Role of Urban Transport in Smart Cites

Smart mobility is at the core of smart city and as such state of the art transit system is critical. Integrated land use and transport planning is the pre-requisite for smart mobility. Transport Demand Management (TDM) optimize the use of transport systems. Multi-modal integration across the city transportation system ensures seamless transfer across modes. Similarly, integration of mass transit systems with intermediate public transit modes such as auto-rickshaw and NMT modes ensure optimum use of public transport. Intelligent transportation systems giving real time information can become the tool in implementation of smart mobility objectives.

This round table discussed the challenges likely to be encountered in transforming the cities into smart ones incorporating the smart mobility features in the years to come. It also discussed implementation including financial models for role of urban transport in smart cities.

Moderator - **Mr. Munish Kumar Garg, Director (Smart Cities), MoUD**

Presenters - **Sh. Ankush Malhotra, Asst. Vice-President, UMTC**

Ms. Swati Khanna, Manager, UMTC

Panelists -

- Ms. Shreya Gadapalli, Regional Director, ITDP
- Mr. Mohinder Singh, Dean, LTA, Singapore

Rapporteur - **UMTC**

Highlights of Discussion

- Transport systems are not keeping pace with the growth of urban areas.
- Transportation is not merely a technical problem; it is a matter of public policy.
- In a business as usual scenario, personal motor vehicle use will be double in our cities in the next 10 years.
- Transport policy basics are to give people walking, cycling and transit and to take from cars road space and parking charges.
- Cites must cap and eventually reduce the use of private vehicles.
- Smart urban transport includes opting the right public transport, multi-modal integration, NMT, parking management, implementing TOD measures, IPT system and information to all.
- Smart implies a connected, technology enabled environment, where the power of digital assets and information is leveraged to manage city services and improve citizens quality of life.
- Smart urban transport system means movement of people and goods in an effective and efficient manner by providing efficient mode & route, cost effective (financial, economic and environment) and safe and accessible transport system.

- Using technology to synchronize all transit modes. Manage the demand and promote use of public transport and next generation vehicles for smart mobility.

Key Issues

- For smart cities the concept paper suggested that after every million urban residents there should be 25-35 km of rapid transit, 200-500 city buses and about 80 km walking and cycling infrastructure.
- High quality footpaths and cycle track are essential for the success of mass rapid transit.
- More parking supply leads to bigger traffic jams.
- Shopping area where people are prioritized over vehicles attract more customers than vast parking lots.
- Parking fee needs to be used to manage demand; it can help funding pedestrian infrastructure.
- Key to smarter transport system is availability of data on various aspects of urban transport.
- The need is to ensure integration of land use and transportation; compact cities which can help curb the travel demand to an extent.

Panelist deliberating the issue

Audience at the session

Round Table 5:- Review of Urban Transport in India

During the last two decades urban population has grown by about 3% per year while total population grew by less than 2% per year on an average. Cities contribute nearly 62%-63% of India's Gross Domestic Product. Future growth of population is also likely to concentrate more and more in the urban areas and their contribution to GDP is likely to rise to 75% by 2030. Urban transport system, however, is not keeping pace with the growth of urban areas thereby deteriorating the environment and hampering the economic efficiency of the cities.

Even with the current size of the urban population, Indian cities are facing severe congestion, air pollution and increasing greenhouse gases emission from the transport sector. An increasing incidence of road accidents and an exploding growth in the demand for petroleum fuels threatens the energy security of the country. With the urban population projected to cross 50% by 2050, the situation is likely to go completely out of control and thwart India's economic development efforts unless remedial measures are taken quickly. It is in this context, the session deliberated on the emerging challenges and suggested some solutions for the same.

Moderator - **Mr. R. K. Singh, Director (Urban Transport), MoUD**

Presenters - **Ms. Sujaya Rathi, Principal Research Scientist, CSTEP**

Ms. Megha Gupta, Urban Transport Planner, Institute of Urban Transport (India)

Panelists -

- Mr. C. K. Khaitan, Jt. Secy, MoUD
- Mr. Ajay Kumar, Sr. Transport Economist, World Bank

Rapporteur - **Ms. Megha Gupta, Urban Transport Planner, IUT**

Highlights of Discussion

- As compared to developed countries share of urban population in India is still low but it will grow a lot more in the years to come.
- Cities with one lakh population and above are dominating the scene of urban growth and the growth rate is particularly faster in cities in the population range of 1-5 million.
- There is a lack of integrated policy for various public transport systems.
- Growth in registered motor vehicles is much more than the population and major increase is in 2 wheeler scooters and motor bikes.
- Increasing motorization is leading to congestion and increased consumption of fuels.
- Mobility planning is not pro-poor.

Key Issues

- Increasing motorized trend demand is not a sustainable scenario which needs to be reviewed to find out the right solution for sustainable development.
- Dense urban form and less dispersed urban population are pre-requisite for success of mass transit system.

Audience at the session

Panelists interacting with participants

Round Table 6:- Improving and Upgrading IPT Services

Within the urban transport framework, intermediate public transport (IPT) like 3-wheelers, auto rickshaws, tempos, etc. cater to the large number of daily urban trips in Indian cities. In the absence of an organized city bus service, they provide an alternative mode of travel and where public transport is available they act as a feeder to the system. However, due to the unorganized nature of this sector, it faces many challenges. The recommendation of the working group on urban transport for 12th Five Year Plan as well as National Transport Development Policy Committee (NTDPC) stressed the need to improve the IPT services as these vehicles have potential for clean mobility and low emission solutions. In the Round Table, discussion focussed on the need of IPT in Indian cities and the methods to improve the system and services.

Moderator - **Dr. Shankar Vishwanath, Ex. Director, (Brihanmumbai Municipal Corporation) Mumbai**

Presenter - **Ms. Kanika Kalra, Urban Transport Expert, IUT**

Panelists -

- Mr. Anand Subramanian, Director Corporate Communications, Ola cabs
- Mr. Navdeep Asija , Founder Eco Cabs

Rapporteur - **Ms. Anindita Ghosh**

Highlights of Discussion

- A study of 20 cities undertaken by IUT reveals that there is no clear cut relationship between the city size in terms of population and the number of IPT vehicles per lakh of population.
- Cities in the study have been classified into three categories based on population. Category 1 includes cities below 10 Lakh population, category 2 includes cities between 10 to 20 Lakh population and category 3 cities are above 20 Lakh population.
- In many category 2 cities between 10-20 Lakh population IPT acts as substitute to the public transport with exception in Indore and Bhopal.
- In category 3 cities above 20 Lakh, IPT acts as feeder to main mode of public transport in cities like Delhi, Mumbai, Kolkata, and Ahmedabad with exception in Surat, Lucknow and Kanpur.
- Three seater auto rickshaws with 60% share dominate the IPT sector across India but they do not have fixed routes. On the other hand Vikram / Tempos mostly operate on fixed routes.
- For auto rickshaws, fares are usually fixed by RTA while for tempos fare is decided generally by the unions and drivers.
- About 60% autos use CNG/LPG as fuel, while others are still using blend diesel and petroleum particularly in smaller cities.

- There is lack of infrastructure facilities for autos as few cities have notified stands provided by local bodies but again the enforcement is poor.
- About two-thirds of drivers are non-matriculate and 70% of vehicles are operating on rent.
- Working population mainly use the auto which account for 52% of total trips. Social trips account for 31% while educational trips are 16%.
- Average distance travelled by passengers per day is 5-6 Kms and they incur an expenditure of about Rs. 500-600 per month on journey by autorickshaws

Key Issues

- Policy and regulatory framework are out dated. There is no economic stability for drivers and they don't have much financial support from financing agencies.
- Most of the autos are operating on rent and there is lack of ownership.
- Infrastructure for IPT services is awfully inadequate in terms of auto stands, interchange points, parking space, drinking water and other facilitates, gas stations, workshops etc.
- Lack of use of modern technology like ITS, and poor social benefits.
- There is a need to make IPT more sustainable mode of transport.
- Special Purpose Vehicles can be used for IPT as has been started in Punjab.

Audience at the session

Presenter making the presentation

Panelist sharing the views

Round Table 7:- Role of Media in Creating Awareness about Urban Transport

The understanding of sustainable urban transport is largely confined to limited groups who are working or dealing with the subject in some form or the other. Those who are widely travelled across the world do understand the importance of sustainable transport in creating sustainable cities. This is, however, not enough.

To prioritize people centric sustainable urban transport solutions in our cities, the masses that actually get impacted by this planning need to be a part of the discussion. This will not only generate a stronger voice for building sustainable transport solutions but will also sensitize other motor vehicle users that roads are meant to be shared by all modes of transport. The most important group in this segment is the media as they would scale up the voice of sustainable urban transport to the masses. All such issues were deliberated in the Round Table Discussion.

Moderator - **Ms. Meenakshi Lekhi, Member of Parliament, New Delhi and Spokesperson – BJP**

Presenter - **Mr. Amit Bhatt, Strategy Head, Urban Transport, EMBARQ India**

Panelists -

- Mr. Rajesh Kalra, Chief Editor of Times Internet Ltd.
- Mr. T. K. Tarun, Sr. Editor, Economic Times
- Mr. Prabhat Agarwal

Rapporteur - **Ms. Kanika Jindal, EMBARQ**

Highlights of Discussion

- There are some alarming facts about mobility in India.
- About 1.40 Lakh deaths / year in India are due to road traffic crashes.
- 6.27 Lakh are reported as pre-mature deaths / year in India due to air pollution.
- There is a strong perception that media does not give enough coverage/importance to sustainable transport initiatives / projects.
- Selling of sustainable stories to media is important so that they get engaged in innovative transport initiatives like raahgiri campaigns.

Key Issues

- Avoid-Shift-Improve strategy needs to be adopted. Efforts should be to avoid unnecessary trips, journey be shifted towards lower emitting modes of transport and the need is to improve technological and operational efficiency of vehicles.
- The strategy will benefit in improving air quality, health, safety, climate mitigation and development.
- The issue is how to convince media to write about sustainable transport.

- The planners, engineers and transport professionals should help in creating the story for media instead of reporting mere facts and figures.
- Media is an important communicator which can help popularize NMT and PT in our cities.

Panelist interacting with participants

Participants expressing their views

Memento being presented to Panelist

Round Table 8:- Evaluation Criteria for Urban Transport Projects

The Ministry of Urban Development Govt. of India provides financial assistance to the urban local bodies and parastatal agencies for various urban transport projects. To ensure the eligibility of the projects for financial assistance, the Institute of Unban Transport (India), appraises these projects on behalf of MoUD. In order to make sure that these projects are sustainable, IUT is preparing evaluation criteria for different categories of urban transport projects viz. transport planning, public transport, non-motorized transport, transport infrastructure, intelligent transport system, and governance. The objective of this Round Table Discussion was to enlist the views of the participants on the evaluation criteria developed by IUT in collaboration with the Climate Works Foundation so as to finalize the same.

Moderator - **Mr. M. K. Sinha, OSD and ex-officio Joint Secretary, MoUD**

Presenter - **Ms. Sonia Arora, Urban Transport Expert, IUT**

Panelists -

- **Mr. Chinnaya Kumar Acharya, Chief of Programs, Shakti Foundation**
- **Dr. Geetam Tiwari, IIT-Delhi**

Rapporteur - **Ms. Tamalika Acharya**

Highlights of Discussion

- For evaluation of urban transport projects socially inclusive mobility (accessibility and affordability) environmental compatibility and economic efficiency are the important elements which need to be addressed.
- Various policy documents of the Govt. of India namely National Urban Transport Policy – 2006, National Transport Development Policy Committee Report, National Mission on Sustainable Habitats have indicated certain sustainable indicators for evaluating the transport projects.
- Social indicators include public transport and NMT in terms of modal shift, network coverage, accessibility, reduction in accidents, roads security and reduction in motorized traffic on road.
- Economic indicators relate to per capita transport expenditure, share of GDP contributed by transport, staff per bus station, travel speed and time, reduction in fuel dependency, land used by transport infrastructure etc.
- Environment indicators are energy / fuel consumption, transport greenhouse gases emission, emissions per capita (No_2, So_2, SPM and RSPM), percentage of vehicles fleet on clean fuels etc.
- Urban transport projects may be categorized as transport planning, public transport, transport infrastructure, non-motorized transport and urban freight.

Key Issues

- Implementation of urban transport projects should benefit the city socially, economically and environmentally.
- In case of public transport projects, modal share should increase in favour of public transport and reduction in personal mode. Economically, it should have increase in earning per km and reduction in travel time while environmentally more use of clean fuels and reduction in GHG emission per capita.
- While evaluation of other transport projects like NMT, transport infrastructure, urban freight, transport planning all social, economic and environmental benefits in tangible terms need to be assessed.

Panelist interacting with the participants

Participants at the session

Round Table 9:- Social Exclusion in Urban Transport – Addressing the Gender Bias

The growing challenge in an increasingly urban world is to ensure that towns and cities provide safe and secure living environments for all. Success depends on good governance in which all sections and genders of society are equal partners and agents for change. In urban areas women are working in various fields along with men but their travel patterns differ. Gender inequalities in cities are substantial barriers to development of women in many cases. Rapid urbanization would only be sustainable if the planning and development efforts are gender sensitive and properly address the issues affecting the women. In planning transport facilities these inequalities must be addressed to promote equal opportunities and greater social and economic benefits. Focus of the Round Table was on understanding the unique travel needs of women and how to address the same so that they feel safe, secure and comfortable while travelling in public transport.

Moderator - **Mr. C. K. Khaitan, Joint Secretary, (Urban Transport) MoUD**

Presenter - **Ms. Himani Jain, Director, Metaurban**

Panelists -

- Mr. Nalin Sinha, Director, ITDP,
- Ms. Anvita Arora, Director, iTrans

Rapporteur - **Mr. Vijay Saini, ICLEI**

Highlights of Discussion

- Gendered cities are distinguished by their roles for different genders.
- Women have strong link in Shelter-transport-livelihood and higher informal sector participation.
- Larger cities report high rate of crimes against women.
- Studies reveal that about 70% of women are harassed by the road side, 50 percent inside public transport and 42 percent while waiting for transport.
- Constitution of India guarantees equality to all [Art 14] no discrimination by state [Art 15(I)1] equality of opportunity [Art 16] equal pay of work [Art 39 (d)] special provisions to be made by state in favour of women for securing just and humane conditions of work [Art 42].
- More women are dependent on public transport and make more trips related with caretaking and household responsibilities.
- In case of women, trip chaining is common. Women make more frequent trips and travel shorter distances but walk longer distances.

Key Issues

- The need is to follow a gendered approach vs the traditional gender neutral position both in transport aspects and in urban planning and design.
- Step free level access to trains, subways, buses from platform.

- Lively, active, well lit footpath and bus stops.
- Safe and secure last mile connectivity with attractive feeder system.
- Women only buses/coaches.
- Adequate lighting, CCTV and panic button, sensitization approach.
- New cities or newly planned areas should be more inclusive.
- Integration of informal sector on street side, zero building setback, transparent frontage, lighting etc.

Presenter making presentation

Interaction by the Panelist

Participants at the session

Round Table 10:- Integrated Land use and Transportation Planning: Building the Foundation for India's Future Smart Cities

Planning for various components of city system, be it environmental resources, land use, mobility, physical and socio-economic infrastructure etc. has more or less been attempted in isolation without any coordination. This process requires to be changed in favour of people centric integrated planning. The need is to put people first while designing the city systems and process. Prioritising people and high capacity public transit as the preferred mode travel is the emerging approach. The emphasis should be on reducing the dependence on personal mode by integrating land use and transport planning. This has become the major concept in numerous cities around the world. Revitalized and vibrant transit and people oriented modes of development have of late emerged as the specific planning strategies for achieving long term sustainability.

This Round Table discussed the preparedness of the cities to apply the emerging planning approach to plan and design its future smart cities. Various case studies were presented showcasing the experiences at various levels to understand what roles the government and private sector can play in creating connected communities. It also identified impediments to successful implementation of integrated land use and transportation plans and to improve the chances of transit supportive development along existing and emerging transportation crridors.

Moderator - **Mr. Amit Bhatt, EMBARQ India**

Presenter - **Mr. Bankim Kalra- Sector Head Urban Planning & Design, IBI Group**

Panelists -

- Mr. Ke Fang, Sr. Urban Transport Specialist, World Bank
- Mr. Trevor Mcintyre, Director, IBI Group

Rapporteur - Mr. Ashish Ghate

Highlights of Discussion

- Smart device like robot is programmed so as to be capable of some independent action. It shows a quick-witted intelligence. It is capable of making adjustments that resemble human decision especially in response to changing circumstances.
- Components of smart city includes, smarts living, smart well-being, smart environment, smart mobility, smart governance, smart people.
- Key elements are live, play, learn, grow, conserve, regenerate cities beyond sustainability, connect and access.
- Smart growth relates to integrated land use and transportation as well as infrastructure planning.
- Low density is not viable for mass transit system.

- International experiences show that jobs within 10 minutes walking distance from station attract more people to use mass transit system.
- Infact, accessibility to jobs by walking significantly affects the use of public transport system.

Key issues

- Challenges in integrated transit oriented planning are as follows:-
    - Conflicting policies
    - Overlapping institutional responsibilities
    - Timing of transit and land use decisions
    - Obsolete Development Regulations
    - Disconnects between various levels of planning
- Compact development in terms of block size, building density and road network is pre-requisite for mass transit system.
- People walk longer in good walking environment.
- There is a need for interaction between planning and design for urban forms and public transport infrastructure-density accessible to public transport and walkability to public transport.

Participants at the session

Panelist interacting with the participants

Round Table 11:- Re-Engineering Transport Design for Safe and Universal Accessibility

Transport infrastructure development has got a momentum to meet the mobility needs of people. While keeping the momentum of pace of development the need is to ensure that the implemented infrastructure projects qualify for acceptance by all users. Generally, engineering proposals and design have been skewed towards vehicular considerations. As found in audit of such projects, the designs of these project do not meet the universal accessibility requirements and safety considerations. The analysis of such projects reveal that some of the accidents are recorded only because due considerations for different users as per their behavioral characteristics and requirements have not been given while designing the projects. Therefore, the Round Table elaborated on the universal accessibility issues so that future engineering projects and proposals address the needs for all.

Moderator - **Ms. Anjali Agarwal, Executive Director, Samrathya**

Presenter - **Dr. Sewa Ram, School of Planning and Architecture, New Delhi**

Panelists -

- Dr. S. M. Sarin, Former Director, CRRI
- Mr. Abhijit Sarkar, Associate Professor, CEPT

Rapporteur - **Ms. Richa Pandey**

Highlights of Discussion

- Approach towards safe mobility has physical and social dimensions. The physical dimensions are mobility, traffic focus, large scale urban transport projects and forecasting traffic.
- Social dimensions include accessibility, people focus, compact urban form, multi-modal travel.
- Conventional approach concentrated on segregation, street as traffic conduit, demand based, travel time minimization and free flowing.
- Sustainable approach aims at greater integration, street as a place, management based, travel time contextualisation and traffic calming.
- Walkability index refers to the extent to which walking is readily available to the user as a safe, connected, accessible and pleasantness.
- Design and planning to meet the needs of mobility impaired pedestrians like wheelchair users, walking aid users, prosthesis users, people with visual and hearing impairments.
- At pedestrian and cyclists crossing the need is to provide NMT infrastructure at intersection, proper sight distance/turning radius, reduce travel speed, access management, etc.

- Design needs for better accessibility are low kerb height, provision of ramp, mild slope on ramp, cross slope, dedicated cycle track, NMT refuge, etc.
- Policy framework towards accessibility comprises The Persons With Disabilities (Equal Opportunities, Protection Of Rights And Full Participation) Act, 1995 (section 44-46) UN CRPD 2007. The Rights of Persons with Disability Bill, 2014 (Pending consideration in Parliament)

Key issues

- Walkability is affected by opportunity and motivation factors.
- Opportunity can be attributed to distance, topography, weather, infrastructure, pedestrian facilities, access proximity to destination, access connectivity to transportation alternatives, street lighting, etc.
- Motivation factors are physical condition (age + health), family circumstances, peer group, habits, personal time and money, personal value of independence, etc.
- Walkability can be measured or assessed based on footpath surface, footpath width, modal conflict, obstructions, encroachment, continuity, safety, pedestrian volume, comforts and amenities.
- Efforts should be towards universal accessibility.
- Universal accessibility should be mandated in all transport planning/engineering projects.
- Behaviour of users need to be factored in design.
- Sensitivity should come within the society. Mainstreaming of people with disability to sensitise the society.

Panelists sharing their views

Participants discussing the issues

H. Audience Opinion Poll

As was done during UMI-2013 an audience opinion poll was conducted in UMI-2014 also in all the Plenary Sessions, Panel Discussions, Technical Sessions & Round Table Discussions, 4-5 standard questions related to theme and sub-theme of each session were posed to the audience at the end of the discussions in each session to seek their opinion. Audience present in the hall responded through voting slips. Questions, where majority of the participants i.e. more than 50% agreed are listed below:-

S. No.	Question	Yes/No	Percentage View (%)
Safety and Security Issues in Urban Mobility			
1	Are there standardised guidelines for meeting the safety and security risks in various modes of Public Transport?	No	66
2	Do you agree that there is huge gap in accident death data between city FIRs and National Crime Research Bureau Record?	Yes	90
3	Can safety be improved by restricting speed only or creating safe infrastructure for pedestrians and cyclists important?	Both	87
4	Would provision of CCTV cameras and GPS on all buses and metro rail improve security of public transport?	Yes	84
Challenges of Tier II cities			
1	Is it a fact that focus of investment in urban transport has been more in metro and mega cities than tier II cities?	Yes	98
2	Are tier II cities, being nodes of urban growth getting due attention for improving urban transport system?	No	67
3	Do you agree the transport challenges in the tier II cities, being growth engine for future, should be addressed on priority before they become unmanageable?	Yes	100
4	Tier II cities promise a great potential in terms of growth and development, will it not be right to develop appropriate mass rapid transport system in these cities?	Yes	74
Creating Sustainable Cities through Sustainable Transport– Best Practices			
1	Do you think the urban sprawl, increasing air and noise pollution, congestion etc. are the result of unsustainable urban transport?	Yes	91
2	Do you think the existing planning instruments have helped in preparing sustainable development plan?	No	69
3	Have the planners made any conscious efforts to plan and implement sustainable urban transport system?	No	50
4	Do we have enough examples of sustainable urban transport in India for replication?	No	65
5	Is there any need for development of performance standards for sustainable urban transport system?	Yes	92
Data Collection and Management			
1	Do you think there is a huge gap in the availability of data in transport sector than the requirements?	Yes	94
2	Is there any established mechanism for collection and	No	73

	compilation of data related to various aspects of urban transport?		
3	Have we made any progress in using ICT enabled services to improve the data base in urban transport?	No	61
4	Is there any need to create institutional and regulatory arrangement for periodic collection of transport data on vital issues?	Yes	88
5	Do you agree that Knowledge Management Centre of IUT should be strengthened to build data base?	Yes	91
Multimodal Integration for City Wide Public Transport Network			
1	Do you think multimodal integration will also be helpful in maximising utilisation of Public transport?	Yes	91
2	Have the upcoming metro rail systems given due attention to integration of various modes?	No	70
3	Are we making efforts to integrate multimodal transport trips involving walking, IPT, Public transport both ingress and egress?	No	57
4	Do you have seamless travel across modes in Metro System from Home to Work to promote Public Transport in cities?	No	70
City Bus Service			
1	Is there proper integration of city bus service and IPT modes in cities having city Bus Service?	No	90
2	Do you think the existing model of Public Private Partnership for city bus operation is successful?	No	58
3	Do you think application of ITS in operation and management of city bus service is being utilized to its full potential by cities?	No	74
4	Do you think grants for city bus service under JNNURM has made a positive impact?	Yes	64
Non – Motorised Transport			
1	Is the Quality of Walking and Cycling infrastructure in cities satisfactory or very good or bad ?	Satisfactory	71
2	Have major cities made any serious efforts for Public Bicycle sharing System?	No	76
3	Do you think NMT is properly integrated with Public Transport in cities?	No	90
4	Do you think there is adequate legal support for protection of NMT users on city roads?	No	80
5	Should pedestrians also be penalized for jay walking on roads?	Yes	55
Rail Transit System			
1	Do you think Metro Rail System coming up in major cities is integrated well with land use?	No	55
2	Is the metro rail right choice for mass transit for 2 million plus cities?	Yes	55
3	Have the metro rails in operation in cities like Delhi, Bangalore, Kolkata, etc. helped in decongestion on roads.	Yes	73
4	Should the Regional Rail Transit system be given priority for inter – city mobility needs?	Yes	70

Green Transport			
1	Do you think greenhouse gas emissions from transport are increasing faster than any other energy using sector?	Yes	80
2	Can the environment impact of transport be reduced by improving NMT facilities in cities?	Yes	65
3	Do you think use of biofuels for transport is making any progress?	No	62
4	Have cities made any efforts for development of green transport infrastructure like greenways, bikeways etc.?	No	71
5	Do you think planners are making efforts for development of green transport modes for liveable cities?	Yes	61
Modern Technology			
1	Are we making serious efforts to develop the appropriate technology suitable to specific transport needs of various cities?	No	51
2	Is there any substantial progress in using newer and cleaner technologies in urban transport?	Yes	52
3	Is the choice of Mass Transit technology in mega cities appropriate?	Yes	51
4	Have we made any conscious efforts to integrate IPT with Public Transport in mega cities?	No	61
5	Is there any need to initiate a regular programme for research and development of modern technology in urban transport?	Yes	92
Intelligent Transport System			
1	Is ITS being really used well for smart solutions for improving the efficiency of transport system in cities in India?	No	74
2	With huge investments in metro rail and Public Transport systems, is there commensurate expenditure in ITS?	No	64
3	Is there any supporting regulatory and policy framework for promoting the application of ITS?	No	62
4	Has the need of ITS percolated down to ULBs and Sate Transport Corporations?	Yes	52
Financing Strategies for Public Transport			
1	Do you think large demand and supply gap in financing is adversely affecting the urban transport?	Yes	84
2	Have we made any substantial progress in capturing the urban gains and channelizing the same into financing the transport infrastructure?	No	78
3	Have city authorities and State Governments made sincere efforts in realising the new levies and unconventional charges for raising the resources?	No	70
4	Is there any progress in Private Sector Financing in Public Transport as anticipated?	No	56
5	Is there any relationship in funding for the urban transport and Housing Sector?	Yes	81
Planning Bus Rapid Transit System			
1	Do you think BRTS in tier II cities is an effective	Yes	84

	solution?		
2	Can BRTS play a catalytic role in transforming cities into more livable?	Yes	93
3	Have we drawn any lessons from the existing BRT system for improvement in future?	Yes	59
4	Will BRT be feasible in old and congested cities?	Yes	59
LRT Innovations			
1	Is there any significant amount of overlap between the LRT technologies?	Yes	80
2	Do you think LRT is economically affordable and socially acceptable solution for urban transport system?	Yes	90
3	Do you think the versatility of LRT can provide large range of transport solutions?	Yes	90
4	Are the operating requirements of LRT in terms of ROW separated or shared is beneficial for Indian cities?	Yes	80
Manpower Capacity in Urban Transport			
1	Have the city authorities employed any urban transport professionals?	No	58
2	Are the city authorities aware about the leaders programme for capacity building by the Ministry of Urban Development (MOUD)?	No	55
3	Have the participants in UMI attended any Capacity Building Programme conducted by IUT?	No	68
4	Do you think Toolkits and Manuals on various aspects of urban transport prepared by IUT are useful?	Yes	75
5	Do you think Government has made efforts to assess the requirement of manpower in urban transport?	No	58
Urban Freight – Role and Impact on Urban Transport			
1	Do you think intermixing of local and regional freight is affecting the urban mobility?	Yes	86
2	Do the planners consider appropriately location and re – location of goods terminals, nodes and hubs etc. while making plan for the city?	No	59
3	Is there any mechanism for regulating the non – motorised means of goods transport in cities?	No	57
4	Do the cities prepare any Freight Traffic Management plan?	No	71
5	Is the strategy of regulating freight movement during peak hours an effective solution for managing traffic in cities?	No	55
Role of Urban Transport in Smart Cities			
1	Do you agree an efficient urban transportation system is one of the pillars of smart city?	Yes	98
2	Do you agree seamless connectivity and improved mobility are some of the priority issues in smart cities?	Yes	90
3	Do you think application of ITS in operation and management of urban transport will hasten the process of making smart cities?	Yes	58
4	Do you think institutional framework for urban transport is required to be strengthen for cities to become smart?	Yes	90
5	Is there any need to develop separate Benchmarks for	Yes	67

	urban transport in the context of smart cities?		
Review of Urban Transport in India			
1	Is it true that despite considerable investments in road improvement projects, congestion on roads is also increasing?	Yes	100
2	Do you think with increasing urbanisation due attention has been given for improving existing urban transportation conditions?	No	69
3	Is the current approach for addressing issues of urban transport sustainable?	No	67
4	Do you think transport issues are more critical in small and medium towns, while major focus for improving urban transport is in mega cities?	Yes	65
5	Is there lack of reliable and adequate information for planning, monitoring and evaluation of urban transport infrastructure?	Yes	87
Improving and Upgrading IPT Services			
1	Do we follow any flexible approach for IPT to increase its share in Public Transport?	Yes	50
2	Do you think IPT plays an important role as a primary mode of Public Transport in small and medium towns?	Yes	94
3	Do you think most of the IPT vehicles have minimal compliance with regulations in terms of road worthiness?	Yes	56
4	Do you think vehicle technology of IPT needs to be upgraded?	Yes	94
5	Should ITS be used to regulate IPT Services?	Yes	100
Role of Media in Creating Awareness about Urban Transport			
1	Do you think media is highlighting the urban transport issues in right perspective?	No	65
2	Do you agree that instead of sensitising the issues like traffic accidents, media reporting should be balanced?	Yes	81
3	Is there a need for stronger role of media and voluntary sector in creating awareness for following the traffic regulations?	Yes	97
4	Can media play an important role in influencing behaviour of end users in public transport?	Yes	97
Evaluation Criteria of Urban Transport Projects			
1	Should the Social, Economic and Environment benefits be the basis along with feasibility for evaluation of various urban transport projects?	Yes	87
2	Does the current process of evaluation of urban transport projects check minimization of greenhouse gas emissions?	No	60
3	Do the Service Level Benchmarks help in evaluating the urban transport projects?	Yes	79
4	Should we see the real outcome of transport projects in tangible terms while evaluating the projects?	Yes	71
Social Exclusion in Urban Transport – Addressing the Gender Bias			
1	Are the various Public Transport Modes in Cities inclusive and sensitive to gender issues?	Yes	90
2	Do we have any mechanism to analyse the ridership,	Yes	76

	gender-wise, in Public Transport System?		
3	Do the Planners consider the issue of inclusiveness at the planning stage of urban transport infrastructure?	No	67
4	Is there adequate regulatory framework to address the gender issues in urban transport?	No	67
5	Should vehicles or coaches be reserved for women?	No	52
Integrated Land use and Transportation Planning			
1	Is it a fact that urban sprawl, among others, is the result of taking up transport and land use planning independent of each other?	Yes	89
2	Are the investments in urban transport infrastructure aligned with Development Plan Proposal?	No	70
3	Have we developed any planning mechanism to evaluate how the change in land use affects the transport system	No	79
4	Do we have appropriate regulatory mechanism in Development plan for embarking on Transit Oriented Development?	No	82
5	Are we providing affordable housing in close proximity to Mass Rapid Transit Nodes?	No	87
Re – Engineering Transport Design for Safe and Universal Accessibility			
1	Do you think design of transport projects are more skewed towards vehicular mobility and do not meet the requirements of universal accessibility?	Yes	100
2	Are you aware about the Guidelines and Space Standards for Barrier Free Built Environment prepared by Ministry of Urban Development?	Yes	68
3	Do you think appropriate design of transport infrastructure can reduce number of crashes?	Yes	88
4	Do you think the existing road infrastructure provides required facilities for IPT mode?	No	82
5	Is there need for standardised street signage including street numbers?	Yes	87
Challenges in Implementing ICT for Mobility in Smart Cities			
1	Do you think ICT is the key driver for improving urban mobility and making the city smart?	Yes	94
2	Do you think implementation of ICT in right perspective will reduce the travel needs, congestion, pollution and improve the urban mobility?	Yes	94
3	Should we use ICT for leveraging the transport network for efficient movement of people and goods to reduce gridlock?	Yes	94
4	ICT is at the Core of the Smart city, can we use it for transport optimisation?	Yes	88

I. Leaders Forum

HIGHLIGHTS

Under the leaders forum, the projects and studies assigned to the officers of the state governments as part of the leaders Programme in Urban Transport Planning and Management of the Ministry of Urban Development, Govt. of India and the World Bank were reviewed by the expert reviewers. The programme was organized by the Centre of Excellence in Urban Transport, CEPT University. Officers associated with the projects and studies made presentation on the projects in terms of structure of the project, objectives, scope and limitations, current status, interim suggestions and way forward for further action on the project. Six Leaders Forums were organized. Chairpersons and reviewers in each Leaders Forum were as follows.

1)	**Chair:-**	Mr. C. K. Khaitan, Joint Secretary (UT), MoUD
	Reviewers:-	Mr. Sandeep Garg Ms. Nitika Bhakuni, Associate Professor, CEPT Ms. Nupur Gupta, Senior Transport Specialist, World Bank Mr. Vijay Anadkat Mr. R. K. Singh, Director (UT), MoUD Ms. Shalini Sinha, Associate Professor, CEPT Mr. A.S.Lakra, Visiting Faculty, CEPT Dr. Sanjay Gupta, Professor, SPA
	Rapporteur:-	Mr. Dhruma Bhavsar, Research Associate, CRDF-CEPT Mr. Sandeep Paul, Senior Researcher, CRDF-CEPT
2)	**Chair:-**	Dr. M. Ramachandran Ex. Secretary, Urban Development, MoUD
	Reviewers:-	Mr. K. Mukundan, Visiting Faculty, CEPT Prof. Shivanand Swamy, Professor, CEPT Mr. I. C. Sharma, NPM, PMU/SUTP Mr. Abhijit Lokre, Associate Professor, CEPT Dr. O. P. Agarwal, Director General, IUT Mr. Gautam Patel, Visiting Faculty, CEPT Mr. Sudesh Kumar, Mott Macdonald
	Rapporteur:-	Ms. Reema Prajapati, Research Associates, CEPT Mr. Viyush Patel, Research Associate, CEPT
3)	**Chair:-**	Mr. I.P.Gautam, Vice Chairman & MD, Metro Link Express for Gandhinagar and Ahmedabad (MEGA) Company Ltd.
	Reviewers:-	Prof. Shivanand Swamy, Professor, CEPT Dr. O. P. Agarwal, Director General, IUT Mr. K. Mukundan, Visiting Faculty, CEPT Mr Vivek Ogra, Visiting Faculty, CEPT Dr. Sewa Ram, Associate Professor, SPA Mr. Gautam Patel, Visiting Faculty, CEPT

		Mr. Sudesh Kumar, Mott Macdonald Mr. Mohinder Singh, Dean, LTA
	Rapporteur:-	Ms. Dhruma Bhavsar, Research Associate, CRDF-CEPT Mr Srujan Gupta, Research Associates, CEPT
4)	**Chair:-**	Ms. Nupur Gupta, Senior Transport Specialist World Bank
	Reviewers:-	Mr. I.C. Sharma, NPM, PMU/SUTP Mr. Abhijit Lokre, Associate Professor, CEPT Ms. Shalini Sinha, Associate Professor, CEPT Mr. Laghu Prashar Dr. Sanjay Gupta, Professor, SPA Mr. A.S.Lakra, Visiting Faculty, CEPT
	Rapporteur:-	Mr. Chintan Daftadar, Senior Researcher, CRDF-CEPT M. Kunal Parikh, Senior Research, CEPT
5)	**Chair:-**	Dr. Sudhir Krishna, Ex. Secretary, Ministry of Urban Development
	Reviewers:-	Mr. I. C. Sharma, NPM, PMU/SUTP Dr. Sewa Ram, Associate Professor, SPA Mr. A S Lakra, Visiting Faculty, CEPT Ms. Nitika Bhakuni, Associate Professor, CEPT Mr. Abhijit Lokre, Associate Professor, CEPT Mr. Vijay Andkat, Visiting Faculty, CEPT
	Rapporteur:-	Mr Chintan Daftardar, Senior Research, CRDF-CEPT Mr. Srujan Gupta, Research Associates, CEPT
6)	**Chair:-**	Mr. R K Singh, Director (UT), Ministry of Urban Development
	Reviewers:-	Ms. Nupur Gupta, Senior Transport Specialist, World Bank Ms. Shalini Sinha, Associate Professor, CEPT Mr. Vivek Ogra, Visiting Faculty, CEPT Mr. Gautam Patel, Visiting Faculty, CEPT Mr. I.C Sharma, NPM, PMU/SUTP Dr. Sanjay Gupta, Professor, SPA Prof. Shivanand Swamy, Professor, CEPT Mr K Mukundan, Visiting Faculty, CEPT
	Rapporteur:-	Ms. Reema Prajapati, Research Associates, CEPT Mr. Sandeep Paul, Senior Researcher, CRDF-CEPT

The following projects and studies were presented in the forum conducted during the conference.

1. Road Map for Revamping the City Water Transport System of Kochi City.
2. Operation of E-Rickshaws in Delhi.
3. Integration of BRTS with City bus services & railway station Surat.
4. Ensuring Sustainability of Transport System by Strategic Implications for core area of Raipur City.
5. Vision towards Integrated Fare Collection System (IFCS) for Indore.
6. Project on Mobile Based Ticketing system for suburban traffic in Mumbai.
7. Alternative financing and operational viability of MRTS projects.
8. Re-design of existing Hubli and Dharwad intra-city Public Transport Network to Integrate with HD-BRTS corridor operations.
9. Multi-mode transit hub at secunderabad Railway Station to ease the traffic congestion.
10. Project on Reducing Congestion in & around The Main Railway Station At Nagpur.
11. Innovative Financing Tool.
12. Gender Inclusive Development in the Transport Sector: Experiences of NCR Planning Board (Delhi).
13. Integration of various Modes of Public Transport at Mansarovar Metro Station in Jaipur.
14. NMT Infrastructure for Bidar.
15. Street Design Universal Accessibility and Mobility.
16. Corridor Development-Dimapur-Chumukedima, Nagaland.
17. A study to Make the City Centre Sector-17, Chandigarh – A, Vehicle Free Zone.
18. Branding, Marketing and Communicating Public Transport.
19. Station Area Development – Case of Chennai Central Station.
20. Formulation of Statute for Creation of an Institutional, Legal, Financial and Operational frame work for Haryana Unified Urban Transport Authority (HUUTA).
21. Transit Oriented Road Network Development along Outer Ring Road in Chennai Metropolitan Area.


View of the Leaders Forum

J. Research Symposium

INTRODUCTION

The research symposium on urban transport was held on 26th and 27th Nov. 2014 at the 7th Urban Mobility India Conference and Exhibition 2014. It was the fifth Research Symposium being held at UMI. The symposium provides a platform to highlight the current research carried out by academia and research institutes in urban transport, especially by young researchers pursuing post graduate or Ph.D. programs. The focus of Research symposium is to:-

- Encourage young researchers working in various facets of urban transport to present their research work and provide them an opportunity for networking with fellow researchers and professionals;
- Enhance capacity building of young researchers in the field of urban transport; and
- Contribute towards building up of research data base, its dissemination and identification of research thrust in the country.

Young researchers (undergraduate, postgraduate and Ph.D. level students) working in the area of urban transport were invited to submit abstracts based on the work carried out by them as part of their academic/research work.

Call for Papers and Selection

The symposium was coordinated by IUT. Young researchers working in the areas of urban transport were invited to submit electronically abstracts on any of the following themes:

1. Public Transport Planning ,
2. Non - Motorized Transport,
3. ITS & Technology,
4. Land Use Transport Integration,
5. Environment & Road Safety,
6. Traffic management and
7. Demand Modeling.

Extended abstracts not exceeding 1000 words, clearly stating the objective of the paper, key results and accomplishments, the significance and the advancement over previous work were invited for review following a given timeline. Papers were selected based on their originality, timeliness, significance, relevance, and clarity of presentation. It was notified that submission of a paper should be regarded as a commitment, in case the paper is accepted, at least one of the authors will register and attend the conference to present the work.

Each abstract was assigned to peer review by three of reviewers/members of Technical Committee not affiliated to author's institution and were asked to score on a scale of 1 to 10. The scores so assigned were averaged out on weighted average method and a final score was arrived at for selection of the 83 papers received, 22 abstracts were chosen taking a cut off for presentation at Urban Mobility India 2014 with an aim to give exposure to maximum numbers of young researchers at the nation's highest level conference on urban transport.

In addition to the objective assessment, the reviewers also gave their valuable comments for improvement of the quality of the abstracts, which were conveyed to the authors along with the

acceptance note and further instructions for the submission of papers. The list of authors for paper presentation is given in the following section. The selected authors were asked to make presentation at the Research Symposium at the UMI 2014 Conference.

Proceedings of Research Symposiums

The Research Symposium had twenty papers presented during the Urban Mobility India 2014 Conference and Expo concurrently in six sessions. Due to large number of papers selected under the theme on Public Transport Planning, the same was conducted in two sessions.

Research Symposiums – 1: Public Transport Planning

Chair: Prof. (Dr.) P.K. Sarkar, SPA, New Delhi	
Author / Presenter	**Institution**
Abhishek Haldar	CEPT, Ahmedabad
Nanda Karpurapu	EMBARQ, India
Tiyali Bose	CEPT, Ahmedabad

Summary

In the session three papers were presented

1. Potential of Light Rail Transit System in India
2. Innovative Strategy towards Organized Public Transport - Case Study: Bhopal
3. Challenges to Gender Mainstreaming in City's Public Transit System: An Explorative Study of Ahmedabad's 'Janmarg'

Research Symposium – 2: Non-Motorized Transport

Chair: Mr Dinesh Arora, Associate Director, AECOM	
Author / Presenter	**Institution**
Anuradha Adhikari	CEPT, Ahmedabad
Naresh Kuruba	CEPT, Ahmedabad
Prabhu TD	SPA, New Delhi

Summary

The following three papers were presented related to Non-Motorized Transport

1. Non-Motorised Transport: Potential and Challenges- A Case of Kolkata
2. Bike and Ride (B&R): Integrating Bicycles and Public Transport
3. Developing a Level of Services & Warrant Provision for Pedestrian Facilities Across The Road At Midblock: Case Study of New Delhi Urban Area

Research Symposium – 3: Environment & Road Safety

Chair: Mr Rakesh Kaul, Senior Vice President, Srei Infrastructure Finance Ltd.	
Author / Presenter	**Institution**
Amegh Gopinath	SPA, New Delhi
Monika Gupta	IIM, Lucknow
Riya Rahiman	IRADe, New Delhi
Teena Thomas	VNIT, Nagrpur

Summary

The session had four papers

1. Planning Strategies for Low Carbon Mobility in a Proposed Special Economic Zone (SEZ) in Kochi
2. Contingent Valuation Method and Carbon Tax in Mitigating CO2 Emissions from Road Transport Sector: A Literature Review
3. Fuel Scenario in India
4. Study of Surface Structures Due to Vibration of Underground Tunnel at Shallow Depth

Research Symposium - 4: Public Transport Planning

Chair: Mr Y.P. Sachdeva, General Manager, RITES Ltd.	
Author / Presenter	**Institution**
Aditya Soni	CEPT, Ahmedabad
Bipin R Muley	NIT Warangal
Naresh Kuruba	EMBARQ, India
Neetu Anna Joseph	CEPT, Ahmedabad

Summary

The session had four papers relating to Public Transport Planning

1. Impact of Congestion on Public Transit
2. Integration of Public Transportations Systems
3. A Methodology to Incorporate Infrastructure Into Public Transport Planning in Constrained Urban Areas
4. Transit Investments and Economic Development -A Case of Ahmedabad 'Janmarg'

Research Symposium – 5: Demand Modeling & ITS

Chair: Dr. Vinay Maitri, SPA New Delhi	
Author / Presenter	**Institution**
Amal Dutta	SPA, New Delhi
Thanasekaran	Anand Institute of Higher Technology, Chennai
Sameep Arora	WRI, India

Summary

The session had three papers on the subject

1. Freight Generation Characteristics in the Metropolitan City of Hyderabad
2. Human Factor Meter Measuring Driving Errors
3. Transit Performance Assessment: Schedule Adherence Ranking of Services in A City Bus Fleet

Research Symposium – 6: Land Use Transport Integration & Road Safety

Chair: Mr Piyush Kansal, Group General Manager, RITES Ltd.	
Author / Presenter	**Institution**
Albin Tharakan	SPA, New Delhi
Sagar Setia	CEPT, Ahmedabad
Surovee Dutta	Jadavpur University

Summary

The session had three papers related to the subject

1. An Approach to Develop a Mechanism for Generation of Road Safety Fund, Case Study: Kerala State
2. Metro Rail Transit System Impacts on Land-Use and Land Values in Bangalore
3. Connecting People to Cities: Through Developing Integrated Land-Use and Transport Strategies

AWARDS

All the sessions were interactive and well received. At the end of presentation in each session, delegates were given voting slips and requested to tick the paper they have liked the most. Award Committee comprising Jury members of the Research Symposium selected three best papers. The response of audience collected through voting slips was also used to arrive at the decision for best paper. The awards were given away at the Valedictory Session of the conference by **Shri Babul Supriyo**, Hon'ble Minister of State for Urban Development, Housing and Urban Poverty Alleviation to the following researchers

1. **BEST PAPER**	**Mr. Nanda Karpurapu & Mr. Umang Jain** for their paper on Innovative Strategy Towards Organized Public Transport - Case Study: Bhopal
2. **FIRST RUNNER UP**	**Mr. Amegh Gopinath** for his paper on Planning Strategies for Low Carbon Mobility in a Proposed Special Economic Zone (SEZ) in Kochi
3. **SECOND RUNNER UP**	**Ms. Neetu Anna Joseph** for her paper on Transit Investments and Economic Development -A Case of Ahmedabad 'JANMARG'

Presentation of Award and View of Participations

K. Data Visualization Challenge

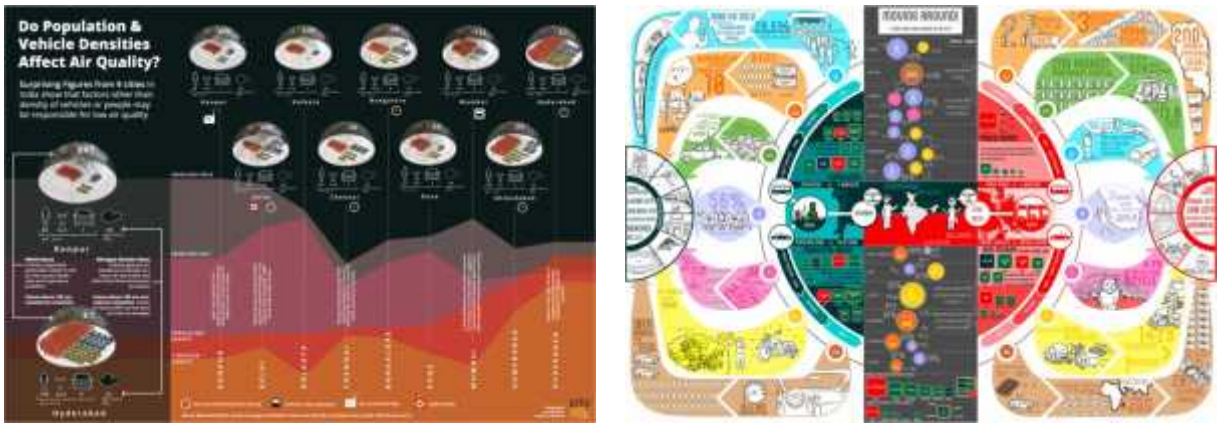
For the first time the Institute of Urban Transport (India) launched a **Data Visualization Challenge** at UMI 2014 with support from EMBARQ India. The Challenge was to create meaningful visualizations that answer the question: **How do we move about Indian cities?** using a mobility dataset provided by the organisers. It was open for urban planners, designers, data scientists, and civil society.

The data-set provided for the Challenge included data for 15 Indian cities and had fields such as:

- Mode share, average trip length, time of journey to work
- Availability of assets, number of registered vehicles
- Length of paved roads, vehicles per 1000 population
- Emissions, health, and accident data
- Population, geographic area, income data

The participants were encouraged to study the dataset provided and extract stories of how people's lives are shaped, impacted, improved and perhaps even hampered by the most basic need for movement. They could also incorporate additional data from other verifiable public sources such as public agency (e.g. MOUD or data.gov.in) or Development banks (e.g. The World Bank) and etc.

Out of the 30 entries received, 14 were selected for display during the conference. These entries were judged by a panel of jurors from CEPT, Clean Air Asia, EMBARQ India, GIZ, ITDP, IUT (India) and SPA New Delhi. The entries were judged on the categories of most beautiful entry, most insightful entry, most comprehensive entry and most creative entry. The awards were given away by **Shri Babul Supriyo**, Hon'ble Minister of State for Urban Development, Housing and Urban Poverty Alleviation at valedictory function of the conference.



Award winning Data Visualizations by Mr. Sudipto Ghosh (L) and Mr. Anuj Vijay Kale (R)

L. Exhibition

The expo is a special feature of UMI to disseminate and showcase the latest development in urban transport technology and systems, implementation of best transport projects, propagation of innovative ideas, presentation of research in the topical areas of interest in urban transport and exchange of good urban transport initiatives and practices in the field. In all, 34 sponsors and 24 exhibitors (Annexure III & IV) participated in the exhibition and exhibited their products, technology, projects and the transport systems for wider dissemination. The exhibition was inaugurated by Shri M. Venkaiah Naidu Hon'ble Minister of Urban Development, Housing & Urban Poverty Alleviation and Parliamentary Affairs, Govt. of India on 25th of November, 2014. Fifteen foreign companies participated in the expo and showcased their products and technologies. A large number of participants and invited guest visited the expo area. The latest technology particularly the modern buses and computer systems helping in traffic management were the special attraction. Exhibitors had received a lot of specific queries from the participants to solve the urban transport problems in their respective cities.

On the whole the expo was received well both by the participants and the visitors. A glimpse of expo area clearly shows the keen interest taken by the delegates in various pavilions of the exhibition.

Glimpses of Exhibition

M. Valedictory and Closing Session

Shri C.K. Khaitan, Joint Secretary (Urban Transport) Ministry of Urban Development welcomed the dignitaries and participants. He highlighted the large scale participation of delegates both national and international; presentation of technical and research papers; exhibition of products and knowledge portals; presentation of live projects in the leaders forum; and the key messages which emerged out of the 4 day conference.

A brief summary of proceeding of the conference was presented by Ms. Megha Puri Jha from IUT (India).

In the valedictory session, a special address was given by Mr. Alain Flausch, Secretary General, UITP. He mentioned that by reorienting the land use planning, vehicle trips and mobility needs could be reduced. Road space should be equitably allotted for car users, cyclists and pedestrians so as to inspire walking and cycling. He said that the important challenge is coping with rapid urban growth to contain urban sprawl. Big mega cities are not manageable and hence satellite towns need to be developed. For development of smart cities, smart transport using latest ITS technology will be necessary. For pushing public transport in cities there is a need for building strong political will. Multi modal integration poses a huge challenge. Cities should also be ranked in terms of mobility status.

On this occasion, the Hon'ble Minister of State for Urban Development and Housing and Urban Poverty Alleviation gave away the awards for excellence in urban transport projects planned and implemented by city and state authorities. Award for best ITS project was given to Karnataka Road Transport Corporation. Urban Mass Transit Project award was bagged jointly by Bhopal Municipal Corporation and Indore city Transport Corporation. Best innovation in safety on roads award was given to Bangalore Police. Best NMT project award was taken by corporation of Chennai and Gurgaon District Administration for Raahgiri. Karnataka city Bus Corporation bagged the best city Bus Services award while Bangalore Metro Transportation Corporation got the inclusive transport award. Two non-government organization also received awards: Urban freight management logistic solution award was bagged by Logisure solution, Jaipur and emerging intermediate Para Transport award was given to Nirmal Foundation Ahmedabad for G-Auto.

The best exhibitor awards, were given to Nitin Fire Protection Industry, UBI France (French Embassy), Lumiplan and Allison.

In his valedictory address, Shri Babul Supriyo Hon'ble Minister of State for Urban Development and Housing and Urban Poverty Alleviation highlighted the vision for changing India for betterment under the leadership of Hon'ble Prime Minister Shri Narendra Modi.

He said the rapid urbanization that has been taking place since the mid-1980s has led to serious problems of mobility. It is increasingly becoming difficult to move from one place to another. Such growth is also responsible for a high share of the petroleum fuel consumed in the country. These problems will continue to grow as developing countries urbanize and increasing income levels add to the vehicle population. With larger number of vehicles on the road for longer hours, it is leading to higher emission levels resulting in higher pollution level. This directly impacts the health of the citizens with the elderly and the children bearing the brunt of this fallout. Respiratory diseases have become endemic in the cities and hit hard the weaker sections of the cities financially. It is, therefore, extremely important that we deal with the mobility problems that we are facing, in a manner that is sustainable and helps our cities grow to their true potential.

Lauding the theme of the Conference on Sustainable Transport for Sustainable Cities as apt and timely in the context of development of smart cities, he appreciated the wide gamut of issues discussed during the four days of conference. He raised some moot questions which required a holistic approach for finding out the lasting solutions to make our cities sustainable and smart in the long run. Most of the cities, particularly the small and medium ones are dependent on IPT modes which need to be regulated and integrated with city bus service and other transit system. The non-motorized transport infrastructure particularly the walkways and cycle tracks are not in satisfactory condition in most of the cities. Issue regarding mixing of local and regional traffic cause lot of traffic congestion and jams. Road engineering design in the form of flyovers, elevated roads etc. cater more to the vehicular mobility than pedestrian and cyclists. Although metro rail and other mass transit systems are coming up in large cities, congestion on roads has not reduced as expected. With climate change and increasing greenhouse gas emissions, due emphasis needs to be given on green transport in terms of technology and infrastructure. As highlighted in the Conference, an efficient transportation system is at the core of smart cities. He emphasized on the use of ICT and other innovative techniques for improving the efficiency of the transport system. A heavy dose of investments may be necessary to sustain the metro and mega cities. The transport problems in small and medium towns which are critical should also be given due attention.

Urban local bodies and State Transport Corporations should make the optimum use of Intelligent Transport System for efficiency and effectiveness of public transport system. Capturing the urban gains and monetizing of urban land would go a long way in augmenting the financing resources for development of public transport. There is a need to evolve appropriate regulatory mechanism for Transit Oriented Development both in green development as well as in brown field development. On the line of Service Level Benchmarks to assess the level of services prepared by Ministry of Urban Development some performance standards particularly for the public transport system should also be developed. Multimodal integration in terms of operation, fare, infrastructure and institution will be necessary for seamless travel and to promote public transport in cities.

He agreed with the important findings of the Conference about safety and security issues in urban transport. He mentioned that government has taken this agenda on priority and accordingly prepared Road Transport and Safety Bill -2014 incorporating various provisions in this regard. The concern regarding inadequacy of data in urban transport is being addressed by developing a Knowledge Management Centre at the Institute of Urban Transport (India). The transport system of a Smart City emphasizes walking, cycling and public transport as the primary means for mobility with personal motor vehicles being actively discouraged. In every city in the advanced world, they would like to have more road space for pedestrians and bicyclists. Such non-motorized transport is not only safe but also has positive effect on the health with reduced pollution.

The announcement of the Hon'ble Prime Minister for developing 100 Smart cities as satellite towns of larger cities and by modernizing the existing mid-sized city, the need will be for holistic planning since all systems of a city would be part of a Smart City. Urban transport would be a key component of a Smart City. Integrated Urban Transport Planning includes integrated land use as one of the key components since land use patterns affect travel demands. Thus, while planning for Smart Cities, this aspect should be integrated which will lead to better transport planning.

While developing the Smart Cities, certain benchmarks conforming to the emphasis on transport systems for such cities should be prescribed. All efforts to improve the urban transport sector and more so for taking up a large programme of Smart Cities would not be possible without sufficient capacity in our cities to undertake efficient urban transport planning and operations. It is

accordingly proposed by the Ministry to take up a national programme towards Capacity Building. This will cover both "leadership" level manpower and "technical" level manpower. It will also cover opportunities for knowledge exchange and research that would support decision making in the Indian context.

The current Urban Mobility Conference, which is the seventh in the series, is also one of the initiatives for the capacity building of the officials of the State government and Cities. The objective of this conference is to bring together urban transport professionals and officials in the country as well as international experts to enable them to share their views and experiences. He hoped the deliberations over the past 4 days enriched the officials and other stakeholders with fresh knowledge and ideas.

He also lauded the efforts made by the Ministry of Urban Development in organizing this conference on such a grand scale with delegates from India and abroad and hoped that this conference would continue to be organized in the coming years with much greater success. He looked forward to the urban transport community to assemble again next year for the conference to deliberate on relevant and topical issues as the current years' theme.

Dr. O. P. Agarwal, Director General, IUT proposed a vote of thanks and informed that UMI-2014 will be held from 24-27 November, 2015 at the same venue on a theme of topical interest.

Highlights of Valedictory Session

Annexure I:
Detailed Conference Programme

Day 1 (25th November, 2014)	
1630 – 1700	**Inauguration of the Exhibition**
1700 – 1830	**Inaugural Session** *(Hall – Zoravar)* • Welcome Address – Shri C.K. Khaitan, Joint Secretary (UD), Ministry of Urban Development, Government of India • Brief Review of Urban Transport in India – Dr. O.P. Agarwal, Director General, institute of Urban Transport (India) • Address – Shri D. S. Misra Addl. Secretary (Urban Development, MoUD • Address – Shri Shankar Aggarwal, Secretary, Ministry of Urban Development, Government of India • Key note address - Shri Jamshyd N. Godrej, Chairman & Managing Director, Godrej & Boyce Manufacturing Company Ltd. • Release of publications for Urban transport by the Chief Guest - Shri M. Venkaiah Naidu, Hon'ble Minister of Urban Development, Housing & Urban Poverty Alleviation and Parliamentary Affairs • Inaugural address by the Chief Guest • Vote of Thanks – Shri Mukund Sinha, OSD (UT), Ministry of Urban Development, Government of India
1900 onwards	*Dinner Reception*
Day 2 (26th November, 2014)	
0930 – 1100	**Research Symposium 1 - Public Transport Planning** *(Hall – Shamsher)* Moderator – Prof. (Dr.) P.K. Sarkar, Head of Department, School of Planning and Architecture Presenters • Challenges to Gender Mainstreaming a City's Public Transit System: An Explorative Study of Ahmedabad's Janmarg – Ms. Tiyali Bose, Academic Associate, CEPT University • Potential of Light Rail Transit System in India – Mr. Abhishek Haldar, Urban Transport Planning & Management, CEPT University • Innovative Strategy Towards Organized Public Transport - Case Study: Bhopal – Ms. Nanda Karpurapu, research Scholar, EMBARQ India and Shri Umang Jain, Senior Project Associate, EMBARQ India
	Research Symposium 2 – Non motorized Transport *(Hall – Taber)* Moderator – Shri Dinesh Arora, Associate Director, AECOM Presenters – • Developing a Level of Service & Warrant Provision for Pedestrian Facilities Across The Road At Midblock: Case Study of New Delhi Urban Area – Shri Prabhu TD, School of Planning & Architecture (SPA), New Delhi and Prof. (Dr.) P.K. Sarkar, Head, Department of Transport Planning, SPA, New Delhi • Non-Motorised Transport: Potential and Challenges- A Case of Kolkata – Ms. Anuradha Adhikari, Academic Associate, Faculty of Planning, CEPT University • Bike and Ride (B&R): Integrating Bicycles and Public Transport – Shri Naresh Kuruba, Research Scholar, CEPT University and Ms. Shalini Sinha, Associate Professor, CEPT University

	Research Symposium 3 – Environment & Road Safety *(Hall – Talwar)* Moderator – Shri Rakesh Kaul, Senior Vice President, Srei Infrastructure Finance Limited Presenters – • Contingent Valuation Method and Carbon Tax in Mitigating CO2 Emissions from Road Transport Sector: A Literature Review - Ms. Monika Gupta, research Scholar, Indian Institute of Management, Lucknow • Fuel Scenario In India – Ms. Riya Rahiman, research Associate, Integrated Research and Action for Development – IRADe and Shri Umang Jain, Senior Project Associate, EMBARQ India • Planning Strategies for Low Carbon Mobility in a Proposed Special Economic Zone (SEZ) in Kochi – Shri Amegh Gopinath, Student, SPA, New Delhi and Dr Sanjay Gupta, Professor, Department of Transport Planning, SPA, New Delhi • Study of Surface Structures Due to Vibration of Underground Tunnel at Shallow Depth – Ms. Teena Thomas, VNIT, Nagpur
1100 – 1130	*Tea &Coffee Break/ Quiz Competition*
1130 – 1300	**Technical Session 1 - Planning for New City Bus Service** *(Hall – Zoravar)* Moderator – Shri R. K. Singh, Director-UT, Ministry of Urban Development Presenters • Role of Private Sector in Improving Public Transport efficiency - Shri Prasanna Patwardhan, CMD, Prasanna Purple Mobility Solutions Pvt. Ltd. • City Bus System Modernisation – A need of the hour – Mr. Visweswara Rao G, Associate, IBI Group – India • Reforms in Bus Based Public Transport System with Sustainable PPP –Delhi Example – Mr. Abhijeet Sarkar, Chief (Road Transport), DIMTS
	Technical Session 2 - Non Motorized Transport *(Hall – Ashoka)* Moderator – Dr P.S. Rana, Patron, Institute of Urban Transport Presenters • Sabarmati River Front Development Project – Mr. Jagdish Patel • Developing an NMT Network: Case Study Chennai – Mr. B.V Babu, Executive Engineer, Corporation of Chennai • Public Bicycle Sharing: Comparison of International Examples – Mr. Christopher Kost, ITDP • Creating Public Spaces – Ms. Bhawana Garg, Special Secretary Transport, UT Administration, Chandigarh • Raahagiri – Ms. Sarika Bhatt, Urban Development Expert, EMBARQ India • Retrofitting Plan to promote Non-Motorized Transport and Pedestrianization - Shri K.K. Joardder, Addl. Chief Planner, TCPO
	Round Table 1 – Creating Manpower Capacity in Urban Transport *(Hall – Shamsher)* Moderator – Dr. Kulwant Singh, Regional Advisor, UN-HABITAT Presenter – Ms. Kanika Kalra, Urban transport Expert, IUT Panellists – • Shri Ajay Kumar, Senior Transport Economist , World Bank • Shri Mohinder Singh, Dean, LTA

	Round Table 2 – Urban Freight - Role and Impact on Urban Transport *(Hall – Taber)* Moderator – Dr. Sanjay Gupta, Professor, SPA Presenter –Shri Parthaa Bosu, India Director and South Asia Liaison, Clean Air Asia Panellists • Mr. Manfred Breithaupt, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, GIZ • Shri Sudhir Gota, Consultant, ADB
	Round Table 3–Mass Transit Options for Medium Size Cities *(Hall –Talwar)* Moderator – Shri Nripesh Kumar, Director, Capital Projects and Infrastructure, Price water house Cooper, India Presenter – Shri Anand Kumar, CTO, Rail Systems Company, Hitachi India Pvt. Ltd. Panellists – • Shri Subodh Jain, (Ret.)General Manager and Member Engg.,(Ex. Officio Secretary to Govt. of India), Indian Railways • Mr. Hidetoshi Miura, Director, Global Strategy and International Business Development, Hitachi Rail Europe Ltd. • Mr. Abhishek Goel, Associate Director, HSBC
1300 – 1430	*Lunch/ Visit to Exhibition*
1430 – 1600	**Technical Session 3 – Planning Rail Transit Systems** *(Hall – Zoravar)* Moderator – Shri I.C. Sharma, National project Manager, SUTP Presenters • Mumbai Monorail – the Experience so far – Smt. K. Vijaya Lakshmi, Addl. Chief (Metro, Mono & UMMTA), MMRDA • Integration of a Metro Rail with Other Transit Systems: Case Study Delhi Metro - Shri Sharat Sharma, Director (Operations), Delhi Metro Rail Corporation (DMRC) • Planning for last mile connectivity from a Metro System: Case Study of Kochi Metro - Shri Elias George, MD, Kochi Metro Rail Limited
	Technical Session 4 – Green Transport *(Hall – Ashoka)* Moderator – Shri Krishan Dhawan, CEO, Shakti Foundation Presenters • Fuel Efficiency norms for Trucks and Buses in India– Shri Satish Chandra Sharma, Chief Project Manager, Indian Oil Corporation Limited • Experimenting with Alternate Fuels to Curb Emissions - Shri K.K. Gandhi, Executive Director, Society of Indian Automobile Manufacturers • Role of Electric Vehicles in Reducing Emissions – Mr. Sajid Mubashir, Member R&D, National Automotive Board (NAB), Department of Heavy Industries • Sustainable Transport in Future Smart Cities- Shri Rohit Natekar, Business Leader – ITS Program & Head of Sales, Automotive IBU, India/MEA/SEA , KPIT Technologies Ltd.
	Round Table 4 – Role Of Urban Transport In Smart Cities *(Hall – Shamsher)* Moderator - Shri Munish Kumar Garg, Director-Smart Cities, Ministry of

	Urban Development. Presenter – Shri Ankush Malhotra Asst. Vice-President, UMTC / Ms. Swati Khanna, Manager, UMTC Panellists – • Ms. Shreya Gadapalli, Regional Director, ITDP • Shri Mohinder Singh, Dean LTA Singapore
	Round Table 5 – Review of Urban Transport in India *(Hall – Taber)* Moderator – Shrir R.K. Singh, Director (Urban transport), Ministry of Urban Development Presenter – Ms. Sujaya Rathi, Principal Research Scientist, CSTEP, Ms. Megha Gupta, Urban Transport Planner, Institute of Urban Transport (India) Panellists – • Shri C.K. Khaitan, Joint Secretary, ministry of Urban Development • Shri Ajay Kumar, Senior Transport Economist , World Bank
	Round Table 6 – Improving and Upgrading IPT Services Moderator - Dr. Shankar Vishwanath, Ex Director (BMC), Mumbai Presenter – Ms. Kanika Kalra, Urban transport Expert, Institute of Urban Transport (India) Panellists • Shri Anand Subramanian, Director - Corporate Communications, Ola Cabs • Shri Navdeep Asija, Founder, Ecocabs
1600 – 1630	*Tea &Coffee Break/ Quiz Competition*
1630 – 1800	**Plenary Session 1 – Safety & Security issues in Urban Mobility** *(Hall – Ashoka)* Moderator – Ms. Debashree Mukherjee, Chairman, DTC Presenter – Shri Ashish Rao Ghorpare, Regional Executive Manager, ICLEI Panellists - • Dr Geetam Tiwari, Trip Chair, IIT Delhi • Shri Partha Roy, Nitin Fire Protection Industries Ltd. • Shri Anil Shukla, Addl. Commissioner (Traffic), Delhi traffic Police
Day 3 (27th November, 2014)	
0930 – 1100	**Research Symposium 4 - Public Transport Planning** *(Hall – Shamsher)* Moderator – Shri Y.P. Sachdeva, General Manager, RITES Presenters • Impact of Congestion on Public Transit – Shri Aditya Soni, Teaching Assistant, CEPT University and Prof. H.M. Shivanand Swamy, CoE Urban Transport, CEPT University • A Methodology to Incorporate Infrastructure Into Public Transport Planning in Constrained Urban Areas – Shri Naresh Kuruba, Intern, EMBARQ India and Ms. Priyanka Vasudevan, Senior Associate, EMBARQ India • Transit Investments and Economic Development -A Case of Ahmedabad 'JANMARG' – Ms. Neetu Anna Joseph, CEPT University • Integration of Public Transport Systems - Shri Bipin R Muley, NIT Warangal and Dr. C.S.R.K. Prasad, head, Transport Division, NIT Warangal
	Research Symposium 5 – Demand Modelling & ITS *(Hall – Taber)* Moderator – Dr. Vinay Maitri, Professor, School of Planning and Architecture

	Presenters • Freight Generation Characteristics in a Metropolitan City of Hyderabad – Shri M. Amal Dutta, PG Student, SPA Delhi and Dr. Sanjay Gupta, Professor, Department of Transport Planning, SPA, New Delhi • Transit Performance Assessment: Schedule Adherence Ranking Of Services In A City Bus Fleet – Shri Sameep Arora, Intern, EMBARQ India and Shri Prashant Bachu, Research Associate, EMBARQ India • Human Factor Meter Measuring Driving Errors – Shri. K.Dhamodharan, Anand Institute of Higher Technology, Shri Thanasekar, Anand Institute of Higher Technology, Chennai
	Research Symposium 6 – Land Use Transport Integration & Road Safety *(Hall – Ashoka)* Moderator – Shri Piyush Kansal, Group General Manager, RITES Presenters • Connecting People to Cities: Through Developing Integrated Land-Use and Transport Strategies – Ms. Surovee Dutta, Asst. Manager, GIFTCL • An Approach to Develop a Mechanism for Generation of Road Safety Fund, Case Study: Kerala State – Mr. Albin Tharakan, M.Planning (transport Planning), SPA, New Delhi and Prof. (Dr.) P.K. Sarkar, Head of Department, School of Planning and Architecture • Metro Rail Transit System Impacts on Land-Use and Land Values in Bangalore, India – Shri Sagar Setia, Research Scholar, CEPT University and Prof. H.M. Shivanand Swamy, CoE Urban Transport, CEPT University
1100 – 1130	*Tea &Coffee Break/ Quiz Competition*
1130 – 1300	**Panel Discussion 1– Data Collection and Management** *(Hall – Zoravar)* Moderator - Dr. M. Ramachandran, Ex- Secretary, MoUD Presenter • Mr. Adnan Rehman, Director Cambridge Systematics International Panellists • Shri Ajai Mathur, MD, Urban Mass transit Company (UMTC) • Shri Anirudh Kumar Bharti, Director (Urban Transport), Ministry of Urban Development • Dr. O.P. Agarwal, Director General, IUT • Mr. Tony Dufays, Director, Regional Offices & Services & CTE, UITP
	Technical Session 5 – Modern Technologies *(Hall – Ashoka)* Moderator – Dr. Johannes Fiedler, Head Research Doppelmayr Urban Solutions: Urban Ropeways Presenters • Alternative Modes to Foster a Comprehensive Urban Mobility : Metrocable in Medellin, Colombia and ferries in Izmir, Turkey - Priscille de CONINCK, Sustainable Transport and Energy Division, AFD • Experience with Ropeways – Dr. Johannes Fiedler, Head Research Doppelmayr Urban Solutions: Urban Ropeways • Net Impact of Mobility in a Changing World - Mr. Lalit Chudhary • Role of LRT in emerging countries : a credible tool between MRT and BRT – Mr Etienne Lhomet, Consultant, CODATU
	Round Table 7 – Role of Media in Creating Awareness about Urban Transport *(Hall – Shamsher)* Moderator – Ms. Meenakshi Lekhi, M.P. - New Delhi and spokesperson for BJP

	Presenter – Shri Amit Bhatt, Strategy Head – Urban Transport , EMBARQ India Panelists – • Shri Rajesh Kalra, Chief Editor of Times Internet Ltd. • Shri T. K. Arun, Senior Editor, Economic Times • Prabhat Agarwal
	Round Table 8 – Evaluation Criteria of Urban Transport Project *(Hall – Taber)* Moderator - Shri M.K. Sinha, OSD (UT), MoUD Presenter – Ms. Sonia Arora, urban Transport Expert, Institute of Urban Transport (India) Panelists – • Mr. Chinnaya Kumar Acharya, Chief of Programs at Shakti Foundation • Dr Geetam Tiwari, IIT Delhi
1300 – 1430	*Lunch/ Visit to Exhibition*
1430 – 1600	**Technical Session 6 – Intelligent Transport Systems** *(Hall – Zoravar)* Moderator –Shri. I.P. Gautam, VC & MD, MEGA Co-Moderator- Shri I. C. Sharma, SUTP Presenters • Use of ITS for Improving Integration: Case Study of Seoul - Dr G.C. Kim, Ex-President, Korea Transportation Research Institute (KOTI) • Use of ITS for Efficient Monitoring of Public Transport Operations - Shri Ravi Gupta, Head- Information technology Group, DIMTS • The role of ITS in improving the Safety of Public Transport – Shri Manish Gupta, Ph.D. VP and Director, Xerox Research Center India • Modernizing City Bus Service through ITS - Shri Chandramauli Shukla, Chief Executive Officer, Bhopal City Link Limited
	Technical Session 7 – Financing Strategies for Public Transport *(Hall – Ashoka)* Moderator – Ms. Jhanja Tripathi, Joint Secretary & Financial Advisor, Ministry of Urban Development Presenters • Financing Mass Transit – Dr. O. P. Agarwal, DG-IUT • Land Value Capture for Financing Urban Transport - Shri Palash Shrivastava, Director Program, IDFC • How to fund public transport and urban mobility policy – Mr Julien ALLAIRE, Executive Manager, CODATU
	Round Table 9 – Social Exclusion in Urban Transport - Addressing the Gender Bias *(Hall – Shamsher)* Moderator - Shri C.K. Khaitan, JS (UT), MoUD Presenter – Ms. Himani Jain, Director, Metaurban Panellist – • Shri Nalin Sinha, Director, ITDP India • Ms. Anvita Arora, Director, iTrans
	Round Table 10 – Integrated Land Use and Transportation Planning: Building the foundation for India's future Smart Cities *(Hall – Taber)* Moderator – Mr. Amit Bhatt, Embarq India Presenter – Shri Bankim Kalra, Sector Lead- Urban Planning & Design, IBI Group Panellists –

	• Mr Ke Fang, Senior Urban Transport Specialist, World Bank • Mr Trevor McIntyre, Director, IBI Group
1600 – 1630	*Tea &Coffee Break/ Quiz Competition*
1630 – 1800	**Plenary Session 2 – Challenges of Tier II Cities** *(Hall – Ashoka)* Moderator - Dr O.P. Agarwal, Director General, IUT Presenter – Gaurav Dubey, Institute of Urban Transport (India) Panellists – • Mr. Tejaswi S Naik, Commissioner, Bhopal Municipal Corporation and MD, BCLL. • Shri Ajay Suri, Regional Advisor (Asia), Cities Alliance • Dr. O. P. Agarwal, DG, IUT • Mr. S. S. Bajaj
Day 4 (28th November, 2014)	
0930 – 1100	**Plenary Session 3 – Creating Sustainable Cities through Sustainable Transport - Best Practices** *(Hall – Ashoka)* Moderator – Shri Anil Baijal, Chairman, IDFC Presenters – • Shri Mohinder Singh, Dean LTA Singapore • Dr G.C. Kim, Ex-President, Korea Transportation Research Institute (KOTI) • Mr Michel LABARDIN, Vice President of CUB – Communauté Urbaine de Bordeaux • Mr Jose Luis Irigoyen, Head – Urban Transport, Director (Transport, Water, Information & Communication Technologies), The World Bank
1100 – 1130	*Tea &Coffee Break/ Networking Break*
1130 – 1300	**Panel Discussion 2 – Multimodal Integration for City wide Public Transport Network** *(Hall – Zoravar)* Moderator – Ms. Naini Jayaseelan, Member Secretary, NCRPB Presenters • Multimodal modal Integration: case example Singapore - Shri Mohinder Singh, Dean LTA Singapore • Multimodal modal Integration: case example Seoul - Dr G.C. Kim, Ex-President, Korea Transportation Research Institute (KOTI) Panellists • Shri N.V.S. Reddy, MD, Hyderabad Metro • Shri Anjum Parwez, Chairman, Bangalore Water Supply and Sewerage Board • Shri Rajender Kumar Kataria, MD, KSRTC, Bangalore
	Technical Session 8 – Planning Bus Rapid Transit System *(Hall – Ashoka)* Moderator – Dr Sudhir Krishna, Ex- Secretary, MoUD Presenters • Advanced Solutions for an Integrated Transport Management System – Mr Iker Estébanez, Country Manager, GMV India • Planning a BRT System – Christopher Kost • Experience with Operation with BRT: Case Study of JanMARG – Chintan Daftadar BRTS Bhopal – Shri Chandramauli Shukla, Chief Executive Officer, Bhopal City Link Limited
	Technical Session 9 - LRT Innovations *(Hall – Shamsher)*

	Moderator – Mr Etienne Lhomet, Consultant, CODATU Presenters • Axonis : Mobility Solution for SMART cities by Mr. Preetam Ganguly • Metropolis and Our Metro Train Solution by Mr. Robert Davies • Signaling and Train Control System by Mr. Paramjit Singh Ghai • HESOP by Mr. Swarup Chakraborty • Track Works by Mr. Preetam Ganguly
	Round Table 11 – Re-Engineering Transport Designs for Safe and Universal Accessibility *(Hall – Taber)* Moderator - Ms. Anjali Agarwal, Executive Director, SAMRATHYA Presenter - Dr Sewa Ram, SPA Delhi Panellists – • Dr. S.M. Sarin, Former Director, CRRI • Mr. Abhijeet Sarkar
1300 – 1400	**Valedictory Session** *(Hall – Zoravar)* • Welcome Address – Shri C.K. Khaitan, Joint Secretary (UD), Ministry of Urban Development, Government of India • Presentation of the summary of proceedings of the Conference – IUT • Remarks – Shri Shankar Aggarwal, Secretary, Ministry of Urban Development, Government of India • Address – Mr Alain Flausch, Secretary General, UITP • Presentation of Awards for excellence in Urban Transport & Urban Mobility Awards - Shri Babul Supriyo, Hon'ble Minister of State for Urban Development • Valedictory Address - Shri Babul. Supriyo, Hon'ble Minister of State for Urban Development • Launch of UMI 2015 & Vote of Thanks – Dr O.P. Agarwal, Director General, Institute of Urban Transport (India)
1400 onwards	*Closing Lunch*

Annexure II:

The Organizing Committee

Shri C.K. Khaitan, JS (UT), MoUD.....Chairperson

Dr. O.P Agarwal, DG, IUT.....Member

Shri R.K. Singh, Director (UT), MoUD.....Member

Dr. S. Gangopadhyay, Vice President, IUT.....Member

Ms. Anvita Arora, Vice President, IUT.....Member

Dr. K. Ravindra, Hony. Secretary, IUT.....Member

Dr. Vinay Maitri, Hony. Jt. Secretary, IUT.....Member

Shri Rakesh Kaul, Hony. Treasurer, IUT.....Member

Shri Rajiv Choudhary, Former Hony. Secretary.....Member

Shri J. B. Kshirsagar, CP, TCPO.....Member

Shri Vishnu Mathur, SIAM.....Member

Shri I. C. Sharma, NPM, SUTP.....Member

Shri Jagan Shah, Dir. NIUA.....Member

Shri C. L. Kaul, ES, IUT.....Member

Ms. Kanika Kalra, UT Expert IUT.....Member

Ms. Megha Puri, Head Marketing & Communication, IUT.....Member

Shri Sandeep Sharma, Sr. Manager, Administration & Coordination, IUT.....Member

Annexure III:

List of Sponsors

1.	Bangalore Metro Rail Corporation Ltd.
2.	Institute of Metro and Rail Technology
3.	Delhi Development Authority
4.	Alstom Transport
5.	Bhopal City Link Ltd.
6.	Atal Indore City Transport Services Ltd.
7.	GMV Innovating Solutions
8.	Doppelmayr Group
9.	Nitin Fire Protection Industries Limited
10.	Bangalore Metropolitan Transport Corporation
11.	Karnataka State Road Transport Corporation
12.	Urban Mass Transit Company Ltd.
13.	Hitachi India Pvt. Ltd.
14.	Delhi Metro Rail Corporation
15.	Society of Indian Automobile Manufacturers
16.	Surat Municipal Corporation
17.	Himachal Road Transport Corporation
18.	RITES Ltd.
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28.	Cambridge Systematics Inc.
29.	IBI Group
30.	Shakti Sustainable Energy Foundation
31.	Kochi Metro Rail Ltd.
32.	Metro Link Express Gandhinagar and Ahmedabad Ltd.
33.	Chennai Metro Rail Ltd.
34.	Sustainable Urban Transport Project

Annexure IV:

List of Exhibitors

1.	Trapeze Group
2.	Allison Transmission
3.	Lumiplan
4.	PTV Group
5.	UBIFRANCE and French Trade Commission India
6.	Institute of Metro and Rail Technology
7.	Tata Motors Ltd.
8.	Safex Fire Services Ltd.
9.	Masstrans Pvt. Ltd.
10.	GMV Innovating Solutions
11.	Terra Motors India Pvt. Ltd.
12.	Mumbai Metropolitan Region Development Authority
13.	KPIT Technologies Ltd.
14.	Doppelmayr Group
15.	Nitin Fire Protection Industries Limited
16.	Leadrail Infra Solutions Pvt. Ltd.
17.	Hitachi India Pvt. Ltd.
18.	Ashok Leyland
19.	GIRO Inc.
20.	Robert Bosch Engineering and Business Solutions
21.	Sustainable Urban Transport Project
22.	Corona Bus Manufacturers Pvt. Ltd.
23.	Cisco India Ltd.
24.	United Traffic & Parking Association

Annexure V:

Abbreviations and Acronyms

ADB	-	Asian Development Bank
APSRT	-	Andhra Pradesh State Road Transport
ASCI	-	Administrative Staff College of India (Hyderabad)
ASRTU	-	Association of State Road Transport Undertaking
BRT	-	Bus Road Transit
BRTS	-	Bus Road Transit System
BMRCL	-	Bangalore Metro Rail Corporation Ltd.
BEST	-	Bombay Electric Supply and Transport
BMTC	-	Bangalore Metropolitan Transport Corporation
BAU	-	Business as Usual
CEPT	-	Centre for Environment Planning and Technology (Ahmedabad)
CAA	-	Civil Aviation Authority
CMP	-	Comprehensive Mobility Plan
CEO	-	Chief Executive Officer
CNG	-	Compressed Natural Gas
CCTV		Close Circuit T.V.
COE	-	Certificate of Entitlement (Singapore) / Centre of Excellence
CRRI	-	Central Road Research Institute
DPR	-	Detailed Project Report
DULT	-	Directorate of Urban Land Transport
DMRC	-	Delhi Metro Rail Corporation
DIMTS	-	Delhi Integrated Multi Modal Transit System Ltd.
ERP	-	Electronic Road Pricing
FAR	-	Floor Area Ratio
FIR	-	First Information Report
FSI	-	Floor Space Index
GDP	-	Gross Domestic Product
GPS	-	Global Positioning Systems
GHG	-	Green House Gases
GIS	-	Gesellschaft Zusammenarbiet (German Institute)
GEF	-	Global Environment Facility
HOD	-	Head of Department
HOVs	-	High Occupancy Vehicles
HDV	-	High Density Vehicle
HCNG	-	High Pressure Compressed Natural Gas
IUT	-	Institute of Urban Transport (India)
IPT	-	Intermediate Public Transport
IIT	-	Indian Institute of Technology
ITS	-	Intelligent Transport System
ITDP	-	Institute for Transport and Development Policy (USA)
ICLEI	-	International Centre for Local Environmental Initiatives
ICT	-	Information communication and Technology
IT	-	Information Technology
IDFC	-	Infrastructure Development Finance Company

JnNURM	-	Jawaharlal Nehru National Urban Renewal Mission
JTPA	-	Japan Transport Planning Association
KSRTC	-	Karnataka State Road Transport Corporation
LRT	-	Light Road Transit
LTA	-	Land Transport Authority (Singapore)
LMATA	-	Lagos Metropolitan Area Transport Authority (Lagos)
LPG	-	Liquefied Petroleum Gas
MTSU	-	Mumbai Transport Support Unit
MoUD	-	Ministry of Urban Development
MD	-	Managing Director
MRT	-	Mass Rapid Transit
MMT	-	Million Metric Tons
NUTP	-	National Urban Transport Policy
NMT	-	Non-Motorized Transport
NCRPB	-	National Capital Region Planning Board
NTDPC	-	National Transport
NGO	-	Non Governmental Organisation
PMV	-	Personal Motorized Vehicles
PHPDT	-	Peak Hour Peak Direction Traffic
PPHPD	-	Passengers per hour per Direction
RTIDF	-	Rajasthan Transport Infrastructure Development Fund
RITES	-	Rail India Technical and Economic Services Ltd.
ROW	-	Right of Way
RWA	-	Resident Welfare Association
SPA	-	School of Planning and Architecture
SLoCaT	-	Sustainable Low Carbon Transport
STUs	-	State Transport Undertaking
SPVs	-	Special Purpose Vehicle
SUTP	-	Sustainable Urban Transport Project
TERI	-	The Energy and Resources Institute
TTMC	-	Traffic and Transit Management Centers (Bangalore)
TDR	-	Transferable Development Rights
TDM	-	Travel Demand Management
TOD	-	Transit Oriented Development
TRIPP	-	Transport Research and Injury Prevention Programme
UMI	-	Urban Mobility India
UNEP	-	United Nations Environment Programme
UTTIPEC	-	Unified Traffic and Transport Infrastructure
UMTA	-	Unified Metropolitan Transport Authority
VC	-	Vice Chairman
WRI	-	World Resource Institute (Washington)
WHO	-	World Health Organisation

IUT TEAM

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