KSCSTE - NATIONAL TRANSPORTATION PLANNING AND RESEARCH CENTRE

Mobility NEWS LETTER

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Editorial

Congestion pricing is a method used to regulate traffic by charging a fee to road users during rush hours. The user fee may vary by the time of day and day of the week, being highest during periods of peak demand and lower at less-popular hours. Congestion pricing has reduced congestion in urban areas, but has also sparked criticism and public discontent. The aim of congestion charging is to reduce congestion which in turn reduces journey time and pollution. The revenue from congestion charging can be spent on public transport and promoting alternatives to private vehicle usage, making city centres more attractive for pedestrians and cyclists, which will help increase the overall quality of life. Congestion charging will make drivers pay the full social cost of private vehicle usage which incurs significant external costs on the rest of society; including congestion, pollution and accident cost.

One of the main rationale for supporting congestion charges is reducing emissions and creating a more sustainable transport system. Besides climate change and global warming, which are problems on a global scale, emission of toxic gases leads to breathing problems premature deaths etc. Improvement in air quality leads to lower health care expenditures. This issue of 'Mobility' focuses on an estimated optimum congestion charge for private vehicle users on the congested corridor of Thiruvananthapuram city.

CONGESTION CHARGING

Congestion pricing or road pricing is a system that directly charges the motorists for use of a road or a network of roads. The level of congestion-pricing depends upon the extent of the area under consideration and time. As the traffic increases, each additional vehicle imposes delay on others, resulting in economically excessive traffic volumes. Vehicle users bear as well as impose congestion costs. Congestion costs will be different for each road and even for a single road. It could be constantly changing depending on the demand for use of the road at a particular time. NATPAC estimated an optimum congestion charge for private vehicle users on the congested corridor of Thiruvananthapuram city. Higher share of personalized transport and para-transit modes in traffic stream were the primary causes of traffic congestion in the city. Booming economy, aspirations to own a car, mismatched public transport with respect to demand or comfort or both and the government's encouraging policies such as open car market, easy loan schemes, advantage of door to door connectivity etc. are a few reasons for the rapid rate of increase in private vehicles in the city.

It is to be noted that the capacity augmentation of road network in Kerala has not been keeping pace with the vehicular growth in the state. This has led to a gap in the supply side when compared to the demand. This is true for parking spaces also. Some of the endeavors of Government of Kerala like the Kerala State Transport Project (KSTP), City Road Improvement Projects (CRIP),

VISION 2020 etc. have strived to reduce this imbalance. The ribbon type development pattern seen in the state has further constrained the possibilities of acquisition of land for road widening.

Traffic Congestion - Factors and Management

There are various factors which give rise to congestion. Some of the main factors are volume of traffic exceeding the capacity of carriageway and various incidents like traffic crashes, processions and jathas, unplanned intersections, poor maintenance of roads etc.

The traditional way to reduce congestion is to increase the road capacity *i.e.* to say, increase the supply. However, these measures frequently fail to keep pace with transportation demand and are likely to generate additional vehicular traffic, which can worsen air quality and create further demand for road construction. While economic downturns may temporarily moderate the sharp upward trend of private automobile use, the twin challenges of congestion on surface transportation and air pollution will remain.

On the demand management side, some of the measures used to reduce congestion are trip reduction programs, flexi-time, improving public transport services, road pricing, optimal usage of available road space and other resources, improving non - motorised transport facilities etc.

Congestion charging

The basic idea behind congestion charging is to charge those who cause congestion to other road users. Congestion charging reduces travel time, improves air quality and decreases greenhouse gas emissions. Congestion charging aims to reduce peak hour traffic by shifting the demand to other transportation modes (carpools, vanpools and transit) or to off-peak periods. The level of congestion charging depends upon the distance/area under consideration and the time. Congestion charging is expected to reduce congestion on roads and increase the average speed on the road network. It will also result in reduced pollution and fuel wastage due to idling of vehicles at signalised intersections. The revenue generated can be beneficially used to improve public transport facilities, road improvement measures etc.

Strategies for Congestion Charging

Several strategies exist on how to implement congestion charging.

- Road pricing/Lane charging: Fee is collected from low-occupancy vehicles to utilize a lane/ carriageway on which high occupancy vehicles (HOV) are allowed to ply free of cost.
- Toll road: Fee is collected from all vehicles for accessing existing/new roads,bridges etc.
- Area charging: Fee levied for access or use of a designated road in a congested area.
- Pay as you drive: Fee levied based on factors like vehicle type, distance travelled, time of day etc.

Congestion Charging for Thiruvananthapuram City – A Pilot Project

Thiruvananthapuram city is well connected through air, railways, waterways and road transportation system. The city and its suburbs may be traversed using its road and the railway network. The International Airport is one of the gateways to the city. The road within the city is generally of ring and radial pattern. The National Highway NH-66 (Kanyakumari to Panvel), State Highways SH-1 also called Main Central Road (MC Road), and SH-2 (Thiruvananthapuram-Thenmala) provide accessibility to various other cities of Kerala, while the city road-network provides connectivity to the activity centres of the urban area.

The road corridors identified as congested in Thiruvananthapuram city is shown in **Figure 1**.

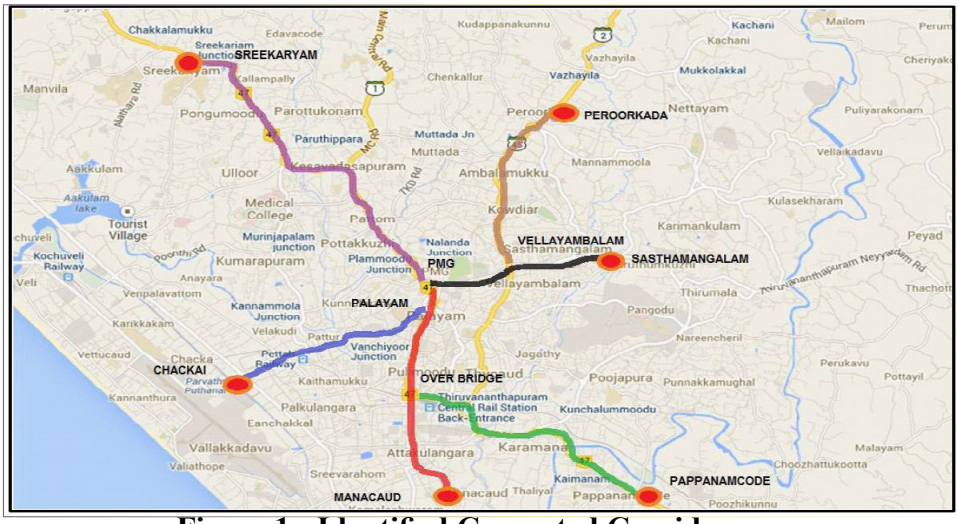

Figure 1: Identified Congested Corridors

As the central area houses numerous traffic generators, high incidents of congestion is witnessed and hence it is the need of the hour that road pricing should be implemented in the city. Supply of road infrastructure is not sufficient to meet demand levels to a given level of service. Eventhough there are various indices to identify congested areas, the method of Travel Time Index was used. Travel time was assessed on major road corridors in the city area, which were primafacia considered as the congested corridors as per the past traffic data available. Accordingly detailed investigation was carried out in these road corridors.

Data collected from the field were analysed to work out the Travel Time Index (TTI) for all the identified corridors. The following formula was used;

Travel Time Index (TTI) = Peak Hour Speed/Free Flow Speed (FFS)

Peak hour speed was worked out from the field data while free flow speed in km/hr was evaluated from the following formula,

$$FFS = 52.4202 + 1.7609*W - 0.1621*R - 0.124*F - 0.0123*C - 0.0025*RG$$

where, W = Pavement Width(m), R = Rise(m/km), F = Fall(m/km), C = Curvature(m), RG = Roughness(mm/km).

In order to demarcate the congested areas, TTI values were classified into five categories (**Table 1**), to indicate the severity of congestion on the identified corridor (**Table 2**)

Table 1: Congestion Levels

Value of TTI	Level of congestion
<2.5	No congestion
2.5 - 4.5	Less congested area
4.5 - 6.5	moderately congested area
6.5 - 8.5	Highly congested area
>8.5	Severely congested area

Table 2:Travel Time Index of major road corridors

Sl. No.	Corridor	TTI	Remarks
1	Manacaud–LMS	9.73	Severely congested
2	Over bridge-Pappanamcode	7.79	Highly congested
3	PMG–Sasthamangalam	5.13	Moderately congested
4	Palayam–Sreekaryam	4.76	Moderately congested
5	Palayam–Chackai	4.30	Less congested
6	Vellayambalam-Peroorkada	3.91	Less congested

It can be seen that MG road is the most congested corridor in Thiruvananthapuram city with a TTI of 9.73, followed by Overbridge - Pappanamcode road with TTI of 7.79 and PMG-Sasthamangalam with TTI of 5.13.

Considering the extent of congestion and the technical and practical feasibility of implementing congestion charging in Thiruvananthapuram city, methods like Area licensing scheme, Parking charging and Crowd charging are proposed.

Parking Charges

Direct charges for parking would have a number of effects out of which the most significant is that congestion levels would fall. This is of importance given the high costs of operating a congestion charging system compared to the lower cost of modifying parking charges. Parking charges then would rise above parking costs and congestion would fall because the demand for travel from those wishing to park in central areas would reduce. **Table 3** shows the proposed parking fee for various categories of vehicles in Thiruvananthapuram.

Table 3: Proposed parking fee for various categories of vehicles

Sl.No.	Vehicle Category	Suggested Parking fee (in Rs)		
		Less than 1 hour	1-2 hours	Above 2 hours
1	Goods auto/mini-truck	15	30	70
2	Car/ Jeep	10	20	50
3	Passenger autorickshaw	8	15	40
4	Two wheeler	6	10	30

Crowd Charging

Hindering freedom of smooth movement between places has to be charged appropriately in order to cut down unnecessary procession and gathering. Posing charges on the people participating in it will reduce the congestion caused by unwanted crowding. Charges should be levied from each person individually and procession pass should be provided. Individual charging and issue of passes can keep a control on violation of this policy.

Considering the frequency of occurrence of traffic jam on major road corridors within the central area of the city, due to the processions, jathas and dharnas, it is proposed to impose congestion charges for all such acts. The criteria for charging the crowd are based on congestion influencing factors. **Table 4** shows the proposed crowd charging rate in Thiruvananthapuram.

Table 4: Crowd charging rate based on congestion influencing factors

Purpose	Minimum Registration charge (Rs.)	Additional charge based on	
		Rate for every 100 people (Rs.)	Hourly fee (Rs.per hour)
Public cause	100	50	200
Cultural & Social events	200	100	400
Religious events	300	150	600
Political events & Others	500	250	1000

Pricing policies including parking charging and crowd charging are the important immediate steps to be taken in order to reduce congestion. All of these measures when implemented concurrently in an integrated multi-level approach can deliver significant improvements in urban traffic conditions in central areas of cities in Kerala State.

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

Name of Programme	Organised by	Date	Venue	Participants
Seminars/Conferences Seminars/Conferences				
'Service Tax'	CII and Gulathi Institute of Finance and Taxation	07.04.2016	Thiruvananthapuram	Shaju D Maya Devi
5th Annual India Commercial Vehicle Summit		07.04.2016 – 08.04.2016	Pune	Sanjai R J
Ease of Business	CII	15.04.2016	Thiruvananthapuram	George Koshy Arun Chandran Anish Kini T Ramakrishnan Sanjai R J
GST	CII and Gulathi Institute of Finance and Taxation	15.04.2016	Thiruvananthapuram	Muhammed Naserudeen C
National Conference on Geotechnical Engineering & Modeling	IGS Thiruvananthapuram Chapter of LBS Institute of Technology For Woman	17.06.2016 – 18.06.2016	LBS Institute of Technology for Women, Thiruvananthapuram	Salini U
Workshops				
How to become a Goody Goody Boss	Trivandrum Management Association (TMA)	17.06.2016	Mascot Hotel, Thiruvananthapuram	D Robinson V S Sanjay Kumar
Application of Geosynthetics in Infrastructure Projects	Central Board of Irrigation & Power (CBIP) and International Geosynthetics Society (India)	28.06.2016	Mascot Hotel, Thiruvananthapuram	Salini P N Wilson K C A Jegan Bharath-Kumar Chandra prathap R Salini U

3. GUIDANCE TO STUDENTS' PROJECT WORK AND THESIS

Name of the Institution	Course	Guide	No.of Students	Topic
National Institute of Technology, Karnataka, Surathkal	M.Tech (Transportn. Engineering)	Dr B G Sreedevi	1	Study on the effect of Geometric Parameters on Road Safety – A Case Study of newly upgraded Highways in Kerala
National Institute of Technology, Kurukshethra	M.Tech (Transportn. Engineering)	Dr B G Sreedevi	1	Utilization of Jarofix and other waste material for road construction
Cochin University of Science and Technology	M.Tech (Transportn. Engineering)	Dr B G Sreedevi	1	Study on the influence of subgrade soil on the strength of inservice flexible pavements
Dayanand Sagar College of Engineering, Bangalore	M.Tech (Transportn. Engineering)	Shaheem S	4	• Study on the upgradation of bus routes in Thiruvananthapuram • Traffic analysis report for NH 47 in Tamil Nadu
National Institute of Technology, Karnataka	M.Tech (Transportn. Engineering)	Shaheem S T Ramakrishnan	5	Traffic and Transportation studies for Karamana City

Name of the Institution	Course	Guide	No.of Students	Topic
National Institute of Technology, Trichy	M.Tech (Transportn. Engineering	Shaheem S Arun Chandran	5	Traffic and Transportation studies for Piravam and Mananthavady Towns
Rajiv Gandhi Institute of Technology (RIT), Kottayam	M.Tech (Transportn. Engineering)	V S Sanjay Kumar	1	Accessibility based residential location modelling
Rajiv Gandhi Institute of Technology (RIT), Kottayam	M.Tech (Transportn. Engineering)	V S Sanjay Kumar	1	Modeling the impact of proposed Vizhinjam Transshipment terminal on Road Transportation
Musaliar College of Engineering, Pathanamthitta	B.Tech (Civil)	Arun Chandran	4	Pedestrian friendly transportation for Pathanamthitta
ACE College of Engineering	B.Tech (Civil)	Arun Chandran	4	Traffic and Transportation study for Piravam
SCMS College of Engineering, Ernakulam	B.Tech (Civil)	Wilson K C	1	Performance evaluation of State Highway 1
Mar Baselios College of Engineering	B.Tech (Civil)	Salini P N	6	Sustainable Transit System for Last Mile Connectivity in an activity centre – Technopark a Case Study
Mar Athanasius College of Engineering, Kothamangalam	B.Tech (Civil)	Salini P N	6	Mode choice for Last Mile Connectivity in Infopark
Rajiv Gandhi Institute of Technology (RIT), Kottayam	M.Tech (Transportn. Engineering)	Salini P N	1	Study on modal shift of home based work trips towards Kochi Metro
National Institute of Technology, Kurukshethra	M.Tech (GE)	Salini U	1	Numerical modeling of highway embankment constructed with soil-jarofix mixture
Rajiv Gandhi Institute of Technology (RIT), Kottayam	M.Tech (GE)	Salini U	1	Laboratory investigation on zychotherm modified bituminous mixes
Rajiv Gandhi Institute of Technology (RIT), Kottayam	M.Tech (GE)	Salini U	1	Characterization of RAP for use of flexible pavement construction
Rajiv Gandhi Institute of Technology (RIT), Kottayam	M.Tech (Transportn. Engineering)	B.AnishKini	1	Impact of implementation of Congestion Charging in Trivandrum City
Valiya Koonambayi Kulathamma College of Engg. & Technology, Paripally	B.Tech (Civil)	B.AnishKini	5	Junction Improvement for Kachery Junction, Attingal
Sree Budhha College of Engineering	B.Tech (Civil)	Sanjai R J	6	Small Industrial Training Prgramme Report

4. INVITED TALKS/MEDIA INTERACTIONS

Dr. B.G.Sreedevi, Director

Media Interactions

1. Discussion on 'Government of India's Road Safety' in 'Varthamanakalam'. Doordarshan on 1st April 2016.
2. 'Programme on Road Safety' in Malayali Durbar. Amrita Channel on 2nd April 2016 (Attended by Salini P.N, Subin B & B. Anish Kini)
3. Discussion on 'Development Agenda'. Asianet News Channel on 15th April 2016.
4. 'Varthamanakalam. Doordarsan on 2nd June 2016

Invited Talk

1. 'Energy Efficiency and Productivity', Talk at District Level Seminar organized by Energy Conservation Society, Kochi, 3rd May 2016.
2. 'Climate Change and Technological Advancements', Talk at 'Workshop on Climate Change and Technological Advancements' organized by Institute for Climate Change Studies (ICCS), Kottayam, 4th May 2016.

P Kalaiarasan, Scientist – C

Invited Talk

'Transportation Sector'. Talk delivered at 'Workshop on Climate Change and Technological Advancements'organized by Institute for Climate Change Studies(ICCS), Kottayam, 4th May 2016.

5. OTHER NEWS

NATPAC and INDIMASI jointly organized a half day programme in connection with International Yoga Day on 21st June at K KarunakaranTranspark, Aakkulam. Guru Yogi Shiva, INDIMASI demonstrated on 'Health of Working Staff'.

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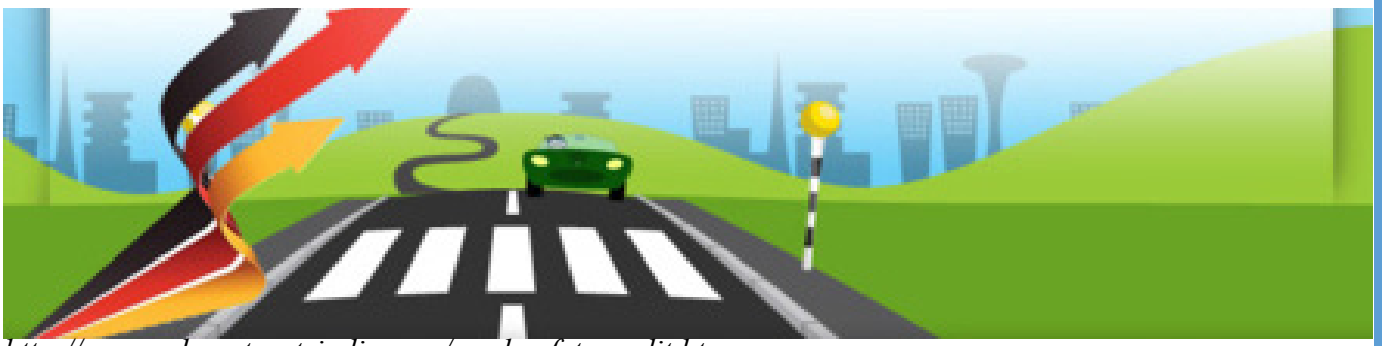
Do you know?

Road Safety Audit

The purpose of Road Safety Audit is to ensure that all road schemes should function as safely as possible, which means that the road users will be exposed to minimal risks of accidents, on new roads as well as on existing roads. Road Safety Audit (RSA) identifies aspects of a Highway Improvement Scheme that could give rise to road safety problems and suggests modifications that would improve the road safety of the resultant scheme. Road Safety Audit thus assesses projects for potential accident elimination / reduction on the basis of road user knowledge, attributes and skills, day/night, wet/dry road conditions. Road Safety Audit aims to recognize the importance of safety in highway design to meet the needs and perceptions of all types of road users. RSA strives to achieve a balance between needs of different road user types where they may be in conflict with one another.



http://www.subcontractsindia.com/road-safety-audit.htm

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