KSCSTE-NATPAC

ANNUAL REPORT

2023-'24

KSCSTE - NATIONAL TRANSPORTATION PLANNING AND RESEARCH CENTRE
(An Institution of Kerala State Council for Science, Technology and Environment)
K. Karunakaran Transpark, Akkulam, Thuruvikkal P.O, Thiruvananthapuram - 695011

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(An Institution of Kerala State Council for Science, Technology and Environment)
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Director's Note…

Greetings from NATPAC!

KSCSTE - National Transportation Planning and Research Centre (KSCSTE-NATPAC) *functions as a Centre of Excellence in the fields of traffic engineering and transportation planning, highway and pavement engineering, planning of rural roads, regional transportation, public transport system, alternate options for transport system, water transport, traffic safety, tourism planning, transport energy and environmental studies. I am happy to present before you this Annual Report of NATPAC for the period 2023-24. The Centre has been actively involved in various transportation research and development activities during this period and also supports the Government to formulate policies in relevant areas. I feel proud of the Centre's achievements in this field.*

During this period there were lots of commendable work in research, consultancy, training and road safety activities. The Centre has implemented 23 research projects, 11 need based studies and 13 consultancy projects. We organized many events and programmes during this year. 13 research papers were published in research journals, 11 conference proceedings were published, and 29 research papers were presented at seminars. NATPAC scientists were also members of various committees like Technical Committee of KRSA, Nodal Officer, Directorate of Environment & Climate Change (DoECC), GoK for State Action Plan for Climate Change (SAPCC), review Committee of KSRTC, Technical Committee of Integrated Digital Traffic Enforcement System for Kerala Police, Traffic Advisory Committee, Thiruvananthapuram city etc.

NATPAC's Regional Centre commenced functioning at Jawaharlal Nehru International Stadium in Kaloor, Ernakulam on 3rd April 2023. NATPAC in association with the Kerala Infrastructure Investment Fund Board (KIIFB) organized a two-day workshop on Full Depth Reclamation (FDR) Technology. A 20 kW Roof Top Solar Power Plant has been installed at NATPAC Head Office, Aakkulam, Thiruvananthapuram with the cooperation of Agency for New and Renewable Energy Research and Technology (ANERT). A Stakeholder Meeting was organized at Government Guest House, Thycaud, Thiruvananthapuram in October 2023 with participation of state level officers of all major stakeholder department and agencies and prepared a comprehensive action plan for road safety for the State.

One-Day Workshop on Full Depth Reclamation Technology was organised at Thiruvananthapuram, Ernakulam, and Kozhikode in association with LSGD - Kerala State Rural Roads Development Agency (KSRRDA) in January 2024. National Road safety Month – 2024 was observed by organizing 22 road safety training programmes across the 14 districts in Kerala covering the road users like Youth, Driving School Instructors, Ambulance Drivers,

Educational Institution Bus Drivers, etc. The three-day training programme for Motor Vehicles Department officials titled as "Propagating Engineering Aspects for Coherent Enforcement" (PEACE) - aims to disseminate practical knowledge about road engineering to enforcement officials thereby combining the engineering and enforcement in a scientific way to empower road safety practices. NATPAC was accorded sanction to conduct 'Training Course for Drivers of Vehicles Carrying Dangerous and Hazardous Goods' by Government of Kerala in 2015 and five programs were conducted in 2023-24 under this program.

The TransTech and TransPedia Research talk series conducted by NATPAC envisioned to promote research for shared benefits, by disseminating knowledge on diverse topics from cutting-edge technologies to sustainable solutions.

The Library of KSCSTE-NATPAC is a specialized one that caters to the scientific community of the institute and extends its services to the scientists and research students of various other research institutions and universities. The library is maintaining a blog natpaclibrary1.blogspot.in to make users abreast of the latest developments in the library. Web OPAC extension of KSCSTE-NATPAC Library is available in https://natpac.libsoft.org/.

We provide facilities and guidance to students to accomplish their project work and training. Several students from reputed academic institutions carried out their project work for B.Tech/M.Tech programmes during this period.

The continuous support obtained from the Executive Vice President of KSCSTE, Research Council and Management Committee of NATPAC are thankfully acknowledged. My gratitude to all the retired staffs of NATPAC who made immense contributions in building up NATPAC. I want to take this opportunity to extend my deepest thanks to each and every member of our team. I also thank all the present Scientific, Technical and Administrative staff for their excellent work. Thank you for your hard work, your passion, and your belief in our mission. I am proud of what we've accomplished together, and I look forward to building on this momentum in the year ahead. As Helen Keller says "Alone we can do so little; together we can do so much."

With Best Wishes

Prof. (Dr.) SAMSON MATHEW
DIRECTOR

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ABOUT THE INSTITUTE

In 1976, National Traffic Planning and Automation Centre (NATPAC) was established as a unit of Kerala State Electronics Development Corporation (KELTRON), Public Sector Enterprise owned by the Government of Kerala. Owing to the contributions and achievements made to the State, it was reconstituted into National Transportation Planning and Research Centre in the year 1982, an autonomous Research and Development Centre under the Department of Science & Technology, Government of Kerala. In 2002, NATPAC was amalgamated with Kerala State Council for Science, Technology and Environment (KSCSTE), an autonomous body under Department of Science and Technology, Government of Kerala. KSCSTE-NATPAC undertakes research, consultancy, and outreach programmes in the fields of traffic engineering and transportation planning, highway and pavement engineering, planning of rural roads, regional transportation, public transport system, alternate options for transport system, water transport, traffic safety, tourism planning, transport energy and environmental studies. The Centre has its headquarters in Thiruvananthapuram and Regional Centres in Kozhikode and Ernakulam.

Vision

"To develop a safe, sustainable, efficient and equitable transportation system through scientific, multi-disciplinary and innovative interventions for societal needs".

Mission

- To promote a safe, reliable, and integrated transport system for fair and effective movement of goods and people;
- To engage and collaborate with multi-disciplinary stakeholders to evolve sustainable and optimal solutions;
- To develop design strategies with state-of-the-art laboratories and technologies through research and practice;
- To explore and advocate intelligent technologies assisted with advanced computation and data analytics for smart mobility;
- To frame guidelines, policies and protocols for transportation needs and to deliver scientific advice to the stakeholders;
- To establish a Centre of Excellence in the field of transportation engineering through research and development;
- To disseminate knowledge to user communities, practitioners, and institutions for fostering the growth of transport sector.

NATPAC presently has a multidisciplinary team of 25 scientists specialized in the different fields of Transportation Engineering and its allied areas supported by Technical Officers and Technical Assistants. The Administrative and Accounts sections of the Institute are coordinated by the Registrar and assist the Director in managing the day-to-day functioning of the Institute.

Thrust Areas of Research

- Traffic Safety / Intelligent Transportation System
- Marginal / Alternate materials for Transport Infrastructure
- Public Transport System and Logistics

Monitoring Committees

Research Council

1	Prof. (Dr.) Tom V Mathew, IIT Bombay	Chairman
2	Dr. S. Velmurugan, Chief Scientist, CSIR-CRRI	Member
3	Prof. (Dr.) Lelitha Devi Vanajakshi, IIT Madras	Member
4	Prof. (Dr.) Kusum Sudhakar Reddy, IIT Kharagpur	Member
5	Prof. (Dr.) Ashalatha R., CET	Member
6	Prof. (Dr.) M. V. L. R. Anjaneyulu, NIT Calicut	Member
7	The Director, NATPAC	Member Convenor
8	The Member Secretary, KSCSTE	Permanent Invitee

The Research Council met on 26th and 27th June 2023 (29th RC), 16th and 17th February 2024 (30th RC) under the chairmanship of Prof. (Dr.) Tom V Mathew.

Management Committee

1	The Director, NATPAC	Chairman
2	Joint Secretary, Science & Technology Dept., Government of Kerala	Member
3	Member Secretary, KSCSTE	Member
4	Registrar, NATPAC	Member
5	Director, ICCS	Member
6	Senior most Scientist, NATPAC	Member

The Management Committee met on 16.05.2023 (40th MC) and 17.11.2023 (41st MC) under the chairmanship of the Director, NATPAC.

Information Officers as per the Right to Information Act

1	State Public Information Officer (Administrative matters)	Shri. D. Shaju, Section Officer
2	State Public Information Officer (Scientific &Technical matters)	Shri. Subin B, Senior Scientist
3	Asst. Public Information Officer	Smt. Arya S K, Office Assistant Grade 2
4	Appellate Authority, RTI Act	Director

Collaborations

MoU Institutes

Sl. No.	MoU Institutes	Date of Signing
1	National Institute of Technology Warangal	20.04.2023
2	Indian Institute of Technology, Kanpur	05.05.2023
3	Indian Institute of Technology, Hyderabad	01.12.2023
4	Cochin University of Science and Technology	15.03.2024

RESEARCH & DEVELOPMENT PROGRAMMES

TRANSPORTATION PLANNING AND MANAGEMENT

1. *Overtaking characteristics of vehicles on undivided two-lane highways - A case study of selected roads in Kerala*

PI: Smt. P N Salini, Senior Scientist
Duration: 2020-24

About 75% of roads in India are Two-lane Two-way roads and Overtaking is an unavoidable manoeuvre observed with significant impacts on safety as well as on system performance. In heterogenous traffic conditions, a speed differential exists between fast- and slow-moving vehicles, hence overtaking manoeuvres are inevitable. This study aims to analyse the overtaking characteristics of vehicles on undivided two-lane highways. The overtaking characteristics of vehicles have a great influence on safety and performance of the traffic stream as a whole. The objectives of the study are:

1) To analyse the characteristics of overtaking in different flow conditions with respect to the vehicle types from actual field traffic scenarios;
2) To identify the parameters influencing overtaking manoeuvres on two-lane two-way highways and their inter relationships;
3) To analyse the factors influencing the lateral and longitudinal interactions between vehicles involved in overtaking manoeuvres and its effect on safety;
4) To develop prediction model for the variables related to overtaking like Overtaking Distance, Overtaking Time, Overtaking Speed, Lateral Clearance, Total Longitudinal Gap based on the influencing parameters.

Study road stretches were identified based on reconnaissance survey. Straight stretches on National Highway (NH 66: Thonakkal-Mangalapuram stretch) and SH 1 with similar traffic and geometric characteristics were taken for initial studies. Videographic data collected by surveys using instrumented car fitted with V Box, cameras and sensors and Drone was used for analysis. Data was extracted using by frame-to-frame analysis. Data on dynamic characteristics of vehicles during overtaking operations like speed, time involved and lateral distances etc. were also extracted.

The types of overtaking prevalent on study road stretches were analysed and was found that there is a positive correlation between lateral clearance and the influencing parameters of

speed of the passing vehicles and longitudinal gap and a negative correlation with presence of heavy vehicles in opposing stream. The higher values of speed maintained by cars is due to higher manoeuvrability, acceleration capability and comparatively lesser size. The lower speed was maintained by LCV-HV may be due to the higher size and comparatively lesser manoeuvrability. Wider range of speed is exhibited by the two-wheeler category during overtaking manoeuvres. The relation between different parameters involved in overtaking maneuvering is arrived at and used for formulation of models. Models were formulated for different characteristic parameters related with overtaking manoeuvers.

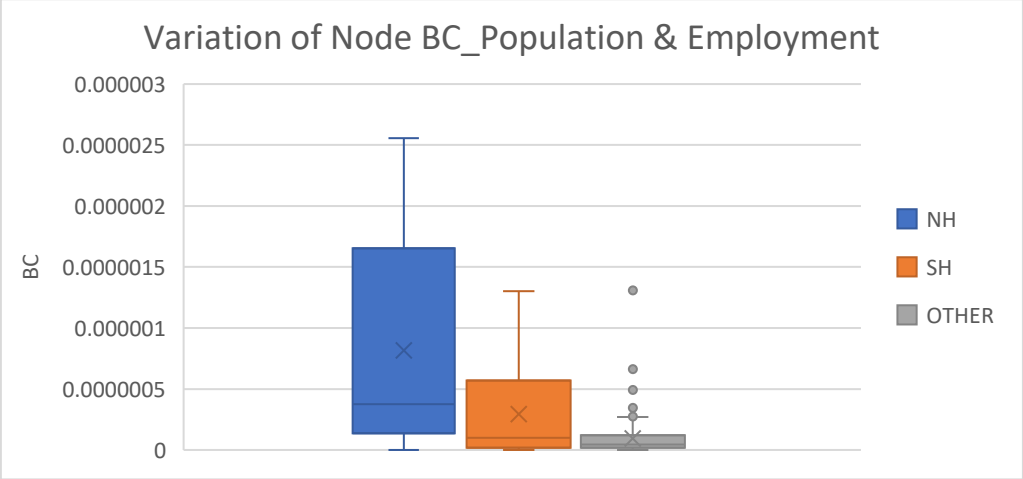
During overtaking maneuvers, cars maintained higher values of speed due to higher manoeuvrability, acceleration capability and comparatively smaller size while that of light commercial vehicles and heavy vehicles have lower speed which may be due to the higher size and comparatively lesser manoeuvrability. Cars and two-wheelers exhibited comparatively wide range of speed during overtaking manoeuvres. On analysis it was found that there is a positive correlation between overtaking distance and the influencing parameters such as speed of overtaken vehicle and total longitudinal gap. For all vehicle categories, a negative correlation was observed between overtaking time and relative speed. Models were formulated for lateral clearance, overtaking distance, overtaking time, overtaking speed and total longitudinal gap for different categories of vehicles using multiple linear regression analysis and were found to be statistically valid. This study analyzed the overtaking characteristics of vehicles on two-lane undivided roads in heterogeneous traffic conditions under two different flow conditions on same study stretches. Realistic data on overtaking manoeuvres were collected from two-lane two-way undivided highway stretches by moving car observer method using an instrumented test car equipped with GPS, cameras and sensor modules and naturalistic driving data was collected by drone surveys as well. Data was extracted from videos collected by drone survey and the results were compared with that obtained by moving car method. The data collected by drone had the advantage that overtaking characteristics of all interacting vehicle combinations could be analysed. Overtaking characteristics of four different categories of vehicles and their combinations were studied. The inter relationship between parameters influencing overtaking characteristics of different vehicle types were obtained after a thorough analysis based on realistic data obtained from field. Models were formulated for overtaking distance, overtaking speed, overtaken speed, overtaking time, lateral and longitudinal gaps and were validated.

A detailed analysis and understanding of overtaking characteristics help to resolve the related road safety issues to a great extent. The approach adopted and findings of the study can have further application as input to simulation software's and software's for driver assisting modules. Further research is needed to identify the impact of other geometric characteristics, such as vertical alignment and driver characteristics.

2. *Synthesis of rich origin –destination matrices using fusion of multiple sparse data source*

PI: Shri.B Anish Kini, Scientist
Duration: 2021-26

As travel patterns are changing due to higher ownership of private vehicles, growth of ride hailing apps etc., urban level planning does not serve the purpose. Therefore, regional planning is the need of the hour. Dynamic travel demand on the regional level is quintessential for transit scheduling and time-based implementation of traffic management measures. This calls for the development of a Regional Dynamic Travel Demand Model. Moreover, as Kerala has a rural-urban continuum development pattern, a clear distinction of urban and rural areas is difficult. In this context, there needs to be a methodology which can help identify priority zones in the network where scant resources need to be invested for trip related data collection. This is of essence also due to the unavailability of periodic household level trip data or travel related proxies. The use of betweenness centrality for estimating traffic volume and spatial interactions has motivated its use for determining the travel demand on large networks. The figure shown below is the variation of the novel betweenness centrality with respect to the road type showing that it can be used as a proxy to traffic volume on links.



Variation of Betweenness Centrality with respect to road type

The proposed methodology has been tested on synthetic network of Sioux Falls and implemented on the urban network of Thiruvananthapuram district in Kerala. This implementation with sensitivity analysis holds promise for decision makers by identification of priority TAZ where trip related data needs to be collected along with options for phasing of funding and data collection efforts.

3. *Development of Integrated Land Use Transport Model for Thiruvananthapuram*

PI: Shri.V S Sanjay Kumar, Principal Scientist
Duration: 2020-24

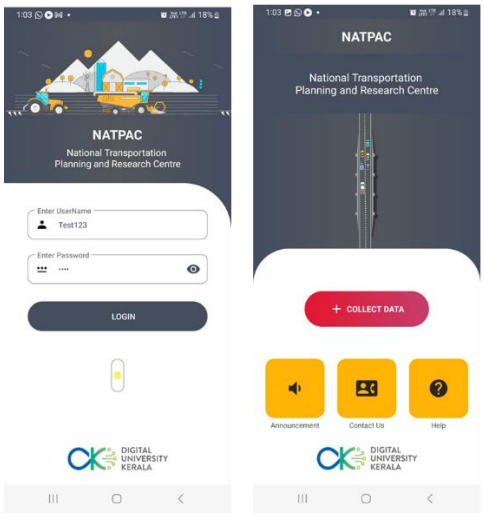
Out of the 14 districts of Kerala, Thiruvananthapuram has shown the highest rate of urbanization and urban population density growth over the past 40 years. The built-up area is densely concentrated in and around the Corporation limits and continues to expand rapidly. With future urban concentration also predicted around this area, Thiruvananthapuram Corporation was selected as the study area. A land use gap analysis comparing existing classifications with URDPFI standards for Small Urban Centres revealed that residential, public/semi-public, and other land use categories exceed recommended norms, while recreational space is nearly absent (0% instead of the prescribed 13%). The settlement pattern confirms that over three-fourths of the area shows an urban character, with NH and NH Bypass corridors being urban/semi-urban. The coastal belt and central areas are urban, while Thuruthumoola remains rural. Commercial activities follow transport corridors; industrial areas are seen near Kazhakootam and Shanghumugham; agricultural land is concentrated on the outskirts, aligned with drainage patterns. A land use

model combining statistical regression and Markovian Transition Matrix was developed using parameters such as demographics (population, density), socio-economic (employment, land price), accessibility (distance to CBD, railway, road length), land use transition, and neighborhood characteristics (nearby institutional, recreational, and industrial land uses). Land use models were developed using BHUVAN's LULC data with ANN and logistic regression in Cellular Automata. ANN showed higher accuracy (93.84%) compared to logistic regression (90.77%). Markovian transition results aligned with 2015 actual land use, confirming suitability for future projections. Predicted urbanization hotspots include Kazhakootam, Pallithura, Kattayikonam (due to Technopark and KINFRA) and Vizhinjam (due to the upcoming port), as well as the new NH Bypass. The road network database was built using NATPAC's GETMAP app, capturing detailed road inventory and geometry. Between 2012 and 2033, vegetation is projected to decline while built-up areas will expand to meet urbanization needs. Survey findings show 82.07% own houses, 17.58% live in rented homes, and 0.35% receive employer-provided housing closely matching Census data. Most households have four members (34.77%), in line with the national average of 4.44. The gender ratio of 1047.6 aligns with the Census value of 1047.57. Two-wheelers are the most common vehicle (68%), followed by cars (39%). Most working members are government employees, business owners, self-employed, or pensioners. Work is the primary trip purpose (57.78%), while social trips are minimal. Car and two-wheeler dominate mode share (>65%); non-motorized transport (walking and cycling) is under 10%. Trip generation models were developed by purpose at household and zonal levels; trip attraction models were also created at zonal level. The final OD matrix (110×110) showed 4.79% of trips originate and 5.04% end outside the study area, with the highest flow between zones 27 and 25. The trip distribution model based on the Gravity Model factored in generation, attraction, and distance decay. Mode choice modeling considered travel time and cost using utility functions, achieving a pseudo-R^2 of 0.506. Trip assignment was conducted using User Equilibrium, validated against real-world data, and incorporating PCU, capacity, and travel time. Scenario analysis included three cases: Do-Nothing (continued trends, congestion, minimal change), New Employment (growth from Vizhinjam port, Technopark), and New Inner Ring Road (traffic diversion, corridor-based land use shifts). These scenarios offer critical insights for urban and transportation planning in Thiruvananthapuram.

4. *Periodic Updation of GIS-based Road and Traffic Database in Kerala*

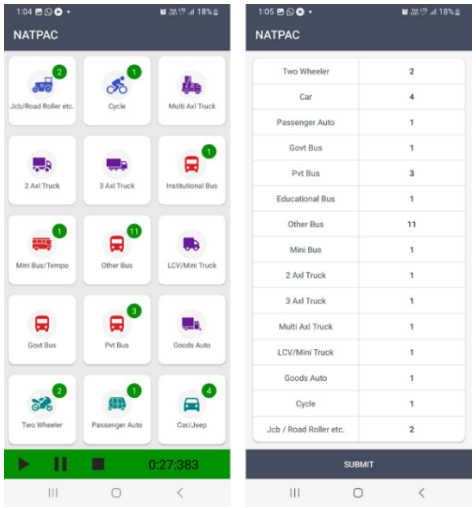
PI: Shri.Ebin Sam S, Scientist
Duration: 2021-24

The study aims to develop a web-based GIS database for data collection, analysis and data management. The primary responsibilities of the Kerala Transportation Database Management System (KTDMS) are to manage the major components of transportation data pertaining to Traffic characteristics, Road inventory, Crash characteristics, Pavement characteristics and overall Transportation network. The entire project was envisaged to develop and deploy the system in various phases. The objectives of the current phase of the study were to develop and maintain Web/Web-GIS based database platform for effective monitoring, management, analysis and database updation of road inventory and traffic data. The study also proposed to develop a mobile application for location tagged collection of traffic data. Primary Surveys were conducted for the development of GIS-based road and traffic database for roads in Kerala at selected locations in state. Mobile applications were developed for data collection, which includes modules for Traffic Data Collection (Volume Count & Parking) and Road Inventory. Requirement analysis and design of schema were finalized and after that web services development were completed. Android Application Design and Web Services Integration were also completed. The primary interface of the mobile application is shown below.



Interface of Mobile Application

Data collection module includes different vehicles icons and on pressing the icon, the vehicles can be counted manually. The count along with the time stamp at which vehicle arrived at the point of time can be recorded in the application.



Traffic volume count module

Once the data collection is completed in the mobile application, the raw data is sent to the web interface and then data is further stored in the database and analyzed through analytical modules. Analytical module for traffic volume comprises of vehicular volume count analysis, pedestrian volume count analysis and Signal Warrant Analysis.

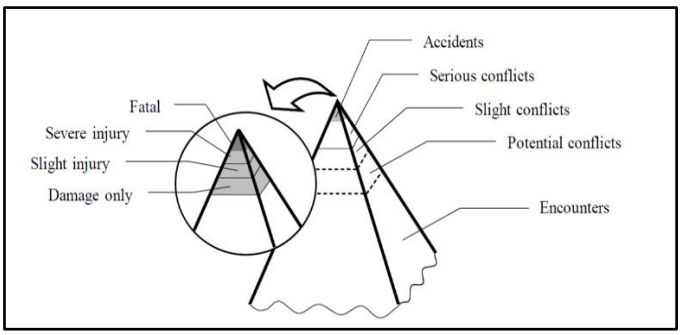
The mobile application for data collection and web-based system/software, namely Kerala Transportation Database Management System (KTDMS), was developed for data collection and analysis for Phase I comprising of Traffic characteristics, Road Inventory and Transportation Network characteristics. The app and web platform were tested in field conditions and based on the feedback received, changes were incorporated. It is expected that the development of GIS based database management system (K-TDMS) will aid in the collection, processing, storing and analyzing big data pooled from various sources. Deployment of KTDMS will result in increased productivity, ensure consistency and reliability of data.

5. *Application of surrogate safety measures at unsignalized intersections*

PI: Shri.Ebin Sam S, Scientist
Duration: 2021-24

Surrogate Safety Measure (SSM) is one of the most widely used proactive methods for identifying future threats and analyzing safety performance of road facilities. Traffic Conflicts, which is an observable situation in which two or more road users approach each other in space and time to such an extent that there is a risk of collision if their movements remain unchanged, are used for the purpose of analysis. Several conflicts that can occur in

traffic have been pictured in 1987 by Hyden with a "safety performance pyramid". The probability of a serious conflict turning into a crash is high and there exists a relationship between the number of serious conflicts and crashes, hence conflicts can be used to determine safety of road.



Safety Performance Pyramid (Source: Hyden (1987))

The scope of the study is limited to the selected unsignalized T intersections along crash prone road stretches on Highways in Kerala. The objectives of the study are:

1) To evaluate the traffic conflicts using Surrogate Safety Measures (SSMs) and its characteristics of the selected intersections;
2) To recommend appropriate interventions by checking its effectiveness through before and after analysis using Simulation model and SSMs.

Kozha intersection was selected as the pilot study intersection and data extraction and analysis were carried out. Kozha intersection is a T intersection with a major road between Kuruvilangad and Monipally and a minor road towards Pala.

Kozha Intersection

Kozha Intersection possesses a higher percentage of cars (44%) followed by two-wheelers (33%). Auto rikshaw contributes 10% of traffic, trucks and buses possess a lesser percentage of traffic.

The investigation of surrogate safety measures provided an indirect measurement of road safety without using crash data. This method helped in overcoming the limitations faced when using crash data for analysis, namely the limited sample size due to overlooking minor crashes and presence of inaccurate/insufficient/incomplete data which makes it difficult to have an accurate diagnosis and intervention. The methodology formulated aided the safety analysis of new schemes through testing and evaluation of different safety improvements without the need for implementation.

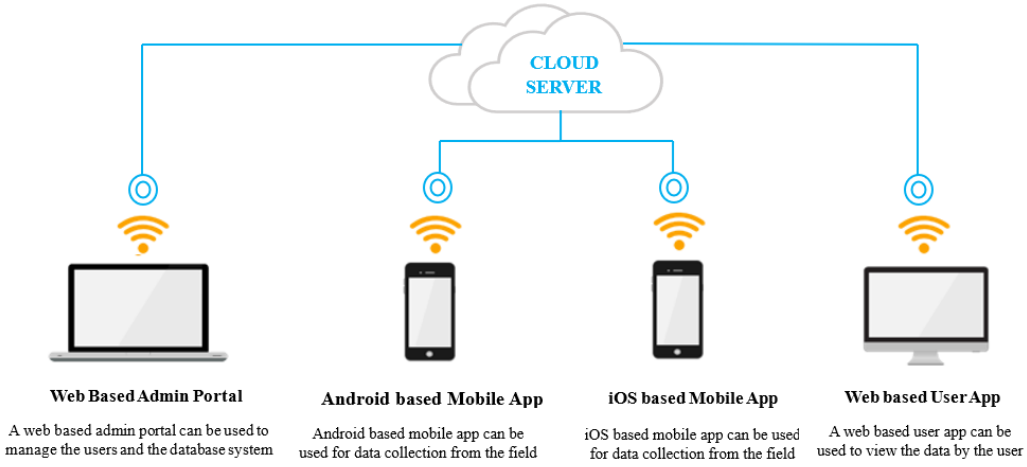
6. *Utilization of Geoinformatics Tools for Development of Comprehensive Road Network for Kerala State*

PI: Shri. M S Saran, Scientist
Duration: 2019-24

With advancements in technology, road-related data collection has transitioned from manual, paper-based methods to real-time digital systems. The development of **GetMap**, an Android-based mobile application, represents a key innovation in this area. This app was designed to facilitate real-time data collection for road surveys, eliminating the need for cumbersome paper forms and manual data entry, making the process faster, cheaper, and more efficient. GetMap uses **Android Studio** for its development and incorporates the **osmdroid Android library**, which provides tools to interact with **OpenStreetMap (OSM)**. The app relies on smartphone location drivers to publish updates on the device's physical location through Android's built-in location services, and it automatically checks and plots user locations on real-time OSM maps.

Key Features

- **Recording Track**: Captures and records the route or path followed during data collection.
- **Road Inventory and Cross Section Data**: Allows users to add and annotate road details, including cross-sectional data.
- **Point Collection with Photos**: Enables users to mark specific points on the map and attach photos to those points.
- **Data Export**: The collected data can be exported as **KML (Keyhole Markup Language)** and **Excel files** for further analysis or sharing.



This app is a valuable tool for agencies like Public Works Departments (PWD), Transport Planning Authorities, and Road Safety Authorities, streamlining the process of road-related data collection and sharing. Once completed, the app will be made available to the public through mobile app stores, offering a practical solution for real-time road data collection. It has significant societal benefits by aiding national and state-level authorities in enhancing infrastructure data accuracy and availability. This shift to digital and mobile-based tools represents a major step forward in road infrastructure management and planning.

7. *Periodic updation of price indices for different public transport and freight operations*

PI: Dr. Sanjai R J, Technical Officer
Duration: 2023-24

NATPAC has been conducting comprehensive studies on public and freight transport in Kerala, including stage carriages, taxis, autorickshaws, state passenger boat services and goods vehicles to determine the cost of operations. These studies aid the government in making informed decisions regarding fare revisions. A scientific approach is utilized to estimate operational costs through a structured, questionnaire-based survey of operators. Vehicles are carefully selected to represent various types of operations and geographic areas, covering both operational and non-operational conditions across the state.

This year's study focused specifically on taxi operations in Kerala. To facilitate this, a structured questionnaire survey was conducted in representative districts including Kozhikode, Wayanad, Ernakulam and Thiruvananthapuram for primary data collection. The sample adequately represented different vehicle types and routes, accounting for various

terrain conditions such as plains, rolling hills, and hilly regions, as well as urban, semi-urban, and rural areas.

According to the survey results, over 70% of taxis operating in Kerala are diesel-powered. Therefore, only diesel-fuelled vehicles were considered for the analysis of operational pricing in this study. Key factors influencing Vehicle Operating Costs (VOC) were identified, including total distance travelled, income, fuel consumption, maintenance costs, welfare expenses, insurance, permit renewal fees, loan interest, road tax, wages, and other miscellaneous expenses. These factors were categorized into fixed and variable costs. Based on these classifications, the fixed and variable costs for taxis were calculated at Rs. 16.25/km and Rs. 6.92/km, respectively, leading to a total VOC of Rs. 23.17/km.

The last fare revision took effect on May 1, 2022. The Price Index for Taxi Operations (PITO) indicated an increase from 221.49 on June 15, 2022, to 227.62 on March 15, 2024, reflecting a 2.77% variation. A significant factor affecting the taxi industry during this period was the fluctuation in fuel prices. Additionally, other operational costs, such as vehicle maintenance, insurance premiums, and driver wages, have also risen. The study further revealed that demand for taxi services in Kerala experienced a substantial resurgence compared to the last three years. By adapting to regulatory changes, integrating technology, and responding to customer preferences, the sector has shown resilience. Although the COVID-19 pandemic previously hampered its growth, the easing of restrictions has allowed the industry to recover. However, demand was not uniform throughout the year. Tourist hubs like Ernakulam, Thiruvananthapuram, and Kozhikode saw significant spikes in taxi usage during peak holiday seasons, while rural and semi-urban areas experienced more stable demand.

Moreover, the emphasis on safety and hygiene that emerged during the pandemic has persisted. Additionally, the growing popularity of ride-sharing and carpooling services continues to influence the industry's trajectory. To capitalize on these trends, taxi operators need to embrace digital solutions and enhance service offerings. Looking ahead, the taxi industry in Kerala is expected to continue growing and evolving.

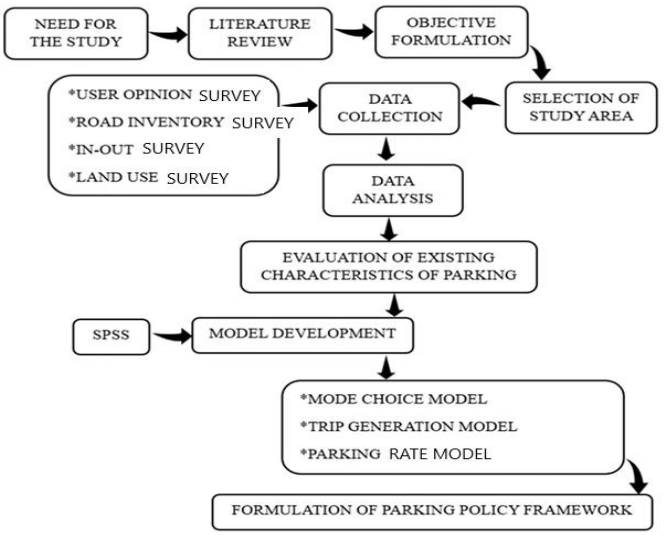
8. *Development of Parking Policy Framework for Kerala*

PI: Dr. Shaheem S, Principal Scientist
Duration: 2022-25

The rapid increase in vehicle population in Kerala's urban centres has led to severe parking problems and traffic congestion, significantly impacting the quality of life and efficiency of urban areas. As the number of vehicles continues to rise, driven by economic growth, rising incomes, and urbanization, the demand for parking spaces has surged, exacerbating existing issues and creating new challenges for urban planners and residents alike.

The present study aims to address various prominent land uses, which include commercial areas, residential zones, public offices, hospitals etc. The parking policy framework proposed to formulate will include strategies such as the development of parking structures, implementation of parking regulations, and promotion of alternative transportation modes. Additionally, it will emphasize the need for sustainable practices, such as encouraging the use of public transport and integrating green spaces into parking designs to enhance environmental quality. By aligning parking management with broader urban planning goals, the framework aims to improve the efficiency and convenience of parking facilities across Kerala. This approach will not only alleviate the current parking challenges but also support the state's long-term vision for sustainable urban development, ensuring that parking infrastructure keeps pace with the evolving needs of its urban centres. The objectives of the study are:

1) To study the existing parking characteristics in the study area;
2) To develop a suitable discrete choice model to predict commuters'mode choice behaviour;
3) To develop models to estimate trip generation and parking generation rates in different land uses;
4) To develop an appropriate parking policy framework for local urban bodies.



Flow chart of the study

In Kerala, like in most Indian states, a parking policy is by and large non-existent and poorly coordinated among the stakeholders. Even more unfortunate is the fact that the present policy promotes private vehicles by making the option of driving more convenient through cheap and easily available parking. Rapid increase in the number of personal vehicles and the resultant demand for parking at home, at work and at all shopping destinations remains a major challenge. Cities in Kerala does not have enough land resources to provide parking for the ever-growing number of private vehicles, and yet the city has allotted considerable amount of scarce urban space for parking. It entails an enormous cost in terms of real estate and parking infrastructure, which is borne by everybody, irrespective of whether they own or use personal vehicles. It leads to distorting the equitable allocation of scarce urban land area among competing needs. In general parking management can be considered as an integral part in making our cities better and competitive

TRAFFIC SAFETY

1. *Study on road crashes involving vulnerable road users with focus on pedestrian fatal crashes*

PI: Shri. V S Sanjay Kumar, Principal Scientist
Duration: 2023-26

Globally, pedestrians are the most vulnerable group in road crashes, accounting for 23% of reported fatalities among the road user types. Vulnerable road users (VRUs) such as pedestrians, cyclists, and motorcyclists are at a higher risk of being involved in crashes due to their lack of protection against the impact of a vehicle. Pedestrians, in particular, are among the most vulnerable road users and account for significant portion of VRU fatalities. In Kerala, between 2018 and 2022, there were over 5,100 pedestrian fatalities, constituting 26.5% of all road crash fatalities. In this background, it is necessary to study the factors influencing pedestrian crashes, including pedestrian behavior, measures of pedestrian exposure and hazard, and specific roadway features and their effects on pedestrian safety.

The study examines pedestrian crashes, including fatal, grievous injury, and minor injury crashes reported during 2018, 2019, and 2022. A total of 11,807 pedestrian crashes were recorded during this period, including 1,450 fatal crashes, 8,452 grievous injury crashes, and 1,905 minor injury crashes. The scope of the study is limited to the pedestrian crashes reported in Kerala during these years. The study has four main objectives. The first objective is to identify pedestrian-vulnerable corridors across Kerala, focusing on specific road sections that pose increased risks and safety concerns for pedestrians. This corridor-based approach aims to reduce pedestrian crashes by targeting high-risk areas. The second objective is to develop crash severity models to predict the likelihood of crash occurrences in specific locations. The third objective is to create a Pedestrian Vulnerability Index, a measure that quantifies the vulnerability of specific corridors by assessing the ease and safety of walking on those roads. Finally, the study aims to formulate a pedestrian safety manual, a comprehensive document that provides guidelines, recommendations, and best practices aimed at promoting pedestrian safety. Crash data from 2018, 2019, and 2022 were collected from the Kerala State Crime Records Bureau. Initially, 400 pedestrian-vulnerable corridors were identified across the state, spanning 555.81 kilometers based on pedestrian fatalities. The number of fatalities in these corridors ranged from 2 to 24, with corridor lengths varying between 200 meters and 4,000 meters. Pedestrian-vulnerable corridors were

then identified based on the total number of pedestrian crashes, including fatal, grievous injury, and minor injury crashes, during the study period. These corridors witnessed 1,548 pedestrian fatalities, indicating a critical need for safety measures. It was observed that out of the 400 demarcated corridors, 262 belonged to rural areas, while the remaining 138 were in urban areas.

2. *Evaluation of the effectiveness of standard traffic calming measures in Kerala*

PI: Shri. Arun Chandran, Senior Scientist
Duration: 2023-25

The most important criterion for the design of the various elements of a road is the design speed, which is the maximum permitted speed at which vehicles can travel with safety. The speed of vehicles needs to be restricted at certain locations like approaches to sharp curves, congested/accident-prone locations, school zones etc. to promote orderly movement of traffic and to enhance safety. Traffic Calming Measures (TCM) are adopted to reduce the speed of vehicles and to improve safety of road.

This study deals with evaluating the effectiveness of traffic calming measures such as Transverse Bar Markings (TBM), Speed Humps and Speed tables in speed reduction and safety. The various literatures pertaining to the study was collected and were reviewed and the objectives and methodology for the study was formulated. The study locations were selected such that it includes various urban and rural locations in Kerala. TCMs selected for study has varying geometric features and the roads selected for the study also varied in geometrical and land use characteristics. Eighteen locations in the urban and rural areas of Thiruvananthapuram, Kottayam and Kozhikode were selected for the study. The data collection for the study includes collection of primary and secondary data. Primary data includes the traffic data and road inventory details. Secondary data includes the crash data to be collected from police stations. Primary data collection was conducted using drone surveillance and videographic surveying using a camera during off peak hours. The data collection for fifteen locations were completed. Data extraction was completed for nine locations, using Kinovea software. The figure shows one of the locations with TBM where the data was collected using drone surveillance. Speed profiles curves were plotted for

different categories of vehicle at each location and were analyzed to determine the influence zone of the TCMs in the upstream of the measures. The percentage reduction in speed of vehicles at each location were determined. Statistical t tests were done to check whether there is a significant difference in the speed of the vehicles while moving across the TCMs.

3. *Safety Implications of Vehicle Manoeuvring Characteristics on Two Lane Highways with Heterogeneous Traffic*

PI: Smt.P N Salini, Senior Scientist
Duration:2023-26

Driving on highways is a common task that many drivers routinely performed, but there is an underlying impact of vehicle manoeuvring characteristics on highways in Kerala which are mostly non-lane based two lane highways with heterogeneous traffic and weak lane discipline. Drivers start exhibiting risk-taking behaviour while passing impeding slower vehicles. Such attempts significantly affect operations and safety of traffic especially at vulnerable locations like straight stretches prevalent with over speeding and unsafe overtaking manoeuvres. The problem is, however, more acute when the prevailing traffic is heterogeneous with a sizable proportion of slower vehicles. Previous research studies have shown that vehicle flow characteristics (speed and acceleration) and visual performance (gap and sight distances), can be critical components of safety analysis. The present study thus can help in evolving a safety evaluation framework for risk assessment of unsafe vehicle maneuvering like risky lane changes during overtaking on straight stretches of highways. The objectives of the study are:

1) To identify and assess the parameters involved in operational and safety impacts of the overtaking maneuvers and the associated risk on two-lane undivided highways;
2) To evaluate the influence of different traffic flow conditions on the occurrence of potential risk situations during the passing maneuver;
3) To estimate the lane change risk index in terms of risk exposure time to potential crash and expected crash severity level in lane changes during overtaking maneuvering of vehicles on two lane undivided highways.

The study will be conducted at straight road stretches in vulnerable locations of selected highways in Kerala. The mixed traffic situation results in the formation of frequent platoons which eventually creates frustration among the driver population and affects traffic safety

as a consequence through unsafe vehicle manoeuvring. The safety parameters like over speeding, risky lateral and longitudinal interaction between vehicles and the critical times involved in vehicle manoeuvring could be investigated from field data obtained from vulnerable locations. Analysis on various data collected were done to arrive at estimates of surrogate safety measures which indicates the extent of risks involved in vehicle maneuvering by integrating the exposure time to hazardous situation and the severity level involved in during the overtaking operations. The potential risks between interacting vehicles during overtaking manoeuvres is assessed by estimating Stopping Distance Index (SDI) based on the analysis of Stopping Sight Distance (SSD) and safety margin between interacting vehicles. The distinctive characteristic of the evolved methodology adopted here is that it integrates the amount of risk exposure time and risk severity level pertaining to the lane changes during overtaking manoeuvres. The findings of the study are:

1) Increased speed values of vehicle manoeuvring were prevalent on the study stretches;
2) From estimated SDI values, it is inferred that risk is associated with either any of the events in the overtaking manoeuvres;
3) This finding conforming to the observation that majority of overtaking manoeuvers happened with inadequate passing gap;
4) The critical passing gap estimated indicates the unsafe vehicle manoeuvring during overtaking.

A rational methodology is evolved out for safety evaluation of the overtaking maneuvers and the associated risks on two-lane two-way highways. The safety of lane changes during overtaking manoeuvres and the potential risk situations are evaluated in terms of risk levels. Estimation of the surrogate safety measure of Overtaking Risk Index (ORI) was done. The following are recommendations of the study.

1) Overtaking Risk Analysis to be replicated for rest of the study stretches and comparison to be carried out on the basis of the volume of interacting vehicles and prevailing speed;
2) Critical passing gap to be estimated for all the study stretches and its comparative analysis on the basis of oncoming traffic volume and opposing traffic speed;
3) Recommendations based on the study to improve the safety of vehicle manoeuvering.

INLAND WATER TRANSPORT SYSTEM & COASTAL SHIPPING

1. *Problems and prospects of inland water transportation in Kuttanad region*

PI: Dr. Sabitha N M, Senior Scientist
Duration: 2023-26

This study focuses on the major issue of database preparation of the waterways of Kuttanad area, and classification of waterways in Kuttanad including feeder canals. The study will also examine the problems and prospects of water transport in Kuttanad area including the impacts of flooding and climate change on waterway operation and seamless navigation.

Field visit to the Kuttanad region was undertaken to assess the challenges associated with water transportation. The assessment identified several significant issues, including the narrowing of canal widths, encroachment on water bodies, instances of flooding, areas with insufficient depth, water pollution, blockages caused by aquatic weeds, sand deposits, and the overall lack of maintenance of the waterways.

To effectively classify the waterways in the Kuttanad region, it is imperative to gather comprehensive details regarding the waterway network and its associated cross-structures. An updated assessment of the waterway network for seven key canals, spanning a total of 51 kilometers in the Alappuzha district has been conducted. These canals are the AS Canal, Vadai Canal, Commercial Canal, Link Canal, Madayan Thodu, Rani Canal, and the Alappuzha-Ambalapuzha Canal. The collected data encompasses canal inventory, bridge inventory, details of electrical lines, and specifications of boat jetties. The canal inventory details include the name and location of each canal, the width of the canal, the type of bank protection employed, land use on either side, and the quality of water, among other factors. The bridge inventory details comprise the name and location of each bridge, its length, width, span, horizontal and vertical clearances underneath the bridge, as well as the year and material of construction. Details concerning electric lines include the location, capacity measured in kilovolts (KV), type of structure, and both horizontal and vertical clearances. The boat jetty inventory contains the name and location of each jetty, along with structural specifications, terminal facilities, and information regarding accessibility.

Information pertaining to the waterway network was secured from the Kerala State Remote Sensing and Environment Centre (KSREC). Land use data for the years 2005, 2010, and 2015 also obtained from KSREC, will be utilized for the analysis and prediction of land use changes. Hydrographic survey data were acquired from the Hydrographic Survey Wing, which has been utilized to gather information concerning areas of low depth. Data regarding current waterway operations were sourced from the State Water Transport Department (SWTD).

To effectively classify the waterways in the Kuttanad region, it is essential to gather comprehensive data on the registered vessels in this area. A total of 1,624 vessels have been registered, and pertinent information has been collected regarding each vessel. The dataset includes details such as vessel type, dimensions, registration year, registration number, specifications concerning firefighting equipment, passenger capacity, details of crew members, speed of vessel, engine type, horsepower, details about lifesaving equipment, gross registered tonnage, and construction material, sourced from the Kerala Maritime Board in Alappuzha. A comprehensive preliminary analysis of the collected vessel data has been undertaken to provide valuable insights into the various types of vessels operating in the Kuttanad region. According to the records from the Directorate of Ports, there are a total of 3,144 vessels registered under the KIV rules. This diverse fleet includes houseboats, motorboats, shikaras, speedboats, barges, ferries, and dredgers. It is noteworthy that 1,624 of these vessels (over 50%) are registered with the Alappuzha Port Registry, with houseboats comprising a significant portion at 821 vessels (also more than 50%).

2. *Performance Evaluation of Kochi Water Metro*

PI: Dr. Sabitha N M, Senior Scientist
Duration: 2021-24

The Kochi Water Metro is a pioneering public transportation initiative launched to address the city's escalating road traffic congestion and provide an efficient, sustainable commuting alternative. Designed as a hybrid of urban water transport and metro systems, the project integrates with existing road and metro networks. This report presents a comprehensive evaluation of the Water Metro's performance and an assessment of existing waterway routes in Kochi to understand commuter behavior, modal preferences, and areas for system enhancement.

A detailed survey was conducted among commuters on key operational routes to analyze travel behavior, the potential for modal shift, and satisfaction levels. In addition, economic viability and associated operational risks were considered to propose effective solutions. Data was collected through interviews and structured questionnaires across selected routes. To gain deeper insights into mode choice behavior, a model incorporating both observable and latent variables was developed. Latent variables—such as personal attitudes and perceptions—play a crucial role in mode selection but are not directly measurable, and they often vary from place to place.

Exploratory Factor Analysis (EFA) was employed using SPSS to identify significant latent factors influencing route choices. The Vyttila–Kakkanad route showed notable influences such as comfort, travel time, safety, connectivity, lifestyle, and commuter habits. On the South Chittoor–High Court route, the dominant factors included safety, travel time and cost, lifestyle, and convenience. Similarly, the Vypin–High Court route highlighted concerns around travel time, cost, and commuter habits.

The mode choice modeling revealed that private modes still dominate travel behavior. For instance, on the Vyttila–Kakkanad route, 64.4% of commuters preferred two-wheelers, while only 31.9% opted for buses and a negligible number chose cars or autos. On the Vypin–High Court route, 48.1% used two-wheelers and 49.5% used buses, showing a better public transport uptake. The South Chittoor–High Court route also reflected similar trends, with 56.4% of users choosing buses.

In addition to the Water Metro routes, five existing waterway services in Kochi operated by SWTD were assessed—namely, Ernakulam–Mulavukadu, Ernakulam–Varapuzha, Ernakulam–Fort Kochi, Ernakulam–Vypin (all operated by SWTD), and the Vypin–Fort Kochi ferry route managed by the Kochi Municipal Corporation. The performance evaluation was based on 2,443 commuter responses collected through detailed questionnaires. Survey sections covered socio-demographic details, activity and trip characteristics, user satisfaction, and attitudinal data. A willingness survey was also conducted to evaluate commuters' readiness to continue with water-based transport, especially when faced with changes in cost or frequency.

To systematically evaluate user satisfaction and identify priority areas for improvement, the Importance–Performance Analysis (IPA) technique was applied. This method categorized

29 sub-factors under eight key themes and plotted them into four quadrants: high importance/high performance, high importance/low performance, low importance/low performance, and low importance/high performance. Critical areas identified in the second quadrant—high importance but low performance—require urgent attention and resource allocation to enhance system efficiency and user satisfaction.

The findings of the study reveal that while water transport in Kochi offers time and cost benefits over road travel, especially in traffic-prone zones, the shift toward the Water Metro and ferry systems is still modest. Barriers such as limited connectivity, frequency issues, and user perception of convenience continue to influence commuter choices. However, the availability of reliable data on latent commuter preferences offers policymakers a valuable opportunity to improve water-based services.

In conclusion, the Kochi Water Metro and existing waterway routes present a promising, eco-friendly solution to urban mobility challenges. With strategic investments in service quality, connectivity, and commuter experience, water-based public transport in Kochi can be significantly optimized. The insights from this evaluation should inform future transport policies and help stakeholders align infrastructure development with user expectations and behavioral trends.

ROAD CONSTRUCTION MATERIALS AND PAVEMENT EVALUATION STUDIES

1. *Laboratory Investigation of Bituminous Porous Mix*

PI: Shri. Jegan Bharath Kumar A, Scientist
Duration: 2021-24

Porous asphalt mixtures include binder, additives and a high share of coarse aggregate with a small quantity of fines, which has a high percentage of permeable air voids (15–20%) that allow water to penetrate through the material. The main objective of the study is to evaluate functional behaviour of porous asphalt mix (Permeability and Clogging behaviour) using different anti clogging agent. The scope of the study is limited into determination of the performance and internal pore structure characteristic of porous asphalt mixes made using Polymer Modified Bitumen - 40 (PMB-40). Furthermore, the mix's performance was compared across different gradations (Type I and Type II) and compaction levels (35 and 50 Blows). The performance assessment of porous asphalt mixes is confined to stability, indirect tensile strength and rutting. Two different aggregate gradations G1 & G2 were studied, the aggregate size and the percentage proportion of the respective gradation type are adopted as in ASTM D7064. Different range of particles are used as clogging material as Type A, Type B, and Type C based on the sizes. For OBC mixes with 35 blows of compaction, the permeability value varies as Type B < Type C <Type A, while for mixes with 50 blows of compaction, the permeability value varies as Type B < Type C < Type A. The permeability of the porous mix will increase by 0.08% for samples compacted at 35 blows and 0.1% for samples compacted at 50 blows during declogging when compared to clogging. Moreover, for stability characteristics of Porous Asphalt mix under different compaction levels, when changing from 35 to 50 levels in dry condition there is an increase in stability of 36% was observed. Hence infer that compaction level affects the stability performance of PA mix. It is due to the reduction in number of air voids as compaction level increases, infiltration of water through pores is reduced which results in higher stability value. Rutting or permanent deformation characteristics under different moisture conditionings shows that maximum rut depth is obtained for conditioned samples comparing to dry samples. For 35 blows compaction level there is an increase in rut depth of 16.01 % and 19.3% under varied moisture conditions as per ASTM D 1075 and ASTM D 7870. Similarly for 50 blows it is 33.38 % and 35.89 % respectively. Under different compaction levels, when changed from 35 to 50 level there is a reduction in rut depth of

26.34 % is occurred in dry conditioning while it is 7.27% MIST conditioning. The pore structure characteristics of porous asphalt mixes were analyzed through image analysis, leading to the determination and examination of parameters such as air void connectivity and Percolation number. These findings were compared with the experimental test results and are consistent with the observed values.

2. *Evaluation of Moisture Susceptibility of Asphalt Mix using Admixtures*

PI: Shri.Jegan Bharath Kumar A, Scientist
Duration:2020-24

Moisture damage in Hot Mix Asphalt (HMA) pavements poses a significant threat to the structural integrity and longevity of road infrastructure. This type of distress occurs when water infiltrates the asphalt layers, leading to reduced pavement performance and increased maintenance costs. The major objective of the study is to investigate the impact of admixtures on the moisture sensitivity of asphalt mixes with various compaction levels. Besides that, to assess the performance of mix by indirect tensile strength, stability tests and rutting test was performed. The HMA mix is subjected to different moisture such as dry and wet conditions in accordance with ASTM D 1075 and AASHTO T 283 and ASTM D 7870. Moreover, the analysis of air void structure is done using high-quality high-resolution images. A widely used digital scanning method for image acquisition is X-ray CT scanning. Images of the HMA mixes were obtained using X-Ray Computed Tomography Technique.

The volumetric properties of the bituminous mix were assessed under varying compaction levels in both dry and wet conditions. The results indicate that the bulk specific gravity is not significantly affected by the wet condition. Among the volumetric properties of the bituminous mix, air voids were identified as the most significant parameter with a 95% confidence level. When the compaction temperature decreases from 150°C to 130°C, the Marshall stability exhibits a reduction ranging from 3% to 25% in dry conditioned samples and 6% to 35% in wet conditioned samples. Similarly, decreasing the compaction level from 75B to 35B results in a decrease in Marshall stability, with reductions of 26% to 42% in dry conditioned samples and 29% to 41% in wet conditioned samples. When the compaction temperature decreases from 150°C to 130°C, the ITS value exhibits a reduction ranging from 15%-45% in dry conditioned samples and 13%-41% in wet

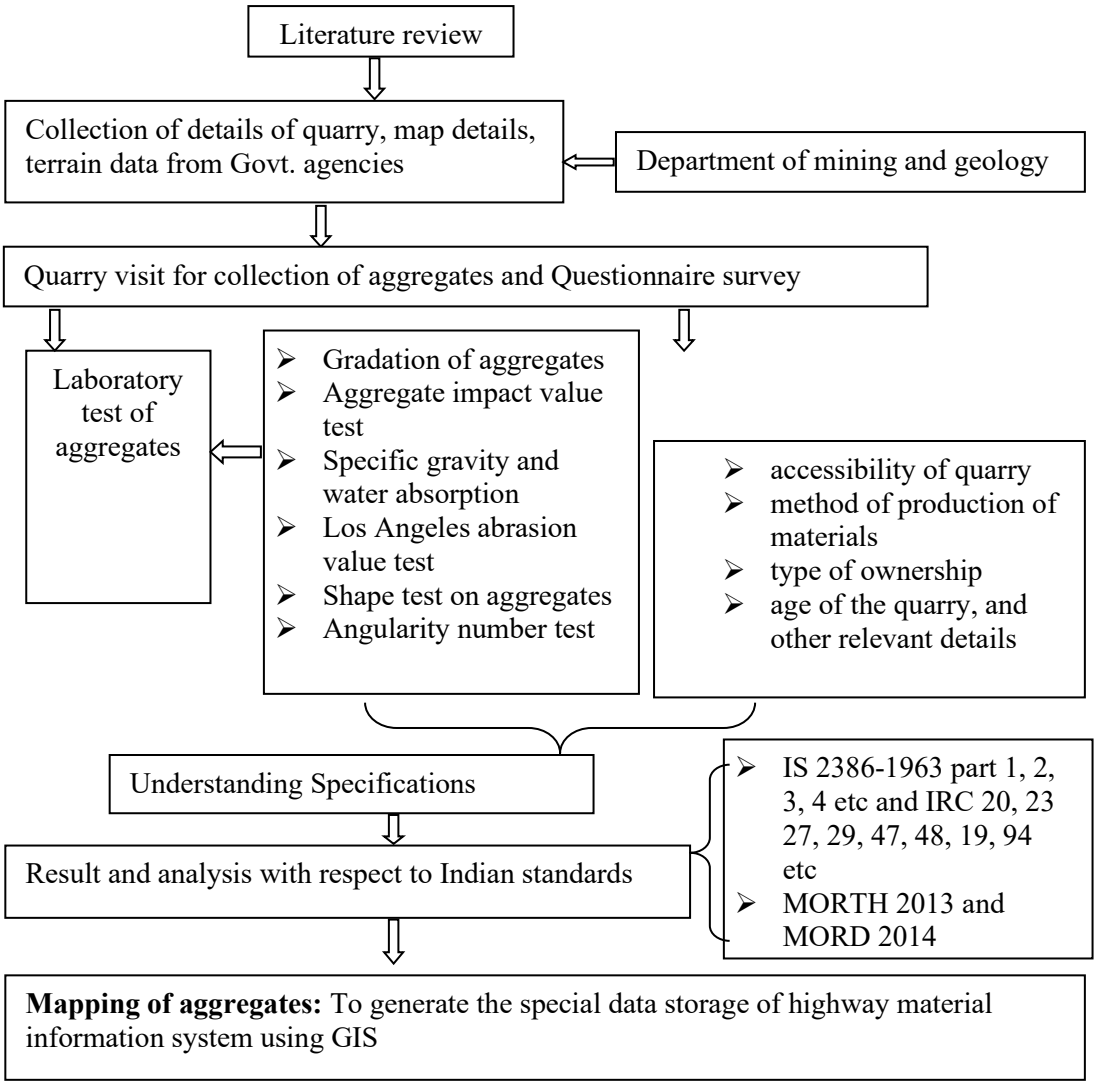
conditioned samples. Similarly, decreasing the compaction level from 75 to 35 blows results in a decrease in ITS value, with reductions of 26% to 42% in dry conditioned samples and 29% to 41% in wet conditioned samples. From the rut test, as the compaction temperature increases from 130°C to 150°C, the rut deformation of both dry and wet-conditioned samples of all phases decreases at a percentage of 2% to 40 %. Compared to samples compacted at 130°C, those at 150°C had less rut deformation. Similarly increase in compaction level from 35 to 75 blows, the rut deformation of both dry and wet-conditioned samples of all phases decreases at a percentage of 17% to 45%.

3. *Resource mapping of Road construction materials in Kerala – Phase II*

PI: Shri. Chandra Prathap R, Scientist
Duration: 2019-24

The mining of aggregates is increasing with increasing demand in infrastructure projects. This led to the resource exploitation. The government implements periodic regulations and restrictions to reduce resource exploitation. But this alone will not create much difference. Therefore, it is necessary to have a proper planning system to show economically viable materials. It is possible by mapping the distribution of aggregate sources and other locally available materials for pavement construction. Mapping of resources helps to determine the source, distance, quantity, and quality of resources. The mapping of aggregate resources will also help in understanding the accessibility and size of the quarry.

Geographical Information System (GIS) can store information systematically and compactly using software like QGIS and ArcGIS. QGIS store the characteristics of aggregates from different quarries in separate datasets by converting them to a shape file. If these results are made available to the public, it will help in quality aggregates selection for pavement.



Methodology

The present work concentrates on five districts in Kerala- Thiruvananthapuram, Thrissur, Kottayam, Ernakulam and Idukki. The aggregate tests conducted on samples include those concerning strength, durability, water absorption, and particle shape. The aggregate for use in pavement layers were tested for satisfy with MoRTH and MoRD criteria. The aggregates of 25 out of 30 quarries conform to MoRTH- criteria in Thiruvananthapuram district. Similarly aggregates from 33 out of 37 quarries conform to MoRTH-criteria in the Kottayam district. The samples of 2 quarries do not satisfy MoRD criteria in Thiruvananthapuram district whereas all the quarries in Kottayam district satisfy MoRD criteria. There are no quarries in Thrissur not satisfying any criteria of MoRTH and MoRD. The characteristics of samples not conforming to aggregate test criteria of MoRTH and MoRD should require a check concerning Marshall Stability and indirect tensile strength of the bituminous concrete mix. These samples are usable once they satisfy the criteria for Marshall Test and ITS. GIS mapping includes the quarry details, aggregate test results,

and suitability in different pavement layers for 9 districts. The nearest quarry to a road segment was identified using QGIS and ArcGIS software.

Mica, Magnetite, Quartz and Albite minerals present in the aggregates affects the strength based parameters mainly water absorption and is indirectly affected by Biotite and Feldspar due to their influence on AIV and LAAV

4. *Investigation on pavement deterioration due to overloading of vehicles*

PI: Shri. Chandra Prathap R, Scientist
Duration: 2022-25

Increase in transportation demand causes pavement to support heavier traffic loads. Flexible pavements are made up of multiple layers with different characteristics that can distribute and withstand dynamic stresses. Axle loading has a significant impact on how well a pavement performs. One of the main factors affecting the performance of pavement is overloaded vehicles. The service life of flexible pavement may be reduced. In addition to impairing the pavement structure's ability to support loads, overloading accelerates the deterioration of the pavement by causing fatigue cracking, rutting, and deformation. Additionally, the enormous stress and strain overloading places on pavement layers can cause early failure and safety issues.

The study concentrates on four highway sections of Kerala. The study aims to assess the influence of overload on the Vehicle Damage Factor (VDF) by examining variation in the factor under different scenarios of loaded vehicles percentages. Five scenarios were considered for the analysis and the most favorable and worst scenarios are identified. The study made use of IITPAVE to calculate the fatigue strain and rutting strain of the observed field pavement thickness and compares it to the allowable fatigue and rutting limit as per IRC 37. This was done for all the five scenarios and the worst and best scenario was identified. The shift in axle loading at gradient is studied and its effects on the pavement damage are assessed in terms of VDF, fatigue strain and rutting strain. Rising slopes of 3%, 5%, 7%, 9% and 11% and overloading percentages of 5%, 10%, 20%, 30% up to 80% was considered. Increase in slope has impact on service life of pavement. For higher slope values a considerable reduction in service life was observed.

(a)

(b)

(c)

(d)

Pavement Distresses observed in the study site – (a) Longitudinal crack – Medium severity; (b) Edge crack – High Severity; (c) Potholes – Medium Severity and (d) Alligator crack – Low Severity

5. *Characterization of Flowable Fills Incorporating Industrial By-products*

PI: Dr. Salini U, Scientist
Duration: 2021-24

Controlled low-strength materials (CLSM) are typically utilized in backfill applications where soil compaction poses a challenge. This cementitious mixture is composed of water, cementitious material, and fine aggregate or filler, creating a self-compacting slurry. In below-grade scenarios, such as utility trenches, CLSM is a popular choice due to its low strength and ease of placement. This study investigates the potential of utilizing concrete waste, quarry waste and fly ash in the production of controlled low-strength materials (CLSM). Fly ash and quarry waste were mixed in various proportions and the properties of the mix were studied in both fresh and dry states. Cement in low proportions was used as a binder. Flowability, bleeding, density, settlement, air content, pH, and electrical

resistivity of the mix was studied in their fresh state. Results indicate that the flowability of the mix was enhanced by the addition of quarry waste. However, incorporating higher amounts of quarry waste caused the mix to exhibit more bleeding, leading to greater settlement. But the inclusion of concrete waste reduces the water demand and mitigates bleeding in CLSM, thereby enhancing the overall stability of the mix. Moreover, CLSM compositions exhibit densities akin to the density of sand. Unconfined compressive strength, water absorption, density, SEM, and XRF analysis were performed on hardened samples. Unconfined compressive strength tests were performed on the various mix proportions of the samples at 1, 7, 14, and 28 days. The CLSM samples were found to have a low strength of 0.08 to 0.35 MPa at 28 days and hence suitable for use as an excavatable material. The addition of 10% and 20% of concrete waste led to substantial increases in unconfined compressive strength (UCS) and split tensile strength, reducing weight loss during durability tests. The formation of pozzolanic hydration products, particularly in mixes with higher fly ash content, was identified as a key factor contributing to strength development, while increased friction between particles of quarry waste further increased the strength and the same has been confirmed using scanning electron microscopy (SEM) and X-ray diffraction (XRD) analysis. A recommended mix of 50% quarry dust, 30% fly ash, and 20% coarse aggregates achieves 1 MPa strength at 28 days, making it ideal for field applications like backfilling, structural fills, and utility bedding. CLSM's versatility extends to erosion control, void filling, and sub-base layers for roads and bridges.

Flowability Measurement from the spread diameter

6. *Stabilisation of pavement layers with the use of Reclaimed Asphalt Pavement (RAP) confined in coir geosynthetics*

PI: Dr. Salini U, Scientist
Duration: 2021-24

The base course in pavement construction is crucial for the stability and longevity of roads. Traditional methods rely on conventional aggregates, which significantly deplete natural resources. This study explores the use of Recycled Asphalt Pavement (RAP) and Construction and Demolition (C&D) waste as alternative base course materials to address environmental concerns and resource scarcity. Although previous research has examined synthetic geosynthetics for reinforcing base courses, there has been limited investigation into the use of coir geocells for this purpose. Coir geosynthetics offer advantages in sustainability, cost-effectiveness, and local availability. This study evaluates the performance of base course layer reinforced with coir geocells. The performance of coir geocell reinforced base course with conventional natural aggregates is compared to that of RAP, and C&D waste as infill material in coir geocells. The methodology involves a comprehensive literature review, experimental investigations, parametric studies, cost analysis, and load-carrying mechanism evaluations, culminating in recommendations for optimal use and future research directions. Monotonic plate load tests, were utilized to investigate the behavior of coir geocells, demonstrating their suitability as pavement materials. Interim results demonstrate that coir geocell reinforcement significantly enhances pavement base course performance, with improvements in ultimate bearing capacity, reduced surface and subgrade heave, and minimized settlement transfer to subgrade layers. Laboratory tests revealed a 16.6% increase in bearing capacity, reduced subgrade settlement, and improved stress distribution, underscoring the effectiveness of coir geocells in enhancing RAP-based pavements. The significance of this research lies in its potential to provide a cost-effective and sustainable alternative to synthetic geosynthetics, particularly for resource-constrained regions. By reinforcing RAP with coir geosynthetics, the study contributes to climate-resilient and eco-friendly infrastructure development, aligning with Kerala's environmental and waste management challenges.

Test section

7. *Effect of permeability on the performance of bituminous mixes*

PI: Shri. Wilson K C, Senior Scientist
Duration: 2023-25

Water infiltration into asphalt pavements can lead to moisture damage, primarily by weakening the cohesive bond between binder particles and the adhesive bond between binder and aggregates. Measuring the permeability of Hot-Mix Asphalt (HMA) mixtures is essential to assess water ingress into pavement layers. This engrossed moisture can initiate and propagate pavement distress, adversely affecting the structural integrity and functional performance of the pavement; ultimately reducing the service life. Present study investigates the impact of permeability on the performance of bituminous surface courses, specifically Bituminous Concrete (BC) and Stone Matrix Asphalt (SMA), incorporating various fillers such as quarry dust, cement, and lime and binders such as VG 30 and VG 40 and NRMB 70.

Marshall specimens at 4% and 7% air voids were prepared in laboratory for the determination of indirect tensile strength (ITS), tensile strength ratio (TSR), coefficient of vertical permeability (kv) and air void topology at optimum binder content. ITS dry testing followed Asphalt Institute MS II; wet conditioning for adhesion failure and pore-pressure were applied by MIST. FM 5-565 procedure was adopted for the measurement of coefficient of vertical permeability as per falling head principle, followed by X ray CT scanning of specimen. Test results indicated that the permeability of all mix combinations was below the critical value. Among the tested fillers, lime was found to be the most

effective in reducing permeability. Analysis of the permeability coefficient in relation to TSR and ITS indicates an inverse relationship between the coefficient of permeability.

In the case of BC mixes, MIST conditioning resulted in an increase in the vertical permeability coefficient (k_v) by more than 100%, and in some instances up to 200%, particularly for mixes incorporating VG 30 binder with Dust and Cement fillers. This substantial increase suggests that the pore pressure generated during conditioning significantly alters the internal void structure, enhancing permeability. The remaining analyses are ongoing.

8. *Effect of Salinity on the Performance of Bituminous Mixtures*

PI: Shri. Wilson K C, Senior Scientist
Duration: 2022-24

Understanding the impact of sea water on the performance of bituminous mixtures is essential for the proper design and maintenance of pavements in coastal areas. The active ions in sea water such as chlorides, sulphates, sodium, etc. could impart deterioration in the inherent properties of mix constituents, especially surface course mixes and finally the performance and durability of pavement. Therefore, the effect of seawater on the performance of bituminous mixtures are taken into account, giving due consideration to the pore pressure effect.

Primary objectives of the study are to investigate the effect of seawater on the properties of bituminous mixture with and without additives after conditioning the samples in a Moisture Induced Stress Tester (MIST). The secondary objective is to compare the effect of salinity on Bituminous Concrete (BC) and Stone Mastic Asphalt (SMA) mixtures. The objectives are achieved by conducting experiments and examinations on laboratory samples prepared as per Marshall method of mix design, complying the mix gradations from MoRTH. Aggregate samples are collected from local granite quarry in Thiruvananthapuram and binder grades adopted are VG 30, VG 40 and NRMB 70. Suitability of aggregates and binders were verified by Indian standard procedures. The mix is also modified with fillers like Cement and Lime.

Apart from IS test procedures, aggregates and fillers were subjected to X-ray fluorescence (XRF) spectroscopy to know the minerology and thereby making a primary inference on

the moisture susceptibility of mix. Test results showed silicious nature and hence hydrophilic aggregates. Furthermore, mix performance is evaluated by conducting indirect tensile strength (ITS) and tensile strength ratio (TSR) of mix compacted to 7% air voids, with and without MIST conditioning; with and without replacement of fillers. MIST conditioning is done with sea water and normal water for comparing the degree of deterioration. ITS and TSR decreases for sea water conditioned samples. Mixes which failed to meet 80% TSR is modified with Zycotherm additive and verified its effect as anti-stripping agent. Also, boiling water test replicated the stripping susceptibility.

From the test results, Lime could produce the highest ITS, particularly under seawater conditions, due to its higher CaO content. TSR values are generally above 80% when conditioned with normal water, but drop below this threshold under seawater exposure. In case of BC mix, VG 40 and VG 30 binders perform better than NRMB 70. The addition of Zycotherm significantly improves the TSR values and ITS mixes exposed to seawater. Lime, in particular, demonstrates the highest TSR values with Zycotherm, indicating its effectiveness in resisting seawater-induced damage. In case of SMA, NRMB 70 is able to provide highest ITS among the binder grades after dry and wet conditioning and along with Zycotherm possible resistance offered against sea water deterioration is found effective with VG 40 binder.

INNOVATIVE PROJECTS

1. *Intelligent Transportation System (ITS) Cell – Driver Rating System*

PI: Shri. B Anish Kini, Scientist
Duration: 2021-24

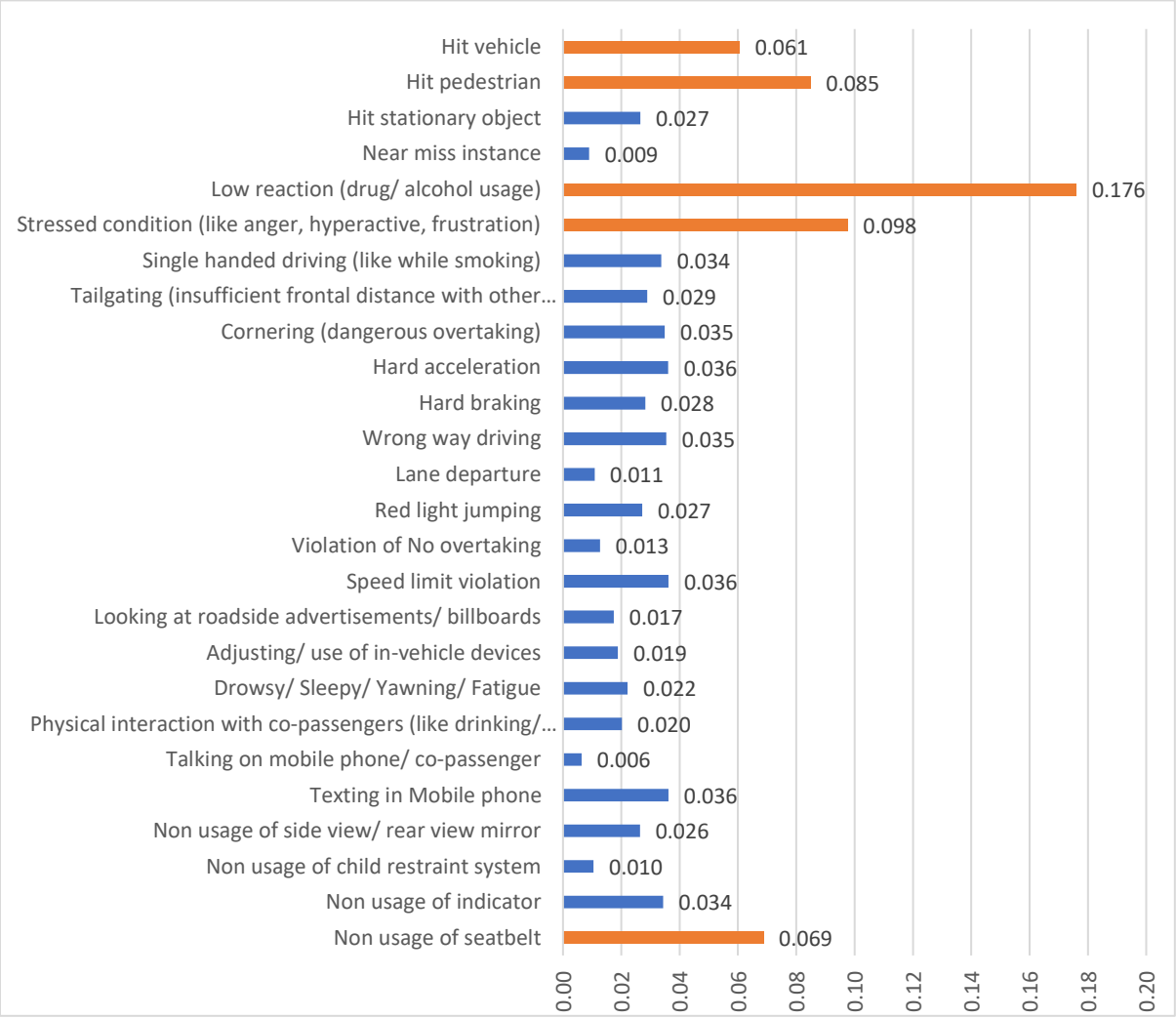
The proliferation of Advanced Driver Assistance Systems (ADAS) and Driver Monitoring Systems (DMS) in modern vehicles represents a significant advancement in automotive safety technology. These systems offer a wide range of functionalities aimed at enhancing driver awareness, preventing accidents, and ultimately saving lives on the road. However, the effectiveness of these systems is often hindered by the lack of standardization across different vehicle manufacturers, leading to inconsistencies in performance metrics and evaluation criteria.

In response to this challenge, this study presents a comprehensive methodology for standardizing ADAS-DMS systems and implementing a robust driver rating mechanism. Through a thorough analysis of existing systems, key criteria and sub-criteria related to driver behaviour are identified, covering aspects such as non-usage of safety devices, distracted driving, violation behaviour, driving behaviour, and involvement in risky instances/crashes.

To prioritize these criteria, the Best Worst Method (BWM), a Multi-Criteria Decision Making (MCDM) technique, is employed. By soliciting expert judgments and conducting pairwise comparisons, the relative importance of each criterion is determined, allowing for the development of a standardized driver rating mechanism. 27 responses were received. Consistency in expert/ user opinions was checked and the experts were asked to revisit their responses if inconsistency was observed. The consistent weights were averaged to determine the local weightage. The global weightage, shown in Figure below, of each sub-criteria is obtained by multiplying the local weights with the weights of the main criteria under which the sub-criteria fall. These global weights serve as a standardized metric for assessing driver safety in a comprehensive manner using all 26 sub-criteria.

The proposed approach aims to establish consistent evaluation criteria and rating methodologies, thereby enabling stakeholders to make informed decisions, improve driver

training programs, and promote a culture of good driving practices. By fostering interoperability and collaboration among industry stakeholders, this standardization effort contributes to the advancement of automotive safety standards and paves the way for future innovations in driver assistance technologies. Ultimately, the implementation of standardized ADAS-DMS systems and driver rating mechanisms holds the potential to significantly enhance safety, efficiency, and accountability in the automotive industry, ushering in a new era of safer roads and improved driver performance.



Global weights for 26 sub-criteria

2. *Study on effect of Dynamic Speed Display Boards on Driver Behaviour at Blackspots and Critical Locations*

PI: Shri. Subin B, Senoir Scientist
Duration: 2021-25

Dynamic Speed Display Board is a standalone compact device which works on solar/ battery powered module with GSM internet connectivity for cloud-based data storage and command control. This device once placed on road, it will display the speed of the oncoming vehicle. It is having the facility to showcase messages along with the speed of the vehicle. For vehicles plying over the posted speed limit, it will display the speed of approaching vehicle in red color along with customized message such as over speed, slow down etc. In addition, it will also flash a strobe lighting which can easily attract attention of drivers to the board and take necessary action to reduce their speed.

The goal of the study is to analyse and quantify the effectiveness of DSDB in speed reduction compared to posted speed limit sign boards. The following are the identified objectives for the project:

1. To study the various factors which influence the over-speeding tendency of drivers;
2. To investigate the effects of Dynamic Speed Display Boards (DSDB) on driving behaviours in accident-prone areas and critical locations;
3. To compare and quantify the efficacy of DSDB in speed reduction with conventional speed reduction warning boards;
4. To analyse the role of driver-related factors on the impact of DSDB using the Questionnaire survey method.

The scope of the study is limited to the application and evaluation of the DSDB signs in various black spot locations and crash-prone locations under different category roads in Kerala. Three scenarios were considered. In first scenario, prevailing speed conditions were assessed and in the second stage, data was collected after installing the posted speed sign. In third stage, the speed data was collected after placing DSDB along with posted speed sign. Overall, both speed limit sign boards and DSDB helped to reduce over speeding behaviour. In addition, ANOVA test results showed that the DSDB were more effective than the conventional posted speed limit sign boards.

The study focuses and is limited to the installation and assessment of Dynamic Speed Display Boards (DSDB) in crash-prone areas and identified black spots along a straight 80 km stretch of SH-1, from Vetturoad to Adoor, which is the first safe corridor demonstration project in Kerala, funded by the World Bank.

The descriptive statistics of spot speed data which was collected from the study stretch shows that before introducing any speed control measures, the average speed of two-wheelers was 59.85 km/hr, which exceeded the speed limit. The speed limit sign board reduced this to 58.77 km/hr, and the DSDB effectively reduced it to 49.26 km/hr. For three-wheelers, the initial mean speed was 47.44 km/hr, with a small reduction from the sign board (46.88 km/hr) and a larger drop with the DSDB to 42.01 km/hr. For cars/jeep/van, the initial mean speed was 55.52 km/hr, which was slightly reduced to 54.85 km/hr by the sign board and further reduced to 53.42 km/hr by the DSDB. LCV, the initial mean speed 54.63 km/hr, which was slightly reduced by the sign board to 54.18 km/hr, with the DSDB bringing it under the speed limit of 48.10 km/hr. Moreover, the heavy vehicles had an initial average speed of 54.68 km/hr, which was slightly reduced to 54.38 km/hr by the sign board and further reduced to 49.18 km/hr with the DSDB, bringing them closer to the speed limit.

The results shows that 76.2% of two-wheelers were travelling at speeds greater than 50 km/hr before the installation of speed limit signs, which was reduced to 74.3% after. Following the implementation of DSDB, the percentage of over speeding two-wheelers decreased to 45.3%. In the case of three-wheelers, the percentage of over speeding is 51.3% without controls measures, 50.8% with posted signs board, and drops significantly to 24.7% with DSDBs. Cars/jeeps/vans have the highest over speeding rates overall, with 78.5% without controls and a significant reduction to 42.3% after DSDB installation. LCV also shows a positive impact, with over speeding decreasing from 64.4% without controls to 41.2% after DSDB installation. In the case of heavy vehicle 70.2% were crossing the speed limit in the absence of speed control measures. After the installation speed limit sign boards, it reduced to 67.5% and further decreased to 47.3% after installing DSDB.

The ANOVA tests was performed at 5% of level of significance to determine if there exist any statistically significant differences in the mean speeds between the three scenarios for each vehicle category. The p-values (Sig.) for all vehicle types are less than 0.05,

indicating strong evidence against the null hypothesis. This means that there is a significant difference in the mean speed of each type of vehicle across the three scenarios.

The results demonstrate that Dynamic Speed Display Boards (DSDB) are more effective than posted speed limit signs in reducing speed tendencies across all vehicle types, including two- and three-wheelers, cars, LCVs, and heavy vehicles. Unlike speed limit signs board, DSDBs actively engage drivers by displaying their actual speed in real time. This feedback increases drivers' awareness, prompting them to consciously monitor and adjust their speed to stay within the posted limit.

SEED FUND PROJECTS

1. *Effect of forced gap behaviour on capacity unsignalized intersections*

PI: Dr. Praveen P S, Junior Scientist
Co-PI: Shri.Ashik K Azad, Junior Scientist
Duration: 2023-24

A manually controlled or an intersection without any signal control is referred to as unsignalised intersection. Unsignalised intersections are potential locations of accidents, especially in developing countries like India where heterogeneous traffic is prevailing and regulations are not strictly followed. Under heterogeneous traffic conditions prevailing in India, when minor road vehicles aggressively cross the conflict area of unsignalised intersection, major road vehicles are sometimes forced to slow down. Rules of priority are not strictly followed at conflict area of the intersection under heterogeneous traffic conditions. Aggressive behaviour of a vehicle from a lower-priority stream (minor road) to make an entry into a higher-priority stream by forcefully reducing the speed of vehicles on the major road to create a gap is termed as forced gap behaviour. The aggressive behaviour of drivers who clears intersection conflict area by forced entry increases the capacity of movement but at the expense of safety at the intersection area. Forced gap behaviour affect capacity of intersections and safety which may require corrective measures relating to intersection design and enforcement. The project studied the effect of forced gap behaviour on capacity at unsignalised intersections at base and non-base intersections. In this study speed variation was used as the basis to quantify forced gap behaviour at base and non-base intersections. The study quantified the influence of speed bump installation on forced gap behaviour of minor road vehicles.

2. *Augmentation of ridership for Kochi Metro Rail through various transit supportive policies*

PI: Dr. Vasudevan N, Junior Scientist
Co-PI: Dr.Anila Cyril, Junior Scientist
Duration: 2023-24

In the last two decades, many Indian cities implemented Metro Rails as mass transit system to attract the choice riders. Major Indian metropolitan cities such as Delhi, Mumbai, Chennai, Bangalore, Hyderabad etc. has implemented Metro rails for their convenient mobility. However, some of the cities found a decline in the ridership of Metro. The

reasons as literature suggests, are attributed to psychological, economical, social parameters. Kochi city in the Indian State of Kerala is selected as the study section and Kochi metro rail system is emphasized in the present study wherein the ridership was not reached up to the expected level. The present work envisages the investigation of choice behavior using Integrated Choice Latent Variable (ICLV) modeling based on the data obtained from a face-to-face interview survey.

The study tried to prioritize a few transit policies in line with TOD concept which are aimed to augment the ridership of metro. The perception on metro usage in different levels are obtained from two-wheeler, auto-rickshaw, car and bus users belonging to the city of Kochi, India. Integrated Choice and Latent Variable (ICLV) method was used to understand the underlying factors of the resistance behavior towards metro use. Connectivity to metro stations, fare and journey time aspects of metro, convenience in using metro and psychological parameters of individual in using metro was analyzed as latent class factors with the help of various measurable indicators. The influence of socio-demographic and economic factors on metro usage was established through ICLV models. It was found that the first-to-last mile connectivity significantly influences the choice of metro for commuting. The parking facility at the metro station was observed to be inadequate, which negatively influenced the park and ride facility for two-wheeler and car users. Further, the existing fare of metro is high and found significant from the model which influenced the two-wheeler and bus users negatively. The inconvenience of making multiple trips by metro significantly influences the choice-riders.

By considering these factors, the study developed a few transit policies that enables to resolve the issues faced in choosing metro as the main mode of travel. Eight policies were developed that cover first-to-last mile connectivity, parking, augmentation of network coverage, integrated digital ticketing for seamless connectivity, urban space development etc. The developed policies were discussed with the metro authorities and were entrusted to do the prioritization of the policies. Towards this, a best-worst method was adopted to estimate the weightage of each policy. Experts from various metro organizations and academicians who have experience in the area of transit policy development participated in the survey. Based on the responses the weightage of each policy and the consistency ratio was estimated. It was found that the improvement of feeder services ranked top priority followed by integrated digital ticketing system, augmentation of network

connectivity, parking facility, provision of skywalk at metro stations, revised fare table, enhanced directional boards at stations. The least priority was obtained for the development of activity places at metro stations.

In nutshell the outcome of the study enables the authorities to prioritize the transit policies for implementation. However, the economic and environmental aspects in implementing the policies on the network level were not covered in the study and can be considered as the future scope of the study.

3. *Strength and behaviour of hybrid fibre reinforced high performance concrete*

PI: Dr. Himasree P R, Junior Scientist
Duration: 2023-24

A study was carried out with an objective to develop a hybrid fibre-reinforced high-performance concrete of better strength and durability characteristics. Considering the sustainability aspect, cement was partially replaced by GGBS (upto 70%). The study found that as the particles of GGBS are finer than cement, the consistency of the mix containing cement and GGBS increases. The initial and final setting times of the mix were found to increase with the increase in the percentage of cement replaced with GGBS. As percentage of GGBS in concrete increases from 0 to 50%, strength of mortar increases and there after it was found to decrease due to the presence of unreactive GGBS in the mix. It was observed that in the case of concrete specimens with 100% cement content, maximum strength was observed at 28 day and after that there was no significant increase in the strength. Whereas a significant increase in strength was observed even after 28 days of curing (at the 56th day) for the specimens containing GGBS of specimens. This indicates the progressive strength development in concrete by the inclusion of GGBS in concrete. The mix design of M35 and M40 grade concrete has a cement requirement of 425.8kg/m3 and 467.3kg/m3. It was found that the replacement of 30, 50 and 70% of cement with GGBS could reduce the cement requirement to 314.3, 224.5 and 134.7kg/m3. Replacing cement with GGBS not only leads to sustainable and cost-effective construction but also it improved the strength of concrete from M35 grade to that of M40 grade. It was also noted that the mix containing 50% GGBS showed better flexural strengths indicating its efficiency in using for flexural elements. This confirms that the special concrete developed can be considered as an ecofriendly and sustainable alternative for all structures as per the

IRC guidelines as the minimum strength specified for them is 40MPa. The properties of concrete, especially its flexural strength was found to improve with the use of fibres in concrete. The designed mix containing 0% GGBS content was less durable compared to those with GGBS. The mix containing GGBS were more durable and stronger compared to the mix without GGBS. No significant reduction in the strength was observed on the specimens containing GGBS tested after 28 days of curing followed by 28 days of immersion in liquid for durability study. This also indicates the improvement in the durability characteristics of this special concrete developed. The durability properties of various mixes indicate that the mix containing 50% GGBS possess better durability properties compared to other mixes. It was also observed that mix containing 30% GGBS was more durable in acid attack compared to the mix containing 50% GGBS. Hence it can be used in places subjected to acid rain or chemical industrial areas.

4. *Route rationalization of KSRTC city circular services of Thiruvananthapuram City*

PI: Dr. Anila Cyril, Junior Scientist
Co-PI: Dr. Vasudevan N, Junior Scientist
Duration: 2023-24

The economy's public transportation sector has a significant impact on both population welfare and the growth of many other sectors. City Circular Service is a cutting-edge transportation system that connects to all important routes inside Thiruvananthapuram City and is also very cost-effective. In the beginning, KSRTC only offered circular services in city places. The distinguishing quality of this mode of transportation is that each colour represents a different city circular service. The area served within 0-500m and 500-800m by each service (both clockwise and anticlockwise) was found by service area analysis by taking willingness to walk as the size of the catchment area. Given that Thiruvananthapuram Corporation has 100 wards with a high population density and a significant demand for public transportation, this circular service may one day be expanded over a large area. Therefore, this study mainly aims to rationalize the circular routes. Before doing the route rationalization, it was necessary to identify the region demanding circular service, transit suitability and centrality of the road network. Area demanding circular service and transit suitability lands were identified with the help of Multi Criteria Analysis and weighted overlay analysis. Centrality measures were done to identify the possible locations of bus stops, efficiency of road network and to analyse the locations of

circular services bus stop. The route rationalization was done by computing the travel demand of existing circular service and also by computing ward to ward travel demand. A new route was created and the locations of bus stop in both clockwise and anticlockwise direction were defined. The Air Rail service is suggested to maintain minimum frequency along the route as it is having very low demand.

5. *Performance evaluation of new technology initiatives in low volume roads*

PI: Shri. Ashik K Azad, Junior Scientist
Co-PI: Shri. Shijith P P, Junior Scientist
Duration: 2023-24

Low-volume roads play a crucial role in providing essential transportation connectivity to rural and remote areas. Low volume road has its own significance, as, out of India's total road network (4.69 million km), the village and other district roads account for an 80% share (MoRTH 2011). In Kerala, during recent years, low volume roads have been constructed using several non-conventional techniques with the objective of reducing the effective thickness of the layers coming over the subgrade as well as reducing the utilization of virgin aggregates. However, the performance of the low-volume roads constructed using these non-conventional techniques is hardly investigated. Understanding the performance of the road infrastructure is essential for ensuring that the road infrastructure is safe, efficient, and sustainable, and also to make informed decisions on budgeting and resource allocation.

In the present study, the functional and structural performance (by Falling Weight Deflectometer) of two low volume roads in which one road (Pennukara Kanal Jn Nettuvaramcode Road- Test Section-TS) was constructed by cement stabilized subgrade whereas the other road (Kodukulanji-Thyyilpadi-Athalakkadav Road- Control Section - CS) were constructed using conventional method, was evaluated. Based on the analysis, it was found that the remaining pavement life (based on 80% reliability) of the Test Section Road were much higher than the Control Section Road, indicating longer life for the TS. On conducting the performance check, both TS and CS were found to be satisfactorily safe in terms of fatigue performance of bituminous layer and rutting performance based on subgrade layer. The use of innovative technologies has the potential to extend the service life of low volume roads, reduce maintenance costs and improve transportation accessibility for communities. In this regard, it is expected that the research findings will

contribute to the advancement of sustainable and cost-effective road infrastructure in rural and remote areas.

Measurement of Pavement Distress

Pavement Structural Evaluation using FWD

6. *Performance evaluation of Cold Recycled Mix Pavement in Kerala*

PI: Shri. Shijith P P, Junior Scientist
Co-PI: Shri. Ashik K Azad, Junior Scientist
Duration: 2023-24

This research investigates the performance evaluation of Cold In-Place Recycled Pavement (CIRP) in Kerala. Detailed pavement evaluation studies, including functional and structural evaluation, were conducted in the CIRP implemented in the NH66 in Malappuram district, Kerala. Falling Weight Deflectometer (FWD) and KGPBACK software were used to evaluate the performance of a CIRP road section by studying the deflection in response to the load applied at selected points on the highway. A conventional flexible pavement stretch was also identified near the CIRP stretch to compare the performance under the same traffic, terrain and climatic conditions.

7. *Evaluation on the Performance and Energy Requirement of Hot and Warm Stone Matrix Asphalt Mixtures*

PI: Dr. Goutham Sarang, Junior Scientist
Co-PI: Shri. Shijith P P, Junior Scientist
Duration: 2023-24

In India, Hot Mix Asphalts (HMA) are generally used in flexible pavements, which require a high amount of fuel consumption and cause emissions from the bitumen. Warm mix technology is considered more environmentally friendly than the HMA technology, due to the lesser energy requirement in the production of Warm Mix Asphalts (WMA) and the lesser emission of gases during its preparation. However, a quantitative evaluation of the

energy requirement for WMAs and HMAs has not been studied well by researchers, especially in gap graded mixtures like Stone Matrix Asphalt (SMA) mixtures. SMA has higher amount of coarse aggregates and mastic content (mineral filler and asphalt binder), leading to good resistance against rutting and skidding, and better durability, compared to conventional mixtures.

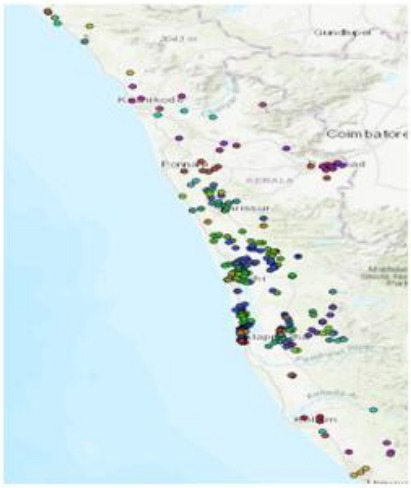
In this study, SMA mixtures were prepared using these both HMA and WMA technologies, and their performance was evaluated based on laboratory tests including drain down, volumetric and Marshall properties and moisture resistance. The WMA mixtures were prepared using a new/not reported chemical additive and the mixtures delivered satisfactory performance.

8. *Development of policy interventions for the efficient and sustainable freight distribution through Cochin Port*

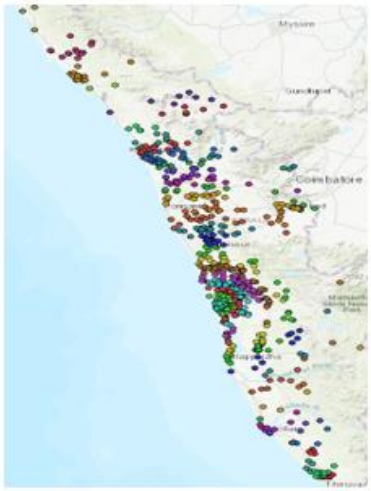
PI: Dr. Rameesha T V, Junior Scientist
Co-PI: Dr. Goutham Sarang, Junior Scientist
Duration: 2023-24

Kerala has a total length of 1,687 km long waterways. It includes 590 km of West Coast Canal (WCC) from Neeleswaram in the north of the State to Kovalam in the south. Even though Kerala has all the geographical advantages for utilizing the waterway network especially for the feasible movement of freight traffic, the major share of cargo movement is through trucks, except in National Waterway 3, where certain barges operate for movement of cargo from Cochin port to few industries. Hence understanding the mode selection behavior of shippers is necessary for the efficient movement of transport of cargo from port to its hinterlands and other minor ports. Present research work is a step in this direction, to investigate the necessity of shifting the cargo from land to water and to understand the choice preference of freight forwarders for the transport of shipments from port to its hinterland. Policy recommendations can be formulated based on the identified significant characteristics from model choice modelling to increase the modal share of cost effective, energy efficient and sustainable transportation of freight from Cochin port to its major hinterlands. The efficient movement of freight is a crucial aspect of modern supply chains. Choosing the appropriate transportation mode for freight plays a pivotal role in optimizing costs, reducing environmental impact, and ensuring timely deliveries. This proposal outlines a comprehensive approach to mode choice modeling for freight transport

through Cochin port to its hinterland and other minor ports, aiming to provide insights into the decision-making processes of shippers and carriers and also to investigate the necessity of shifting cargo from land to water.



Rubber and Plastic (NPCMS class 36)
Clusters:30
Silhouette score:0.239



Mechanical Products (NPCMS class 3755)
Clusters:30
Silhouette score:0.467

9. *Socio-Economic impact analysis of road traffic accidents*

PI: Dr. Sunitha Vijayan, Junior Scientist
Duration: 2023-24

The present study focuses on estimating the trend and pattern of claim disbursement in Motor Accident Claims Tribunals (MACT), the financial burden of Road Traffic Injuries (RTIs) due to catastrophic out-of-pocket expenditure and the effectiveness of motor accident compensation in mitigating the cost of Road Traffic Accidents in Thiruvananthapuram district. The study considers only Road Accident victims for whom motor accident claims were settled at the Motor Accident Claims Tribunals (MACT) in Thiruvananthapuram district during the year 2022, over the period from 1st January 2022 to 31st December 2022.

A negative trend for case filing and disposal and a positive trend for case pendency and caseload was evident at the Motor Accident Claims Tribunals (MACT) in Thiruvananthapuram district. The pattern of case disposal revealed the presence of a high proportion of low-income accident victims belonging to the unorganized sector with high injury severity. The long case disposal period for court award cases averaging six years, in turn, critically influences the distress financing and increased financial burden among the victims. The mean claim disbursed for the claim settled at Thiruvananthapuram district

during the year 2022 as per court method of road accident cost calculation was Rs. 104304 for minor injury accidents, Rs. 243571 for major injury accidents, Rs. 546875 for severe injury accidents and Rs. 1885561 for death cases.

The major factors influencing years taken for court award settlement were identified to be positively influenced by injury severity, inpatient days and percentage of disability. Around 58 per cent of the road accident victims suffered from catastrophic health expenditures due to road accident expenses, and around 20 percent of the road accident victims were driven to impoverishment and among them, 12 per cent were steered to extreme distress financial situation due to Road Traffic Injury associated expenses. Medical expense ($p<0.001$), non-medical expense ($p<0.001$) and road traffic injury severity ($p<0.001$) were observed to have a positive influence on COOP expenditure. On the other hand, the type of hospital ($p<0.004$) and level of income of the road accident victim ($p<0.001$) depicted a negative relationship with COOP at a higher significance level. With respect to the effectiveness of the multiplier method in mitigating the accident cost, the calculated BC ratio depicting the effectiveness of compensation was lesser than one on average for all road accident cases settled, and maintaining court expenses including the advocate remuneration, at seven per cent, was found to optimize the BC ratio towards one.

10. *Effect of segregating motorized two-wheelers on traffic flow characteristics*

PI: Smt.Ardra S Krishna, Junior Scientist
Duration: 2023-24

The traffic in developing nations is typically heterogeneous. Different types of vehicles with varying dynamic and static characteristics share the same road space without much segregation and control of speed. Two-wheelers are dynamically unstable among them and are easily injured since they operate on two wheels with less physical protection. They often tend to filter through the traffic and pass the stopped vehicles, which can increase the probability of a road crash. This makes them particularly vulnerable in heterogeneous traffic conditions. To safeguard this vulnerable group, dedicated lanes can be a potential solution, it also improves overall traffic conditions by segregating two-wheeler traffic from heavy vehicles. Dedicated lanes are in two types: Exclusive and Inclusive. Exclusive MTW lanes feature a separate carriageway dedicated solely to two-wheelers, separated

from other traffic by physical barriers. In contrast, Inclusive lanes are integrated within the carriageway, separated by road markings.

Exclusive MTW lanes

Inclusive MTW lanes

Some cities in Kerala have pilot projects or experimental MTW lanes. The corridor between Muvattupuzha and Vengalloor in Kerala is an example of such a notable experiment in this concept. As these types of facilities are rarely implemented in practice, this can be considered a case study to evaluate their effectiveness, operational performance, road user compliance, regional benefits, and the constraints and challenges encountered. This work aimed to give a general summary of Kerala's initial attempt to implement an inclusive MTW lane. The study examined the significance of the initiative in the context of Kerala, the advantages it gives to the region, and the constraints and difficulties encountered in the post-implementation phase. The traffic flow characteristics of the study stretch were analysed by establishing the speed-flow-density relationship, enabling both quantitative and qualitative assessments of performance. Spot speed characteristics of vehicles using the road facility were also analysed.

Photographs of the study corridor: Muvattupuzha and Vengalloor

The study concludes that inclusive MTW lanes improve the operational performance of two-lane undivided roads by increasing vehicle speeds and capacity. However, the presence of side frictions can significantly impact these benefits, leading to reduced efficiency and higher congestion. Implementing dedicated MTW lanes can enhance road safety and traffic flow, but careful consideration of roadside conditions is essential for optimal performance.

CAPACITY BUILDING AND TRAINING

a. Training Programmes Conducted

1. One-day road safety audit course for Kerala State Rural Roads Development Agency Engineers

NATPAC organised a one-day road safety audit course for Kerala State Rural Roads Development Agency (KSRRDA) Engineers on 24th November 2023 at GCDA Conference Hall, Jawaharlal Nehru International Stadium, Ernakulam. The inauguration of the programme was done by Shri.T.J.Vinod MLA, Kerala Legislative Assembly, Ernakulam Constituency.

Technical Presentations made during the Programme

Sl.No.	Name	Designation	Topic
1	Prof. (Dr.) Samson Mathew	Director	Introduction to Road Safety Audit
2	Shri. Shaheem S	Principal Scientist	Design Stage Road Safety Audit
3	Shri. Subin B	Senior Scientist	Construction Stage Road Safety Audit
4	Shri. B. Anish Kini	Scientist	Pre-opening Stage Road Safety Audit
5	Shri. Arun Chandran	Senior Scientist	Traffic Signs and Markings
6	Shri. S. Shaheem Shri. Subin B Shri. B. Anish Kini Dr. Praveen P. S Dr. Anila Cyril	Principal Scientist Senior Scientist Scientist Junior Scientist Junior Scientist	Case Studies & Counter Measures

Shri. T. J. Vinod MLA, Kerala Legislative Assembly, Ernakulam Constituency, inaugurating the one-day road safety audit course for Kerala State Rural Roads Development Agency (KSRRDA) Engineers

2. Training Course for Drivers of Vehicles Carrying Dangerous and Hazardous Goods

Government of Kerala accorded sanction to KSCSTE-NATPAC for conducting 'Training Course for Drivers of Vehicles Carrying Dangerous and Hazardous Goods' vide G.O. (Rt) No.138/2015/Tran., dated 17th March 2015. A certificate for the same is issued to participants on the completion of training and this certificate is valid for 3 years. The training intends to ensure employee's safety, reduce incidents and crashes, increase employee's skills, ensure environmental protection, preclude penalties and reduce operating costs.

During the year 2023 – 24, five programmes were conducted at the KSCSTE-NATPAC office, *K Karunakaran Transpark*, Aakkulam, Thiruvananthapuram. One hundred and forty-nine drivers got benefitted from the course and are successfully endorsed to operate vehicles carrying dangerous and hazardous goods.

Date	Number of drivers Participated
17/05/2023 – 19/05/2023	23
02/08/2023 – 04/08/2023	33
25/10/2023 – 27/10/2023	31
27/12/2023 – 29/12/2023	30
20/03/2024 – 22/03/2024	32
Total	**149**

3. Road Safety Training for Various Target Groups

Sl. No.	Details of Training	Date
1	Excise Department Drivers Training Program, at State Excise Academy & Research Centre, Thrissur. 30 participants.	25.04.2023 - 27.04.2023
2	One day Road Safety Awareness Program at SAP camp Peroorkada. 30 participants.	28.04.2023
3	Road Safety Awareness to NCC cadets of CATC CUM TSC LAUNCH CAMP, at Don Bosco College, Kottiyam. 600 participants.	07.05.2023
4	Training on Road Safety for students from Good Shepherd School, at K Karunakaran Transpark, Aakkulam. 40 participants.	24.08.2023
5	Training Programme on Road Safety for students, at HSS Arimpur, Thrissur. 80 participants.	21.09.2023
6	Driving school instructors training programme, organised by SC College of Engineering in association with MVD, at Govt.Guest House, Kollam. 210 participants.	04.10.2023
7	Training on Road Safety, at Kerala Police Academy, Thrissur. 23 SHO's participated.	20.10.2023
8	Defensive driving techniques, at Airport, Tvpm. 50 participants.	30.10.2023
9	Road Safety Training Programme for student police cadets – in connection with the 'Road Safety Year – 1st November 2023 –	02.11.2023

	31st October 2024', at KSCSTE- Kerala School of Mathematics (KSoM), Kunnamangalam, Kozhikode. 42 participants.	
10	Capacity Building Program on road safety for LSGD Engineers – 2 batches, organised in association with NIT Calicut at Matter Material Testing and Research Laboratory Pvt. Ltd. (Matter Lab), Kozhikode. 54 participants.	09.11.2023 – 10.11.2023
11	Safe Road to School (SRS) – programme, at Cotton Hill School, Tvpm. 200 students participated.	09.11.2023
12	Road Safety Training for School Teachers, at Government Pre-Primary Teachers Training Institute, Cotton Hill, Tvpm.	23.11.2023
13	One-Day Road Safety Course" for KSRRDA Engineers, at Ernakulam.	24.11.2023
14	Traffic enforcement and traffic control devices, at Kerala Police Academy, Thrissur. 230 Women Police Constables and 8 inservice reporter officers participated.	01.12.2023 – 09.12.2023
15	One day training programme on 'Road Safety and Youth Leadership - RSYLP', at Vidya Academy of Science and Technology.	27.12.2023
16	Traffic enforcement 7day training with road patrol workshop, at Kerala Police Academy, Thrissur	February 2024
17	Road Safety Training Programme for Youth, at SD college Alappuzha	13.02.2024

Capacity Building Program on road safety for LSGD Engineers

Traffic enforcement 7day training with road patrol workshop at Kerala Police Academy, Thrissur

4. Road Safety Education, Awareness, Training Programme and Outdoor Campaign on Safe Corridor Demonstration Project (SCDP)

Sl. No	Program Details	Date	Venue	No. of participants
1	One day road safety training for drivers	29.04.2023	All Saints Public School, Adoor, Pathanamthitta	50

5. Propagating Engineering Aspects for Coherent Enforcement - PEACE'22

KSCSTE- NATPAC has excelled in the field of road safety for the past several decades and has successfully been training people from various departments/organizations and different professional backgrounds. The three-day training programme for Motor Vehicles Department officials titled as "Propagating Engineering Aspects for Coherent Enforcement" (PEACE) aims to disseminate practical knowledge about road engineering to enforcement officials thereby combining the engineering and enforcement in a scientific way to empower road safety practices. The training programme will be conducted across Kerala by NATPAC in association with Kerala Road Safety Authority (KRSA) and Motor Vehicles Department (MVD) in five phases. Programmes completed during this period: -

Zone Details	Date	Venue
Thrissur, Ernakulam	09.05.2023-11.05.2023	KSCSTE-KFRI, Thrissur, 30 participants

6. In-house Training/Invited Expert Talk

Sl. No.	Details of Training	Date
i.	Discussion on 'Various ITS applications in Transportation Engineering' by Dr. Rajesh Krishnan, Chief Exective Officer, ITS Planners and Engineers Pvt.Ltd.	01.06.2023
ii.	Presentation on 'Driving Simulator' by Roombr VirtuLive Tech	17.08.2023
iii.	Online demo of 'Civil site design' for Scientists, Technical staff and Project Fellows.	30.11.2023
iv.	Interaction with Prof. (Dr.)Vivek Tandon, Professor of Civil Engineering, University of Texas, El Paso, on the topic "Flooding potential and resilience evaluation of critical transportation infrastructure after an extreme weather event".	07.12.2023
v.	Interaction with Santhosh Madhavan, Assistant Business Manager, Kataline Infraproducts Pvt. Ltd.	28.12.2023

vi.	5-day training programme on DGPS and Total Station for 22 ITI Surveyor students from Government ITI for Women, Kazhakootam at NATPAC.	11.12.2023 – 18.12.2023
vii.	Laboratory demonstration for students of St.Thomas institute for Science and Technology, Trivandrum, at KSCSTE-NATPAC, Aakkulam. 48 students participated.	22.02.2024
viii.	Five-day on job training and field practice on total station and DGPS, for ITI surveyor students from Attukal ITI. 25 students attended.	11.03.2024 – 15.03.2024
ix.	Demonstration cum training of ARES commander 2024 for scientists, technical staff and project fellows.	18.03.2024
x.	Workshop on Bitumen Rheology by Dr Sumit Singh, Anton Paar for Scientists, Technical staff and Project Fellows.	21.03.2024


Interaction with Prof. (Dr.)Vivek Tandon, Professor of Civil Engineering, University of Texas, El Paso

7. TransTech Talk Series

KSCSTE-NATPAC has initiated a technical talk series entitled "TransTech Talk Series" focussing on various aspects of Transportation sector.

Series No.	Resource Person	Topic	Date
3	Prof. R. Jayakrishnan, Professor of Civil and Environmental Engineering, University of California, Irvine	Traffic Signal Control of the future: Should we do it at intersections?	13.04.2023
4	Er. Tony Mathew, Head - Operations and Delivery, Transport Research Laboratory (TRL), India	Application of Safe Systems Approach using Crash Data Analysis Case Study: Himachal Pradesh, India	31.05.2023
5	Dr.Varun Varghese, Assistant Professor, Transdisciplinary Science and Engineering Program, Graduate School of Advanced Science and Engineering, Hiroshima University, Japan	Quantifying the trade-offs between environmental sustainability and equity in welfare for Mass Rapid Transit Systems (MRT)	15.06.2023
6	Dr. Sunanda Dissanayake, Ph.D., P.E., F. ASCE, Chair and Professor of the Civil and Environmental Engineering Dept. at Kennesaw State University (KSU)	Data-Driven Road Design and Policy Decisions based on Traffic Safety Considerations: Case Studies	13.07.2023

7	Dr. Neeraj Buch, Ph.D., Professor of Pavement Engineering, Rochester Institute of Technology, USA	Performance Evaluation of Long-Life Rigid Pavements in Michigan	10.08.2023
8	Prof. Sabya Mishra, Professor, Department of Civil Engineering, University of Memphis	Optimal Integration of On-Demand Transit Services with Fixed Route Transit Network for Cost-Effective First and Last Mile Connectivity	15.09.2023
9	Er. Indranil Bose, Transport Expert - World Bank	Climate and disaster risk informed transport planning – roads and waterways	13.10.2023
10	Dr. Deshpande, Senior Geospatial Technology manager at Dewberry, Virgina, USA	Alignment Mapping of Structural Members and Rollers in a Steel Mill using Terrestrial Lidar Point Cloud	20.11.2023
11	Prof. Srinivas Peeta, Professor, School of Civil and Environmental Engineering and the H. Milton Stewart School of Industrial and Systems Engineering at Georgia Institute of Technology (Georgia Tech)	Enabling Sustainable Travel in smart and Engaged Communities	07.12.2023
12	Prof. Krishna R Reddy, Professor of Civil and Environmental Engineering, University of Illinois Chicago (UIC), USA	Integrating Sustainability and Resilience in Transportation Engineering: Challenges, Frameworks and Applications	12.01.2024
13	Prof. Ashish Bhaskar, Professor of Civil and Environmental Engineering at the Queensland University of Technology, Brisbane, Australia	Real-Time Simulation of Large Urban Networks: Leveraging Big Transport Data	09.02.2024
14	Er.Suvendu Seth, Transportation Consultant	Improving Road Safety on Indian Roads	15.03.2024

8. TransPedia Research Talk Series

TransPedia is a distinctive endeavour from NATPAC, envisioned to promote research for shared benefits, by disseminating knowledge on diverse topics from cutting-edge technologies to sustainable solutions. This also brings out a platform for young researchers across the globe to connect and interact to better shape the future of research and development in transportation.

Series No.	Resource Person	Topic	Date
1	Dr.Remya K Padinjarapat, completed Ph.D from Indian	Saturation Flow Estimation at Signalized Intersections with Multi-Class Traffic Streams	24.08.2023

	Institute of Technology Bombay in 2021		
2	Dr. Chethana Ramachandra, Assistant Professor, Dept. of Civil Engg., B.M.S. College of Engineering, Bengaluru	Decision Support System for Maintenance Management of Indian Highways	27.09.2023
3	Dr.Suvin P Venthuruthiyil, Assistant Professor, Dept. of Civil Engg., IIT Hyderabad	Revisiting proactive road safety analysis: past, present and the way forward	25.10.2023
4	Dr. Sonu Mathew, completed his Ph.D from the University of North Carolina, at Charlotte, United States in 2020	Developing local road AADT using Geo-spatial methods	29.11.2023
5	Dr.Srijith Balakrishnan, Assistant Professor, Faculty of Technology, Policy and Management TU Delft, Netherlands	Resilience mapping of road networks using traffic data	27.12.2023
6	Dr. Madhumita Paul, Assistant Professor, IIT Kharagpur	Proactive Road Safety Assessment of Intersections through Microsimulation Approach	24.01.2024
7	Dr. Nishant Bhargava, Assistant Professor, Department of Civil Engineering, Birla Institute of Technology and Science (BITS) Pilani, Pilani Campus	Microsurfacing: A Sustainable Preventive Maintenance Treatment for Highways	28.02.2024
8	Dr. Gajanand Sharma, Assistant Professor, Ranbir and Chitra Gupta School of Infrastructure Design and Management (RCGSIDM), IIT Kharagpur	Transportation-Derived Quality of Life, Equity, and Safety	27.03.2024

b. Student Training and Academic Support

1. Students' Training/Project Work and Thesis

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

M.Tech/M.Plan/M.Sc.

Sl No.	Name of the Institution	Course	Guide	No. of Students	Topic
1	RIT, Kottayam	M. Tech	Dr. Shaheem S	1	Development of parking policy framework for Kerala
2	RIT, Kottayam	M. Tech		1	Emerging urban parking policies for

Sl No.	Name of the Institution	Course	Guide	No. of Students	Topic
					Thiruvananthapuram city: a streamlined approach
3	Jyothi Engineering College, Thrissur	M. Tech	Shri. V S Sanjay Kumar	1	Safety Assessment of Pedestrian Vulnerable Corridor
4	College of Engineering, Thiruvananthapuram	M. Tech (Geoinformatics)	Dr. Sabitha N M	1	Feasibility of Inland Water Transport – A Case study
5	Birla Institute of Technology and Science Pilani, Rajasthan	M. Tech	Shri.Ebin Sam S	1	Identification of Black Spots and its Analysis on Kerala Roads Using Machine Learning
6	Bharathidasan University	M. Tech (Geoinformatics)	Shri.Chandraprathap R	1	Utilizing GIS for Mapping Suitable Aggregates in Road Construction Projects
7	RIT, Kottayam	M. Tech	Shri.Jegan Bharath Kumar A	1	Literature Studies on Hot Mix Asphalt
8	Mar Baselios College of Engineering and Technology (MBCET)	M. Tech (TE)		1	Evaluating the performance & Rheological characteristics of Porous Asphalt mix
9	College of Engineering Trivandrum (CET)	M. Tech (GE)	Dr. Salini U	1	Investigations on the application of concrete demolition waste as a Geocell infill
10		M. Tech (GE)		1	Investigations on the application of construction demolition waste and rap as geocell infill
11	Cochin University of Science and Technology (CUSAT)	M. Tech (GE)		1	Laboratory studies on stabilization of soft soil by lime precipitation technique
12		M. Tech (GE)		1	Effect of pore fluid chemistry on swell and consolidation behavior of marine clays
13		M. Tech (GE)		1	Study on the suitability of sustainable infill materials in coir geocell reinforced base course
14	MBCET, Thiruvananthapuram	M. Tech	Dr. Praveen P S	1	Analysis of forced gap characteristics at an unsignalized T-Intersection

Sl No.	Name of the Institution	Course	Guide	No. of Students	Topic
15	College of Engineering, Thiruvananthapuram	M. Tech		1	Optimising Noise Insulation and Ventilation in High Rise Residential Buildings
16	SVNIT Surat	M. Tech	Dr. Vasudevan N	1	Augmentation of Ridership of Kochi Metro
17		M. Tech		1	Mode choice analysis using ICLV for Kochi metro
18	College of Engineering Trivandrum (CET)	M. Tech (Structural Eng.)	Dr. Himasree P R	1	Influence of GGBS on the strength and behaviour of performance of cement mortars
19		M. Tech (Structural Eng.)		1	Performance of hybrid fibre reinforced high performance concrete
20		M. Tech (Structural Eng.)		1	Strength and behaviour of bamboo fibre-reinforced BRC slabs
21	Government Engineering College Thrissur (GEC Thrissur)	M. Tech (Structural Eng.)		1	Performance of Polypropylene fibre and steel fibre layered reinforced concrete beam
22		M. Tech (Structural Eng.)		1	Experimental and Numerical study on flexural behaviour of RCC beam strengthened using basalt textile reinforced graphene enhanced mortar (BTRGM)
23	College of Engineering Trivandrum (CET)	M. Tech	Dr. Anila Cyril	1	Public transport route planning and service optimization using ETM data
24	Cochin University of Science and Technology (CUSAT)	M. Tech	Dr.Goutham Sarang	1	Soil stabilization
25		M. Tech		1	Soil structure interaction
26		M. Tech (GE)		1	Study on the rutting behavior of rubber tyre and coir geotextile reinforced soil
27		M. Tech (GE)		1	Investigation of pullout behavior of soil nail interaction
28	Mar Ivanios College, Thiruvananthapuram	M.Sc	Dr.Sunitha Vijayan	3	Time Series Modelling and

Sl No.	Name of the Institution	Course	Guide	No. of Students	Topic
					Forecasting of Motor Vehicle Accident Cases Filed/Disposed at MACTs of Thiruvananthapuram District

B.Tech

Sl No.	Name of the Institution	Course	Guide	No. of Students	Topic
1	TKM College of Engineering, Kollam	B.Tech	Shri.Ebin Sam S	1	Safety Assessment of Koottanad Junction
2	TKM College of Engineering, Kollam	B. Tech		1	Optimizing Ambulance Allocation using Blackspot Analysis in Kollam District
3	Sri Sivasubramaniya Nadar College of Engineering (SSN), Chennai	B. E	Shri.Jegan Bharath Kumar A	4	Study of Volumetric Properties of HMA Under Different Compaction Level
4	Sree Narayana Institute of Technology - [SNIT], Adoor	B. Tech		4	Permeability behaviour of porous asphalt using asphalt permeameter
5	Government College of Engineering, Erode, Tamil Nadu	B.E		5	Assessment of Moisture Susceptibility of HMA with GGBS
6	Mar Baselios College of Engineering and Technology, Thiruvananthapuram	B. Tech		4	Permeability of Hot Mix Asphalt for Different Compaction and Moisture Conditions
7	Amrita School of Engineering, Amrita Vishwa Vidyapeetham, Coimbatore	B. Tech		4	Performance Evaluation of HMA mix of varying RAP material and binder content
8	College of Engineering, Muttathara	B. Tech	Shri. Chandraprathap R	1	Strength test on modified cold bituminous mix using natural fibre
9	College of Engineering, Muttathara	B. Tech	Dr. Salini U	4	Use of red mud and lime for stabilization of weak soil
10	Mar Baselios College of Engineering and Technology	B. Tech		4	Evaluation of moisture susceptibility of warm mix asphalt
11	Government Engineering College Barton Hill, Thiruvananthapuram	B. Tech		4	Experimental evaluation of permeability characteristics of asphalt pavements

Sl No.	Name of the Institution	Course	Guide	No. of Students	Topic
12	Mar Baselios Institute of Technology and Science	B. Tech	Shri. B Anish Kini	4	Traffic Impact Assessment and design of road stretch – Edachira to Kadambrayar bridge
13	KMEA Engineering College	B. Tech		4	Development of traffic mitigation strategies for Kalamukku junction in Ernakulam
14	Cochin University of Science and Technology (CUSAT)	B. Tech		6	Feasibility of PRT at Infopark and its vicinity in Ernakulam
15	College of Engineering Kidangoor, Kottayam	B.Tech	Dr.Vasudevan N	4	Analysis and Redesign of IMG Junction, Kakkanad
16		B.Tech		4	Traffic Flow Regulation through Junction Redesign at Kakkanad with Sustainable Approach
17	C H Mohammed Koya KMEA Engineering College, Edathala	B.Tech		3	Mode Choice Behavior of Travelers belonging various Socio-Demographic Background in context with Metro-A case study of Kochi
18	Muthoot Institute of Technology and Science, Varikoli	B.Tech		4	Congestion mitigation measure at Ernakulam Collectorate Junction using simulation
19	Cochin University of Science & Technology,	B.Tech		5	Feasibility of a Skywalk between Two Major Transit Stations in the City of Kochi
20	Albertian Institute of Science and Technology	B. Tech	Dr. Anila Cyril	4	Traffic Management Measures to reduce Traffic Congestion on Seaport-Airport Road near HMT Junction, Kalamassery
21	Mar Baselious Institute of Science and Technology	B. Tech		4	Feasibility study and planning of a mobility hub at Infopark
22	Federal Institute of Science and Technology	B. Tech		4	Study on parking demand and its characteristics using structural equation modelling
23	Muslim Association College of Engineering,	B. Tech	Shri. Ashik K Azad	5	Performance evaluation of low volume roads constructed using new technologies

Sl No.	Name of the Institution	Course	Guide	No. of Students	Topic
	Venjaramoodu, Thiruvananthapuram				
24	College of Engineering, Trikaripur	B. Tech	Shri. Shijith P P	5	Comparison on the field perfomance of conventional and cold mix recycled pavement
25	LBS College of Engineering, Kasargod	B. Tech	Dr. Goutham Sarang	4	Comparison of hot and warm stone matrix asphalt mixtures
26	GEC Barton Hill	B. Tech		4	Mechanical and Infiltration Characteristics of Pervious Concrete Pavement Incorporating Recycled Asphalt Pavement Aggregates
27	Muslim Association College of Engineering, Venjaramoodu, Trivandrum	B. Tech	Dr. Sanjai R J	4	Macro Level Operational Analysis Study on KSWTD

M.Tech/M.Sc (Internship)

Sl. No.	Name of the Institution	No. of Students
1	Indian Institute of Technology, Kharagpur	2
2	National Institute of Technology Calicut	20
3	National Institute of Technology Tiruchirappalli	3
4	National Institute of Technology Karnataka	5
5	CET School of Management, College of Engineering Trivandrum	1
6	College of Engineering, Trivandrum	19
7	Thangal Kunju Musaliar College of Engineering, Kollam	3
8	Anna University	1
9	University of Madras	5
10	St.Thomas College, Chengannur	11
11	Muthoot Institute of Technology and Science, Varikoli	2
12	Vellore Institute of Technology, Chennai	4
13	Rajiv Gandhi Institute of Technology (RIT) Kottayam	1

B.Tech (Internship)

Sl. No.	Name of the Institution	No. of Students
1	National Institute of Technology Calicut	7
2	College of Engineering, Trivandrum	6
3	Mar Baselios College of Engineering and Technology, Thiruvananthapuram	13
4	Sri Sivasubramaniya Nadar College of Engineering (SSN), Chennai	4
5	Cochin University of Science and Technology	4
6	School of Planning and Architecture, Vijayawada	1
7	St Thomas College of Engineering and Technology, Alappuzha	11
8	Muthooth Institute of Technology and Science (MITS)	4

WORKSHOPS, CONFERENCES AND CONSULTATIONS

a. Stakeholder Consultation

1. Stakeholder Consultation for the Preparation of "Road Safety Action Plan for Kerala" (RSAP-K)

Government of Kerala has entrusted NATPAC to prepare a comprehensive action plan for road safety for the State after obtaining views/suggestions from all the stakeholders' departments/institutions. In this backdrop, a Stakeholder Meeting was organized by KSCSTE-NATPAC on 26th October 2023 at Government Guest House, Thycaud, Thiruvananthapuram. The program was inaugurated by the Hon'ble Minister for Transport Adv.Antony Raju. Dr Ravi Raman, Member, Kerala State Planning Board presided over the inaugural session. Shri. Jyothilal IAS, Additional Chief Secretary, GoK delivered the keynote address. Shri. Sparjan Kumar IPS, Inspector General of Police, GoK was present at the programme.

Manorama 27-10-2023

കേരള കൗമുദി

Trivandrum 27 Oct 2023

റോഡ് സുരക്ഷയെ എതിർക്കുന്ന സ്ഥിതി: മന്ത്രി ആന്റണി രാജു

തിരുവനന്തപുരം: വാഹനാപകടമരണനിരക്ക് വർദ്ധിക്കുമ്പോഴും റോഡ് സുരക്ഷാ നിയമങ്ങളോട് എതിർപ്പ് പ്രകടിപ്പിക്കുന്ന സ്ഥിതിയാണുള്ളതെന്ന് മന്ത്രി ആന്റണി രാജു. റോഡ് സുരക്ഷാ കർമ്മ പദ്ധതി (കെ-റോഡ്) ഉദ്ഘാടനം ചെയ്യുകയായിരുന്നു മന്ത്രി. സംസ്ഥാനത്ത് ഒരു വർഷം വാഹനാപകടങ്ങളിൽ 4,000 പേർ മരിക്കുന്നത് ഗൗരവമായി കാണണമെന്നില്ല. ബസ് ഡ്രൈവർമാർക്ക് സീറ്റ് ബെൽറ്റ് നിർബന്ധമാക്കിയത് കേന്ദ്രസർക്കാരാണ്. വടക്കഞ്ചേരി അപകടത്തിൽ ഡ്രൈവർ സീറ്റിൽ നിന്ന് തെറിച്ചു പോയതോടെ ബസ് ഇടിച്ചുകയറിയതാണ് അപകടതീവ്രത വർദ്ധിപ്പിച്ചതെന്നും അദ്ദേഹം പറയുന്നു. ആസൂത്രണ കമ്മിഷൻ അംഗം ഡോ. കെ. രവിരാമൻ അദ്ധ്യക്ഷനായി. അഡിഷണൽ ചീഫ് സെക്രട്ടറി കെ.ആർ. ജ്യോതിലാൽ, ഐ.ജി ജി. സ്പർജൻ കുമാർ, നാറ്റ്പാക് ഡയറക്ടർ ഡോ. സാംസൺ മാത്യു തുടങ്ങിയവർ സംസാരിച്ചു.

KERALA KAUMUDI EPAPER
Clipping Kerala Kaumudi - Trivandrum

റോഡ് സുരക്ഷ: ആക്ഷൻ പ്ലാൻ തയാറാക്കാൻ യോഗം

തിരുവനന്തപുരം • സംസ്ഥാനത്തെ റോഡ് സുരക്ഷാ പദ്ധതികൾക്കുള്ള ആക്ഷൻ പ്ലാൻ തയാറാക്കുന്നതിന് വകുപ്പുകളുടെ ഏകോപനയോഗത്തിന് തുടക്കമായി. മന്ത്രി ആന്റണി രാജു ഉദ്ഘാടനം ചെയ്തു.

1 വർഷം നീണ്ടു നിൽക്കുന്ന റോഡ് സുരക്ഷാ പദ്ധതികൾക്ക് നവംബർ 1 മുതൽ തുടക്കമാകുമെന്നും ഇതിന് റോഡ് സുരക്ഷാ കലണ്ടർ ഉണ്ടാകുമെന്നും മന്ത്രി പറഞ്ഞു.

കേരള ആസൂത്രണ ബോർഡ് അംഗം ഡോ.കെ.രവി രാമൻ അധ്യക്ഷനായിരുന്നു.

അഡിഷനൽ ചീഫ് സെക്രട്ടറി കെ.ആർ. ജ്യോതിലാൽ, ട്രാൻസ്പോർട്ട് കമ്മിഷണർ എസ്. ശ്രീജിത്ത്, നാറ്റ്പാക് ഡയറക്ടർ ഡോ. സാംസൺ മാത്യു, നാറ്റ്പാക് പ്രിൻസിപ്പൽ സയന്റിസ്റ്റ് വി.എസ്. സഞ്ജയകുമാർ, നാറ്റ്പാക് റജിസ്ട്രാർ എസ്. ഷഹീം എന്നിവർ നിർദേശങ്ങളും റിപ്പോർട്ടുകളും അവതരിപ്പിച്ചു.

2. Regional Stakeholder Consultation for Policy Advocacy in Road Safety issues, Challenges and Way Forward for Kerala

A consultation workshop on 'Policy advocacy in road safety issues, challenges and way forward for Kerala' was organized by CED and CUTS International in association with KSCSTE-NATPAC at Hotel Pearl Regency, Thrissur on 8th December 2023. The official

inauguration of the workshop was carried out by Smt. S. Ajeetha Begum IPS, DIG of Police, Thrissur Range. Key note address was delivered by Shri. P. S. Pramoj Sanker IOFS, Additional Transport Commissioner.

Panel Discussion was conducted on the theme 'Policy Advocacy in Road Safety: Issues, Challenges and Way Forward for Kerala', moderated by Shri. T. Elangovan, Former Director, NATPAC & Former Executive Director, KRSA. The panelists were Shri. James M. P, Deputy Transport Commissioner, Central Zone, Thrissur; Shri. Sajeev K. K, Asst. Commissioner of Police, Thrissur City; Dr. Praveenkumar V K, Surgeon, General Hospital, Thrissur, District nodal officer, Trauma care; Dr. M. V. L. R. Anjaneyulu, Professor (HAG), NIT Calicut and Prof. (Dr.) Samson Mathew, Director, NATPAC.

b. Technology Demonstration Workshops

1. Two-day workshop on Full Depth Reclamation (FDR) Technology

KSCSTE – NATPAC organized a two-day workshop on Full Depth Reclamation (FDR) Technology in association with Kerala Infrastructure Investment Fund Board (KIIFB) on 4th and 5th May 2023, at RECCAA Club, Kakkanad, Ernakulam. The inauguration of the workshop was done by Smt. Uma Thomas, MLA. The Managing Director of Kochi Metro Rail Limited, Shri. Loknath Behra, IPS was the chief guest for the inaugural ceremony. The workshop aimed at bringing the best technical minds working in the field of FDR technology on to a common platform to share their expertise, experience, and challenges for the development of infrastructure in the country. The professionals from IITs/NITs, Central and State Government Departments and Industries who have expertise in FDR technology were the resource persons for this Program. The Program was

designed primarily for practicing engineers, academicians, researchers and postgraduate students working in the area of pavement design and construction.

Inauguration of the two-day workshop on Full Depth Reclamation (FDR) Technology by Smt. Uma Thomas MLA

newindianexpress.com

Road construction using FDR tech economical, eco-friendly: Workshop

EXPRESS NEWS SERVICE @Kochi

NATPAC workshop held in Kochi on Thursday opined that the Full Depth Reclamation (FDR) technology, a recycling method for reconstructing existing roads, will bring revolutionary changes to the road construction activities in the state. Speaking to *TNIE*, KSCSTE-Natpac Director Samson Mathew said the FDR technology will be the final solution to the road issues in the state.

"Using the technology, the roads will be constructed after digging up nearly 30cm. Hence, the durability will be long. This method has proved to be working in some states in India and even in foreign countries. Even the PWD and the NHAI have started constructing roads using FDR technology," he said.

Samson said the technology is eco-friendly and cost-effective when compared to the conventional method of road construction.

"It requires only 20-25% of new construction materials as recycled ones will be used for the works. Only chemicals or cement need to be added for this type of construction. As per the study, it will help reduce the road construction cost by 15-40%," he said.

MLA Uma Thomas inaugurated the two-day workshop organised by Natpac in association with KIIFB. Kochi Metro MD Loknath Behera was the chief guest, A Veeraraghavan (IIT Madras) and principal consultant L S Murali also attended the function.

The workshop was organised to discuss the expertise, experience, and challenges of FDR technology on a single platform, enabling major changes to the infrastructure development in the country.

The experts took classes on the possibilities of FDR technology on roads with low traffic density, followed by discussions and debates on topics of sample and mix design construction and quality control

2. One-day Workshop on Full Depth Reclamation Technology

Kerala State Council for Science, Technology and Environment (KSCSTE) - National Transportation Planning and Research Centre (NATPAC) in association with LSGD - Kerala State Rural Roads Development Agency (KSRRDA) conducted One-Day Workshop on Full Depth Reclamation Technology at Thiruvananthapuram, Ernakulam, and Kozhikode where representatives from various government departments and construction sector participated. The technical sessions were handled by experts from IITs/NITs, engineers from various government departments and technology providers such as Zydex, RoadstaB, AVS Inno Infra, Vishwa Samudra Engineering and Avijeet Agencies.

The workshop at Thiruvananthapuram was held on 8th January 2024 at Parijatham Auditorium, IMG, Thiruvananthapuram; at Ernakulam on 10th January 2024 at GCDA Conference Hall, Jawaharlal Nehru International Stadium, Ernakulam and at Calicut on 12th January 2024 at Bhaskara Hall, National Institute of Technology (NIT), Calicut.

Prof. Dr. K P Sudheer, Ex Officio Principal Secretary, Science & Technology Department and Executive Vice President, KSCSTE inaugurating the FDR workshop at Thiruvananthapuram

Participants of the FDR workshop at Ernakulam

Participants of the FDR workshop at Calicut

3. Inauguration of 20kW Roof Top Solar Power Plant and Panel Discussion

A 20 kW Roof Top Solar Power Plant has been installed at NATPAC Head Office, Akkulam, Thiruvananthapuram with the cooperation of Agency for New and Renewable Energy Research and Technology (ANERT). The formal inauguration of the Solar Roof Top Power Plant was done by Shri. K. Krishnankutty, Hon'ble Minister for Electricity, Govt. of Kerala on 19th April 2023 at NATPAC Head Office, Akkulam, Thiruvananthapuram. The function was presided over by Shri. Kadakampally Surendran, Member, Kerala Legislative Assembly.

The Energy Audit of the NATPAC office was conducted by Energy Management Centre (EMC) and the audit report was released by the Hon'ble Minister during the inaugural function. Prof. (Dr.) Samson Mathew, Director, KSCSTE-NATPAC welcomed the participants. Shri. M.C. Dathan, Scientific Advisor to Hon'ble Chief Minister of Kerala; Shri Narendra Nath Veluri IFS, Chief Executive Officer, ANERT; Shri Sajeev G.,

Chief Engineer, Renewable Energy and Energy Savings, KSEB Ltd.; and Shri. Suresh Kumar S. Thiruvananthapuram Corporation Councillor, Akkulam felicitated the function. The Energy Audit Report of NATPAC was presented by Shri. Johnson Daniel, Head, NMEEE Division, Energy Management Centre-Kerala. Shri. Shaheem S., Registrar-In-Charge, KSCSTE-NATPAC delivered the vote of thanks.

As part of this program, a panel discussion moderated by Shri. Pramoj Shankar P S, IOFS, Additional Transport Commissioner, MVD and JMD, KSRTC was conducted on the topic "Clean and Green Energy Towards Sustainable Transportation". The Experts from Stakeholders comprising Government Departments, Semi-Government Organizations, Academic and Research Institutes participated in the discussion in online mode as well.

Inauguration of the Solar Roof Top Power Plant by Shri. K. Krishnankutty, Hon'ble Minister for Electricity, Govt. of Kerala

TIMES CITY

Panel discussion on clean energy in transportation

TIMES NEWS NETWORK

Thiruvananthapuram: NATPAC on Wednesday organised a panel discussion on clean and green energy towards sustainable transportation. The discussion mainly centred on the need to reduce emissions and embracing sustainable modes of public transport.

Noted educationist and energy conservation expert RVG Menon who was part of the discussion said automobile driven development is not sustainable. He observed that the level of conversion to electric vehicles is not as visible in public sector as in private sector.

NATPAC

While, Kuncheria P Isaac, founder vice-chancellor APJ Abdul Kalam Technological University, who was also part of the event, spoke about the techniques to develop new road construction materials with lesser emissions. He also raised concerns over the use of footpaths and bicycles citing safety issues posed by the present road infrastructur.

Sreedevi R, executive engineer, KSEB opined that emission reduction is possible by a slew of measures such as promoting fiscal incentives, good investment in infrastructure and low carbon vehicle operation and rapid electrification of road transport.

The newly installed solar power plant was also inaugurated on the occasion by minister for electricity K Krishnankutty.

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AWARENESS CAMPAIGNS AND OBSERVANCES

1. Malayalam Day and Official language week - 2023

KSCSTE-NATPAC celebrated Malayalam Day and Official language week from 01.11.2023 – 07.11.2023. Bharana Bhasha Oath taking ceremony was conducted in NATPAC at 2 pm on 1st November 2023. Shri.Shaheem S, Registrar (i/c), NATPAC delivered the oath to the staff of NATPAC. Malayalam day celebrations were officially inaugurated by Shri.Vibhu Pirappancode, Employment Officer, National Employment Service on 1st November 2023.

The inauguration of official language week celebrations was done on 2nd November 2023 by Dr.Ajayan Panayara, Associate Professor, Malayalam Dept., University College, Thiruvananthapuram. As part of official language week celebrations talks were delivered by Smt.Bindu, Supdt., Sree Chithra Poor Home on 3rd November 2023 and Shri.Palliyara Sreedharan, Director, Kerala Bala Sahitya Institute on 7th November 2023. Various competitions in Malayalam were conducted for the staff of KSCSTE-NATPAC in connection with official language week celebrations. Five officially using English words and its corresponding Malayalam words were displayed in KSCSTE-NATPAC's Office.

Bharana Bhasha Oath taking ceremony

Talk by Shri.Vibhu Pirappancode, Employment Officer, National Employment Service

Talk by Dr. Ajayan Panayara, Associate Professor, Malayalam Dept., University College, Thiruvananthapuram

Distribution of prizes by Shri.Palliyara Sreedharan, Director, Kerala Bala Sahitya Institute

2. GIS Day 2023

KSCSTE-NATPAC organised GIS Day 2023 celebrations featuring an expert talk by Dr.Suresh Francis, Scientist, Kerala State Remote Sensing and Environment Centre (KSREC), Thiruvananthapuram, Kerala on the topic "Mobile and Web GIS Decision Support Platforms for Evidence Based Planning and Decision Making" on 15th November 2023 at 10:30 am IST through hybrid mode. Dr. Suresh Francis delivered an enlightening talk about the various projects undertaken by KSREC, and data products created including Kerala GIS (KGIS) with GRAMAM mobile mapping application and interacted with the audience.

3. Observance of 'World Day of Remembrance' for Road Traffic Accident Victims - WDoR 2023

KSCSTE NATPAC, Centre for Environment and Development (CED) and CUTS International jointly observed the Remembrance Day for road traffic accident victims on 19th November 2023, at Marine Drive, Ernakulam. The commemoration day was observed with the support of GCDA, National Safety Council and Vasan Eye Care. As part of the programme, soft policing and distribution of road safety pamphlets were carried out on the road corridor from Subhash Park to High Court Junction with the help of NSS volunteers from various colleges in the district and the Police. A first aid and trauma care demonstration, conversation with road crash victims and a free eye check-up camp were also organized.

4. National Road Safety Month 2024

As part of observance of Road Safety Month 2024, NATPAC in association with various academic institutions organized 22 road safety training programmes across the 14 districts in Kerala covering the road users like Youth, Driving School Instructors, Ambulance Drivers, Educational Institution Bus Drivers, etc. Various snapshots of road safety programmes conducted across the state is shown in the figure below. The detailed schedule of the training programmes is represented in the Table below.

Road Safety Month 2024 - Training Programmes by KSCSTE-NATPAC

Sl. No	District	Target Group	Training Programme	No. of Participants	Venue	Date
1	Thrissur	Youth	One-day training programme for Driving School Instructors	53	Sahrdaya College of Engineering and Technology, Thrissur	31/01/2024
		Driving School Instructors	One-day training programme on Road Safety and Youth Leadership	50		01/02/2024
2	Ernakulam	Youth	One-day training programme on Road Safety and Youth Leadership	40	KMEA Engineering College, Edathala	01/02/2024
		Ambulance Drivers	One-day training programme for Ambulance Drivers	33		03/02/2024
3	Kozhikode	Youth	One-day training programme on Road Safety and Youth Leadership	45	KSCSTE - Kerala School of Mathematics (KSoM), Kunnamangalam, Kozhikode	02/02/2024
4	Kannur	Youth	One-day Training Programme on Road Safety and Youth Leadership	60	St. Thomas College of Engineering & Technology, Mattanur, Kannur.	02/02/2024
		Educational Institution Bus Drivers	One-day Training Programme for Educational Institution Bus Drivers	43		03/02/2024
5	Wayanad	NSS Volunteers	Road Safety Youth Leadership Programme for NSS Volunteers	42	WMO Arts and Science College, Muttil, Wayanad	03/02/2024
6	Malappuram	Youth	One-day training programme on Road Safety and Youth Leadership	38	M E S Ponnani College Ponnani, Malappuram	07/02/2024
		Educational Institution Bus Drivers	One-day Training Programme for Educational Institution Bus Drivers	43		08/02/2024
7	Trivandrum	Youth	One-day training programme on Road Safety and Youth Leadership	63	College of Engineering Trivandrum	07/02/2024
		Youth	One-day training programme on Road Safety and Youth Leadership	45	Mar Baselios College of Engineering and Technology (Autonomous), Thiruvananthapuram	08/02/2024
		Educational Institution Bus Drivers	One-day Training Programme for Educational Institution Bus Drivers	24		14/02/2024
8	Kollam	Youth	One-day training programme on Road Safety and Youth Leadership	150	Fatima Mata National College (FMNC), Kollam	12/02/2024
9	Kottayam	Youth	Research Resilience and Advocacy on Road Safety	80	Rajiv Gandhi Institute of Technology, Kottayam	13/02/2024
10	Alappuzha	Youth	One-day training programme on Road Safety and Youth Leadership	89	Sanatana Dharma College, Alappuzha	13/02/2024

Sl. No	District	Target Group	Training Programme	No. of Participants	Venue	Date
11	Idukki	Youth	One-day training programme on Road Safety and Youth Leadership	59	College of Engineering, Munnar	13/02/2024
12	Kasaragod	Ambulance Drivers	One-day training programme for Ambulance Drivers	40	Nehru Arts and Science College-Kanhangad, Kasaragod	13/02/2024
		Youth	One-day training programme on Road Safety and Youth Leadership	100		14/02/2024
13	Palakkad	Youth	One-day training programme for Road Safety and Youth Leadership	50	NSS College of Engineering, Palakkad	13/02/2024
		Driving School Instructors	One-day training programme for Driving School Instructors	50		14/02/2024
14	Pathanamthitta	Youth	One-day training programme on Road Safety and Youth Leadership	75	Musalair College of Engineering & Technology, Pathanamthitta	14/02/2024

OUTREACH AND EXHIBITIONS

1. Exhibitions

1. Conducted Road Safety exhibition as part of 'Pinarayi Peruma 2023', Thalassery, Kannur, 4th – 14th April 2023.

2. Conducted Road Safety exhibition as part of Workshop on Full Depth Reclamation at RECCA Club, Kakkanad, Ernakulam on 4th - 5th May 2023.
3. Road Safety exhibition at the Global Science Festival Kerala (GSFK 2024), Life Science Park, Thonnakkal, Thiruvananthapuram, 15.01.2024 – 15.02.2024.

4. Road Safety exhibition in connection with 36th Kerala Science Congress, Kasaragod Government College, Vidyanagar, Kasaragod, 08.02.2024 -11.02.2024.

5. Road Safety exhibition at the Educational Expo at P T M Group of Educational Institutions, Balaramapuram, 22.02.2024 – 23.02.2024.

2. Participation in Workshops, Seminars/Conferences and other Training Programmes

Name of Programme	Organised by	Date (s)	Venue	Participants
Seminars/Conferences				
Review meeting for the GHG inventory of Kerala State	Directorate of Environment & Climate Change, Government of Kerala & Vasudha Foundation	26.05.2023	Apollo Dimora, Trivandrum	Shri. Jegan Bharath Kumar A
Ist Vision Zero Summit	Maulana Azad National Institute of Technology	29.05.2023 – 31.05.2023	Maulana Azad National Institute of Technology	Shri.V S Sanjay Kumar Shri. Ebin Sam S
National Conference, Indian Environment Congress 2023 (IEC 2023)	The Centre for Environment and Development	11.07.2023 – 13.07.2023	Mascot hotel, Thiruvananthapuram	Shri.Tinku Casper D'Silva
Geovision Seminar	ESRI India	23.08.2023	Hotel Hycinth, Trivandrum	Dr. Sabitha N M Shri. M S Saran Shri. Ebin Sam S
Seminar on 'Bamboo Construction for Rural Maharashtra: Present Status and Future Possibilities'	CTARA, IITB	16.09.2023	CTARA Hall, IITB - online	Dr. Himasree P R
Keraleeyam Session - Seminar on "Kerala Economy"	Finance Department, Government of Kerala	03.11.2023	Sankaranarayanan Thambi Hall, Legislature (Niyamasabha) Complex, Thiruvananthapuram	Dr. Sunitha Vijayan
The World Institute of Sustainable Energy (WISE) - one day Seminar on Climate Resilient Water		09.11.2023	Institute of Management in Government, Thiruvananthapuram	Shri. M.S.Saran Dr. Sabitha N M

Name of Programme	Organised by	Date (s)	Venue	Participants
Management in Kerala				
IRF Annual conference 2023 - "Innovation for Better Mobility Systems"	IRF	21.11.2023 – 22.11.2023	Online	Shri. M.S.Saran
82nd Annual Session of Indian Roads congress	IRC	02.12.2023 – 05.12.2023	Mahatma Mandir, Gujarat	Prof. (Dr.) Samson Mathew Shri.V S Sanjay Kumar Smt. Salini P N
7th Conference of Transportation Research Group of India (CTRG)	SVNIT Surat	17.12.2023 – 20.12.2023	SVNIT Surat	Prof. (Dr.) Samson Mathew Smt. Salini P N, Shri. Arun Chandran, Shri. Chandra Prathap R, Dr. Salini U, Dr.Vasudevan N
Smarter Fleet Management: Real-Time Route Optimization and Alerts with Kinetica	Kinetica and Geospatial World			Dr. Anila Cyril
RAID 2024	NIT, Calicut	12.02.2024 - 13.02.2024	NIT, Calicut	Dr. Shaheem S
National Conference on Soils and Foundation (SAF-2024)	LBS Institute of Technology for Women, Poojappura	15.02.2024 & 17.02.2024		Dr Salini U
RICS India - Built environment in the new era- vision of Kerala Face to Face Event		01.03.2024	Hyat Regency, Thiruvananthapuram	Shri.V S Sanjay Kumar, Dr. Sunitha Vijayan
Stakeholders Meet on "Collaborative Assessment of Practical Issues in Transportation" (CAPIT)	Organised by Transportation Engineering Research Centre, College of Engineering Trivandrum	02.03.2024	College of Engineering Trivandrum	Dr. Samson Mathew, Shri.V S Sanjay Kumar, Shri. Arun Chandran, Shri. Chandra prathap R, Dr.Salini U
Training Programmes				
Road Safety Audit and other Road Safety Related Aspects	CSIR - Central Road Research Institute, New Delhi	15.04.2024 – 30.04.2024	CSIR - Central Road Research Institute	Shri. Arun Chandran
FDP on "Pavement Design: Principles and Practice"	NIT Calicut	15.05.2023 – 20.05.2023	NIT Calicut	Shri. Shijith P P Dr. Goutham Sarang
Five-days Training programme in MIDAS FEA NX software	KHRI	06.06.2023 - 08.06.2023	KHRI, Trivandrum	Dr. Salini U

Name of Programme	Organised by	Date (s)	Venue	Participants
Online Course on "Mastering a Presentation"	WiseUp Communications	29.06.2023	Online	Shri.Ebin Sam S
Online Course on "Writing a Research Article"	WiseUp Communications	29.06.2023	Online	Shri.Ebin Sam S
One Week online STTP on "Application of MCDM Methods in Logistics and Transportation Engineering (MMLT 2023)	NIT Calicut	10.07.2023 – 15.07.2023	Online	Shri. Anish Kini
PTV Visum Training	Unitrans Mobility Solutions, PTV Group	03.08.2023 – 05.08.2023	Online	Dr. Anila Cyril
Surface and Sub surface drainage management	IAHE	04.09.2023 – 06.09.2023	Online	Dr. Sabitha N M
Five days training program on 'Pavement Evaluation Techniques and their applications for maintenance and rehabilitation'	CSIR – CRRI	18.09.2023 – 22.09.2023	Delhi	Shri. Ashik K Azad
Online training programme on Structural Equation Modelling Using SPSS Amos	P.G. & Research Department of Commerce, St. Peter's College, Kolenchery	09.10.2023 – 13.10.2023	Online	Dr. Sunitha Vijayan
Short Term Training Programme - "Tools for Transportation Data Analysis & Modelling" (TTDAM 2023)	Centre for Transportation Research (CTR) and NIT Calicut	09.10.2023 – 14.10.2023	Online	Smt. Ardra S. Krishna
Faculty Development Program on Application of Machine Learning in Transportation Engineering	College of Engineering Trivandrum	20.11.2023 – 24.11.2023	College of Engineering Trivandrum	Dr. Vasudevan N
Faculty Development Programme on Research Methodology and Multivariate Data Analysis (RMMDA)	Department of Management Studies, ABV-Indian Institute of Information Technology and Management, Gwalior	27.11.2023 – 03.12.2023	Online	Dr. Sunitha Vijayan
Quality assurance, health assessment and	CSIR – CRRI	11.12.2023 – 15.12.2023	Delhi	Dr. Himasree P R

Name of Programme	Organised by	Date (s)	Venue	Participants
rehabilitation of bridge				
"Geospatial Technologies and Trends"	Kerala State Remote Sensing and Environment Centre (KSREC)	20.12.2023 – 22.12.2023		Shri. M.S.Saran
Hands-on training on "Statistical Techniques in Transportation Engineering"	CET	31.01.2024 – 02.02.2024	CET	Dr. Salini U
Workshops				
SDG Vetting	Centre for Management Development	03.05.2023	Centre for Management Development	Shri.V S Sanjay Kumar
Two-Days Workshop on "Full Depth Reclamation Technology"	NATPAC and KIIFB	04.05.2023 – 05.05.2023	RECCA Club, Kochi	Staff of NATPAC
Technical Session on Bentley Civil WorkSuite	Bentley	16.05.2023	Hilton Garden Inn, Trivandrum	Shri.Wilson K C Shri. Chandra prathap R Dr. Salini U
Stakeholder workshop on Facilitating Multi level Climate Governance in Kerala	World Institute of Sustainable Energy	18.05.2023	World Institute of Sustainable Energy	Shri.V S Sanjay Kumar
Review Meeting for the GHG Inventory of Kerala State	Directorate of Environment & Climate Change, Government of Kerala & Vasudha Foundation	26.05.2023	Apollo Dimora, Trivandrum	Shri.Jegan Bharath Kumar A
EPC-An effective way of implementing infrastructure projects	KIIFB	24.06.2023		Shri.V S Sanjay Kumar Shri. Wilson K C Shri. Ebin Sam S
Recent advances in freight transportation (RAFT 2023)	Centre of excellence in logistics and supply chain management	17.07.2023 – 22.07.2023	NIT Calicut	Dr.Rameesha T V
Workshop on Application of Remote Sensing & GIS in Water Resources Engineering	Sathyabama Institute of Science and Technology and Department of Civil Engineering, NITC	24.07.2023 – 28.07.2023	Online	Dr. Sabitha N M
Stakeholder meeting on draft Comprehensive mobility Plan	UMTC	29.07.2023	Mascot hotel, Thiruvananthapuram	Shri.V S Sanjay Kumar Shri.Ebin Sam S
Drone Survey, Photogrammetry and Digitization of Maps	Department of Civil Engineering, Presidency University,	21.08.2023 – 25.08.2023	SERB Sponsored 5 days Hands on Workshop (Online)	Shri.Ebin Sam S

Name of Programme	Organised by	Date (s)	Venue	Participants
for Engineering Applications	Bangalore, Bengaluru			
State level stakeholder consultation on current status, challenges and way forward of road safety in Kerala	KRSA	25.08.2023	Hotel Residency Tower, Thiruvananthapuram	Shri.V S Sanjay Kumar Shri.Ebin Sam S Shri. Chandra prathap R
State level stakeholder consultation workshop	CWRDM	13.09.2023	Institute of Management in Government (IMG)	Shri.V S Sanjay Kumar Dr. Sabitha N M Shri. Jegan Bharath Kumar A Dr. Himasree P R
Workshop on Stakeholder Consultation for Policy Advocacy in Road Safety: Issues, Challenges and Way Forward for Kerala	NATPAC and KIIFB	25.09.2023	Hotel Residency Tower, Thiruvananthapuram	Shri. Chandra prathap R Dr. Praveen P S
Workshop on "Data Analytics with Python"	IEEE student chapter, NIT Tiruchirappalli	14.10.2023 – 15.10.2023		Dr. Sabitha N M
One Day Workshop on "Open-Source ERP - The quick and cost-effective way to your ERP"	ICFOSS	19.10.2023	Greenfield Stadium, Karyavattom,Thiruvananthapuram	Dr. Sunitha Vijayan
Inception Workshop on State Specific Action Plan for Water Sector in Kerala	KSCSTE	13.11.2023	IMG, Thiruvananthapuram	Dr. Sabitha N M
Workshop on "Moisture sensitivity of hot mix asphalt (HMA) - A Comprehensive Study on the Petrology and Moisture Susceptibility of HMA Aggregate Sources/Quarries in Kerala	KHRI	17.11.2023	KHRI	Dr. Salini U
Faculty Development Programme on Research Methodology and Multivariate Data Analysis (RMMDA)	Department of Management Studies, ABV-Indian Institute of Information Technology and Management, Gwalior.	27.11.2023 – 03.12.2023	Online	Dr. Sunitha Vijayan
Increasing Adaptive Capacity of Transport	World Bank jointly with the	29.11.2023 – 30.11.2023	Cinnamon Conference Hall	Shri. Ashik K Azad Shri. Shijith P P

Name of Programme	Organised by	Date (s)	Venue	Participants
Assets & Communities to Withstand Disasters	Government of Kerala (GoK)		at the Four Points Sheraton, Infopark Kochi Phase 1 Campus, Kakkanad, Kochi.	
One day workshop on usage of Public Spaces and impact of Climate Change and worsening Air Quality on Young Children, their caregivers and pregnant Women in Indian Cities	ICLEI South Asia with support from the Kochi Municipal Corporation	06.12.2023	Kochi	Dr. Anila Cyril
"GIS Insights: Mapping Tomorrow with Open-Source Spatial Solution"	ICFOSS, Thiruvananthapuram	18.01.2024		Shri. M S Saran
1st User Workshop of TUTEM: Technologies for Urban Transit to Enhance Mobility and Safe Accessibility	IIT Bombay, BITS Pilani, Hyderabad Campus, IIT Kharagpur and Location Mind funded by Asian Development Bank	01.03.2024	Metro Rail Bhavan, Begumpet, Hyderabad	Dr. Samson Mathew
Webinars				
Powering the Future with Hydrogen Fuel Cells	MathWorks India Private Limited	26.04.2023 – 27.04.2023	Online	Dr. Sanjai R J
Write zero-defect code: Harnessing the power of Formal Methods- based verification		23.08.2023		
Electrothermal Modelling and Analysis for Electric Motors and Batteries		12.09.2023 – 13.09.2023		
Trimble DA2 GNSS Receiver: Unleashing the Power of Accuracy in India	Trimble	31.05.2023	Online	Shri. M S Saran
How to Crack AI Engineer Roles in 2023	SRM University, Chennai	08.06.2023	Online	Shri. M S Saran
ArcGIS for Drone Data Processing and Analysis	ESRI India	29.06.2023	Online	Shri. M S Saran
Accuracy Matters: Transforming Asset Data Capture & Inspection with Trimble Technology	Trimble	05.07.2023	Online	Shri. M S Saran

Name of Programme	Organised by	Date (s)	Venue	Participants
The Coexistence Conundrum	Down to Earth	06.07.2023	Online	Shri. M S Saran
Spatial Statistics in ArcGIS - from Cluster Analysis to Analysing Space-time data	ESRI India	12.07.2023	Online	Shri. M S Saran
Revolutionizing Land Use Intelligence for Urban and Natural Systems with High Resolution Satellite Imagery	Planet, Vassar Lab, Bhubaneswar Development Authority and ORSAC	19.07.2023	Online	Shri. M S Saran
How to publish Scholarly books in Remote Sensing and Photogrammetry	Taylor and Francis Group	25.07.2023	Online	Shri. M S Saran
APAC's Geospatial Industry Outlook and Business Directions	Geospatial World	03.08.2023	Online	Shri. M S Saran
Navigating the Future with GIS Managed Cloud Services - Empowering your Spatial Data Infrastructure	ESRI India	08.08.2023	Online	Shri. M S Saran
International Webinar Series on Geoenvironmental Engineering, Sustainability, and Resiliency Confirmation		31.08.2023 07.09.2023 14.09.2023 21.09.2023 28.09.2023	Online	Dr. Salini U
Ban on Single-Use Plastics in India	Centre for Science and Environment (CSE) Delhi	07.09.2023	Online	Shri. M S Saran
International Webinar Series on Geoenvironmental Engineering, Sustainability, and Resiliency Confirmation		05.10.2023 12.10.2023 19.10.2023 09.11.2023 30.11.2023	Online	Dr. Salini U
Smarter Fleet Management: Real-Time Route Optimization and Alerts with Kinetica	Kinetica	26.10.2023	Online	Shri.Ebin Sam S
Short slab concrete pavements (SSCP) for high volume roads	RASTA Centre for road technology	28.10.2023	Online	Dr. Himasree P R
Valuing Sustainable Transport: Investment, Systems Thinking and Integrated Cost-Benefit Analysis	International Institute of Sustainable Development	21.11.2023	Online	Dr. Sunitha Vijayan

Name of Programme	Organised by	Date (s)	Venue	Participants
13th P K Goplalakrishnan Memorial Lecture by Dr. Arvind Virmani on the topic "India@2047: Will be a Developed Country"	Centre for Development Studies, Trivandrum	22.11.2023	Online	Dr. Sunitha Vijayan
Smarter Fleet Management: Real-Time Route Optimization and Alerts with Kinetica	Kinetica and Geospatial World	30.11.2023	Online	Dr. Anila Cyril
7th IS Gulati Commemoration Lecture on "A World Order in Crisis and Transition: Thinking Ahead About its Future" by Prof. Deepak Nayyar, Emeritus Professor, JNU & Former Vice Chancellor, University of Delhi.	Gulati Institute of Finance and Taxation (GIFT), Thiruvananthapuram , Kerala, India	04.12.2023	Online	Dr. Sunitha Vijayan
Geoenvironmental Engineering webinar		18.01.2024 25.01.2024 01.02.2024 08.02.2024	Online	Dr. Salini U
Zero Emission Buses	UTTP Asia-Pacific together with UTP India and UITP Australia & New Zealand	01.02.2024	Online	Dr. Sanjai R J
Launching of Indian National Group of fib (ING- fib)	Indian Association of Structural Engineers	07.02.2024	Online	Dr. Himasree P R
Spatial Analytics in ArcGIS	ESRI India	21.02.2024	Online	Shri. M S Saran
ArcGIS Geostatistical Analyst	ESRI India	28.02.2024	Online	Shri. M S Saran
Geospatial Artificial Intelligence (GeoAI)	ESRI Public safety Team	06.03.2024	Online	Dr. Anila Cyril
How to develop a network -centric security approach to defend against threats	CISCO	19.03.2024	Online	Dr. Sanjai R J
GIS Basics	Esri Training	18.03.2024	Online	Dr. Anila Cyril

Dr. Samson Mathew, Director, NATPAC and Scientists from NATPAC attending the 82nd Annual Session of IRC

Dr. Samson Mathew, Director, NATPAC and Scientists from NATPAC attending the 7th CTRG at SVNIT Surat

PUBLICATIONS AND DISSEMINATION

1. Publications and Presentations

Papers Published in Referred Journals

- **Shaheem S,** Nisha Radhakrishnan, **Samson Mathew.** (2023). Development of Structural Equation Model for Travel Mode Choice Behaviour of Working Population in Thiruvananthapuram City. *Civil Engineering and Architecture,* 11(5), 2572-2582. https//DOI:10.13189/cea.2023.110524.
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- **Shaheem S,** Radhakrishnan N, **Mathew S.** (2024). Mode Choice Modelling of Different Categories of Work Trips in Thiruvananthapuram City. *Proceedings of SECON'23. Lecture Notes in Civil Engineering,* 381, pp. 251–269, Springer, Cham. https://doi.org/10.1007/978-3-031-39663-2_20.
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- **Salini P N,** Rahul P, **Salini U, Mathew S.** (2023). Estimation of Risk Exposure Index for Road Network in Landslide-Prone Areas. In: Agarwal, A., Velmurugan, S., Maurya, A.K. (eds) *Recent Trends in Transportation Infrastructure*, Volume 2. TIPCE 2022. Lecture Notes in Civil Engineering, vol 347. Springer, Singapore. https://doi.org/10.1007/978-981-99-2556-8_22. *(Scopus Indexed).*
- **Salini P N, Kini B A**, Mohan G. (2023). Comparison of Dynamic Passenger Car Values Estimated at Signalised Intersections under Heterogeneous Traffic Conditions. *Lecture Notes in Civil Engineering*, 261, pp. 51–65. *(Scopus Indexed).*
- Sabu K, **N M Sabitha, Kumar, V S S,** George G, Dhurai V. (2023). Factors Influencing Mode Choice Towards Kochi Water Metro: A Latent Variable Approach. *Engineering Research Transcripts*, 5, 65–74. https://doi.org/10.55084/grinrey/ERT/978-81-964105-3-7_5.
- Mammen N, **Wilson K C**, Verghese V. (2023). Traffic Impact Assessment of a proposed shopping mall in a Medium-Sized Town. *Lecture Notes in Civil Engineering*, 261, pp. 673–688.
- Najla Abdul Nassir, **Ebin Sam**, Jomy Thomas, Rajesh Mulleti. Crash Blackspot Identification and Analysis: A Case Study of Ernakulam District. In: Alka Bharat, Yogesh Kumar Garg, Rahul Tiwari (eds), *Vision Zero - Systems, Approaches and Implementation, Bloomsbury Publishing*, ISBN: 9789356404731, 1st Vision Zero Summit.

- **Ebin Sam S, Sanjay Kumar V S**, Angel Maria Mathew. Comparative Spatial analysis of Crash Hotspots - A Covid-19 perspective. In: Alka Bharat, Yogesh Kumar Garg, Rahul Tiwari (eds), *Vision Zero - Systems, Approaches and Implementation*, Bloomsbury Publishing, ISBN: 9789356404731, 1st Vision Zero Summit.
- **Jegan Bharath Kumar A**, Ganeshvijay R, Murshida P, Rajasekar R. (2023). Analysis of Internal Pore Structure of Porous Asphalt Concrete Using X-ray Computed Tomography Images. In: Rastogi, R., Bharath, G., Singh, D. (eds) *Recent Trends in Transportation Infrastructure,* Volume 1. TIPCE 2022. Lecture Notes in Civil Engineering, vol 354. Springer, Singapore. https://doi.org/10.1007/978-981-99-3142-2_4.
- **Salini U,** Koshy S A. (2023). Dynamic Complex Modulus and Rutting Characteristics of Reclaimed Asphalt Pavement (RAP) Mixes. In: Rastogi, R., Bharath, G., Singh, D. (eds) *Recent Trends in Transportation Infrastructure*, Volume 1. TIPCE 2022. Lecture Notes in Civil Engineering, vol 354. Springer, Singapore. https://doi.org/10.1007/978-981-99-3142-2_25.
- **Salini U, Jegan Bharath Kumar A**. (2023). Stabilization of Sub-grade Soil Using Shredded Waste Plastic Bags. In: Muthukkumaran, K., Sathiyamoorthy, R., Moghal, A.A.B., Jeyapriya, S.P. (eds) *Ground Improvement Techniques.* IGC 2021. *Lecture Notes in Civil Engineering,* vol 297. Springer, Singapore. https://doi.org/10.1007/978-981-19-6727-6_26.

Book Chapter

- **Sunitha Vijayan**, Vishnu P.S. (2023). Crop Insurance in Kerala: The Journey of a Lost Saviour, Edited book chapter, *Social and Solidarity Economy: A sectoral Narrative.* ISBN:978-93- 91798-51-2, Page no: 107-123, Academic Publication, Delhi.

Presentation of Papers in Seminars/Workshops

Sl No.	Author(s)	Paper Details	Date
1	Midhun K R, **Salini U,** Swathy Pushpan	*"Effect of wet dry cycles on the behaviour of dredged marine clay".* International Conference on Sustainable Infrastructure: Innovations, Opportunities, and Challenges (SIIOC2023), organised by NITK, Surathkal. *Published in Proceedings.*	20.04.2023 – 21.04.2023

Sl No.	Author(s)	Paper Details	Date
2	Mahima Babu K C, **Salini U,** Swathy Pushpan	*"Effectiveness of coir geocell for reinforcing base course*". International Conference on Sustainable Infrastructure: Innovations, Opportunities, and Challenges (SIIOC2023), organised by NITK, Surathkal. *Published in Proceedings.*	20.04.2023 – 21.04.2023
3	Krishnapriya P K, **Salini U,** Swathy Pushpan	*"Behaviour of Palm Oil Fuel Ash stabilized residual soil".* International Conference on Sustainable Infrastructure: Innovations, Opportunities, and Challenges (SIIOC2023), organised by NITK, Surathkal. *Published in Proceedings.*	20.04.2023 – 21.04.2023
4	Jasmine A Rahman, **Rameesha T V**	*"An investigation on impact of soil types and seismic zones on the response reduction factor of an elevated water tank*". International Conference on Sustainable Infrastructure: Innovations, Opportunities, and Challenges (SIIOC2023), organised by NITK, Surathkal. *Published in Proceedings.*	20.04.2023 – 21.04.2023
5	G Liander, R N Malavika, P S Shivani, D Nauzzin, **P S Praveen**, **K A Ashik,** C M Lekshmi	*"Forced Gap Behaviour at Unsignalised Intersections: A Case Study".* Ist Vision Zero Summit, National Conference on Road Safety, Maulana Azad National Institute of Technology, Bhopal. *Published in Proceedings.*	29.05.2023 – 31.05.2023
6	**Ebin Sam S, Sanjay Kumar V S,** Angel Maria Mathew	*"Comparative Spatial analysis of Crash Hotspots - A Covid-19 perspective".* Ist Vision Zero Summit, National Conference on Road Safety, Maulana Azad National Institute of Technology, Bhopal. *Published in Proceedings.*	29.05.2023 – 31.05.2023
7	**Ebin Sam S,** Muhammed Hafiz A N, Dr. M. V. L. R. Anjaneyulu	*"Evaluation of crossing conflicts at an uncontrolled T-intersection using Surrogate Safety Measures".* Ist Vision Zero Summit, Maulana Azad National Institute of Technology.	29.05.2023 – 31.05.2023
8	Najla Abdul Nassir, **Ebin Sam S,** Jomy Thomas, Rajesh Mulleti	*"Crash Blackspot Identification and Analysis: A Case Study of Ernakulam District".* Ist Vision Zero Summit, Maulana Azad National Institute of Technology.	29.05.2023 – 31.05.2023
9	**Shaheem S,** Nisha Radhakrishnan, **Samson Mathew**	*"Mode Choice Modelling of different categories of Work Trips in Thiruvananthapuram City".* Fourth International Conference on Structural Engineering and Construction Management (SECON'23.	07.06.2023 – 09.06.2023
10	**Salini P N,** Archa S, Ashalatha R, Binu Sara Mathew	*"Passing Characteristics of Vehicles on Undivided Two-Lane Highways with Heterogeneous Traffic".* 16th World Conference on Transport Research 2023 (WCTR 2023) at Montreal, Canada.	17.07.2023 – 21.07.2023
11	**Salini P N,** Sreelakshmi P V, Ashalatha R, Binu Sara Mathew	*"Modelling Lateral Placement and Lateral Clearance During Passing Manoeuvres".* 16th World Conference on Transport Research 2023 (WCTR 2023) at Montreal, Canada.	17.07.2023 – 21.07.2023

Sl No.	Author(s)	Paper Details	Date
12	Sruthy C S, **Sanjay Kumar V S,** Jinumol K R	*"A Review on Pedestrian Crash Prediction Models".* National Conference on Recent Advances in Material science in Engineering (RAME-2023), organised by Department of Civil Engineering & Department of Mechanical Engineering, East Point College of Engineering and Technology, Bengalore. *Published in Proceedings.*	26.07.2023 – 27.07.2023
13	Jishnu Dev M V, Kalidasan S S, **Sabitha N M,** Sherin N S, **Sanjai R J**	*"An assessment of willingness to pay for passenger boats".* National Conference on Recent Advances in Material science in Engineering (RAME-2023), organised by Department of Civil Engineering & Department of Mechanical Engineering, East Point College of Engineering and Technology, Bengalore. *Published in Proceedings.*	26.07.2023 – 27.07.2023
14	**Dr.Rameesha T V,** P Krishnankutty	*"Ship maneuvering in waves".* 10th International Congress on Industrial and Applied Mathematics, Waseda University, Tokyo, Japan.	20.08.2023 – 25.08.2023
15	**Shaheem.S,** Nisha Radhakrishnan, **Samson Mathew**	*"Mode Choice Modelling of Different Categories of Work Trips in Thiruvananthapuram City".* 4th International Conference on Structural Engineering and Construction Management (SECON'23), organized by the Department of Civil Engineering, Federal Institute of Science and Technology (FISAT)	07.09.2023
16	Najla Abdul Nassir, **Ebin Sam S,** Jomy Thomas, Rajesh Mulleti	*"Spatial Analysis of Road Crash Black Spots: A Case Study of Ernakulam District".* Conference on Transportation Systems Engineering and Management (CTSEM 2023), National Institute of Technology Warangal. *Published in Proceedings.*	12.10.2023 – 14.10.2023
17	**Dr.Sunitha Vijayan,** Mahima Raj	*"Impact Assessment of Covid 19 on Agriculture Sector in Kerala: Empirical Evidence from Thiruvananthapuram District".* DCA sponsored International Conference 2023, organised by Government College, Ambalapuzha.	26.10.2023
18	**Wilson K C,** Dr. Satyakumar M	*"Influence of Aggregate Mineral Properties on Moisture Susceptibility".* 7th Conference of Transportation Research Group of India (CTRG-2023), organized by SVNIT Surat. *Published in Proceedings.*	17.12.2023 – 20.12.2023
19	**Chandra Prathap R, Dr. Sunitha V, Dr. Samson Mathew,** Devika Santosh	*"Investigating Overloading on Vehicle Axles and Gross Vehicle Weight: Evidence from Field Data Analysis".* 7th Conference of Transportation Research Group of India (CTRG-2023), organized by SVNIT Surat. *Published in Proceedings.*	17.12.2023 – 20.12.2023
20	Soorya Ann Koshy, **Dr. Salini U**	*"Laboratory Investigation on Clogging Behavior of Open Graded Friction Course mixes".* 7th Conference of Transportation Research Group of India (CTRG-2023), organized by SVNIT Surat. *Published in Proceedings.*	17.12.2023 – 20.12.2023
21	**Salini P N,**	*"Modelling the Potential Shift to Sustainable Modes and the Resultant Reduction in Carbon Emission".* 7th	17.12.2023 – 20.12.2023

Sl No.	Author(s)	Paper Details	Date
	Keerthi Rajendran, Archana S, Archa S	Conference of Transportation Research Group of India (CTRG-2023), organized by SVNIT Surat.	
22	**Arun Chandran, B Anish Kini, Praveen P S,** Abhiram M P, Althaf J Muhammed, **Subin B**	*"Impact of Implementing Tubular Marker in an Urban Two Lane Two Way Road with Mixed Traffic Conditions".* 7th Conference of Transportation Research Group of India (CTRG-2023), organized by SVNIT Surat.	17.12.2023 – 20.12.2023
23	**V S Sanjay Kumar, Dr.Vasudevan N,** Neelu Mammen, Shabana Yoonus, **Dr.Samson Mathew**	"*Understanding the Willingness of Mode Shift to Feeder Services Amid Important Events - A Case Study".* 7th Conference of Transportation Research Group of India (CTRG-2023), organized by SVNIT Surat.	17.12.2023 – 20.12.2023
24	**P R Himasree,** Athira Raj, Chaaruchandra Korde, Sarif N, Sreedevi Lekshmi	*"Synthesis, characterization and durability studies of hybrid fiber reinforced high performance mortar".* International Conference on Sustainable Materials for Engineering Applications (ICSMEA 2024), IIT Madras. (Published in proceedings)	01.02.2024 – 03.02.2024
25	**Shaheem S, Praveen P S,** Adurthi N M, Abhiram M P	*"A study on identifying traffic improvement measures at a median opening on NH 66 in Thiruvananthapuram city".* 36th Kerala Science Congress, Kasaragod Government College, Vidyanagar, Kasaragod.	08.02.2024 – 11.02.2024
26	**Praveen P S, Ashik K A,** Leander G, Malavika R N, Nauzzin D, Shivani P S	*"A Case Study on Forced Gap Behaviour at Unsignalised Intersections in Thiruvananthapuram City".* 36th Kerala Science Congress, Kasaragod Government College, Vidyanagar, Kasaragod.	08.02.2024 – 11.02.2024
27	**Rameesha T V,** Veena P Nair	*"Structural behaviour of CFST columns under corrosion".* 36th Kerala Science Congress, Kasaragod Government College, Vidyanagar, Kasaragod.	08.02.2024 – 11.02.2024
28	**Ashik K Azad, Shijith P P,** Ann Lilly Thomas	Poster titled *"Performance Comparison of Low Volume Roads Constructed Using New Technology and Conventional Method".* 36th Kerala Science Congress, Kasaragod Government College, Vidyanagar, Kasaragod.	08.02.2024 – 11.02.2024
29	Sajeeha S, **Shaheem S**	*"Comparison of Trip Generation and Parking Rates in Major Cities of Kerala*". Recent Advances in Infrastructure Development, NIT Calicut.	12.02.2024 – 13.02.2024
30	**Dr. Sunitha Vijayan,** A S Hima	*"Covid-19 and Healthcare Expenditure: Evidence from Thiruvananthapuram District."* National Conference on 'Recent Trends in Economics', organised by the Department of Economics, VTM NSS College, Dhanuvachapuram.	13.02.2024

2. Invited Talks/Media Interactions

Invited Talk

Sl. No.	Name& designation of staff	Topic/Particulars	Event/Venue	Date
1	Prof. (Dr.) Samson Mathew, Director	*Guidelines for the Design and Construction of Pavements using Natural Geotextiles*	Faculty Development Programme on "Recent Advances in Transportation Geotechnics (ReATraG'24)", College of Engineering Trivandrum	16.01.2024
2		*Sustainable Transportation*	Techsynod'24, organized by Mohandas College of Engineering and Technology, Trivandrum	25.01.2024
3		*Environmental Concerns of Pampa river*	Pampa convention	06.02.2024
4		*Keynote Address - Engineering Solutions for a Sustainable World*	World engineering Day Celebrations, organised by the Institution of Engineers (India) Kerala State Centre and Marian Engineering College at Marian Engineering college, Tvpm.	04.03.2024
5		*Novelty in Science, Engineering and Management*	Inaugural speech, International Conference, Mahaguru Institute of Technology, Kayamkulam	22.03.2024
6	Dr. Shaheem S, Principal Scientist	*Traffic signal control of the future: should we do it at intersections?*	Trans Tech	03.04.2023
7		*Optimal integration of on demand transit services with fixed route transit network for cost effective first and last mile connectivity.*	Trans Tech	15.09.2023
8		*Future Transportation*	Winter CONFEST 2023, Kochi	02.12.2023
9		Co-chaired a session	Recent Advances in Infrastructure Development (RAID) 2024, NIT Calicut	13.02.2024
10	Shri. V S Sanjay Kumar, Principal Scientist	*Basic Principles of Road Safety*	Training for ambulance drivers at Sree Chitra Thirunal College of Engineering, Thiruvananthapuram	03.07.2023
11		*Basic Principles of Road Safety*	Training for driving school instructors at Sree Chitra Thirunal College of Engineering, Thiruvananthapuram	12.09.2023

Sl. No.	Name& designation of staff	Topic/Particulars	Event/Venue	Date
12		*New Bituminous pavement surfaces*	KHRI	19.10.2023
13		*Defensive Driving and Road Safety for Employees of Adani Airport*	Thiruvananthapuram International Airport	30.10.2023
14		*Road safety training for school teachers*	Sree Chitra Thirunal College of Engineering, Thiruvananthapuram	23.11.2023
15		*Overview of Road Accidents & Reconstruction*	Online training programme "Road Accident Reconstruction – Human Factors – Social Cost of Road Crashes & Injuries", organized by Engineering Staff College of India – Hyderabad, sponsored by Ministry of Road Transport & Highways, Government of India	08.12.2023
16		*Role of Teachers in Ensuring a Safe Road System*	Road Safety Training for Teachers - INSIGHTS , organised by Sree Chithira Tirunal College of Engineering at Govt. Pre-Primary Training Institute, Manacaud	19.02.2024
17		*Forensic Investigation of Crashes & Data Management & Data Mining Framework*	Training Program on Road Crash Data Analysis and Investigation, Sponsored by the Ministry of Road Transport and Highways (Transport Section), Govt. of India, New Delhi, Engineering Staff College of India (ESCI) at Hyderabad	21.02.2024 (FN)
18		*Social Cost of Road Crashes and Injuries, Crash Data Collection & Legal Aspects of Crash Investigation*		21.02.2024 (AN)
19		*EDR data collections - Modelling and Simulation of Crashes*		22.02.2024 (FN)
20		*Chief guest and Keynote Lecture at the opening ceremony*	Observation of 53rd National Safety Week organised by Thiruvananthapuram International Airport, Thiruvananthapuram International Airport	04.03.2024

Sl. No.	Name& designation of staff	Topic/Particulars	Event/Venue	Date
21		*Role of Teachers in Ensuring a Safe Road System*	Road Safety Training for Teachers - INSIGHTS , organised by Sree Chithira Tirunal College of Engineering at Govt. Pre-Primary Training Institute, Manacaud	16.03.2024
22	Shri. Wilson K C, Senior Scientist	*Advancements in Rigid Pavements*	KHRI for PWD engineers	18.10.2023
23		*Design of Rigid pavements*	Mar Baselios College of Engineering and Technology (MBCET), Thiruvananthapuram	October 2023
24	Shri. Ebin Sam S, Scientist	*Road safety training for representatives of Road Safety Cell*	Cotton hill school, Thiruvananthapuram	23.11.2023
25	Shri. Jegan Bharath Kumar A, Scientist	*New type of bituminous pavement surfaces*	KHRI for PWD engineers	19.10.2023
26		*Emerging sustainable Pavement Technologies and Carbon Foot print*	Engineers at Highway Research Station (HRS), Chennai	08.02.2024
27	Shri. Chandraprathap R, Scientist	*Cold Bituminous Mixes*	KHRI for PWD engineers	19.10.2023
28		*Reclaimed Asphalt Pavement Technologies*	Highway Research Station, Chennai (Training TST-07) for PWD engineers	08.02.2024
29	Dr. Salini U, Scientist	*FDR Technology*	KHRI for PWD engineers	18.10.2023
30		*Geosynthetics for pavement construction*	KHRI for PWD engineers	20.10.2023
31		*Introduction to Full Depth Reclamation Technology*	One Day Workshop on FDR Technology for KSRRDA engineers, at GCDA HAll	14.01.2024
32		*Full Depth Reclamation – A Sustainable Pavement Reconstruction Technology*	Through online for LSGD AE association	14.01.2024
33		*Practical Considerations of Subgrade*	Online FDP on Recent Advances in Transportation Geotechnics (ReATraG24) at CET	20.01.2024
34		*Full Depth Reclamation*	HRS Training TST-07 'Green Highways' (Batch-I), Chennai	08.02.2024
35		*Co-Chaired the Plenary Session*	National Conference on Soils and Foundations SAF-2024, organised by IGS TVM Chapter and LBSITW	15.02.2024
36	Shri. B Anish Kini, Scientist	*Road Safety Audit*	For LSGD Engineers, organized by KILA	26.04.2023
37		*Road Safety Audit*	For LSGD Engineers, organized by KILA	21.06.2023

Sl. No.	Name& designation of staff	Topic/Particulars	Event/Venue	Date
38		*Road Safety Audit*	For LSGD Engineers, organized by KILA	24.06.2023
39		*Introduction to VISSIM*	MBCET Faculty and M.Tech students	18.07.2023
40		*Introduction to Road Safety Audit*	For LSGD Engineers, Thrissur	09.11.2023 – 10.11.2023
41	Dr. Vasudevan N, Junior Scientist	*Transportation Engineering and Planning: Scope and Opportunities*	Muthoot Institute of Technology and Science, Varikoli	24.04.2023
42		*Basic Principles of Road safety*	HSS, Arimpur, Thrissur	21.09.2023
43	Dr. Himasree P R, Junior Scientist	*Review on bamboo reinforced concrete structural elements*	IITB	16.09.2023
44		*Bamboo reinforced concrete structural elements*	College of Engineering, Thiruvananthapuram	18.09.2023
45		*Whitetopping on bituminous roads*	KHRI, Karyavattom	18.10.2023
46		Sesssion Chair	Ist Indian Conference on Disaster Resilient Infrastructure (I-DRI 2024), NIT Puducherry	07.03.2024 – 08.03.2024
47	Dr. Anila Cyril, Junior Scientist	*"Rack & Crack"*	Idea Pitching Competition conducted by Christ College of Engineering, Crowne Plaza, Ernakulam	09.03.2024
48		Industry advisory panel	KIT's College of Engineering (Autonomous) Kolhapur (Online)	13.03.2024
49	Shri. Ashik K Azad, Junior Scientist	*Preventing Pollution and the Ways to Control Industrial Disasters*	St. Thomas Institute for Science and Technology, Kazhakoottam, Trivandrum	30.11.2023
50	Shri. Shijith P P, Junior Scientist	*Cement treated Base (CTB) and Cement Treated Subbase (CTSB)*	Kerala Highway Research Institute (KHRI), Karyavattom, Thiruvananthapuram	20.10.2023
51		*Course facilitator for Soil Mechanics*	SNS College of Technology, Coimbatore (Online)	05.10. 2023 – 15.10.2023
52	Dr. Goutham Sarang, Junior Scientist	*IRC 37 - 2018 - Flexible Pavement Design*	Vellore Institute of Technology Chennai – Online	19.07.2023
53		*Reclaimed Asphalt Pavement*	Kerala Highway Research Institute (KHRI), Karyavattom, Thiruvananthapuram for PWD engineers	20.10.2023
54	Dr. Rameesha T V, Junior Scientist	*Ship maneuvering in waves*	Mini Symposium Talk - Industrial and Applied Mathematics - ICIAM 2023,	20.08.2023 – 26.08.2023

Sl. No.	Name& designation of staff	Topic/Particulars	Event/Venue	Date
			Waseda university, Tokyo, Japan	
55		*Soil structure interaction*	St. Thomas College of Engineering and Technology	04.09.2023
56	Dr. Sunitha Vijayan, Junior Scientist	*Project preparation- Financial Assistance or Schemes from public or private sector for entrepreneurship development on plant propagation and nursery management*	Nurseries skill-based training programme supported by KSCSTE SC/ST Cell on "Nursery management and Quality Planting Material Production" to the employees of Aralam Farming Corporation, Kannur at KSCSTE-MGIPS - Online	18.10.2023
57		*Project preparation- Financial Assistance or Schemes*	Skill Based Training Programme on Plant Propagation and Training Management at KSCSTE-MBGIPS - Online	02.12.2023
58		*Research Methodology for Social Science: An Empirical and Practical Approach*	VTM NSS College, Dhanuvachapuram	09.03.2024
59		*Agriculture and Environment Nexus: Exploring the Interlinkages between Agriculture Risk and Production in Kerala*	Department of Economics, NSS College Cherthala	27.03.2024

Media Interaction

Sl. No.	Name& designation of staff	Topic/Particulars	Media	Date
1	Prof. (Dr.) Samson Mathew, Director	കോഴിക്കോട് ജില്ലയിൽ ശ്രദ്ധിക്കണം ഈ 32 സ്ഥലങ്ങൾ	AIR Kozhikode	10.01.2024
2		*Share Auto in Kochi - scope and challenges*	AIR Kochi FM	14.01.2024
3		കെ.എസ്.ആർ.ടി.സി നേത്യമാറ്റം ഗുണം ചെയ്യുമോ?	Samakalikam, Dooradarsan	23.01.2024
4	Shri.V S Sanjay Kumar, Principal Scientist	*Soft Policing* - on World Day of Remembrance for Road Traffic Victims	The Hindu	19.11.2023
5	Shri. Subin B, Senior Scientist	*Death rate due to two-wheeler accidents is on the rise*	AIR, Trivandrun	01.05.2023
6	Shri. Ebin Sam S, Scientist	*Misguiding of Google map*	The Hindu	01.10.2023
7	Shri. B Anish Kini, Scientist	*Traffic study at Kakkanad, Thrikkakara*	Nanma, 24 News channel	22.08.2023

3. Road Safety Education Materials

Films

1. Savari, A Documentary Film on Road Safety – For Auto rickshaw Drivers
2. Gathy, A Short Film on Two Wheeler Safety
3. IRC Film (English and Malayalam) – For School Children
4. Right Step (English and Malayalam) – For School Children
5. VIC Roads, Australia – For School Children
6. A Picnic on Pedals – For School Children
7. Vazhikkannumai – On Pedestrian Safety
8. Sradhha –Transportation of Goods Vehicles
9. Take care
10. A Film on Seatbelt
11. A film on Rash Driving
12. A Film on Pedestrian Crossing
13. Distraction is Extraction
14. Hands free is not Risk free

Cartoon Films

1. Zebra crossing
2. Why should we avoid accidents
3. Travel from school to home
4. Tow way road
5. Take to hospital
6. Signals
7. Signalized Intersection Turn From Wrong Lane
8. Safe road to travel
9. Rules to obey while crossing the road
10. Rules for students who are walking to school
11. Preparation for Safe Driving - Two wheeler
12. Preparation For Safe Driving - Four Wheeler
13. Pelican signal
14. Parked vehicle
15. One way street
16. Never Jump a signal
17. Never Drive on Footpath
18. Never cross in a roundabout
19. How to cross roads at night
20. Head Safety First
21. Getting ready for going to school
22. Four lane road
23. For those who use auto rickshaw
24. For those who cross railway lane
25. For students traveling in school bus, van, mini van

26. For people using public vehicle
27. For people using private vehicle
28. For people using cycle
29. Driving in rain
30. Driving distraction-Talking
31. Driving distraction two wheeler
32. Driving distraction children
33. Driving distraction - Hoarding
34. Driving distraction - Drinking water
35. Driving discipline in an Undivided Road
36. Driving at bends
37. Don't play on road
38. Don't overtake in bends
39. Do not use Mobile Phone While Driving
40. Do not use Mobile Phone While Crossing Road
41. Do not over speed
42. Dim your head lamp
43. Crossing roads
44. Always walk on the right hand side of the road
45. Always keep the right lane when turning right
46. Always Change Lane with Indicator
47. About vehicle Preference in roundabouts

Booklets

1. Safe Road to School (English & Malayalam)
2. Preventing Accidents
3. Two Wheeler Driving Manual
4. Road Safety Manual for Goods Vehicle
5. All about Lane Driving and Road Safety
6. Auto rickshaw Driving Manual (English & Malayalam)
7. Defensive Driving
8. Teacher's Manual (English & Malayalam)
9. Safe Community Programme for Panchayats (English & Malayalam)
10. Helping Road Accident Victims (English & Malayalam)
11. Rules of Road Regulations,1989
12. On Car and Safe Driving
13. Road Safety Slogan
14. Vehicle Upkeep and Safety
15. Alphabets of Road Language
16. Road Safety Quiz
17. Safe and Responsible Parking
18. Road Safety and Youth Leadership Programmes
19. Safety Rules for Railway Level Crossing and Around Tracks
20. Safe and Secure Travel by Train

21. Driver's Guide (Malayalam)
22. Formation and Activities of Road Safety Cell in Schools (Malayalam)
23. കാൽനടയാത്രക്കാർക്കുള്ള സുരക്ഷാമാർഗരേഖ
24. സ്കൂൾകുട്ടികൾക്കുള്ള റോഡ്സുരക്ഷാധിഷ്ഠിത ബോധവത്കരണം
25. പപ്പു ഉറങ്ങുകയല്ല
26. സുരക്ഷിതമായ സൈക്കിൾസവാരി
27. സുരക്ഷിത പാർക്കിംഗ്
28. റോഡിലെ ഭാഷയുടെ അക്ഷരമാല
29. റോഡ്സുരക്ഷാ മുദ്രാവാക്യങ്ങൾ
30. റോഡ്ഗതാഗത നിയന്ത്രണ ചട്ടങ്ങൾ
31. ലെയിൻ അധിഷ്ഠിത ഡ്രൈവിംഗും റോഡ്സുരക്ഷയും
32. പ്രതിരോധാത്മകഡ്രൈവിംഗ്
33. റോഡ്സുരക്ഷയും യുവജന നേതൃത്വ പരിപാടികളും
34. ഇരുചക്ര വാഹനമോടിക്കുന്നവർക്ക് ഒരു കൈപുസ്തകം
35. ചരക്ക് വാഹനങ്ങൾക്കുള്ള റോഡ് സുരക്ഷാസഹായി
36. പ്രതിരോധാത്മക ബസ്ഡ്രൈവിംഗും റോഡ്സുരക്ഷയും
37. റോഡപകടങ്ങൾ തടയുന്നതിനുള്ളമാർഗങ്ങൾ
38. വാഹനങ്ങളുടെ പരിപാലനവും സുരക്ഷയും
39. കുട്ടികൾക്കായുള്ള റോഡ് സുരക്ഷാധിഷിഠിത ബോധവൽക്കരണം

Leaflets

1. Who is Walking on the Wrong Side
2. Police Hand signals
3. Safe and Correct Ways of Parking
4. Protect your Child from Injury
5. Spot the Hidden Dangers
6. Two Wheeler Driving
7. School Safety – A Checklist for Parents
8. Understanding Traffic Rules and Regulations (English & Malayalam)
9. Helmets (English & Malayalam)
10. Golden Rules for Defensive Driving (English & Malayalam)
11. Safe Car Driving
12. Safety Precautions for Two-Wheeler Drivers
13. Safe and Responsible Parking
14. Traffic Control Devices
15. Trains of thought- Use Extreme caution when crossing
16. Trains of thought- Safety Slogans - Just Think
17. Trains of thought- Safety Slogans - Just Think over these
18. Railway level Crossings- Safety Tips for Vehicle Drivers
19. Safe Crossing of Railway Tracks-Tips for Pedestrians and Cyclists
20. Railway Level Crossing- Safety Tips for School Buses
21. Railway Level Crossing- Safety Tips for Truck drivers
22. സുരക്ഷിത ഇരുചക്രവാഹന സവാരി

23. രാത്രികാലറോഡപകടങ്ങൾ എങ്ങനെ ഒഴിവാക്കാം
24. സുരക്ഷിത യാത്രയ്ക്കുള്ള മാർഗനിർദ്ദേശങ്ങൾ
25. പ്രതിരോധാത്മക ഡ്രൈവിംഗ്
26. റോഡ്സുരക്ഷയും മുതിർന്ന പൗരന്മാരും
27. അമിതവേഗതയും അപകടസാധ്യതകളും
28. സുരക്ഷിത പാർക്കിംഗ്
29. സുരക്ഷിത ബസ്യാത്ര
30. ബസ്യാത്രയിൽ/കാൽനടയാത്രക്കാർ
31. ഡ്രൈവർമാർ/അമിതവേഗത
32. സ്ക്കൂട്ടർ/മോട്ടോർ/ഹെൽമെറ്റ് ധരിക്കൂ
33. മൊബൈൽഫോൺ/സീറ്റ്ബെൽറ്റ്
34. ആട്ടോറിക്ഷയിൽ/മദ്യപിച്ച്
35. റോഡിൽ എങ്ങനെ സുരക്ഷിതരാകാം

Road Safety Posters

1. പത്തിനും പതിനഞ്ചിനും ഇടയ്ക്ക് വയസ്സുള്ള കുട്ടികൾക്ക്വേണ്ടി രക്ഷിതാക്കൾക്ക് എന്തുചെയ്യാം 1
2. പത്തിനുംപതിനഞ്ചിനും ഇടയ്ക്ക് വയസ്സുള്ളകുട്ടികൾക്ക് വേണ്ടി രക്ഷിതാക്കൾക്ക് എന്തുചെയ്യാം 2
3. അഞ്ചിനും പത്തിനും ഇടയ്ക്ക് വയസ്സുള്ളകുട്ടികൾക്ക്വേണ്ടി രക്ഷിതാക്കൾക്ക് എന്തുചെയ്യാം 1
4. അഞ്ചിനും പത്തിനുംഇടയ്ക്ക് വയസ്സുള്ളകുട്ടികൾക്ക് വേണ്ടി രക്ഷിതാക്കൾക്ക് എന്തുചെയ്യാം 2
5. അഞ്ചിനും പത്തിനും ഇടയ്ക്ക് വയസ്സുള്ളകുട്ടികൾക്ക്വേണ്ടി രക്ഷിതാക്കൾക്ക് എന്തു ചെയ്യാം 3
6. റോഡ്മുറിച്ചു കടക്കുമ്പോൾ 1
7. റോഡ്മുറിച്ചു കടക്കുമ്പോൾ 2
8. റോഡ്മുറിച്ചു കടക്കുമ്പോൾ 3
9. ചിലറോഡ്സുരക്ഷാ പ്രവർത്തനങ്ങൾ 1
10. ചിലറോഡ്സുരക്ഷാ പ്രവർത്തനങ്ങൾ 2
11. ആട്ടോറിക്ഷയിൽ സഞ്ചരിക്കുമ്പോൾ ശ്രദ്ധിക്കേണ്ട കാര്യങ്ങൾ 1
12. ആട്ടോറിക്ഷയിൽ സഞ്ചരിക്കുമ്പോൾ ശ്രദ്ധിക്കേണ്ട കാര്യങ്ങൾ 2
13. റോഡ്സുരക്ഷയെ കുറിച്ച് അറിഞ്ഞിരിക്കേണ്ട മറ്റ്കാര്യങ്ങൾ 1
14. റോഡ്സുരക്ഷയെ കുറിച്ച് അറിഞ്ഞിരിക്കേണ്ട മറ്റ്കാര്യങ്ങൾ 2
15. നിങ്ങളും റോഡ് സുരക്ഷിതത്വവും 1
16. നിങ്ങളും റോഡ് സുരക്ഷിതത്വവും 2
17. ക്രോസിംഗ് ഡ്രിൽ 1
18. ക്രോസിംഗ് ഡ്രിൽ 2
19. യാത്ര ചെയ്യുമ്പോൾ ശദ്ധിക്കേണ്ട കാര്യങ്ങൾ
20. സിഗ്നൽലൈറ്റുകൾ
21. സൈക്കിൾസവാരി ചെയ്യുമ്പോൾ
22. റോഡിൽ നടക്കുമ്പോൾ

23. Protect your life with seat belt and helmet
24. സുരക്ഷിതമായി ബസ്സിൽയാത്ര ചെയ്യുന്നതിന് ചില നിർദ്ദേശങ്ങൾ
25. സിഗ്നൽലൈറ്റുകൾ കാൽനടയാത്രക്കാരുടെ ശ്രദ്ധയ്ക്ക്

INFRASTRUCTURE AND INSTITUTIONAL EXPANSION

a. Institutional Expansion

1. NATPAC Regional Centre at Jawaharlal Nehru International Stadium, Kaloor, Ernakulam

NATPAC's Regional Centre commenced functioning at Jawaharlal Nehru International Stadium in Kaloor, Ernakulam on 3rd April 2023.

Ernakulam Regional Office - GCDA room at Jawahar Lal Nehru Stadium, Kaloor functioning from 3rd April 2023

b. Infrastructure

1. Major Purchase of Equipments/Software/Renewal in 2023-24

- Leica Disto Meter
- TransCAD Renewal
- AEC Collection – AutoCAD
- CCTV Camera for Kozhikode and Ernakulam
- Los Angeles Abrasion Testing Machine
- Digital touch Standee Kiosk
- Deep Freezer
- PTV-Renewal
- ARES Commander Software

- Mobile Web Application Software
- ERDAS – Rehost
- ADAS System – DMS-FCW-Unit
- Firewall for Kozhikode and Ernakulam
- K-TDMS Software

2. Testing Facilities and Equipments

NATPAC is well equipped with the state-of-the-art equipment's for testing of highway materials, pavement evaluation and mix design. There is also a Geotechnical Lab for soil testing with all the equipment's for routine testing of soil. The Traffic Engineering Lab of NATPAC is equipped with several software's used for traffic modelling and analysis. The Environmental Lab services provide air quality monitoring, noise level measurement and measurement of meteorological parameters. NATPAC has all the basic test setup for tests on soil, aggregate and bitumen. Some of the major equipment's/software's available with NATPAC is given below:

1. Tests on Soil

- All basic equipments
- Standard and Modified Proctor Compaction test setup
- Automatic motorized universal compactor
- Hydraulic Ejector
- CBR test equipment
- Direct Shear Test Setup
- Triaxial Shear Test Setup
- Unconfined Compression Test Setup
- Consolidation Test Setup
- Combined pH, TDS and conductivity meter

2. Tests on Bitumen

- All basic equipment
- Brookefield viscometer

3. Tests on Aggregate

- All basic equipment

4. Tests on Mixes

- Digital Marshall stability and ITS test setup
- Motorized centrifuge extractor
- Automatic compactor
- Wheel rut tester and Shaper
- Corelok Device
- Bitumen mixer

5. Field Testing

- Field CBR
- Dynamic cone penetrometer test

- Core cutting machine – (100mm dia.core bit)- undisturbed sampling of bituminous pavement
- Fifth Wheel Bump Integrator
- Benkelman Beam
- Skid resistance tester

6. Traffic Engineering Laboratory

- Noise level meter
- Speed Radar
- Inertial Measurement Unit (IMU) and laser sensors as add-on to Video VBox
- TIRTL

7. Topographic Survey

- DGPS
- Total stations-3 Nos.
- Automatic levels-2 Nos.
- High end plotters -2 Nos.
- Handheld GPS

8. Environment Laboratory

- CO Analyzer
- CO2Analyzer
- NO2Analyzer
- CH4Analyzer
- Respirable Dust Sampler (APM 460)-2 Nos.

9. Water Transport Laboratory

- Echo sounder
- Portable cantilever scale
- Flow Probe

10. Application Softwares

- MX ROAD
- AUTO CAD
- ARC GIS
- 3DS MAX
- TALLY
- STADD PRO
- HDM IV
- SPSS with AMOSS
- ERDAS
- OPEN ROADS DESIGNER
- OPEN ROADS CONCEPT STATION
- Bentley CUBE
- PTV Vissim, Viswalk, Vistro and Visum
- MATLAB
- TRANSCAD

3. Library and Information Services

The NATPAC Library is endowed with the responsibility of providing assistance to the scientists, researchers and students in their scientific and academic activities. The library continued to cater to the information needs of the institute and students. The library has a vast collection of books on Transportation, Traffic Engineering, Transport Economics, Urban and Regional Planning, Water Transport, Environment, Management, Operations Research, Geography, Statistics and allied subjects. The Technical Reports prepared by NATPAC are also available for reference purpose. The library has a good collection of the publications by

Indian Roads Congress (IRC) and this collection is being updated regularly. A number of new journals, both National and International, have been added to the library during this year.

An in-house database of books, periodicals, bound volumes of journals, reports, etc., is being updated. The library is maintaining a blog natpaclibrary1.blogspot.in to make users abreast of the latest developments in the library. NATPAC library is automated and managed using LIBSOFT. Bibliographic record of books available in the library can be accessed through https://natpac.libsoft.org/.

The major services rendered to users by the library are reference service and literature search. Clippings from newspapers, web resources, etc. are maintained in the library for the benefits of users. E-mail alerts are sent to scientists and technical staff for new arrival of books and publications. NATPAC has been extending academic support and other R&D facilities to Researchers as well as Professionals to carry out their research and project works. During this year many Research scholars/students from different institutions undertook project works using the facilities available in NATPAC library.

PROFESSIONAL NETWORKING

1. Nominations to Technical Committees/Advisory Bodies/Membership of Professional Institutions

Dr. Shaheem S

i. H-1 Committee: Transport Planning and Traffic Engineering Committee
ii. G-7 Committee: Intelligent Transportation Systems Committee
iii. G-3 Committee: Reduction of Carbon Footprints in Road Construction & Environment
iv. Sub Committee Member - Preparation of IRC Code "Smart Parking Management System"

Shri. V S Sanjay Kumar

i. Nodal officer to formulation of SDG vision document 2030
ii. Nodal officer for the project Sustainable Thrithala
iii. Member, Technical Committee, KRSA
iv. Member, Road Safety Content Committee, KRSA
v. Member, Technical Support Unit, PM Gathisakthi
vi. Associate Member, Institution of Engineers, India (AM 099062-3)

vii. Life Member, Indian Roads Congress, New Delhi (Roll No. e-LM 100707)
viii. Member, Institute of Urban Transport (India) (Roll No: M-1415)

Shri. Subin B

i. Expert committee member for the extension and operation of 108 ambulances in Kerala
ii. Expert committee member for the formulation of Power Policies for the Kerala State
iii. Expert committee member for the development of road safety booklet for school curriculum

Shri M S Saran

i. Life Member, National Association of Geographers India (NAGI)
ii. Life Member, The Indian Geographical Society

Shri. Ebin Sam S

i. Life Member, Indian Roads Congress (e-LM 100932)
ii. Life Member, Institute of Urban Transport (M-1500)
iii. Kerala Economic Association - Life Membership (449)
iv. Life Member of Indian Society of Remote Sensing (L-4790)
v. Member, The Institution of Engineers (India) (M-1645301)
vi. Additional nodal officer for implement of iRAD
vii. Member of review committee of KSRTC
viii. Nominated Member of Working Group on Sustainable Development Goals- 11 for Kerala by KSCSTE
ix. Expert Member of Task Force for Action plan to reduce accidents involved by KSRTC buses
x. Member for assessment works done by DIMTS for KSRTC
xi. Deputed associate with KSCSTE in the implementation of science park projects in Kerala

Shri.Chandra prathap R

i. Fellow Member, Institution of Engineers India, Kolkatta
ii. Life Member, Indian Roads Congress, New Delhi
iii. Life Member, Institute of Urban Transport
iv. Life Member, Indian Geotechnical Society

Shri. B Anish Kini

i. Member of IRC's G7 committee on Intelligent Transportation Systems for 2021-23

Dr. Praveen P S

i. Associate Member, The Institution of Engineers (India)

Dr. Vasudevan N

i. Member of Research Doctoral Committee constituted by KTU for two Doctoral Thesis at CET
ii. Member of Department Advisory Board of Christ College of Engineering, Irinjalakkuda for the year 2023-24

Shri. Ashik K Azad

i. Nodal officer representing NATPAC in the Digital Research and Information Platform for Science (DRIPS)
ii. Technical support for the preparation of Expression of Interest (EoI) & Request for Proposal (RFP) as part of the setting up of Science Park at Kannur in Kerala

Dr. Goutham Sarang

i. Life Member, Indian Roads Congress (e-LM 101503)

Shri. Shijith P P

i. Life Member, Indian Roads Congress (e-LM 103541)

2. Awards/Recognitions

- Bagged first prize in the Idea Pitching Competition "A solution to Water Logging in Kochi City", organized by FEELA & TERESIAN IEDC on 12th May 2023. (Team Members: Shri. B Anish Kini, Scientist; Dr.Rameesha T V, Junior Scientist; Dr.Vasudevan N, Junior Scientist; Dr. Anila Cyril, Junior Scientist).
- **Tinku Casper D'Silva, Junior Scientist –** got Commonwealth Split-site Ph.D. Scholarship 2023- 2024 – at Lancaster University, UK (October 2023 – September 2024)

കേരള കൗമുദി
Epaper 14 May 2023

നാറ്റ്പാക്ക് ടീമിന് വിജയം

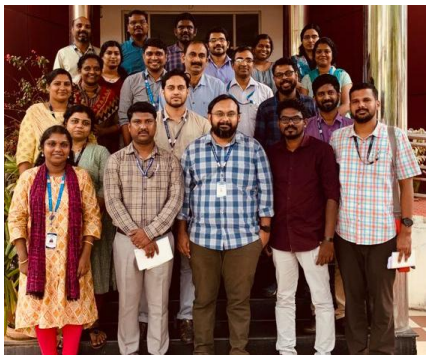
കൊച്ചി: കൊച്ചി നഗരത്തിലെ വെള്ള ക്കെട്ടിന് പരിഹാരം എന്ന വിഷയത്തി ൽ സംഘടിഷിച്ച ആശയ രൂപീകരണ മത്സരത്തിൽ നാറ്റ്പാക് ടീം വിജയിക ളായി. ഫെഡറേഷൻ ഓഫ് എൻജിനിയ റിംഗ് എംപ്ലോയീസ് ഇൻ ലോക്കൽ അ ഡ്മിനിസ്ട്രേഷൻ (ഫീല) എറണാകുളം സെന്റ് തെരേസാസ് കോളേജുമായി സ ഹകരിച്ചായിരുന്ന മത്സരം. പതിനായി രം രൂപയാണ് പുരസ്കാരം. ഭൂമിയുടെ ല ഭ്യതയും കൈവശം വയ്ക്കാനുള്ള ശേഷി യും അനുസരിച്ച് ചെറിയ തോതിലുള്ള തണ്ണീർത്തടങ്ങൾ രൂപകല്പന ചെയ്യുക , പ്രാദേശിക ആവശ്യാനുസരണം ശരി യായ ഡ്രെയിനേജ് രൂപകല്പനയും അറ്റ കുറ്റപ്പണികളും, മണ്ണൊലിപ്പ് തടയൽ, മ ഴവെള്ള സംഭരണം എന്നിവയാണ് നാ റ്റ്പാക് ടീം നിർദ്ദേശിച്ചത്

INSTITUTIONAL UPDATES

Other News

- NATPAC and NIT Warangal signed a memorandum of understanding on 20th April 2023, IIT Hyderabad and NATPAC on 1st December 2023 to collaborate on research in various sectors.
- The 76th Independence Day celebration on 15th August 2023 at K Karunakaran Transpark.

- Newly joined scientists of various institutes of the KSCSTE visited NATPAC as part of the orientation programme conducted by KSCSTE on 12th September 2023.



- NATPAC observed Sevanavaram from 3rd October 2023 – 6th October 2023.
- NATPAC celebrated its 49th Foundation Day, HRIDHYAM 2023 on 6th November 2023.

- NATPAC observed 'Constitution Day' on 27th November 2023.

- NATPAC organised New Year Celebration on 1st January 2024. In connection with the new year celebrations talk on 'Bharanabhasha – Malayalam' was delivered by Dr. M. G. Sasibhooshan.

- Republic Day Celebration at NATPAC

- NATPAC observed Martyrs' Day on 30th January 2024.
- Post Graduate Students of Govt.RIT, Kottayam interacted with Scientists of NATPAC on 6th February 2024.

- The Civil Engineering Division at the School of Engineering of the Cochin University of Science and Technology (CUSAT) and the KSCSTE-National Transportation Planning and Research Centre (NATPAC) signed a memorandum of understanding on 15th March 2024 to collaborate on research in various sectors.

Cusat, NATPAC join hands for research

The Hindu Bureau
KOCHI

The Civil Engineering division at the School of Engineering of the Cochin University of Science and Technology (Cusat) and the National Transportation Planning and Research Centre (NATPAC) have signed a memorandum of understanding to collaborate on research in various sectors.

The two institutions will join hands to carry out research in the areas of water, air, highway, engineering, traffic and transportation planning, road safety, transport economics, and management, according to a release.

Topics

The agreement will help in undertaking consultancy projects as per requirements across various sectors.

The research topics include economic feasibility, public transport studies, social and economic impact analysis, transport energy and pollution, water transport, and innovative transport system applications.

ACHIEVEMENTS

Dr. Sabitha N M, Senior Scientist
Awarded PhD from NIT Calicut on 2nd September 2023

RECRUITMENTS

Dr. Sunitha Vijayan
(Quantitative Techniques/ Transport Economics)
Junior Scientist
Joined on 25th May 2023

Shri. Tinku Casper D'Silva
(Environmental Engineering)

Junior Scientist
Joined on 5th June 2023

Smt. Ardra S Krishna
(Traffic and Transportation Engineering)
Junior Scientist
Joined on 5th June 2023

Shri.Suresh Kumar K
Registrar
Joined on 14th March 2024

SUPERANNUATION

Smt. Lekha. R
Typist cum Stenographer
Superannuated on
30th April 2023

HUMAN RESOURCES

STAFF – AS ON 01.04.2024

Sl.No	Name		Designation
Prof.(Dr.) Samson Mathew		-	Director
Scientific Staff			
1.	Dr.Shaheem S	-	Principal Scientist
2.	V. S.Sanjay Kumar	-	Principal Scientist
3.	B. Subin	-	Senior Scientist
4.	P. N. Salini	-	Senior Scientist
5.	M. S. Saran	-	Scientist
6.	Dr.N. M. Sabitha	-	Senior Scientist
7.	K. C. Wilson	-	Senior Scientist
8.	Arun Chandran	-	Senior Scientist
9.	Veena K. S	-	Scientist
10.	Ebin Sam S	-	Scientist
11.	A. Jegan Bharath Kumar	-	Scientist
12.	R. Chandra Prathap	-	Scientist
13.	Dr. Salini U	-	Scientist
14.	B. Anish Kini	-	Scientist
15.	Dr.Praveen P S	-	Junior Scientist
16.	Dr.Vasudevan N	-	Junior Scientist
17.	Dr.Himasree P R	-	Junior Scientist
18.	Dr.Anila Cyril	-	Junior Scientist
19.	Ashik K Azad	-	Junior Scientist
20.	Shijith P P	-	Junior Scientist
21.	Dr.Goutham Sarang	-	Junior Scientist
22.	Dr.Rameesha T V	-	Junior Scientist
23.	Dr.Sunitha Vijayan	-	Junior Scientist
24.	Ardra S Krishna	-	Junior Scientist
25.	Tinku Casper D'Silva	-	Junior Scientist
Technical Staff			
26.	M.S. Radhakrishnan	-	Technical Officer Grade -4
27.	Dr.R. J. Sanjai	-	Technical Officer Grade -2
28.	Shyama C	-	Library Assistant
Administrative Staff			
29.	Suresh Kumar K	-	Registrar
30.	Govind Raj K	-	Deputy Secretary to Govt., on deputation as Deputy Registrar
31.	Reshmy R S	-	Assistant Registrar (Fin)
32.	Bindu S R	-	Assistant Registrar (Admin)
33.	D. Shaju	-	Section Officer Grade-1
34.	Smt. Lekha. R	-	Typist cum Stenographer Grade 5
35.	Arya S.K	-	Office Assistant
36.	Maya Devi M	-	Office Assistant
37.	Veena S	-	Office Assistant
38.	Muhammed Naserudeen C	-	Office Assistant
39.	Sangeetha T.S	-	Office Assistant
40.	Lajila K.B	-	Confidential Assistant
41.	A. Praveen Kumar	-	Clerical Assistant
42.	G.Ragesh	-	Driver cum Office Attendent
43.	A.Somaraj	-	Driver cum Office Attendent
44.	Surendran Kulangara	-	Driver cum Office Attendent
45.	Shijil P. R.	-	Driver cum Office Attendent
46.	A. Anil Kumar	-	Multi tasking Staff
47.	Athira S.Kumar	-	Multi tasking Staff
48.	Bharat Menon	-	Multi tasking Staff

RESEARCH STUDIES

Sl.No.	Code	Project
1	Plan-431/20-24/23	Overtaking Characteristics of Vehicles on Undivided Two-Lane Highways– A Case Study of Selected Roads in Kerala
2	Plan-432 /21-24/23	Intelligent Transport System (ITS) Cell -Driver Rating System
3	Plan-433/ 21-26/23	Synthesis of rich origin –destination matrices using fusion of multiple sparse data source
4	Plan-435/ 21-24/23	Laboratory Investigation of Bituminous Porous Mix
5	Plan-436/ 20-24/23	Development of Integrated Land Use Transport Model for Thiruvananthapuram
6	Plan-437/ 21-24/23	Periodic Updation of GIS-based Road and Traffic Database for Kerala
7	Plan-438/ 20-24/23	Evaluation of Moisture Susceptibility of Asphalt Mix Using Admixtures
8	Plan-439/ 21-24/23	Application of Surrogate Safety Measures at Unsignalized Intersections
9	Plan-440/ 22-25/23	Application of ITS for Enhancing Safety at Critical Locations and Blackspots
10	Plan-441/ 19-24/23	Resource Mapping of road construction materials in Kerala -Phase II
11	Plan-443/ 21-24/23	Characterization of flowable fill incorporating industrial by-products
12	Plan-445/ 21-24/23	Performance evaluation of Kochi Water Metro
13	Plan-446/ 19-24/23	Utilization of Geoinformatics Tools for Development of Comprehensive Road Network for Kerala State
14	Plan-447/ 23-24/23	Periodic Updation of Price Indices for Different Public Transport & Freight Operations
15	Plan-448/ 22-25/23	Development of parking policy framework in Kerala
16	Plan-449/ 22-25/23	Investigation on pavement deterioration due to overloading of vehicles
17	Plan-450/ 22-24/23	Effect of Salinity on the Laboratory Performance of Bituminous Mixtures
18	Plan-460/23-25/23	Effect of permeability of various pavement layers on the performance of pavement
19	Plan-461/23-26/23	Stabilisation of pavement layers with the use of Reclaimed Asphalt Pavement (RAP) confined in coir geosynthetics
20	Plan-462/23-26/23	Study on Road Crashes involving Vulnerable Road Users with Focus on Pedestrian Fatal Crashes
21	Plan-463/23-25/23	Evaluation of the effectiveness of standard traffic calming measures
22	Plan-464/23-26/23	Problems and Prospects of Inland Water Transportation in Kuttanad Region
23	Plan-465/23-26/233	Safety Implications of Vehicle Manoeuvring Characteristics on Two Lane Highways with Heterogeneous Traffic
24	Plan-466/1	Junction improvement study for Anicode junction in Palakkad district

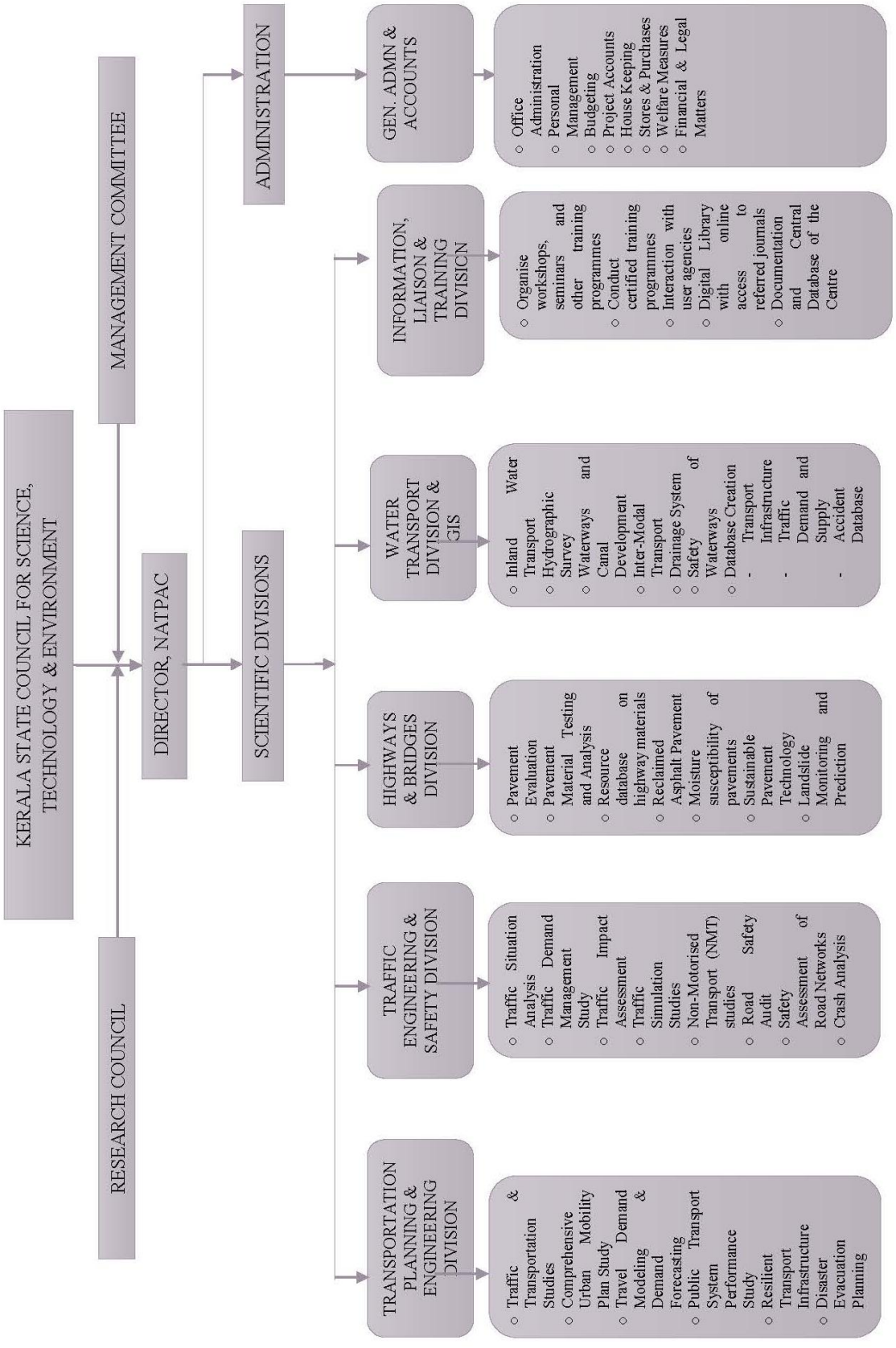
25	Plan-466/2	Traffic study at Junction in front of Sree Ragam Auditorium in Thiruvananthapuram District
26	Plan-466/3	Traffic study on installing medians on the Kodungalloor-Shornur Road in Thrissur
27	Plan-466/4	Traffic volume analysis on selected roads in Cannanore Cantonment limits
28	Plan-466/5	Traffic Study at Bakery Junction in Thiruvananthapuram District
29	Plan-466/6	Coldmix road evaluation of PMGSY roads in Wayanad district
30	Plan-466/7	Feasibility study of Kollam Water Metro
31	Plan-466/8	Feasibility Study of Traffic Signals and other traffic regulation measures to be adopted in Kommadi bridge and power house bridge in Alappuzha
32	Plan-466/9	Muzhappilangad Drive-in beach study
33	Plan-466/10	Development plan for the selected roads leading to Muzhappilangad beach in Kannur district
34	Plan-466/11	Traffic study and ridership estimation for the proposed Sabari Rail project

CONSULTANCY/SPONSORED PROJECTS

Sl. No	Code	Project	Sponsored by	Total Project Cost (in Lakhs)
1	C00922	PMGSY-III - Kannur - Traffic Study & Axle Load Survey of PMGSY roads – Central Poyiloor – Vengathode Road	Triprangottoor Gramapanchayath	1.50
2	C00922	PMGSY-III - Kannur - Traffic Study & Axle Load Survey of PMGSY roads – Pokkundu – Koonam – Kulathur – Kannadippara – Naduvil Road	PIU, LSGD – Kannur District Panchayth	1.50
3	C00123	KRSA – Feasibility study for traffic signal systems at Kallisseri and Pravinkoodu, Alappuzha	Kerala Road Safety Authority (KRSA)	1.44
4	C00323	Preparation of DPR for coastal highway stretches omitted for port connectivity projects in Malappuram and Kannur District	Kerala Road Fund Board (KRFB)	70.00
5	C00423	Feasibility study of transportation hub at Karikkamuri, Ernakulam for VMHS	Vyttila Mobility Hub Society, Ernakulam	15.00
6	C00523	PMGSY Kottayam-Traffic survey in the package No.KR-07-73, Ettumanoor block, package KR-07-75 Pampady block and package No.KR-07-71, Vazhoor block in Kottayam district	Kerala State Rural Roads Development Agency (KSRRDA)	0.70
7	C00623	Traffic study for Infopark Ernakulam	Infopark, Kochi	24.45
8	C00723	Vizhinjam traffic impact study	Adani Port	14.00
9	C00823	Preperation of detailed architectural drawings, structural designs and estimates for the development works of Parvathy Puthanar between Kovalam and Akkulam	Kerala Waterways and Infrastructures Lt. (KWIL)	35.07

10	C00923	Installation of solar powered traffic signals at Anchal and Pathanapuram towns in Kollam district	Kerala Road Safety Authority (KRSA)	1.44
11	C01023	Traffic modifications at All Saints Junction, Thiruvananthapuram	Kerala Road Fund Board (KRFB)	1.71
12	C01123	Calculation of lead measurement between Kummil Quarry and Vizhinjam	Adani Vizhinjam Port (P) Ltd.	0.59
13	C01223	Design of roundabout at Mini Civil Station at Pala, Kottayam	PWD Roads, Kottayam	1.74

ORGANISATIONAL STRUCTURE



FINANCIAL OVERVIEW

Balance Sheet

National Transportation Planning And Research Centre
(A unit of Kerala State Council for Science, Technology & Environment. Govt. of Kerala)
Balance Sheet as at 31 March 2024

Liabilities	Sch No	As at 31 March 2024	As at 31 March 2023	Assets	Sch No	As at 31 March 2024	As at 31 March 2023
Reserves & Surplus	5	8,63,50,363	8,95,36,486	Property, Plant & Equipment	2	8,63,01,862	8,95,36,485
Building Fund Account	6	-	2,66,79,019	Work in Progress	2	48,500	4,43,322
Current Liablities	7	74,72,782	2,30,33,819	Current Assets	3	8,87,32,852	13,18,86,719
Unspent balance	8	8,39,34,218	7,26,22,961	Loans & Advances	4	2,92,10,555	3,29,09,679
Corpus fund	9	2,65,36,406	4,29,03,920				
Total		**20,42,93,769**	**25,47,76,206**	**Total**		**20,42,93,769**	**25,47,76,206**

The accompanying notes form an integral part of the financial statements
For National Transportation Planning and Research Centre

Asst. Registrar (Finance) | Deputy Registrar | Registrar | Director

For
JAKS and Associates
Chartered Accountants
FRN:001360S

Selastin A,F.C.A
Partner,M.No 202874

Trivandrum
Date 19-11-2024
UDIN: 24202874BKCZMC8867

National Transportation Planning and Research Centre Thiruvananthapuram PIN-695011 KSCSTE

National Transportation Planning And Research Centre
(A unit of Kerala State Council for Science, Technology & Environment. Govt. of Kerala)
Income & Expenditure Account for the year ended 31 March 2024

Expenditure	Sch No	As at 31 March 2024	As at 31 March 2023	Income	Sch No	As at 31 March 2024	As at 31 March 2023
To Infrastructure Strengthening (Plan)	13	1,77,05,777	1,79,50,920	By Grant from Government of Kerala	10	7,70,07,386	7,18,63,195
To Infrastructure Strengthening (Non Plan)	14	54,16,940	54,18,567	By Other Receipts	11	29,22,657	34,60,049
To Salaries and Allowances (Non Plan)	15	5,68,07,326	5,19,53,757	By Depreciation written back	2	93,64,654	90,60,249
To Depreciation	2	93,64,654	90,60,249	By Income from Consultancy Project	12	26,57,433	15,14,146
To Consultancy Project Expenses	16	26,57,433	15,14,146				
Total		9,19,52,130	8,58,97,639	Total		9,19,52,130	8,58,97,639

The accompanying notes form an integral part of the financial statements
For National Transportation Planning and Research Centre

Asst. Registrar (Finance) | Deputy Registrar | Registrar | Director

For
JAKS and Associates
Chartered Accountants
FRN:001360S

Selastin A,F.C.A
Partner,M.No 202874

Trivandrum
Date 19-11-2024
UDIN: 24202874BKCZMC8867

National Transportation Planning and Research Centre Thiruvananthapuram PIN-695011 KSCSTE

ANNUAL REPORT 2023-'24

KSCSTE-National Transportation Planning and Research Centre

(An Institution of Kerala State Council for Science, Technology and environment)

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