CiSTUP News Letter

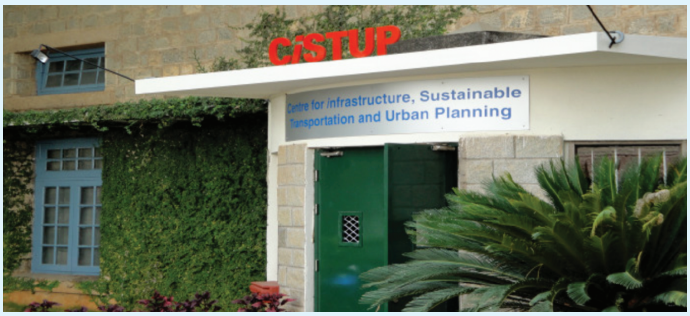
Center for Infrastructure, Sustainable Transportation and Urban Planning, Indian Institute of Science, Bangalore, INDIA

Volume - 1, Issue - 1 November, 2009

A vehicle for Analytical thinking to improve the Unique Urban Issues

Message by President of CiSTUP & Director of IISc: Prof P. Balaram

I am glad to note that CiSTUP has come out with the First issue of its NEWSLETTER". This center was launched recently with support from Govt, of Karnataka, to develop unique expertise in the areas of infrastructure, sustainable transportation and urban planning. It is heartening to observe that in a short span of time, the center has grown very fast and its activities have increased manifold. Therefore, it is an ideal time for the center to come out with NEWSLETTER, which will serve as its mouthpiece to disseminate information; about its current and planned activities, state-of-art practices in the theme areas etc. I am sure this NEWSLETTER will provide valuable information and insight to; the stakeholders of the center, students, researchers, and other related professionals. I convey my heartiest Congratulations and best wishes to the team of CiSTUP that has been working on this NEWSLETTER.



About starting of the CiSTUP :

The Indian Institute of Science is pleased to announce the establishment of center for infrastructure, Sustainable Transportation and Urban Planning (CiSTUP). This center is launched with the generous financial aid from the Government of Karnataka to develop it as a unique expertise having an interface in the areas of infrastructure, sustainable transportation and urban planning. CiSTUP will be engaged in several activities such as basic and applied research and development, academic activities, training programmes, workshops and consultancy projects in the areas of infrastructure, sustainable transportation and urban planning. Detailed proposal and MoU were prepared jointly by Sri. Upendra Tripathy, then Principal Secretary (Transport), Govt of Karnataka and Professors from Department of Civil Engineerin, Indian Institute of Science, Bangalore. The proposal was approved in the cabinet meeting held on September 26th 2008 at Gulbarga. MoU was signed by IISc and Govt of Karnataka on November 19th, 2008. Center was inaugurated on January 2nd 2009 by Honorable Chief Minister of Karnataka Sri. Yeddyurappa.

By Prof. **T.G.Sitharam.**

Edited by Prof. T. G. Sitharam
Published by Center for infrastructure, Sustainable Transportation and Urban Planning(CiSTUP),Indian Institute of Science, Bangalore -560012
This News Letter is for limited circulation only.

Objectives & Proposed Activities of CiSTUP



Objectives of CiSTUP :

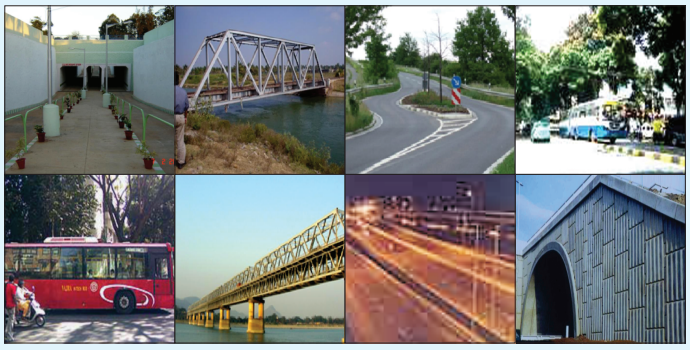
- Conducting basic and applied research in the areas of infrastructure, sustainable transportation systems and urban planning of the highest quality that incorporates significance to national/city problems and practical utility.
- Innovating on problems of multidisciplinary research in infrastructure, sustainable transportation systems and urban planning, which are useful to the city planning, development and society at large.
- To generate more number of trained technical/ scientific professionals in infrastructure, sustainable transportation systems and urban planning while ensuring quality with appropriate training and scientific culture.
- Strengthen teaching and research in the areas of infrastructure, sustainable transportation systems and urban planning through collaboration with other relevant institutions like Indian Institute of Management (IIM), center for Environmental Planning & Technology University (CEPT), Environmental Management & Policy Research Institute (EMPRI) and engineering colleges. Manage and regulate partnerships to diversify resources and to ensure quality.
- Generating "Out of the Box" ideas along with plan for carrying out large projects of national interest/ importance on locally relevant themes in infrastructure, sustainable transportation systems and urban planning.
- Facilitating the rigorous study of innovations while developing partnerships crucial to bridging science, engineering, management and service.
- Commitment towards popularizing education/ outreach programmes in sustainable urban development along with transportation systems, collaborating strategically with stakeholders, which can help make the CiSTUP's research available to a broader audience in more meaningful and tangible ways. Stakeholders shall include people at large, youngsters who aspire to study in infrastructure, transportation systems and urban planning, practitioners, researchers, policy makers and administrators.
- Create a vibrant center of international standards on the lines of United Nations University (UNU) in the area of infrastructure, sustainable transportation systems, and urban planning.

Proposed Activities of CiSTUP

- CiSTUP will be engaged in several activities such as Research and Development, Academic courses, Training programs and Consultancy projects. In the first year an attempt will be made to develop research and training programme, conducting Training programs and handling consultancy projects in the related areas of infrastructure, transportation and urban planning by the existing faculty from different departments/centers in IISc.
- In the second year, continuation of these activities will be made along with an attempt to start two M.Tech. programs one in Transportation and Urban Infrastructure Engineering and the other in Urban Planning.
- From the third and in subsequent years, all the previously planned activities will be continued.
- CiSTUP series of activities looking at different urban issues such as urban planning, transport planning, hazard mapping, flood mapping, etc involving several cities in Karnataka such as Bellary , Belgaum , Hubli-Dharwar , Mangalore, Mysore and Gulbarga for their sustainable growth will be taken up.

STAKE HOLDERS

To start this center, Government of Karnataka brought together various stake holders Bangalore Metropolitan Transport Corporation(BMTC),Bangalore Development Authority (BDA), Karnataka State Road Transport Corporation (KSRTC), North East Karnataka Road Transport Corporation (NEKRTC), North West Karnataka Road Transport Corporation (NWKRTC). Further, Bruhat Bangalore Mahanagara Palike (BBMP) and Namma Metro, Bangalore have also showed interest in joining CiSTUP





Highlights of the Inaugural Address During Inaguration Function of CiSTUP

Sri. B. S. Yeddyurappa,

Hon. Chief Minister of Karnataka
on January 2nd, 2009 at the Inagural function

It is a splendid opportunity to Karnataka Govt. To set up a high level scientific and technical center in very important areas of urban infrastructure, sustainable transportation systems and urban planning, which would be inspired by an excellent atmosphere at the Indian Institute of Science, with brilliant researchers and successful programs to its credit. "The theme proposed for CiSTUP is also unique and such an interdisciplinary center does not exist in the country at present. There is a clear need of a multi-disciplinary center such as CiSTUP which can develop unique expertise having an interface in the areas of infrastructure, sustainable transportation and urban planning in the 21st century, where we are witnessing a phenomenal growth in our urban cities." "This is an appropriate time to start a center (CiSTUP) of this nature at this Institute located in Bangalore, which is celebrating its 100th year along with IISc`s available expertise of multi disciplinary nature. The State Govt. has mobilized a corpus fund of about Rs.30 crore from various stake holders like BMTC, BDA, KSRTC, NEKRTC; NWKRTC. The center will not only concentrate on the issues of the major cities like Bangalore but also developing cities like Gulbarga, Bellary etc,. One can be sure that CiSTUP at IISc can grow into a center of excellence to host south Asia campus of United Nations University. We look forward to this center playing an active role in better planning of urban centers in different parts of the state and the country in the long run."

About CiSTUP Activities in Welcome Address during the Inaguration

By
Prof.T.G.Sitharam.

CiSTUP will be engaged in several activities which include basic and applied research and development, academic programmes, training programmes, workshops and consultancy projects in the areas of infrastructure, sustainable transportation systems and urban planning. CiSTUP intends to generate trained technical and scientific professionals in the above areas. In addition, it will facilitate research in urban flooding, urban heat island effects, solid waste management, seismic microzonation, disaster mitigation, remote sensing, resource optimization, mathematical modeling, pavement geo techniques, pavement design, ground improvement techniques and other aspects of urban infrastructure and planning. CiSTUP also plans to set up a specialized library and publish books and monographs dealing with these themes. The center will promote outreach / training activities to the stake holders in the areas of infrastructure, sustainable transportation & traffic engineering and urban planning. Online training / help programmes in these fields are also being planned. The center has setup laboratories in transportation & traffic engineering, geoinformatics, and disaster mitigation. Further, there will be CiSTUP lecture series, annual conference for the practicing community and decision makers and annual special invited lectures on the topics of sustainable transportation, infrastructure and urban planning. The center is planning to undertake joint research and training programmes in collaboration with several leading institutes of higher learning within and outside the nation.




List of Faculty Associated in CiSTUP

Chairman
Prof. **T G Sitharam**

Prof. **Ananth Ramaswamy**

Dr. **Andre Pittet**

Dr. **Anjula Gurtoo**

Prof. **Anurag Kumar**

Dr. **Ashish Verma**

Prof. **C. Bhattacharya**

Dr. **H.N. Chanakya**

Prof. **J.M. Chandra Kishen**

Prof. **H.S. Jamadagni**

Prof. **M.S. Mohan Kumar**

Prof. **D. Nagesh Kumar**

Dr. **K.S. Nanjunda Rao**

Dr. **Parameshwar Iyer**

Dr. **Parthasarathy Ramachandran**

Dr. **T.V. Ramchandra**

Prof. **M. Shekar**

Prof. **G.L. Shivakumar Babu**

Prof. **B.V. Venkatarama Reddy**

People at CiSTUP

Research Staff:

Dr. K V Gururaj
Prof. Shankar Rao

Project Trainees:

Mr. Sreenivasulu S
Ms. Priyadarshini J Shetty
Ms. Sushma Srinivas
Ms. Usha Kalpana R
Mr. Santosh MS
Mr. Karthik B N
Ms. Shashikala V
Ms. Shruthika G R
Mrs. Priyamvada Srinath
Mr. Santhosh Kumar HV

Office Staff :

Mr. M L V Subramanyam
Mrs. R.Chandrama
Mr. Ambareesh.V
Mr. Selva Kumar A

President	Co-President	Member Secretary
Prof. P. Balaram , Director IISc, Bangalore	**Shri. Sudhakar Rao IAS ,** Chief Secretary, GoK, Bangalore	**Prof. T.G. Sitharam ,** Chairman, CiSTUP, IISc, Bangalore

Members of Executive Council

Shri. Siddaiah IAS, Commissioner, BDA, Bangalore.	**Shri. Shankar Linge Gowda IAS,** Principal Secretary, Transport Dept., GoK, Bangalore.
Shri. K. Jothiramalingam IAS, Principal Secretary, Urban Development Dept. GoK, Bangalore.	**Shri. B. Basappa,** Director General Hasiru Bhavana, Bangalore
Shri. Gaurav Gupta IAS, Managing Director, KSRTC, Bangalore.	**Shri. Syed Zameer Pasha IAS,** Managing Director, BMTC, Bangalore.
Dr. S.K. Rao, Director General, Administrative Staff College of India, Hyderabad.	**Prof. Dinesh Mohan,** Henry Ford prof. of transportation safety, IIT New Delhi.
Prof. Shivanda Swamy, Asst. Director, CEPT, Ahmedabad.	**Prof. P.P. Mujumdar,** Dept. of Civil Engg., IISc, Bangalore.
Prof. Y. Narahari, Dept. of Computer Science & Automation, IISc, Bangalore.	**Prof. B.N. Raghunandan,** Dept. of Aeorspace Engg., IISc, Bangalore.
Prof. J. Srinivasan, Dept. of Mechanical Sciences, IISc, Bangalore.	**Transportation expert from** Japan International Cooperation Agency (JICA)
Transportation expert from Asian Development Bank Institute	Transportation expert from World bank

Invities to the Executive Council

Shri. Upendra Tripathy IAS,
Joint Secretary, Ministry of Minority Affairs GoI.

Dr. Kota Harinarayana,
Raja Ramanna Fellow,
NAL, Bangalore.

Shri M. Sivasailam IAS,
Managing Director,
BMRC, Bangalore.

Commissioner, DULT, GoK

Sri. Srivasta Krishna, IAS, Bangalore.

Dr. Arcot Ramachandran,
Chairman of TERI & Hon
Visiting professor NIAS, Bangalore.

Shri. O.P. Agarwal,
Managing Director,
UMTC, New Delhi.

Dr. S.K Lohia
Director (UT),
Ministry of Urban Development,
Nirman Bhawan, New Delhi.

Asst Commissioner of Police, GoK.

Research & Acadamic Advisory Committee of CiSTUP

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Prof B N Raghunandhan
Divisional Chairman,
Earth and Environmental Sciences

Convenor of RAAC
Prof T G Sitharam
Chirman, CiSTUP

Members:
Prof Y Narahari
Dept of Computer Science and Automation

Prof P P Mujumdar
Chairman Dept of Civil Engineering

Other Members:
Group for Transportation Engineering:
Dr Ashish Verma
Dept of Civil Engineering

Prof C.E.G. Justo
Mr Mukkanna,
Chief Mechanical Engineer,
Bangalore Metropolitan Transport Corporation (BMTC)

Group for Infrastructure:
Prof Ananth Ramasamy
Dept of Civil Engineering

Mr. Vivek Menon, P.E.
Managing Director, Invicus Engineering Co.

Mr Palanethra Naik
Chief Engineer
Bangalore Metropolitan
Transport Corporation (BMTC)

Group for Urban Planning:
Dr T.V. Ramachandra center
for Ecological Sciences

Mr R Sreenivas Member,
Town Planning, Bangalore Development Authority (BDA)

Shri B Basappa
Director General
EMPRI " Hasiru Bhavana"

Traffic and Transport Engineering

- Intelligent integrated transportation systems, transportation facilities including airports, highways, railroads, mass transit systems and ports
- Traffic surveys and traffic management systems
- Traffic demand management
- Pavement materials and pavement design
- Highway, Bridge and Railway engineering
- Alternative energy and low emission fuels
- Emergency management(Natural and man made)

Urban Infrastructure, Building & Construction Engineering

- Infrastructural engineering, management of existing infrastructure including inspection, maintenance, rehabilitation, repair and retrofitting
- Urban utilities (pipelines, communication networks, etc.) management
- Solid waste management, waste reutilization and urban ecology
- Urban water management including water supply, sewage, surface drainage, flooding, rainwater harvesting, lakes, etc.
- Building science, construction and technology, Sustainable and cost effective housing, accelerated construction technologies and fire safety
- Development of nondestructive evaluation techniques and tools
- Integrated Construction project management
- Green buildings and energy conservation

Urban Sprawl and planning

- Urban and community planning, mobility issues
- Patterns, process, cause and consequence of urban sprawl
- Geometric land-use planning along with zoning regulations
- Integrated city land use planning with transportation planning

Tunneling engineering and underground space utilization

- Underground Metros
- Large underground excavations for multi basements, underpasses, and other geotechnical

Climate Change, Geohazards and disaster mitigation

- Seismic microzonation of urban centers and disaster mitigation
- Hazard studies due to earthquakes, landslides and floods
- Seismic resistant design of infrastructure

Environmental Impact Assessment

- Greenhouse gas emission estimation
- Assessment and Mitigation of Key Environmental Impacts
- Environmental

ICT for Transportation / Infrastructure

- Video Surveillance for monitoring Public Infrastructure.
- Sensor networks and instrumentation of existing infrastructure
- Wireless Technologies
- Network analysis
- Sensor network and data for dynamic monitoring of atmospheric pollution

Urban economics and social issues

- Urban economics
- Urban slum management and social issues

Workshop on Sustainable Transportation

Date: 30th April 2009 (Thursday); Time: 9:30 am to 3 pm
Venue: Golden Jubilee Seminar hall, Department of Civil Engineering, IISc

The term sustainabale transportation is often defined in words such as this: "Sustainable transportation is about meeting or helping meet the mobility needs of the present without compromising the ability of future generations to meet their needs." The term is also used to describe all forms of transport which minimize fuel consumption and emissions of carbon dioxide and pollutants. Traditionally, transport and land use decisions have been made solely by elected politicians, advised by expert professionals. Life is now much more complicated. The policies are influenced by neighbouring towns and cities, as well as by regional and national policies. Fewer policy decisions can now be taken solely by government. The private sector and agencies are increasingly responsible for public transport, road construction and land use decisions. Increasingly, too, those affected as users, businesses and residents expect to be fully involved in decision-making. Fortunately, we now have available a much wider range of possible policy interventions, including land use, information technology, management and pricing to add to the conventional provision of new infrastructure. However this, too, brings its challenges. We know much less about the potential of some of these newer instruments, or how well they work in different situations. This workshop will address these issues and also discuss a number of possible approaches to decision-making so that the cities can develop their own policies.

Convenor : **Prof T.G. Sitharam**
Speakers : **Prof Michael A P Taylor & Dr. Sekhar VC Somenahalli**

Brainstorming Session on Urban Development and Environmental Sustainability

Date: 11th May 2009 (Monday), 9:30 am to 4:30 pm
Venue: Golden Jubilee Seminar Hall, Department of Civil Engineering, Indian Institute of Science , Bangalore

Background: Expanding urban regions have emerged as one of the major anthropogenic sources of global environmental change. Beyond multiple environmental stresses from land use change, land degradation, and air and water pollution, urban development often creates new human vulnerabilities from unhealthy living conditions for residents of urban peripheries. Much of urban growth worldwide in the next decades will take place in the developing countries of Asia . India 's urban population is currently growing at about 2.3 percent per annum with an unprecedented population growth and migration. The number of urban agglomerations and towns in India has increased from 3697 in 1991 to 4369 in 2001. It is projected that the country's urban population would increase from 28.3 percent in 2003 to about 41.4 percent by 2030. Cross-national comparative analysis and assessment of the environmental consequences from these processes is crucial to understanding the policy alternatives to address them. The brainstorm session addresses how urban sprawl has affected the environment in the urban periphery in two distinct national contexts and suggests alternative policies and institutional arrangements for making urbanization more sustainable. Comparison of urban sprawl and its consequences with case studies from developing countries holds special interest for the global problem of sprawl and urban environmental sustainability.

Co-ordinator : **Dr. T.V. Ramachandra**
Convenor : **Prof T.G. Sitharam**

Joint Round Table Discussion on Infrastructural and Service Demands of Emerging Urban Growth Centers

Background: Infrastructure and environmental constraints associated with the unplanned urbanisation has put most of the cities in developing countries at a competitive disadvantage. Problems of collective provision are demanding innovative in situ local and regional governance and regulatory solutions around issues such as investment in hard infrastructure and affordable housing. Local infrastructural solutions to entrepreneurial modes of growth are increasingly influenced by wider debates about quality of life, carbon reduction, and social and environmental sustainability. The Joint Round Table discussion provided a forum for interaction with strategic actors and policymakers

Co-ordinator : **Dr. T.V.Ramachandra, CiSTUP & Dr. Robin, CiSTUP .**
Convenor : **Prof T. G. Sitharam**

Brainstorming Meeting on "Roadmap to CiSTUP activities" on June 23rd 2009

Venue: Conference Hall, Department of Civil Engineering (Ist Floor), IISc

Date: June 23rd 2009 (Tuesday),
TIME: 3.00PM to 5:30 PM

A Brainstorming meeting on "Roadmap to CiSTUP activities" was done to discuss and chalk out the road map. The participants were from EC members of CiSTUP, Associate faculty of the center, Representatives from Stake Holders, and some invites (Prof. Subramaniam, Dr. Robin from CSTEP, Mr. Vivek Memon and others one or two field practitioners). Divisional Chairman, Earth and Environmental Sciences attended the meeting.

Co-ordinator: **Prof T. G. Sitharam**

Brainstorming Session on Conservation & Management of Urban Lakes: 26th September 2009

Venue: CiSTUP Seminar Hall, IISc Campus

The workshop is meant for Research Scholars and Master students. The age of participant be less than 30. All the applicant should send a write-up on "need and challenges of wetland Monitoring and Management in India" and "how wetland monitoring workshop would benefit their career"

Co-ordinator: **Prof T.V.Ramachandra**

Workshop on Urban Lake Monitoring and Management (23rd To 25th Sept)

Venue: Conference Hall, CiSTUP, IISc

Date: Sep. 23 rd to 25 th 2009

Urban lakes depend on various interdependent and inter-related factors that are vital for its existence and role in the maintenance of ecological balance. Concern for the declining water quality and impaired ecological conditions in many aquatic ecosystems caused by various anthropogenic activities has necessitated greater stress for monitoring and sustainable management. Understanding the nature and extent of the problems, quantified sources of pollution, and relationships for determining the response of aquatic ecosystems to various levels of pollution is required for formulating a variety of control and restoration measures. Integrated studies are required to understand the full range of human impacts on aquatic ecosystems.

In this course the participants were taught how lakes / wetlands are defined, categorized, and distributed locally and globally; their patterns of development; their ecological and biogeochemical functions; their values to human society; the causes of wetland degradation and destruction; concepts and techniques in wetland restoration and creation; and issues in wetland management, key research areas in wetland science and policy issues in the context of rapid urbanisation.

Co-ordinator: Prof T.V.Ramachandra

Seminar on Sustainable Urban Environment,

Tuesday,17th November, 2009, 9.00 AM to 6.00PM

Organised by : Maini Group, CiSTUP & Loughborough University. Co-hosted by: CiSTUP

One Day Conference Titled "Moblicity" jointly organized with praja.in Date: Nov.21st 2009

The event will bring various stakeholders including citizens to share and discuss issues related to Sustainable Transportation.

Co-ordinators: Dr Ashish Verma & Prof T.G.Sitharam

One week workshop on "Computer Aided Transportation Planning and Traffic Engineering"

Date: Dec.7th to 11th Dec. 2009

During the second half of the last century, urban population in India had grown enormously. Also, the number of cities with a population of one million and above has steadily increased from 5 in 1951 to 35 in 2001. This urbanization has brought in its wake its own problems, especially with regard to its impact on the infrastructure facilities. The urban transport system has come under heavy strain and this has adversely affected the quality of life of urban dwellers. Mass transport facilities in the cities are grossly inadequate for providing fast, comfortable, and convenient travel. This has resulted in heavy shift of commuter patronage from mass transportation to private and intermediate transport (leading to an imbalance in the modal spilt) and consequently, a huge increase in no. of intermediate and private vehicle ownership. The resultant effects are; increased traffic congestion and transport-borne pollution, heavy fuel consumption, poor level of service to the commuter etc. In such a situation there is an urgent need to apply scientific methods of transportation planning and traffic engineering duly aided by computers, to achieve both long term and short term solutions to the overall problems of traffic and transport in Indian cities. Considering this, a one-week workshop is proposed that will build capacity of the middle level technical officers, as well as other participants, who are involved in such exercise; to learn computer aided transportation planning and traffic engineering, and arrive at transport solutions which are effective and sustainable.

The course is open to middle level technical officers from Traffic Police, BDA, BBMP, BMTC etc.; and faculty of degree level institutions. Participants should be currently involved in works related to transportation planning and traffic engineering/operation in their organization and should preferably be B.E./B-Tech in Civil Engg./Transportation Engineering or post-graduate in Transportation Engineering or Transportation Planning. Candidates with any other relevant background will also be considered if they are currently involved in works related to transportation planning and traffic engineering/operation. A limited number of post-graduate student participants will also be allowed.

Co-ordinators: **Dr Ashish Verma**

Three Day workshop on "Recent Trends in Sustainable Transportation Planning"

Date: Dec.12th to 14th Dec. 2009

This workshop will build capacity of the senior level technical officers (especially from stakeholder organizations of CiSTUP) who are involved in such exercise, to understand recent trends of sustainable transportation planning and traffic engineering; and arrive at transport solutions which are effective and sustainable.

The course is open to senior level officers from Traffic Police, BDA, BBMP, BMTC, Namma Metro, KSRTC, NEKRTC, NWKRTC, R.T.O. etc. Participants should be currently involved in works related to transportation planning and traffic engineering/operation in their organization and should preferably be B.E./B-Tech in Civil Engg./Transportation Engineering or post-graduate in Transportation Engineering or Transportation Planning. Candidates with any other relevant background will also be considered if they are currently involved in works related to transportation planning and traffic engineering/operation. A limited number of engineering college teachers and post-graduate student participants will also be allowed.

Co-ordinators: Dr Ashish Verma

National Conference on Urban Water Management : Challenges and Options

December 13 - 15th 2009, Bangalore, INDIA

Organized by: Centre for Sustainable Development, Bangalore, Karnataka, INDIA.

Co-Hosted by: Cistup

1st Transportation Research Group Conference (TRGC), at CiSTUP, IISc Bangalore during December 2011.

Transportation Research Group Conference (TRGC) is a IISc-PanIIT initiative to start a peer-reviewed bi-annual umbrella conference and a journal in India which encompasses all the themes and areas within the whole domain of Transportation Engineering. The 1 st version of this conference will be held during Dec. 2011 at CiSTUP, IISc Bangalore. Background of TRGC: During the 1 st Indo-US Symposium on "Mass Transit and Travel Behaviour Research (MTTBR-08)" held at IIT Guwahati during 12 th - 15 th Feb. 2008, a meeting was held between the Transportation Engineering faculties of all IITs-IISc who attended the symposium, to discuss on collaborative activities. During the meeting, it was strongly felt that there is a need to have a peer-reviewed umbrella conference and journal in India which encompasses all the themes and areas within the whole domain of Transportation Engineering. It was also more-or-less agreed that none of the present sequel conferences and journals in India caters to this requirement. Therefore, it was decided to form a Transportation Research Group (TRG) India , which will be a registered society and under whose banner the TRGC will be organized bi-annually and the venue will rotate among IISc and seven older IITs. This conference is not meant to compete with any of the existing conferences, but to act as an exhaustive platform in India for exchange of knowledge and ideas, for all Transportation Engineering professions of India and elsewhere.

Seismic Microzonation of Urban centers: A tool for Disaster Mitigation and Urban Planning

By Prof. **T. G. Sitharam**
Chairman, CiSTUP

250 km from away from Delhi caused moderate damage to some of the buildings built on filled land or on soft alluvium. The Bhuj earthquake caused severe damage not only in the epicentral region, but even in Ahmedabad, about 200 km away, attributed to increased ground shaking on the soft alluvium. In the modern urban planning and development, microzonation of seismic hazard is an important aspect, for seismic design, estimation of liquefaction potential, land use planning as well as for addressing insurance concerns. Thus, microzonation of major cities and other regions likely to be affected by future near or distant earthquakes is now regarded as an inevitable aspect of earthquake studies. Prevention of disaster includes all measures taken before an earthquake event in order to reduce the earthquake risk. As the earthquake hazard can not be reduced or influenced, prevention/mitigation measures may include:

- Land use management taking into account local earthquake hazard considering local site effects,
- Reduction of the vulnerability of structures and infrastructural facilities, and,
- Reduction of the value at risk.

Seismic hazard inturn earthquake damage is commonly controlled by three interacting factors- source and path characteristics, local geological and geotechnical conditions and design of the structures. Seismic microzontaion is the process of assessment of the first two factors to provide a basis for estimating and mapping potential damage to buildings, which in other words is quantification of the risk. Obviously, all of this including preparation of microzonation maps would require analysis and presentation of a large amount of data – geologic, seismologic, engineering specifications etc. History of earthquakes, geometry and history of faults in the region, attenuation relationships, and ground amplification, liquefaction susceptibility are only few of the important inputs required. Presenting all of this information in the proper format, for the use of planners, developers, insurance companies etc. is another important aspect of microzonation. Considering the social and economic implications of this exercise, it is important that each of the parameters is carefully represented and the maps are presented with clarity, in appropriate scales and user friendly formats. It is essential to conduct a regional seismic hazard study based on detailed regional geological investigations preferably with an accuracy of 1:25,000 map scale coupled with seismological studies. It is preferable that these earthquake hazard maps should be defined with respect to spectral accelerations for competent site conditions. It is important to consider not only the acceleration amplitudes but also the frequency content of the motion, which has an influence on the structural response. The other output from the earthquake hazard study should be acceleration time history records based on the probabilistic method for the earthquake hazard assessment. These time history records can be used for site response analysis. Disaster management policy of urban areas / municipalities shall include the regulations related to the development based on microzonation maps and land use issues of disaster mitigation, and emergencies and rehabilitation. With these policies the job of the planning departments of the urban centers / municipalities is to develop and apply seismic microzonation in their urban master planning and to the control of land development and building.

GeoInformatics for Sustainable Urban Planning Urban Ecology, Environment and Policy Research CiSTUP

By **Dr. T.V. Ramachandra** Convenor

India 's urban population is currently growing at about 2.3 percent per annum. An increased urban population and growth in urban areas is inadvertent with an unpremeditated population growth and migration. Urban growth, as such is a continuously evolving natural process due to population growth rates (birth and death). The number of urban agglomerations and towns in India has increased from 3697 in 1991 to 4369 in 2001. It is projected that the country's urban population would increase from 28.3 percent in 2003 to about 41.4 percent by 2030. In India , an area is designated as urban if the population is more than 5000 with a population density of more than 400 persons per sq. km and at least 75 percent of the population is involved in non-agricultural occupations. By 2001, there were 35 urban agglomerations / cities having a population of more than one million from 25 urban agglomerations in 1991. Of the 4000 plus urban agglomerations, about 38 percent reside in just 35 urban areas, thus indicating the magnitude of urbanisation prevailing in the country. This clearly indicates the magnitude of concentrated growth and urban primacy, which also has lead to urban sprawl. Urbanisation is a form of metropolitan growth contributed by rural-urban migration leading to higher proportional population growth of urban-rural and subsequent infrastructure initiatives, resulting in the growth of villages into towns, towns into cities and cities into metros. Urbanisation, as such, is not seen as a threat to environment and development, but it is the unplanned urbanisation and subsequent urban growth, or the sprawl effecting land-use with loss of prime agricultural lands and also ecologically sensitive regions. Indian economy is mainly agrarian (contribution to GDP is about 28 percent) with about 70 percent of the population reside in rural areas. It is thus imperative to carry out better regional planning through proper understanding of the implications associated with the problem of unplanned urban growth or the sprawl.

Urban sprawl is the outgrowth of urban areas caused by uncontrolled and uncoordinated urban growth. Sprawl is also considered to be an unplanned outgrowth of urban areas along the periphery of cities, along highways, and along the road connecting a city. Towns and cities are expanding in certain pockets with a change in land use along highways and in immediate vicinity of the cities due to ad hoc approaches in planning and decision-making. This dispersed development outside of compact urban and rural centers along highways and in rural countryside impacts local ecology and environment such as loss of agricultural land, open space, and ecologically sensitive

habitats. Also, these regions lack basic amenities due to lack of prior information and predictions of such growth during planning, policy and decision-making. However, in such a phenomenon of development to have basic infrastructure, regional planning requires an understanding of the sprawl dynamics. Nevertheless, in majority of cases there are inadequacies to ascertain the nature of uncontrolled growth. Due to lack of prior planning, coordinated decision-making and visualization of the outgrowths, these regions are devoid of basic amenities like water, electricity, sanitation, etc. and also results in inefficient and drastic change in land use affecting the ecosystem and thus threatening sustainability of the region.

Urban growth patterns resulting in sprawl are 'unsustainable', with the current consumption surging ahead of regions' carrying capacity and leading to depletion of natural resources for future generations. The need for managing urban sprawl also arises out of the global concerns of achieving sustainable urbanisation. Sustainable urbanisation is a dynamic, multi-dimensional process covering environmental as well as social, economic and political-institutional sustainability. Understanding the sprawl processes, its dynamics and modelling provide an insight of future growth trends, which is useful for effective resource utilization and infrastructure planning. The efficiency of urban settlements largely depends on how well they are planned; how well they are developed economically and how efficiently they are managed. This necessitates the understanding of patterns of growth from regional planning point of view to provide basic amenities in the region. Geoinformatics with spatio-temporal data and decision support systems aid in assessing the type, extent and nature of sprawl taking place in a region and the drivers responsible for the growth. This would help developers and town planners to project growth patterns, sustainably manage natural resources and facilitate various infrastructure facilities.

A Multi-Objective, Generalized Cost (GC) Based Passenger Information System (PIS) Design for Multi-Modal Transit System

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In a developing country like India , any city's economic and social health depends to a large extent on the performance of its urban public transport system. Public transport modes are considered as space efficient modes of transport because they carry more number of passengers per unit of road space occupied. However, the success of any public transport system in a city depends to a larger extent, on an efficient passenger information system for the users, as they are usually not well aware of the spatial and temporal variations in transit services. A good Passenger Information System (PIS) bridges this information gap by providing the pre-trip and/or en-route information to the travelers about their travel options. This influences their travel behavior with respect to; mode choice, time of travel, cost of travel, route choice or trip making.

A few existing models of PIS involve either the direct cost incurred during travel or the in-vehicle travel time as a parameter to find the optimum path for making a trip. An assumption that users are simply aiming to minimize their money costs, when in fact they attach greater significance to time saving or vice versa, may lead to errors in trip planning. For this reason, most of the urban transport models use some form of generalized cost (as a impedance parameter) rather than simple "out of pocket" money outlays as the major variable determining travel behavior, trip distribution, trip frequency and mode choice. Hence, it is felt that this concept of GC can be potentially adopted in PIS also.

Generally, it is a natural tendency of a public transport user to attach differential importance to various legs of a trip (walking, waiting, travel time etc.). For example, a person might perceive waiting time at terminals as uncomfortable and would attach higher preference to a route on which the waiting time is less or minimum. Similarly, an elderly or disabled person may not like to walk more to reach a bus stop or train station and thus will prefer a route that has less walking time, while planning a trip. Some users may prefer direct routes as compared to routes involving transfers, even when the direct route involves higher in-vehicle travel time. Thus, we feel that all the elements considered in trip planning should be included in finding optimum route at differential importance given by the user concerned in making the choices.

These considerations are especially important in developing countries like India , where various modes of public transport are generally not integrated properly, and the transfer time from one mode to another may be very large. Also, many Indian cities follow experience or thumb rules more than some scientific approaches, to decide routes and schedules of their public transport systems. This may lead to higher and uncomfortable walking and waiting time for the user. Besides all these, a major share of public transport users in India are captive riders, for whom the fare paid for making a trip is also an important criteria for choosing any transit route for trip making. All these considerations relevant for Indian conditions can be imitated in trip itinerary planning, by considering a Generalized Cost (GC) approach during shortest path analysis for finding the optimum route through a multi-modal transit network. However, it is to be noted that by adopting the GC approach for transit trip planning, the basic idea is to mimic the differential importance given by the public transport user to various legs of a trip (walking, waiting, travel time etc.) while selecting the best route for traveling between a Origin-Destination (O-D) pair. This is different from the general notion of GC where the purpose is to convert time values into cost terms to obtain overall impedance to travel between an O-D pair, by multiplying each time leg by value of time in monetary terms. Instead in the present case, the weights (to be given as input by the users) are mere representation of the importance users wish to attach to each leg and not to assign their perceived monetary value to each time leg. This framework of PIS can be easily implemented using GIS.

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Publlic Participation in CiSTUP Activities

CiSTUP will make an attempt in assuring public participation in training programmes in the areas eg: Infrastructure, Transportation and Urban Planning and also involve in decision making process. When policy documents from the Government are discussed, it will make an attempt to get public involved in such a process.