

From the Director's Desk



Ensuring mobility by reducing its negative impact on the economy, environment, and quality of life is one of the central challenges of our times. Traffic congestion is a condition on road networks that occurs as use increases, and is characterized by slower speeds, longer trip times, and increased vehicular queuing. The most common example is the physical use of roads by vehicles. It is compounded by people being brought into city on large by roads or motorways. These roads then link up with smaller, older, narrower roads in the city centre. This causes a bottleneck and congestion. This issue of 'Mobility' focuses on suggesting possible solutions for easing the traffic congestion around Thiruvananthapuram Technopark on NH-66.

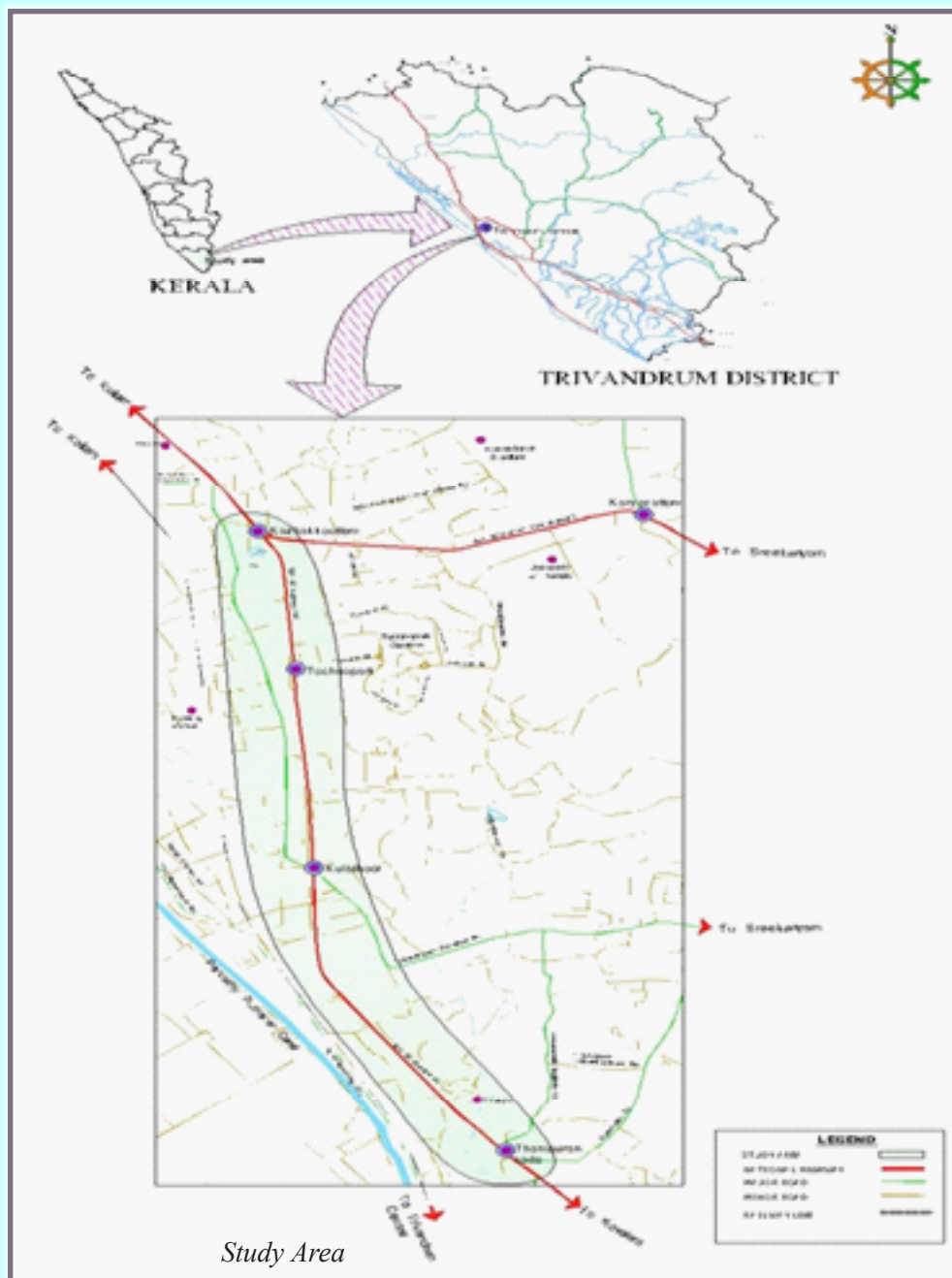
TRAFFIC SOLUTION FOR TECHNOPARK - NH-ACCESS

Thiruvananthapuram Technopark, the largest information technology park in India, contributes considerable amount of traffic on NH 66 Bypass road. The traffic is expected to grow in the upcoming years with the commissioning of all the three phases of Technopark. The generated traffic from Technopark during peak hours and through traffic on NH 66 Bypass will cause severe traffic congestion on the road stretch from Kazhakkootam and Thampuram Nada. Electronics Technology Park, Kerala entrusted NATPAC to suggest possible solutions for easing the traffic considering the formation of entries to the NH 66 Bypass.

Technopark is located near Kazhakkootam on National Highway 66 Bypass (NH 66), which connects Kazhakkootam on NH - 66 and Mukkola near Kovalam. Once the Technopark becomes fully functional, it is expected to have 10 entries/exits on NH 66 Bypass. It was observed that, during morning and evening peak hours, NH Bypass road near main entry/exit of Technopark is experiencing severe traffic congestion. The traffic from the expected entry/exit points will further deteriorate the traffic scenario in this stretch.

On the NH 66 bypass road section, maximum daily traffic was to the tune of 47,037 Passenger Car Unit (PCU) between Technopark and Thrippadapuram intersection, followed by 46,369 PCU between Thampuram Nada intersection and Akkulam. On NH-66 road stretch, a maximum traffic of over 60,000 PCU was observed at Kazhakkootam to Pallippuram stretch and more than 31,000 PCU was observed at Kazhakkootam - Kariavattom stretch. The maximum traffic during peak hour on the study stretch was observed at Technopark phase I campus intersection followed by Kazhakkootam and Kulathoor intersections. All the road sections in the study stretch on NH Bypass road are operating with nearly three times more than its capacity during the base year itself.

30% of the trip makers of the Technopark Campus use two wheelers while 26% each use car and bus as their mode of travel. Among the proposed entry/exit points, estimated traffic volume during peak hour observed at Technopark main gate entrance was in the order of about 2,400 PCUs. TCS entry in SEZ zone (near Technopark main entry) caters traffic volume of 4,000 PCUs during peak hour. Proposed entry/exit point to Infosys campus attracts traffic volume around 5,000 PCUs during peak hour. Anticipated peak hour traffic from UST Global campus (Exit 2) and Phase III SEZ (Exit 3) is estimated to be around 3,600 and 3,400 PCUs respectively. The generated traffic from all phases of Technopark will directly flow to NH bypass through

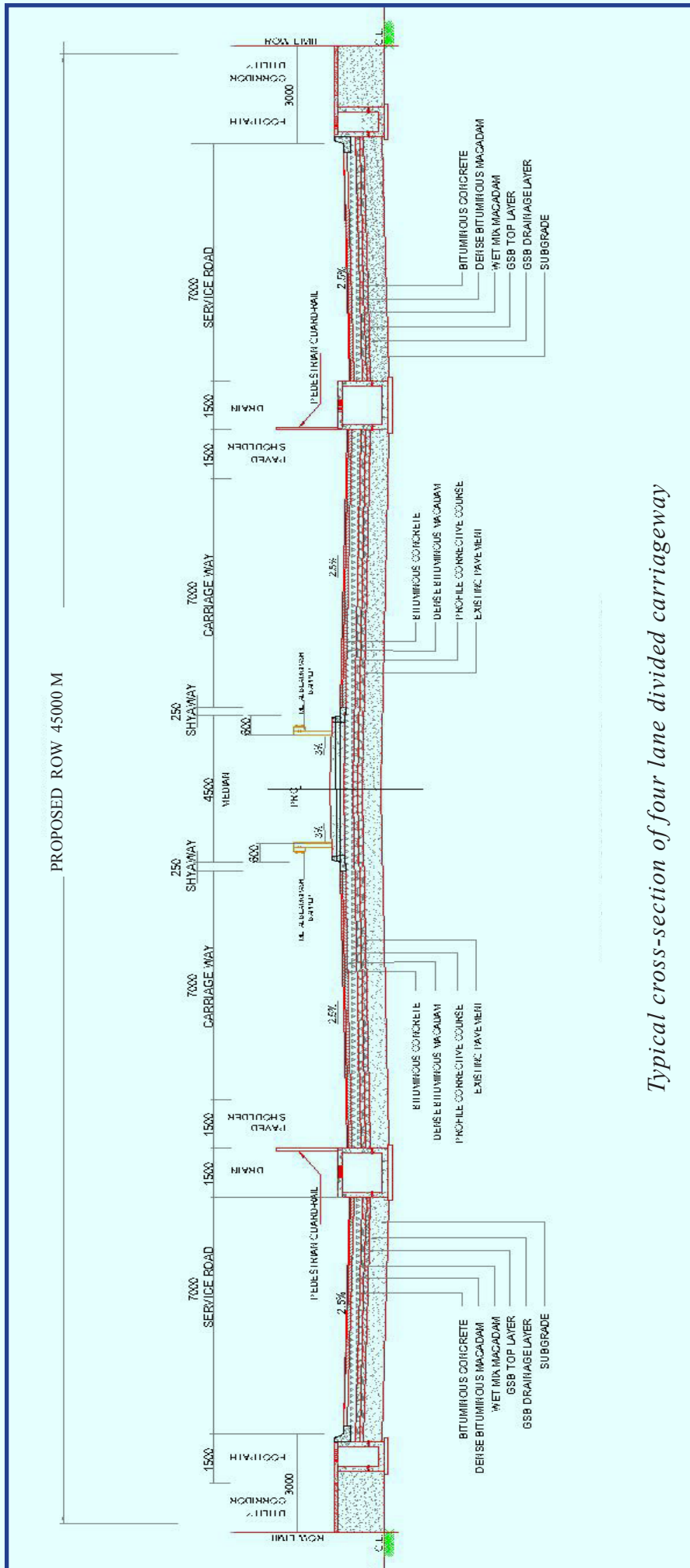


the proposed ten entry /exit points.

Future levels of traffic on road stretches in the study area were estimated for different horizon years. It was seen that the existing road network would not be able to handle the traffic in the horizon years without upgradation of the current transport infrastructure facilities. More number of entry points creates more junctions in the highway, which affects the safety and speed of traffic flow in the main stream. Hence limiting the entry points by developing internal roads, which connects all the three phases of Technopark and providing two or three well designed access at proper locations to the highway is the best solution while considering the heavy traffic flow on the NH Bypass.

Among the six intersections surveyed, maximum number of vehicles are using the Kazhakoottam intersection. The road links, intersecting

at Kazhakoottam junction (Kazhakoottam-Technopark link, Kazhakoottam-Market road, Kazhakoottam-Kollam road and Kazhakoottam-Ulloor road) are carrying traffic loads more than its capacity and exert maximum conflicts. Therefore, by considering the IRC:SP:84-2009 recommendations, provision of a flyover at Kazhakoottam will be more beneficial as long-term traffic management strategy. Considering the estimated traffic from Technopark phase I campus, a fly over is required at the existing main gate point also. Accordingly, a six-lane elevated road from Kazhakoottam to Technopark of length 2 km with at-grade service road on either side has been proposed. The approach of the elevated road starts from 320m ahead of Menamkulam road junction (towards Kollam direction) on NH 66. The elevated road traverses ahead for 1.36km length covering Menamkulam road junction, Kazhakoottam junction and Technopark phase I junction. Two exit ramps are proposed from the elevated road to the Technopark Phase I campus and TCS campus. The elevated section ramps descent and end at 320m after the Technopark Junction. Two lane service roads are proposed for the entire stretch while a three lane service road is proposed under the first flyover. At-grade median openings are provided at entry and exit points of proposed bus terminals, entry/exit of phase I campus and entry/exit of TCS campus. An opening from service road to main carriageway is provided at two locations.



While considering the future traffic from the Technopark phase III campus to Kulathoor junction on NH bypass, a flyover is required to cater the through traffic. Correspondingly a six-lane flyover at Kulathoor road intersection with a total length of 700m (including approach), with two-lane service road at-grade on either sides has been proposed. The proposed flyover at Kulathoor starts 320m ahead of Kulathoor junction on NH 66 Bypass. Traffic from commercial zone and SEZ of Phase III development should use the service road. Four - lane divided carriageway with two-lane service road on either side is proposed from the end of the second flyover to Thampuran Nada Junction. Traffic from UST Global's campus and Infosys campus should use the service road and should merge with the NH at Thampuran Nada junction. At-grade junction improvements are required at Menamkulam road junction, Kazhakoottam Junction, Technopark Main entry junction, Kulathoor junction and Thampuran Nada junction. It is proposed that service roads on this road stretch may be regulated as one-way.

Appropriate transportation improvement measures are suggested to reduce the congestion and delay experienced between the Kazhakoottam to Thampuran Nada road stretch. The proposals can very well handle the traffic and cause minimum disturbance to the through traffic on the NH. Traffic from the ten exits from the Technopark Campus is very well accommodated to merge with the NH traffic with least disturbance. For long run benefits, i.e. in order to

accommodate sufficient traffic, it is proposed to strengthen and widen the roads passing near the boundary of Technopark mainly

Arasamoodu- Kuzhivila road and Kariavattom-Thrippadapuram road.

2. SCIENTISTS' INTERFACE MEET – 2014

Kerala State Council for Science, Technology & Environment (KSCSTE) organized Second Scientists' Interface Meeting at Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram on 15th – 17th October 2014.

A Memorandum of Understanding (MoU) was signed between National Transportation Planning and Research Centre (NATPAC) and Centre of Excellence in Transportation Engineering - NIT-Trichy, Centre for Transportation Research - NIT-Calicut and Transportation Engineering Research Centre - College of Engineering Trivandrum on 16th October 2014. All the aforesaid institutions agreed to jointly collaborate on activities of mutual interest for furthering the objectives of excellence in basic and applied research in the field of transportation.

The MoU is aimed at:

- Effectively share the facilities and expertise for improving the capabilities for advanced education and research by facilitating academic and research interactions.
- Initiate joint research in the frontier areas of Transportation Engineering and to establish advanced research facilities in the areas of design, construction and maintenance of various transportation related infrastructure.
- Jointly develop learning resources, teaching aids, items of experimental set up etc., for educational research and development purposes.
- Share non-classified data for exclusive use in research and academic activities.



Signing of Memorandum of Understanding (MoU) between National Transportation Planning and Research Centre (NATPAC) and NIT-Calicut

Signing of Memorandum of Understanding (MoU) between National Transportation Planning and Research Centre (NATPAC) and Transportation Engineering Research Centre - College of Engineering Trivandrum

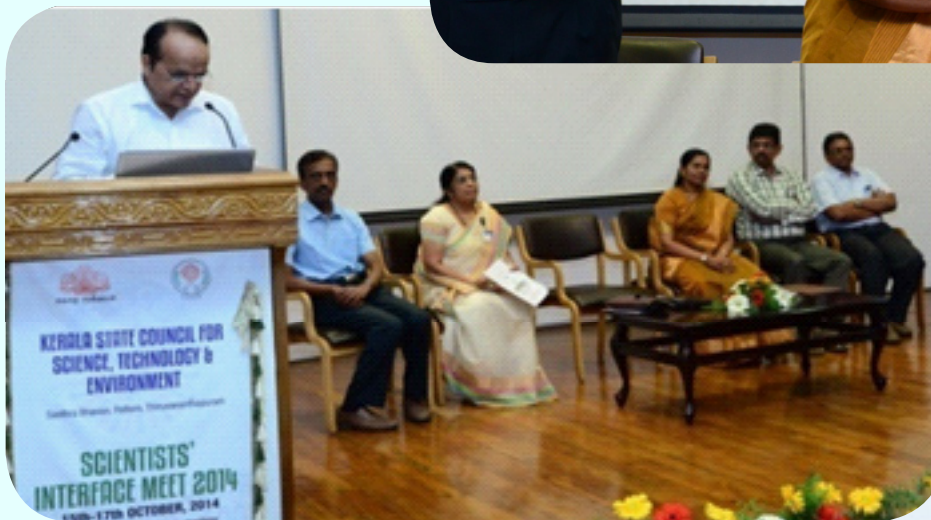


- Facilitate joint/collaborative research projects and guidance for Ph.D /M.Tech / B.Tech students and publication of research papers.
- Jointly conduct or mutually inform about conferences / seminars /symposiums / training programmes in the fields of Transportation Engineering and allied areas.

Dr.V.N.Rajasekharan Pillai, Executive Vice President, KSCSTE felicitated the function. Dr.Samson Mathew, Professor, National Institute of Technology, Trichi; Dr.M.V.L.R Anjaneyulu, Professor, National Institute of Technology,

Calicut; Dr.M. Satyakumar, Professor, College of Engineering, Thiruvananthapuram and Dr. S.Sheela, Principal, College of Engineering, Thiruvananthapuram shared the platform. Scientists of NATPAC presented their academic and professional profile and research areas of their expertise. They also briefed their future areas of research in different disciplines. The interface offered a rare opportunity for scientists to meet and interact with others working in related fields and to develop new ideas for future research.

Signing of Memorandum of Understanding (MoU) between National Transportation Planning and Research Centre (NATPAC) and Centre of Excellence in Transportation Engineering - NIT-Trichy



Felicitation address by Dr.V.N.Rajasekharan Pillai, Executive Vice President, KSCSTE

NATPAC Scientists with Executive Vice President, KSCSTE and external experts



3. TRAINING PROGRAMMES CONDUCTED

a *In-house Training*

Training on 'Traffic Engineering Design and Road Geometrics' was given to young scientists by Shri. T. Elangovan, Scientist – G on 5th and 11th December 2014.



Shri.T.Elangovan interacting with young scientists

b *Meetings*

- i) NATPAC organised Stakeholders meeting as part of preparing a Comprehensive Mobility Plan (CMP) for Thiruvananthapuram City on 7th November 2014 at Sasthra Bhavan, Pattom. Dr.Shashi Tharoor,



Smt.B.G.Sreedevi, Director, NATPAC; Shri.P.K.Venugopal, Chairman, TRIDA; Dr.Shashi Tharoor, MP; Shri.Sheikh Pareeth IAS and Prof.V.N.Rajasekharan Pillai, Executive Vice President, KSCSTE at the Stakeholders meeting for CMP

MP gave special address on the various schemes and initiatives that need to be undertaken to have an integrated and strategic vision as far as transportation in the city is concerned. Prof.V.N.Rajasekharan Pillai, Executive Vice President, KSCSTE also addressed the gathering.

Shri.N.Seshadri, Vice President, Urban Mass Transport Company Ltd., Bengaluru and Shri. S.Shaheem, Scientist – E1, NATPAC briefed on the significance of CMP. Senior officials from Government and Non-Government organisations participated. Urban Mass Transit Company (UMTC) Ltd. and NATPAC made presentations highlighting the need for CMP and its status. Suggestions like shared parking utilising educational institutions and other vacant public places and introduction of bus services connecting airport to various places in the city came up. The main

objective highlighted in the meeting was to have a sustainable approach of land conservation and road transportation development.

- ii) As part of preparing a Comprehensive Mobility Plan (CMP) for Kozhikode City NATPAC organised Stakeholders meeting on 11th November 2014 at Malabar Palace Hotel, Kozhikode. About 40 officials representing various Govt. Departments/Agencies participated in the meeting and came out with suggestions for improving the transport scenario in Kozhikode City. The meeting was chaired by Shri.T.Elangovan, Scientist-G, NATPAC. Special addresses were made by Shri. V.K Akber, Superintendent of Police (Traffic); Shri.A.M.Jayan, Secretary, Kozhikode Development Authority and Shri. Anand Elamon, Project Manager, Kerala Monorail Corporation Ltd, Kozhikode. Shri.N.Seshadri, Vice President, Urban Mass Transport Company Ltd., Bengaluru and Shri. S. Shaheem, Scientist – E1, NATPAC briefed on the significance of CMP.

Various development proposals to be included in the Comprehensive Mobility Plan were discussed during the meeting. Shifting the vegetable market from Palayam to the Vengeri Wholesale Vegetable Market at Thadampattuthazham, construction of a multi-storeyed parking facility in the Mananchira area, construction of flyovers at the Thondayad and Malaparamba junctions and setting up of bus terminals at Meenchantha and Medical College were some of them.



Meeting in progress

4. INVITED TALKS/MEDIA INTERACTIONS

B.G.Sreedevi, Director

Media Interactions

1. 'Road Development in Kerala'. Media Plus Channel on 6th October 2014.
2. 'Road Infrastructure Development'. Discussion in Asianet Plus Channel on 20th October 2014.

B.G.Sreedevi, Director

Invited Talk

1. Discussion on 'Urban Governance'. Organised by Institute of Sustainable Development and Governance at Press Club, Thiruvananthapuram, 13th October 2014.
2. Inaugural address at the awareness class on 'How to reduce electricity bill'. Organised by P.T.P.Avenue Residence Association, 23rd November 2014.

T.Elangovan, Scientist-G**Invited Talk**

1. ‘*Sustainable Transport Development*’. Talk delivered at short term course on ‘Urban Design and Mobility’, organised by Architectural Department, College of Engineering, Trivandrum, 12th November 2014.
2. ‘*Road Safety Action Plan for Kerala State*’. Talk delivered before the Road Safety Committee constituted by the Supreme Court of India as member of the State delegation, 15th December 2014.

Shaheem.S, Scientist-E1**Invited Talk**

1. ‘*Introduction to Comprehensive Mobility Plan*’. Talk delivered at short term course on ‘Transportation System Management and Operations’, organised by Mar Athanasius College of Engineering, Kothamangalam, 17th November 2014.
2. ‘*Sustainable Urban Transport for Thrissur City*’. Talk delivered at ‘Thrissur Next-Urban Design’, organised by IAA and College of Engineering, Thrissur, 22nd November 2014.

5. PARTICIPATION IN WORKSHOPS, SEMINARS/CONFERENCES AND OTHER TRAINING PROGRAMMES

Name of Programme	Organised by	Date	Venue	Participants
<i>Seminars/Conferences</i>				
Stake Holders Meet on “Consultation of Urban Governance”	Institute of Sustainable Development and Governance (ISDG)	13.10.2014	Press Club, Thiruvananthapuram	P.Kalaiarasan
Demonstration Project on “Mobile desalination plant in backwaters of Kerala”		14.10.2014	Thiruvananthapuram	T.Elangovan
Panel discussion on 'Climate Change Innovation Programme'	Department of Environment and Climate Change	24.11.2014	Taj Vivanta, Trivandrum	B.G.Sreedevi P.Kalaiarasan
‘TRIMA 2014’	Trivandrum Management Association	25.11.2014 – 26.11.2014		B.G.Sreedevi George Koshy K.Mohanakumar
Urban Mobility India Conference 2014	Institute of Urban Transport – India	25.11.2014 – 28.11.2014	New Delhi	T.Elangovan
International Conference on “Road Safety Scenario and Way forward”	Indian Roads Congress, World Bank and PIARC, France	29.11.2014 – 30.11.2014	New Delhi	T.Elangovan
<i>Workshops</i>				
‘Two Day Workshop on KOHA’, the Open Source Library Management Software	KLA Centre for Professional Development	13.12.2014 – 14.12.2014	KLA Head Quarters, Thiruvananthapuram	Veena K S

6. GUIDANCE TO STUDENTS’ PROJECT WORK AND THESIS

The list of guidance provided by the Scientific Divisions to students from various National Institutes and reputed Professional Colleges during this period is given below:

Name of the Institution	Course	No.of Students	Topic
Traffic and Transportation Division			
College of Engineering, Thiruvananthapuram	M.Tech (Trpt.)	1	Walkability of pedestrians and modeling pedestrian flow speed
National Institute of Technology, Kurukshethra	M.Tech (Transportn. Engineering)	1	Quick Response Travel Demand Estimation Techniques for small and medium size towns
National Institute of Technology, Kurukshethra	M.Tech (Transport Engineering)	1	Impact of weather on traffic flow and travel behaviour of commuters in selected corridors in Kerala
St.Joseph's College of Engineering & Technology, Pala	B.Tech (Civil)	4	Preparation of TOD for Kochi Metro alignment
Carmel Higher Secondary School, Trivandrum	SSLC	6 students – Project work for National level science popularization Project	Vehicular emission and climatic change – A case study of Trivandrum City
School of Architecture and Planning, Anna University, Chennai	MTP	1	Planning for Non Motorised Transport in Cities
Cochin University of Science and Technology	B.Tech (Civil)	1	Impact of higher FAR ratio in commercial areas
Cochin University of Science and Technology	B.Tech (Civil)	1	Parking demand assessment for LRT Stations in Thiruvananthapuram
Water Transportation Division			
Sree Budha College of Engineering for Women, Pathanamthitta	B.Tech (Civil)	7	Impacts of vehicular pollution on human beings – A case study
St.Joseph's College of Engineering & Technology, Pala	B.Tech (Civil)	4	Estimation of Carbon Credit for Inland Water Transportation of NW3
CEPT, Ahmedabad	PG in Urban & Regional Planning	1	Inland Waterways and its sustainable development
Traffic Safety and Extension Services Division			
College of Engineering , Kidangoor, Kottayam	B.Tech (Civil)	6	Accident Analysis in Kottayam District using GIS
Highway Engineering Division			
Pankaja Kasthuri College of Engineering	B.Tech (Civil)	5	Capacity Analysis of SH – 1
Marian Engineering College, Thiruvananthapuram	B.Tech (Civil)	6	Performance of glass fibre reinforced SMA
SCMS School of Engineering and Technology, Kochi	B.Tech (Civil)	4	Mix design for coir fibre reinforced bituminous concrete
Rajiv Gandhi Institute of Technology (RIT), Kottayam	M.Tech (Transportn. Engineering)	6	Pavement materials and testing on mixes

7. PRESENTATION OF PAPERS IN SEMINARS/WORKSHOPS

B.G.Sreedevi, “*Development of Capital Region in terms of Infrastructure*”. Seminar organised by The Thiruvananthapuram Chamber of Commerce &

Industry at the Chamber Hall, Thiruvananthapuram, 4th November 2014.

B.G.Sreedevi, “*Sustainable Urban Transport*”.

Department of Architecture, College of Engineering, Thiruvananthapuram, 19th November 2014.

B.G.Sreedevi, P.Kalaiarasan, “*Study on Ambient Air Quality and its contribution to climate change in Kerala*”. Department of Environment and Climate Change, Thiruvananthapuram, 12th December 2014.

Uthara K, T. Elangovan, Sachdeva S.N, “*Impact of weather on traffic and travel behaviour of commuters*”. International Conference on ‘Recent Trends and Challenges in Civil Engineering’ (RTCCE – 2014), organised by Motilal Nehru National Institute of Technology, Allahabad, 12th– 14th December 2014.

Sara Abraham, T.Elangovan, Sachdeva S N, “*Development of Quick Response Travel Demand Estimation Technique for small towns*”. International Conference on ‘Recent Trends and Challenges in Civil Engineering’

(RTCCE – 2014), organised by Motilal Nehru National Institute of Technology (MNNIT), Allahabad, 12th – 14th December 2014.

Sanjay Kumar V.S, “*Activity Based Travel Demand Modelling of Thiruvananthapuram Urban Area*”. “*Socio-economic valuation of Traffic Delay*”. “*Public Transport Accessibility Analysis for Thiruvananthapuram Urban Area*”. 11th International Conference on Transportation Planning and Implementation Methodologies for Developing Countries (TPMDC – 2014), organized by IIT Bombay, 10th – 12th December 2014.

PAPERS PUBLISHED IN REFERRED JOURNALS

Ebin Sam. “*Willingness to Shift from Car to Bicycle – A case study of Calicut City*”, International Journal of Engineering Research and Technology, Volume 3, Issue 11, November 2014.

8. OTHER NEWS

1. *Mind Creating Reality – Experimental Evidences*. Talk delivered by Prof.V.P.N. Namboori as part of the monthly lecture series jointly organised by NATPAC and Swadeshi Science Movement, Thiruvananthapuram at Sasthra Bhavan, Pattom on 9th October 2014.
2. *Raman Spectroscopy for Medical Diagnosis*. Talk delivered by Prof.V.Unnikrishnan Nair, visiting Professor, IISER, Thiruvananthapuram as part of the monthly lecture series jointly organised by NATPAC and Swadeshi Science Movement, Thiruvananthapuram at Sasthra Bhavan, Pattom on 13th November 2014.
3. *Stress Management*. Talk delivered by Dr.G.Ravikumar, Scientist – F, NATPAC at Sasthra Bhavan, Pattom on 13th November 2014.



NATPAC Staff taking Human Rights Oath

4. Human Rights Oath taking ceremony was conducted in NATPAC at 11am on 10th December 2014, the International Human Rights day. B G Sreedevi, Director delivered the oath to the staff of NATPAC.
5. Shri. Mahesh Rajoria, General Manager and Shri. Hena Kausar, Asst. General Manager of Maruti Suzuki, India Ltd, visited NATPAC on 17th December 2014 to discuss about the road safety scenario of the State and the road safety programs and activities of NATPAC. M/s Maruti envisages developing model cities with safe roads in the country incorporating comprehensive road safety programmes.



Representatives from M/s Maruti interacting with NATPAC Officials

9. STAFF RETIREMENTS

- Shri. P .C. Sivadas, Deputy Registrar (Administration) retired from service on 30th October 2014.



10. NOMINATIONS TO TECHNICAL COMMITTEES/ADVISORY BODIES

P Kalaiarasan, Scientist-C

Nominated as Member for Technical cum Advisory Committee of Kerala Forest Department for procuring Satellite Imageries and GIS software.

11. DO YOU KNOW

Width of Carriageway

Width of Carriageway in metres			
Single lane	Two lanes without raised kerbs	Two lanes with raised kerbs	Multi-lane pavements, width per lane
3.75*	7	7.5	3.5

Source: IRC:73:1980 (Geometric Design Standards for Rural (Non-Urban) Highways)

- ★ On village roads, the width may be restricted to 3m normally. Widths greater than 3m, may however be adopted judiciously, depending on the type and intensity of traffic, cost and related factors.
- ★ Except on important trunk routes, an intermediate carriageway width of 5.5m may also be adopted instead of regular two lanes if the same is considered advantageous.
Where the carriageway width changes from single to two lanes or two lanes to four lanes, the transition should be effected through a taper of 1 in 15 to 1 in 20.

Shoulder width: Shoulder width will be one half the difference between the road way width and the carriageway width. Shoulder width in general be 2.5m.

Median width: Desirable median width for rural highways is 5m while the absolute minimum is 1.2m.

Edited by

**D.Robinson
Scientist-F
NATPAC**



Published by

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