



MESSAGE BY

MR. GAURAV GUPTA, IAS, MD, KSRTC



An Institution initiated by Government of Karnataka and its Institutions in 2009, CiSTUP has now emerged as Centre of Excellence in the field of Urban Transport and Planning. It has been a privilege for me to be associated with this Institution from its inception. I am happy to note that CiSTUP is now making its presence felt through multifaceted efforts by organizing events inviting global experts in the field of Urban issues and Sustainable Transport.

I am sure that in this issue of Newsletter you will find many interesting and relevant deliberations on the challenges faced by our growing cities and unique solutions being attempted in other parts of the world that we need to replicate in Indian cities. KSRTC has been an active contributor and stakeholder in CiSTUP and I have had the privilege of being a member of Executive Council. I am sure the Newsletter would help to reach out the activities of CiSTUP to all its stakeholders so as to have the broad based consensus on how to tackle challenging issues related to transport in Indian cities.

I extend my best wishes for the success of CiSTUP Centre and happily congratulate the team led by Prof. T.G.Sitharam who made it possible for CiSTUP to meet the objectives laid out.

MESSAGE BY CHAIRMAN PROF. T.G. SITHARAM



I hope that those of you who regularly read the Newsletter from CiSTUP will be aware of the range and breadth of the activities that is being carried out in this centre. All this is possible with the active participation of the entire Faculty associated with CiSTUP and also the people working here. I take this opportunity through this Newsletter to extend a Warm

Welcome to the new members who have joined the centre during the last two months. I am quite confident that the induction of these members to the centre will augment the resources' that the centre is already having for carrying out the

MESSAGE BY

MR. K R SREENIVASA, IAS, MD, BMTC



I have taken charge as Managing Director of Bangalore Metropolitan Transport Corporation recently and during the course of my taking charge I had the opportunity to learn from my colleagues that how CiSTUP has been actively associated with our Corporation. I learnt that this centre which started in 2009 has started a new M.Tech course in Transportation and Infrastructure Engineering wherein candidates sponsored by

BMTC and KSRTC are admitted. This surely will go a long way in enriching the knowledge of the Officers/Employees in our Corporation. BMTC is one of the major stakeholders of this centre and I am confident that CiSTUP in the days to come will be much more involved with us.

The newsletter in general gives a vivid picture of the activities that are being carried out by the Organization. I find from the list of activities that are carried out at this centre that CiSTUP has been doing a lot of good work in the thrust areas like Transportation, Urban planning and also infrastructure development. It is heartening to note that the information about all these activities are being circulated to all the concerned through this newsletter.

I congratulate chairman, CiSTUP and his team for the excellent work done.

different activities planned for the future.

I had the opportunity to visit Germany and Hong Kong during the past few months. During the course of my discussions with the Professors in some Universities there I found that most of them are eager to extend their collaborations with the CiSTUP, IISc. As a start up in this direction ACATECH from Germany joined hands with CiSTUP in organizing One day Symposium on "Smart Mobility and Energy Concepts for Megacities"-details are given in this Newsletter. An interactive workshop on the burning issue of Air Pollution was conducted on 28th February 2011. Many such important activities were done which are forming a part of this Newsletter.

Wishing you all a very Happy reading and I welcome any suggestions in the direction of improving further the activities at the centre.

Interactive workshop on Current Status of Air Pollution in Bangalore 28th Feb 2011 at CiSTUP, IISc

With over 4 million vehicles, 7 million people and an annual economic growth of 10.3%, Bangalore is one of the fastest growing metropolitan and also has deteriorating air quality. This workshop held on 28th Feb 2011 at CiSTUP, IISc primarily aimed at understanding and addressing the present status of Air Pollution in Bangalore, focusing on pollution from transportation sector. This was a joint workshop between CiSTUP, IISc and Karnataka Environment Research Foundation (KERF). The issues covered were estimation, monitoring and inventorying air pollutants to vertical exhaust, sensors, networking and policy issues. Over 35 participants participated in this workshop including professors, scientists, academicians, managers, commissioners, directors, officers and entrepreneurs from Indian Institute of Science (IISc), Karnataka Environment Research Foundation (KERF), Directorate of Urban Land Transport (DULT), Bangalore Metropolitan Transport Corporation (BMTc), Environmental Management and Policy Research Institute (EMPRI), Karnataka State Pollution Control Board (KSPCB), Central Pollution Control Board (CPCB), Department of Transport, Regional Transport Office (RTO), MS Ramaiah Institute of Technology (MSRIT), BIGTECH Solutions, PRAXIR Techno Solutions, ENZEN Global Solutions, Neureol Tech, Institute of Engineers and Don Bosco Institute of Technology.

Prof. Sitharam, Chairman, CiSTUP, IISc briefed on the relevance of air pollution from CiSTUP's perspective (especially relating to transportation sector) and CiSTUP's ongoing activities. Prof. Rajashekhar Murthy, Scientist from Environment Canada (EC) and President, Karnataka Environment Research Foundation (KERF) presented on origin of Air Pollution monitoring in Bangalore and activities of KERF over the years.



Prof. T.G. Sitharam with Panel Members

Dr. Nagappa from Karnataka State Pollution Control Board (KSPCB) provided detailed account air pollution, ambient air quality standards, monitoring and research they carried out in Bangalore. He pointed out that concentration of particulate matter and NO_x are 2 to 5 times the national limits. . 42% of air pollution is attributed to transportation sector, while construction and industrial activities contribute 28%. Dr. Madhusudanan from Central Pollution Control Board (CPCB) provided impetus on central government's source apportionment studies, gaps in air quality studies, CPCB's high quality monitoring stations and way forward involving exposure assessment

coordination among agencies, reduction of toxic constituents, emission reduction strategies, need to address indoor air pollution monitoring and empower people with information. These two presentations clearly highlighted the need for controlling /abating air pollution in the city of Bangalore for a sustainable growth. It was very clear that the majority of emissions are from Transport sector and dust due to construction activities / road dust.



Panel Discussion

Dr. Ashwin Mahesh of Mapunity pointed out the gap in knowing ill effects of air pollution, quantification of the same and taking it to government. Dr. Ashwin Sabapathy of ENZEN Global briefed on networking and inventorying in Bangalore. Dr. Chalapathi Rao and Dr. Dinesh from Centre for Electronics Design and Technology, IISc spoke on biosensors and their utility in air pollution monitoring. Prof. Amrutur from Electronics and Communication Engineering, IISc spoke on large scale urban air quality monitoring system, mobile devices and sensors developed at IISc. Prof. Mohan, from IISc who is also member of Core Group on Automotive Research and Development (CAR), Govt of India, briefed on the availability of research funding and type of research on air pollution carried out under CAR programme.

Panel discussions in the afternoon started with Prof. Rajashekhar Murthy's comment on travel time and timing of vehicles. Mr. Parameshwar, Technical director, BMTc explained Average speed reduction in Bangalore due to construction activities from 25 kmph to 15-16kmph, reduction of air pollution to 11-12% on Bus Day (an initiative by BMTc to use mass transportation vehicle), alternative fuel systems and finally on adapting vertical exhaust as social commitment from Government. Dr. Madhusudhanan asked researchers to use CPCB's air quality sensors for comparison and cross-verification. Mr. Shailendra Singh (DULT) stressed on multimodal transportation system and the work carried out on cycling paths in Jayanagara. Dr. Ashwin sabapathy stressed on inventory on the vehicles and management to improve speed of vehicles. Mr. Hemanth Kumar from Transportation Department said 'walking has become luxury' in Bangalore. He mentioned about 1hr concept where people would like to travel in mass transport system if it is within 1hr from the place of work to place of living, beyond which people tend to use their own. Dr. Amrutur. pointed out data presentation and reach out to common people. Finally the workshop ended up with Prof. Sitharam thanking all the participants.

Lecture by Prof Schoenharting CO2-Monitoring in Urban Areas held on 9th February 2011

Prof. Dr. techn. Joerg Schoenharting (born 1941), studied civil engineering at the Technical Universities of Stuttgart and Aachen, graduate 1966, doctorate from the Technical University of Vienna (1970), 21 years consultant engineer, first in Vienna, then as a partner and managing director of Steierwald Schoenharting und Partner GmbH (today SSP Consult Beratende Ingenieure GmbH), 1996 appointment as university professor at the University of Essen, head of the institute of transport and traffic engineering. In 2006 Prof. Schoenharting retired from the University and founded together with Dipl.-Ing. Stefan Wolter the TRC Transportation Research and Consult GmbH. This company is now the fourth year in the market and can show remarkable success

"Trees, Temples and Technology - enhancing ecosystem services in a changing social Context " (Trees that grow on sacred sites in Bangalore will be in focus). Held on 10th February 2011

By Maria Schewenius,

Master Student

Ecosystems, Governance and Globalization

Stockholm University

Background: The cultural dimension of ecosystem services is poorly explored in research but what has been found is that informal rules such as norms, traditions and values can protect natural resources. This talk connects, perhaps for the first time, research on cultural ecosystem services with theories on urban informal management of green areas.

Open Day Celebrations on 4th and 5th March in CiSTUP



The Institute had declared 4th and 5th March as open days and many of the students have assisted CiSTUP in this activity. BMTC and KSRTC had set up a stall at CiSTUP to display the activities of Public Transport to the common man. On both days 4th and 5th March, it was a grand success.



KSRTC and BMTC displaying the stall at CiSTUP open day celebration

Workshop on Open source Geospatial tools 1st-5th May 2011

CiSTUP jointly with KSCST, OSGEO, IIIT (Hyderabad) and SACON

The growth of GIS is hindered by highly priced proprietary softwares and unavailability of public geodata. Many of such licensed software's remain unutilized in various government offices because they require either extensive training or easy availability on multiple locations. All this can be changed by the use of Free/Open source software tools. This is significant since all government data and most educational institutions work in local language media. FOSS GIS or Free/Open source Geospatial software's are more powerful and usable for developing systems where more and more public participation is sought. In this regard the proposed workshop during 1-5th May 2011 helps to understand the potential and limitations of Open source geospatial tools.

CiSTUP Stall at Karnataka State Council for Science and Technology (KSCST) Exhibition held from 26th to 28th May 2011 at J.N TATA Auditorium, Indian Institute of Science

GRIP IT- Joint Symposium Smart Mobility and Energy Concepts for Mega Cities held on 19th May 2011

The Symposium- Smart Mobility and Energy Concepts for Mega Cities was jointly held by acatech National Academy of Science and Engineering together with Centre for infrastructure Sustainable Transportation and Urban Planning(CiSTUP), Indian Institute of Science , Bangalore at the Satish Dawan Auditorium at the Institutes premises on Bangalore in 19th May 2011.

The objective of the Symposium was to act as a catalyst for future research and development collaborations between India and Germany and to bring together the German and Indian colleagues from the world of academics and industry. The focus of the symposium was on smart cities and its major components of mobility and energy and logistics.

Prof. Dr. T.G. Sitharam (Chairman, CiSTUP) welcomed the dignitaries and participants to the symposium. Prof. Otthein Herzog (Executive Board Member, National Academy of Science and Engineering) also welcomed all and provided a brief introduction to acatech and the initiatives under the GRIP IT project. The Symposium was inaugurated by the traditional lighting of the lamp by the guests of honor.



Traditional lighting of the lamp by the guests of honor.

The inaugural function of the symposium was addressed by Mr. Rolf. Saligman, German General Consul, Bangalore, Mr.Subir, Hari Singh IAS, Additional Chief Secretary, Government of Karnataka, Dr. Christian Aulbach, Science and Technology Counsellor, German Embassy, and Dr. A. Ravindra, IAS, Advisor of Chief minister of Karnataka. The inaugural function was presided over by Prof. Dr. B.N Raghundandan, Divisional Chair , Earth and Environmental Sciences, Indian Institute of Science. Dr.Raghunandan provided the presidential remarks. Prof. Mohan Kumar, Indian Institute of Science thanked the dignitaries after the inaugural function.



Topics Presented by the Speakers at the Symposium

Topic Presented	Speaker
Innovation Technology advances towards smart cities	Prof.Dr.Ina Schieferdecker, Fraunhofer FOKUS-Institute fur Offene Kommunikations systeme
Advances towards Smart Cities- An Indian perspective	Prof.Dr.T.G.Sitharam, Chairman(CiSTUP), Indian Institute of Science, Bangalore
Multimodal Logistics and Transportation Concepts in Germany	Prof.Dr.Bernd Noche, Head of Dept. Transportation Systems and Logistics, Universitat Duisburg-Essen
Multimodal Logistics and Transportation Concepts in India	Dr. Ashwin Mahesh, Urban Research Strategist, Government of Karnataka
Energy/Smart Grid- Best Practices in Europe	Prof. Dr .Wolfgang Nebel, Chairman, OFFIS, Oldenburg
Energy/Smart Grid-Best practices in India	Dr. Akansha Chaurey, Director Decentralized Electricity Solutions, The Energy and Resource Institute (TERI)

Prof. Shieferdecker focused on the definition of smart cities, the vision and challenges for smart cities. She stressed on the importance of information and communication technologies as the backbone for the development of smart cities.

Prof. Sitharam focused on achieving sustainable urban mobility for smart cities from and Indian perspective and stressed on the development of a new culture for Indian mobility by education, training and raising awareness. This should be supported by more data and information.

Prof Noche discussed on the significance of logistics and transportation systems in megacities and some of the intermodal transportation and logistics solution concepts which are being used in Germany. He also presented on some of the projects which have been initiated in the fields of logistics and transportation in Europe including the project on future of internet in Logistics.

Dr. Ashwin Mahesh presented on the multimodal logistics concepts which are evolving in India from a state and national level perspective and a city level perspective. He discussed some of the issues that were being faced at these two levels within the country and some of the initiatives and challenges in moving towards the multimodal transportation concepts in India.

Prof. Nebel presented on policy drives and legal frameworks for smart grids in Europe and the various initiatives and focus areas within the various European countries for the different energy topics and the need for standardization at various levels. He also presented on the various e-energy initiatives within Germany and in the other European countries.

Dr. Akansha Chaurey presented on India's achievements within the renewable energy fields and on the various initiatives for solar lighting systems. Solar based Mini-grid systems and hybrid systems that have been implemented in India. She also presented on the emerging scenarios in the field of energy and the changes in the policy framework conducive towards prompting use of renewable energy in India and the initiatives for India's First Mini-Grid initiative at TERI.

The presentations were followed by a short interactive session with the participants. The presentation were followed by a panel discussion on the question 'Can Technology help to improve the quality of life in Indian megacities?'.

The panel discussion was moderated by Dr. Peter Sachsenmeier, CEO, IMAG and the panelists were:

Prof. Dr. Ina Shieferdecker,

Prof. Dr. T. G. Sitharam,

Dr. Ashwin Mahesh,

Dr. Akansha Chaurey and

Dr. Jorg Himmelreich (German Marshall Fund)

Prof. Sachsenmeier initiated the discussion by presenting the definition of Quality of Life (QoL) and the issues of marginalization on the quality of life- the claim and the reality. The panel discussion brought out various interesting discussions and perspectives on the topic. Dr. Mahesh mentioned the two criteria for technology that helps people to improve their quality of life: give people a choice and increase their amount of autonomy. There were some views that technology by itself will not increase the quality of life but should be used as a tool to improve them. There were also other views that the technology should not only be used for the megacities to improve the living conditions. The discussions also brought out the need for the involvement and voice of the citizens and good governance practices in planning and implementing decisions for urban development.

Prof. Herzog summarized the events of the day and thanked the speakers and for their active participants at the symposium. As next steps, he informed that the next symposium would be organized in the 4th quarter of 2011.



A Comparison of Artificial Technologies used in Vehicle Actuated Traffic Signals

By Jay Kapasi, TG Sitharam, Deepak Baindur

Over the past few years, the exponential increase in urban population and vehicle ownership has lead to a substantial increase in traffic congestion in metropolitan cities in India. Hence there arises an urgent need for proper implementation of Intelligent Transportation Systems (ITS) in order to effectively manage and regulate urban road traffic and mitigate road related accidents.

One of the most important applications of ITS is in the integration of Artificial Intelligence (AI) with transport infrastructure for managing traffic by actuated traffic signals at road intersections. This paper reviews the various AI technologies used for vehicle detection which forms an integral part of a vehicle actuated traffic signal system. The aim is to identify effective technologies and solutions to the current traffic scenario in India.

In this paper the in-roadway and over-roadway sensor technologies, already employed in some parts of the world, have been qualitatively and quantitatively compared and discussed. Their probable applications, drawbacks and customisation necessary for their effective implementation in Indian urban scenarios are analysed. We propose that the on-surface mounting of sensor, although not extensively used in India, will be technically better suited to Indian traffic conditions. The paper concludes by identifying new areas of application of this technology to develop more efficient traffic management systems in India.

Victorian Clean Technology Business Delegation attended by CiSTUP Staff

Victorian Clean Technology Business Delegation, as a part of Australian Trade Commission, Government of Australia had arranged their industrial capability seminar and networking meet at Vivanta by Taj, MG Road Bangalore on 11 April 2011. We (Dr. Gururaja, Dr. Deepak Baindur, Dr. Harish and Mrs. Manjula) attended this seminar and interacted with three of the six participating institutes. Seminar was inaugurated by the Honorable Minister Ms. Louise Asher, Victorian Minister for Innovation, Services and Small Business and Minister for Tourism and Major Events. Mr. Carter, Australian Consul Commercial for South India set the stage with briefing on Victorian companies and their interest. This was followed by presentations from eight institutions, who are looking for business interaction and research interest in India. Environmental Protection Authority, Victoria, Australia, Ecotech Pvt. Ltd, Entura Hydro Tasmania, Swinburne University of Technology, Earth Systems Pvt. Ltd and VR TEK Global Pvt Ltd discussed their achievements, network and business interest in Indian subcontinent. We interacted with Mr. Manoj Kumar of Ecotech Pvt. Ltd., Mr. Greg Powley of Swinburne University of Technology and Mr. Goutam Surana of Neo Systek. We explained the kind of research work at CiSTUP and they seemed to be interested in many relevant topics. Mr. Manoj Kumar has supplied air quality monitoring instruments to CPCB and many state pollution control boards and was keen on attending our conference held on 28th February. Mr. Powley was happy to have knowledge exchange programmes with India. Mr. Surana wanted to come to CiSTUP to discuss about 'green toilets' that they were developing. We felt that this interaction will help in developing greater network of CiSTUP with Australian institutions.

Note on the visit to LalBahadur Sashtri Academy at Missouri during 14th and 15th of April 2011 on Training Programme for senior IAS officers on urban related issues By Dr.T.V.Ramanayya, CiSTUP Senior Fellow.

The IAS officers heading various infrastructural departments are currently undergoing training programs at different levels as Phase I to Phase V at different time periods in their career. IAS officers with 8 to 15 years of experience are chosen for Phase IV program at the academy. The program was implemented by IIM Bangalore with partnership from Syracuse university of USA. It is felt that there is a need to review and update the contents of the module. Hence this meeting on 14 and 15 of April 2011.

The director of LBSNAA outlined the need for an urban centre and the efforts of Shri Rudra Gangadharam, then Director, LBSNAA, Shri Padamvir Singh, then Joint Director (now Director). In a very short span, the centre has achieved its first milestone of creation of modules for Foundation Course, Phase I, District Training, Phase II, Phase III, Phase IV and Induction Courses through deliberations at National Consultations with people involved in urban management. The meeting was attended by experts in different aspects of urban issues. My specific area of involvement is on the issues concerning on Urban Transport. The following topics were finalized to be included in the urban module.

Regional and Urban Development Planning

Overview of Urban Land and Housing

Urban Transport Issues in India

- How Significant is the Urban Transport Problem in India?
- What is the Government of India Policy Response to the Urban Transport Problem
- What is currently being implemented to address the Urban Transport problem?
- A way forward
- A Potential Role of the World Bank
- Case Study Urban Transport in Bangalore
- Case Studies of Transportation Public-Private Partnerships around the World.
- National Urban Transport Policy
- Review of Urban Transportation in India
- Case Study Urban Transport in Chennai

The expert group suggested that the module on Urban Issues should focus on the following topics

- The Infrastructure Sector in India
- Urban Water and Wastewater
- Solid Waste Management
- Implementation on Strategy
- Financing and Implementation of Development Planning
- Good Governance through Fiscal Transparency and Accountability
- Key technology clusters to boost innovations in finance
- Models of Urban Governance and Governance Systems in India

ASSESSMENT DERIVED CONSERVATIONS STRATEGIES FOR MAJOR LAKES OF KARNATAKA

DERIVED CONSERVATION STRATEGIES FOR MAJOR LAKES OF KARNATAKA:

MEMO 2: MAJOR FINDINGS

May 5, 2011

Identification of water bodies and development of a tank profiles

As agreed upon in previous meetings, a tank cascade approach was adopted for tank enumeration in the study area. To identify all water bodies, help from the village secretary was solicited, satellite images over several years and village maps etc. were used. According to in-depth study of study area, it was found that the count of water bodies has gone up to 117 with varying sizes (kere, kunta, Katta' etc.) while land use was changed for about 30 of them. Efforts are on demarcate the boundaries of water bodies using GPS. Water bodies were classified into various categories based on different characteristics such as a) impact of encroachment, b) duration of presence of water – seasonal or perennial, c) water quality. A detailed examination with reference to physico-chemical characteristics and micro environmental profile was restricted to 33 lakes that were discussed in the previous meeting. Water quality studies for the cool-dry season have been completed.

Literature survey

A literature survey is carried out to find out if any scientific investigations were made and whose findings/recommendations could benefit the project. In addition, various institutions such as Karnataka State Pollution Control Board, Indian Institute of Science (Central Library), Bangalore University, Lake Development Authority, Department of Mines and Geology etc. were consulted and it is observed that their focus was not on water bodies of the study area. However four recent studies carried out by scholars of Bangalore University were identified, looking into some of the water bodies such as Mallathalli Lake, Dubasipalya Lake in the study area. However, none of these studies have entered the public domain yet and will remain out of reach until 2012 when they become entrants to the library. In conclusion, no publicly available information has been identified regarding the water bodies in study area. However, a literature survey on the studies made regarding lakes in general located in and around Bangalore is in Progress.

Identification of unauthorized waste dumps

In a significant percentage of lakes, it was observed that water bodies became regular place for dumping of wastes ranging from construction materials, industrial waste, biomedical waste, agricultural waste (Bendimatta Lake, Dasappanakuppe Lake, Dubasipalya Lake). It appears that waste is burnt systematically in several locations, preventing the identification of its origin (Henchinakuppe Lake). With the runoff from waste dumps entering water bodies, action on illegal waste disposal is warranted and necessary (re-fer to Annex for photographs). A report in this respect will be submitted to the concerned authorities shortly

Changes in the composition of the team

With effect April 11, 2011 Dr. K. Lenin Babu has succeeded Mr Felix Nitz as Project Coordinator for the Centre for Lake Conservation. He will henceforth be coordinating with project partners, stakeholders and supervise the work and progress of both EMPRI's team and the project overall.



Completed Research Projects

S.No.	Title of the Project	Investigator/s
1.	Probabilistic& Deterministic Seismic Hazard Assessment of Karnataka State and Microzonation of Tier II Cities for Urban Planning	Prof.T.G.Sitharam
2.	Condition Assessment of Existing Road Pavement using Field and laboratory Experiments.	Dr.Anbazhagan
3.	Development of a novel electric van for mail delivery and pick-up	Prof.Anindya Deb
4.	Studies on the performance and Emission characteristics of different Straight Vegetable Oils (SVO) as fuels in a Diesel Engine for Urban Transportation	Dr.R.T.Naik

Ongoing Research Projects

S.No.	Title of the Project	Investigator/s
1	A Multi-Objective Transit Trip Itinerary Planning System Using GIS for Bangalore City.	Dr.Ashish Verma
2	Development of an eco-friendly electric car	Prof.Anindya Deb
3	Use of Plastic Wastes in Subgrade Road Construction	Prof.G.L.S.Babu
4	Retrofit Parallel Hybrid drive	Prof.K.Gopakumar
5	Damage Assessment of Reinforced concrete bridge beams using acoustic emission method.	Dr.R.Vidya Sagar
6	Damage assessment, repair and retrofit of reinforced concrete girders and columns using fiber reinforced polymer composite and cementitious materials.	Prof.Ananth Ramaswamy
7	Quantification of Damage for Residual Life Assessment of Reinforced Concrete Infrastructures.	Dr.J.M.Chandra Kishen
8	Urban Water supply and Management	Prof.M.S.Mohan Kumar
9	Construction waste-potential resource for building products: A case study of Bangalore City	Prof.B.V.V.Reddy
10	Sustainable use of Sewage-fed urban water bodies	Dr.H.N.Chanakya
11	Domestic Water Pricing for Demand Management	Dr.P.Ramachandran
12	Development of dedicated Spectrometric Reagent Kits and Cookbook for Pollution Monitoring of Bangalore Lakes and water bodies.	Dr.J.R.Mudakavi
13	Structural Health Monitoring of Underpass made from precast RCC boxes	Prof.S.Ashokan
14	Assessment of seismic performance of reinforced masonry building models through shock table & shaking table tests	Dr.K.S.Nanjunda Rao
15	Transition metal oxide coated windows as natural Air-conditioners	Prof.K.B.R.Verma

Ongoing Research Projects		
S.No.	Title of the Project	Investigator/s
1	Characterization of Rail Track Ballast fouling Using Ground Penetration Radar and Field Sampling	Dr. P. Anabzhagan
2	Demand Management and Strategies for Improvement of Market Share of KSRTC on Selected Routes	Prof. R Srinivasan
3	Performance Evaluation of Geosynthetic Reinforced Unpaved Roads	G.M. Latha
4	Development of Bio-Hybrid Three-Wheeled Auto-Rickshaw for Urban Transportation	Dr. R.T. Naik Co-PI: Prof.G.K.Anantha Suresh
5	A Knowledge Management Model for the Bangalore Namma Metro Project	Dr. Parameshwar Iyer
6	Management and Technology of Urban Solid waste leachate	PI: Dr.H.N.Chanakya Co-PI: Dr. S.G. Sreekanteshwara Swamy
7	Valuation of Ecological Functions and Benefits of Bangalore Urban Wetlands	Dr. D.Sannadurgappa
8	Use of Solid Waste to Enhance Properties of Problematic Soils of Karnataka	P.V. Sivapullaiah
9	Bearing Capacity of Shallow embedded pipelines in urban sprawl	Tejas Gorur Murthy
10	Urban Sprawl in Tier-11 Cities of Karnataka: Analysis of Patterns, Process and Environmental Sustainability	Dr.T.V.Ramachandra
11	Underground Construction in Urban Areas:Field Data Analysis and Monitoring, Numerical Simulations and validation	Prof.T.G.Sitharam
12	Design for Thermal comfort using Ventilation and thermal mass.	Prof.Jaywant H. Arakere



SUSTAINABLE TRANSPORT AND INFRASTRUCTURE FOR THE GROWTH OF INDIAN CITIES

**By Prof. T. G. Sitharam,
Fagun Rajkotia and Radha Chanchani**

A sustainable transport system is a well balanced system which makes a positive contribution to the development of the community it serves; in terms of environmental, social and economical aspects. According to the European Union Council of Ministers of Transport, a sustainable transportation system is the one which allows safe and convenient access to basic needs of all groups of people of society. The system supports the development of its society which is consistent with the ecosystem and promotes equity between successive generations. It should be affordable and efficiently operational. Sustainable transportation system is one which provides a choice of transport modes for all sections of the public. The system should be environmentally sustainable along with a provision for utilizing renewable resources, limiting emissions and reducing the generation of noise. It should minimize the impact on the use of land with a plan for well balanced regional development.

The transport sector is considered as a significant component of economic development and human welfare. An efficient transport system enhances economic and social opportunities to its community by providing better accessibility to markets, employment and additional investments. Indian cities are experiencing economic growth, rapid urbanization and along with it ever-increasing transportation activity. In such a situation the provision of easy accessibility to education, work places, entertainment, and other activities becomes more important than ever. The challenge is to provide low cost and sustainable accessibility that is affordable even for low income groups.

Sustainable transport system means an environment friendly system that minimizes the use of energy and produce less CO₂ and methane. Today, transport activity is considered as one of the major global consumers of energy; currently it represents about 1/4th of aggregate energy consumption and CO₂ emissions. The environmental impacts due to the transport activities can be reduced by providing safe and easy accessibility of multiple modes of transport such as walking, cycling, para-transit (three wheelers), public transportation (like bus, metro rail, commuter rail, etc), and by enhancing the role of public transport. In addition, the impact can be reduced by developing fuel-efficient vehicles with bio fuels or renewable energy. The society can contribute to reduce the impact by making smart choice such as car-pooling, etc. Among the different modes of transport, walking and bicycling are the most sustainable. Recently, these modes are gaining world wide acceptance and attention. The next most sustainable mode is public transport. Apart from a good city bus service, Bangalore is implementing rail-based transport options like the metro and considering

developing a commuter rail system which connects the main city with its suburban areas and nearby towns.

Several countries including South Korea, USA and France are tearing down expressways after 50 years of the greatest road building activities in the world's history. According to Walter Kulash, a traffic engineer from Orlando, Florida, "widening roads to solve traffic congestion is like loosening your belt to cure obesity". Across the world, many city authorities are re-evaluating post-World War II federal urban policies and its destructive effects on cities. For example, when the 1989 earthquake damaged the Embarcadero Freeway in San Francisco the city decided not to rebuild it as it was blocking views of the Bay and lowered property values. Another world famous example is that of Seoul, Korea where Lee Myung-bak, the city's mayor had proposed to remove a major freeway which was passing over Cheonggyecheon Creek and introduced a Bus Rapid Transit (BRT) system to accommodate the displaced traffic which would reduce the automobile usage in the city by half. Under his guidance, in 2003, the city has opened a 14.5 km BRT corridor and at the same time the freeway was closed. Today, the stream is restored and the revitalized surrounding area has become a famous tourist spot. The city continues to promote public transportation by adding more BRT routes.

Unfortunately, we have been engaged in similar road building exercises in our cities while overlooking the mistakes committed earlier. The Bangalore city authority is investing in road widening project to reduce traffic congestion on its roads. Before implementing we need to remember and learn from history and best practices from around the world. Instead of road widening, wouldn't it be a good idea to strengthen our road network by connecting arterial and sub-arterial roads? One should provide travelers with many options. We should really be investing in improving streetscapes, sidewalks, bike paths and transit, instead of devoting almost all of its tax money to huge, highly engineered expressways.

- Sustainable Transportation and TDM; Planning That Balances Economic, Social and Ecological Objectives.
- The Geography of Transport System;
<http://people.hofstra.edu/geotrans/eng/ch7en/conc7en/ch7c1en.html>
- The Geography of Transport System;
<http://people.hofstra.edu/geotrans/eng/ch7en/conc7en/ch7c1en.html>
- Transport Technologies and Policy Scenarios to 2050; by World Energy Council 2007;
http://www.worldenergy.org/documents/transportation_study_executive_summary_online.pdf
- Removing Freeways - Restoring Cities;
<http://www.preservenet.com/freeways/FreewaysTear.html>

MULTI-PRONGED STRATEGY TO ACHIEVE 'SUSTAINABLE URBAN MOBILITY'

By Radha Chanchani and Fagun Rajkotia

'Accessibility' is understood as the ease of reaching a desired destination. 'Mobility' is movement required to achieve access, which can be by different modes. For long now cities have been designed for mobility, and that too usually focused on moving automobiles rather than people. However, mobility is secondary. Cities should first be designed for accessibility - the new paradigm for urban and transport planning!! This can only be achieved by the integration of land use and transport, which forms the crux of any good city plan and design.

1. Reduce Travel Demand, Bring Destinations Closer and Improve Accessibility

Plan and design urban areas so as to reduce the need to travel long distances to access education, work, recreation, shopping, basic goods and services; daily needs are met nearby. Employ the principles of Smart Growth and Transit-Oriented Development:

- The 5D's of Development – Diversity (appropriate mix of uses), Density, (urban) Design, Distance to Transit and Destination Accessibility. Create compact, relatively dense, mixed-use, mixed income and livable neighbourhoods that are pedestrian and cycle friendly and support public transit.
- Enmeshed Hierarchies – integrate the planning and design of Road Networks with Public Transportation Systems and the distribution of Land Uses and Densities. Establish well-formed road network hierarchies based on functional characteristics.
- People's experience of the city is through mobility and the public realm. Improve public open spaces in conjunction with public transport systems to transform the quality of life and experience of the city; like in the successful world-class examples of Curitiba and Bogota in South America.

2. Improved Mobility of 'People' rather than 'Automobiles'

- Develop affordable and efficient integrated, multi-modal public transport systems. These are valuable for their economy of money and space, socially equitable and environmentally friendlier options. Low-cost, locally-relevant and development-oriented public transport systems should be implemented before exploring expensive options.
- Strengthen and promote the shift to sustainable, zero or low carbon mobility modes like non-motorised transport, para-transit and public transport options. Walkable and cycle-friendly streets create safer, more humane and liveable environments.

To make any city sustainable, a well-developed, integrated, multi-modal public transportation system is vital. Any mass rapid transit systems such as metro, commuter rail or bus-based transport, can only be successful when these are seamlessly integrated with last mile connectivity options like walking, cycling, or intermediate para-transit modes such as autorickshaws, shared taxis, etc. Normally, people avoid using public transport when the stops do not safely and conveniently connect with the origin or destination points of the trip. Ideally, walking and cycling are most sustainable transportation modes, but people shun them due to many reasons. One of the reason is, it may not be safe enough to bike or walk along the arterial or main roads due to high volumes of faster moving vehicular traffic and so it is essential to have sidewalks and segregated cycle lanes along such roads with easy access to the public transit stop and parking facilities. Autorickshaws and shared taxis should be used as feeders to connect poorly serviced, interior areas with the public transit system. These aspects are critical in promoting the shift to public transport.

- In addition to its functional characteristics, the design of roads and streets needs to be context-sensitive (taking into account adjacent functions/ activities) and multi-modal. Equitable distribution of road space based on user groups.

3. Broad Policy Measures and Strategies

- Employ push-pull factors to work together. Discourage private motorized vehicle use through transport demand management measures like parking policies, congestion charging, higher taxes and fuel costs, etc. Encourage car pooling, prioritize HOV (high-occupancy vehicle and bus) lanes, explore innovative means of incentivizing public transport like discounts and subsidies.

4. Use of Science and Technology for Improved Service Systems and Delivery

- Cleaner, greener, more efficient fuels, vehicle design and technology – with a focus on fuel efficiency leading to lower air pollution and GHG emissions, alternate less polluting fuels (gas/electricity) based on renewable resources.
- Use of ICT (information and communication technology) for efficient traffic management and operation services, passenger information systems, electronic payment services, road transport-related personal safety services, weather and environmental conditions monitoring services, disaster response management and co-ordination services, etc.

5. Public Education and Awareness Campaigns to ensure Participation

ONE DAY WORKSHOP

ON

Modern Trends in Pavement Engineering

15th July, 2011

Co-ordinator

Prof. G L Sivakumar Babu

Professor

Indian Institute of Science,

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- Stabilisation techniques,
- New materials - modifiers etc.
- Pavement design - flexible/semi-rigid/rigid - empirical/M-E
- New technologies in pavement Construction
- Pavement maintenance and road asset management

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