

# Swami Keshvanand Institute of Technology, Management & Gramothan

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# Center of Excellence in "Transportation Engineering"

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Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

## <u>Report</u>

# Centre of Excellence in "Transportation Research"

### **Introduction**

We aim at educating and training students with sound knowledge and awareness in variety of areas including transportation and materials. Institute also runs a post graduate programme relevant to the thematic area of proposed Centre of Excellence in Transportation Research.

The Institute broadly emphasizes on quality education, training and research. It has well equipped laboratories that complement the high standards of the Institute. Well qualified and experienced faculty members are serving in the domain of Transportation Engineering.

Experts from the industry are periodically invited to give lectures/demonstrations to the students on the latest developments in the field. Students are given exposure to industries by industrial visits and industrial training sessions. In last few years we have also conducted in-house trainings of our students successfully.

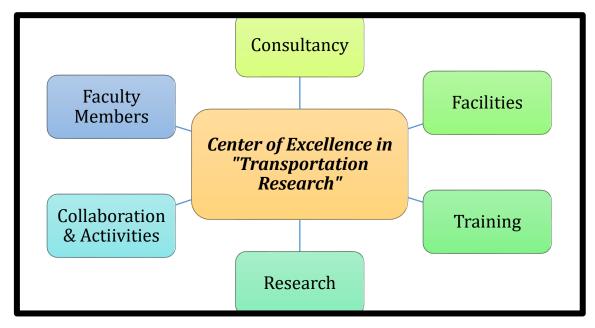
### **Objectives**

- To create a resource centre for exchange and dissimination of information and knowledge.
- To impart training to students and other stakeholders in the domain of Transportation Research.
- 3. To promote multidisciplinary research in the area of transportation engineering.
- 4. To provide sustainable technological support for various projects leading to the development of Transportation Systems and materials.

5. To bring awareness in the society related to road safety and utilization of waste materials

In order to achieve above mentioned objectives the following salient features strongly support the cration of Centre of Excellence in Transportation Research at our Institute.

### Salient Features



- **Consultancy**: Several consultancy assignments have been undertaken from various organisations in the area of proposed Centre of Excellence. The details are attached in Annexure I.
- **Laboratory Infrastructure**: Well equipped laboratories with state of art equipments used for testing of materials related to construction of pavements and performance evaluation are available. The details are attached in Annexure II.
- **Training**: Successful inhouse training of the students sharing the various aspects related to Transportation Engineering like Traffic Data Analysis, Pavement Material etc have been conducted. The details are attached in Annexure III.
- **Research**: The department has completed few DST sponsored projects and several post graduation projects are undergoing. The details are attached in Annexure IV.

- **Collaborations & Activities**: The Institute is associated with Indian Concrete Institute and several activities like Workshops and Conference have been conducted in the past. The details are attached in Annexure V.
- **Faculty members**: The Institute is having faculty members expertise in the area of Transportation Engineering. The details are attached in Annexure VI.

## I. CONSULTANCY

S.No.	Client	Description of Work	Sanction Date
1	Traffic Police Commissionerate, Jaipur	"Traffic Management Inspection of Jaipur Walled City"	15/02/2021
2	Rural Development & Panchayati Raj Department, Govt. of Rajasthan	"Preparation of Spatial Plans and concept note for identified clusters"	20/09/2020
3	Traffic Police Commissionerate, Jaipur	"Inspection of Congested Streets and Intersections in Jaipur City"	14/08/2019
4	Gram Panchayat Ramsar Palawala, Panchayat Samiti-Bassi, Jaipur	"Compressive Strength Test by Core Cutting Method"	01/06/2016
5	Rural Development & Panchayati Raj Department, Govt. of Rajasthan	"Third Party Inspection of various works under BADP scheme"	01/06/2016
6	Rural Development & Panchayati Raj Department, Govt. of Rajasthan	"Third Party Inspection of various works under MPLAD scheme"	22/03/2016
7	Rural Development & Panchayati Raj Department, Govt. of Rajasthan	"Third Party Inspection & Quality Testing of Various Works"	01/12/2015

### II. LABORATORY INFRASTRUCTURE

The state-of-the-art infrastructural facilities available in this area have been summarised below:

#### 1. Digital Marshall Apparatus

The digital marshall apparatus is used for measurement of bituminous mix properties, stability & flow and optimum binder content of the mix. The apparatus is suitable for testing both standard and modified samples. The Indirect Tensile Strength test assembly is also attached.



#### 2. Rolling Thin Film Oven Test (RTFOT) Apparatus

The Rolling Thin Film Oven (RTFO) test is used to measure the effect of heat and air on a moving film of semi-solid asphalt binder. The results of this treatment are determined from measurements of the binder properties before and after the test. Repeatability of the test is directly related to the accuracy with which the oven temperature can be maintained and the reproducibility of the thermal rise time of the system.



#### 3. Accelerated Aggregate Polishing Apparatus

This device is used for the determination of the Polished Stone Value PSV. Fourteen specimen aggregate samples are clamped around a rotating road wheel. These samples are subjected to two timed stages of abrasive polishing under a loaded rubber tyre.



#### 4. Pendulum Skid Resistance Tester

It measures the frictional resistance between a rubber slider mounted on the end of a pendulum arm and the test surface. This provides with a routine method of checking the resistance of wet and dry surfaces to slipping and skidding, both in the lab and on site. The distance travelled by the head after striking the sample is determined by the friction of the sample surface. A reading of Skid Resistance is then obtained.



#### 5. Automatic Mixer for Bituminous Concrete

This machine is used for laboratory mixing of bituminous materials to prepare the specimens to be used for various asphalt tests.



#### 6. Bitumen Extractor

The Centrifuge Extractor is used to establish the bitumen percentage in bituminous paving mixtures. It consists of a removable, precision machined, aluminum rotor bowl, mounted on a vertical shaft.



#### 7. Concrete Permeability Testing Apparatus

The concrete permeability testing apparatus is used for the determination of durability characteristics of the rigid pavements or other concrete structures. The permeability or the ability to resist the flow of water is determined on specimens either casted in the laboratory or obtained by cutting out cores from construction sites.



#### 8. California Bearing Ratio (CBR) Test

The california bearing ratio test is penetration test meant for the evaluation of subgrade strength of roads and pavements. The results obtained by these tests are used with the empirical curves to determine the thickness of pavement and its component layers. This is the most widely used method for the design of flexible pavement.



#### 9. Tile Abrasion Testing Machine

Tile Abrasion Testing Machine is used for determining the resistance to wear for floor tiles. The tile sample is pressed under a specified load against a grinding path, strewn evenly with an abrasive powder, revolving at the rate of  $30 \pm 1$  rpm. At the end of 100 revolutions of the disc, the second parallel side of the tile is subjected to wear an equal number of revolutions of the disc.



#### **10.Los Angeles Abrasion Testing Machine**

This machine is for determining the resistance to wear off small size coarse aggregates and crushed rock. The machine consists of a hollow cylinder, mounted on a sturdy frame on ball bearings. A detachable shelf which extends throughout the inside length of the drum catches the abrasive charge and does not allow it to fall on the cover.



#### 11. Water Absorption and Specific Gravity testing Apparatus

The density basket apparatus is used to determine bulk specific gravity and water absorption of coarse aggregates



#### **12. Ductility Testing Machine**

This machine is designed to test three specimens simultaneously. It consists of a carriage moving over a lead screw. An electric motor driven reduction gear unit ensures smooth constant speed and continuous operation. The entire assembly is mounted with water bath completely encased in metal bound hardwood. It is equipped with an electric pump circulator and heater. The temperature is controlled by digital temperature controller.



#### **13. Ring and Ball Apparatus**

This equipment is used to determine the temperature at which a sample of bituminous material loaded by a 9.5mm diameter steel ball drops a specified distance when heated under specified conditions.



#### 14. Temperature Controlled Water Bath

A temperature control water bath is an equipment used to keep bituminous samples over an extended period of time in controlled temperature range.



#### **15.Aggregate Impact Testing Machine**

It is for determining the aggregate impact value. The sturdy construction consists of a base and support columns to form a rigid frame work around the quick release trigger mechanism to ensure an effective free fall of the hammer during test. The free fall can be adjusted through  $380 \pm 5$  mm. The hammer is provided with a locking arrangement.

#### 16. Thickness Gauge and Flakiness Gauge

These gauges are used for measuring the shape of the aggregate particles. The elongation index and the flakiness index is tested using the gauges.

#### **17. Minor Instruments**

Other minor instruments such as Temperature Radar Gun, Rebound Hammer, Automatic Sieve Shaker, Digital Vernier Callipers, Specific Gravity Bottles etc are also available in the laboratory.

### III. TRAINING

Inhouse Internship for B.Tech. III and II-year students is being conducted by the department for enhancing the technical and management skills. The module includes software training, advance laboratory investigations, construction site visits and report preparation.



Traffic Survey at Intersection



Visit to Bitumen Hot Mix Plant



Surveying Training with Total Station



Presentation of the Training Work



Evaluation of newly constructed road



Laboratory sample preparation

### IV. RESEARCH

### **1. COMPLETED PROJECTS**

S.No.	Project Title	Duration	Funding Agency
1	Modelling of bricks for achieving high strength in masonry with low cement consumption	24 Month (2014-15)	DST, Rajasthan
2	Experimental investigations on strength properties of hardened concrete with the use of granite fine	12 Month (2014-15)	DST, Rajasthan

### 2. ONGOING PG PROJECTS

S.No.	Project Title
1	Bus Rapid Transit Jaipur: An Evaluation of Performance, Design Features, Safety Audit and Impacts
2	Analyses and Design of Traffic Calming Plan for Enhancing Safety: A Case Study of Jagatpura Mahal Road
3	Evaluation of Existing Pedestrian Facilities and Its Potential Improvements from Gopulpura Bypass Junction to Gurjar Ki Thadi Junction
4	Modelling and Simulation of Traffic at Urban Intersection using SUMO software
5	Performance Testing of Aged Bitumen under different Temperature Ranges
6	Redesign and Planning of Traffic Signalization at selected congested Intersections of Jaipur city
7	A study on Partial Replacement Sand Stone Waste in Concrete Pavements
8	A study on safety aspects of National highways crossing from Urban Areas

#### **3. PUBLICATIONS**

- Sachdeva, N. & Gupta, L.K., (2020). Analysis of Existing Pedestrian Facilities in Selected Areas of Jaipur City. International Journal of Engineering Research & Technology
- 2. Jain, K. L., & Bhargava, S. (2020). Effect of Alccofine on Durability Properties of Concrete. International Journal of Concrete Technology, 6(1), 23-31.
- Jain, K. L., Sancheti, G., & Gupta, L. K. (2020). Durability performance of waste granite and glass powder added concrete. Construction and Building Materials, 252, 119075.
- Jain, K. L., (2019). To Study Mechanical Properties of Concrete by Using Industrial Waste Material. International Journal of Clinical and Experimental Pathology.
- A Mathur, DK Sharma, R Choudhary (2018) A Case Study on Analysis of Road Safety concerns on a stretch of National Highway 12 in Rajasthan, Trends in Transport Engineering and Applications
- 6. Sachdeva, N. (2018). Effect of Compaction Temperature on Marshall Properties of Bituminous Concrete.
- Sachdeva, N., & Sharma, D. K. (2018) Effect of Compaction Temperature on Durability of Bituminous Concrete.
- Kishan, J. (2016). To effect on strength properties of concrete of by using GGBS by Partial Replacing cement and addition of GGBS without replacing cement. SSRG Int. J. Civil Eng, 3, 144-149.
- 9. Kishan, J. (2016). To study the effect of the partial replacement of cement by using glass powder & fly ash in concrete. SSRG Int. J. Civil Eng, 3.

### V. COLLABORATION & ACTIVITIES

#### **1. COLLABORATIONS**

#### • Indian Concrete Institute



- The Student Chapter of Indian Concrete Institute at SKIT, Jaipur is one of the most active chapters in the country that organizes various inter college events for knowledge dissemination and skill development. Concrete Mix Design Workshop, Quiz Competition, Cube making competition have been widely accoladed by participants from several Institutions.
- The chapter won the Best Student Chapter Award for the year 2019 in Rajasthan.
- Mr. Anirudh Mathur, Asst. Prof. is service as an Executive Committee member of ICI Rajasthan State Centre since 2019.

#### • CERTIFIED ROAD SAFETY AUDITOR

Two faculty members from the department have been certified as Road Safety Auditors by IRC, MORTH and MNIT, Jaipur.

Malaviya National Institute of Technology Jaipur (An Institute of National Importance) 15-Days Road Safety Auditors Certification Course Certificate MNIT/1000113054/RSA2/41 This to Certify that Dr. Prachi Kushwaha has successfully completed requirements of 15-Days Road Safety Auditors Certification Course from 5th December 2020 to 19th December 2020 organized at MNIT Jaipur, as per the Memorandum of Understanding signed between MoRT&H, IRC and MNIT Jaipur. The course was conducted as per the policy on accreditation of road safety auditors recommended by Indian Roads Congress. r. Arun Gaur Dr. B.L. Swami Associate Professor, MNIT Professor, MNIT Course Coordinator Course Coordinator Malaviya National Institute of Technology Jaipur (An Institute of National Importance) 15-Days Road Safety Auditors Certification Course Certificate MNIT/1000113054/RSA2/35 This to Certify that Mr. Anirudh Mathur has successfully completed requirements of 15-Days Road Safety Auditors Certification Course from 5th December 2020 to 19th December 2020 organized at MNIT Jaipur, as per the Memorandum of Understanding signed between MoRT&H, IRC and MNIT Jaipur. The course was conducted as per the policy on accreditation of road safety auditors recommended by Indian Roads Congress. br Dr. Arun Gaur Dr. B.L. Swami Associate Professor, MNIT Professor, MNIT Course Coordinator Course Coordinator

#### 2. ACTIVITIES

#### **Workshops & Conferences**

• RTU-ATU TEQIP-III sponsored Student Workshop on "Design of Traffic Engineering Facilities (DTEF - 2021)" held on 25 - 29 December, 2020



More than 750 participants from across the country participated and got benefited from the workshop. Speakers from eminent Institutes and Industry shared their experiences on various topics related to Traffic Engineering Design Facilities, which is one of the booming areas in Transportation Engineering.  RTU-ATU TEQIP-III sponsored Faculty Development Program on "Emerging Trends in Infrastructure Development (ETID - 2021)" held on February 25 -March 01, 2021



• More than hundred participants from across the globe participated in the event. Speakers from eminent Institutes and Industry shared their experiences on various topics related to Emerging Trends in Infrastructure Development.  National Conference on "Development of Smart Cities for Better World (NCDSC -2017)" held on January 18-19, 2019



National Conference on "Sustainable Development for Smart Cities (SDSC - 2017)" . held on August 18-19, 2017

Fr. Amit Jakhar	Er. J.B. Jangid
r. Deepak Sharma	Er. Ajay Gautam
r. Priyanka Gupta	Er. Ankur Mishra
r. Manmohan Sharma	Er. Sandesh Saxena
r. Saurabh Kumar	Er, Ashish Sharma
Fr. Nishant Sachdeva	Er, Tanu Sharma
Er, Suniti Kumari	Er. Pooja Jain
r. Sitaram Saini	Er, Anirudh Mathur
r. Shubham Kumawat	Er, Aiay Mandrawalia

DELEGATES	REGULAR FEE (₹)
Academicians	1000/-
Research Scholars / Students	800/-
Participants from industries/ Professionals	2000/-

Original and unpublished research work/ case study on any one or more of the themes are invited from practising engineers, academicians, R&D personnels and consultants. The paper should conform to the following guidelines: I. The official language for the conference is English for all purposes.

The official language for the conference is English for all purposes.
 Abstract of the paper must be typed in a single space in 300 words. The full text of the paper must not exceed 12 pages of A4 size in single space using Times New Roman font size 12 including abstract, appendices, tables, illustrations and photographs.
 Quality research papers will be published in reputed research journal based on selection of reviewing committee.

#### IMPORTANT DATES EVENT LAST DATE Abstract acceptance 15-06-2017 Intimation acceptance 20-06-2017 Submission of full paper 05-07-2017 Paper review outcomes 15-07-2017 25-07-2017 Revised paper submission Last date for registration 31-07-2017 ABOUT JAIPUR

Jaipur was founded in AD 1727 by Sawai Jaisingh II. Jaipur the capital of Rajasthan is popularly known as the Pink City the capital of Rajasthan is popularly known as the Pink City with broad avenues and spacious gardenes. Jaipur is stepped in history and culture. Here the past comes alive in magnificent forts and palaces, blushed pink, where once lived the Maharajas. The bustling bazaars of Jaipur, famous for Rajasthan jeweilery, fabric and shoes, possess a timeless quality and are surely a treasure-trove for the shoppers. This fascinating city with its romantic charm takes you to an epoch of royalty and tradition. Spread around it, in rows, are public buildings, the residences of noblemen, the living and trading quarters of merchants and artisans.

#### ACCOMODATION

Participants have to make their own arrangements for their stay at Jaipur during the conference. Accommodation can be arranged on request and prior information.

#### MODEL & POSTER EXHIBITION

Model & Poster Exhibition will be organized during the conference. Best model and best poster will be awarded separately. For more information, please visit (www.smartcity.skit.ac.in) or contact Er. Akash Johari Contact : 08432764965 



#### ABOUT THE INSTITUTE

committee

ABOOTTHE INSTITUTE Swami Keshvanand Institute of Technology, Management & Gramothan (SKIT) inspired from the learning of Swami Keshvanand, was established in the year 2000 by Technorcats and Managers Society for advanced learning. Today the institute is recognized as one of the centers of academic excellence in northern India. The Institute is affiliated to Rajasthan Technical University, Kota for offering postgraduate and under graduate courses in engineering and management. SKIT is putting in efforts for making industry ready engineers and managers through effective Industry–Institute interface. The institute is also accredited by NBA and IE(I).

#### ABOUT CIVIL ENGINEERING DEPARTMENT

Due to extra-clinary growth in the infrastructure development in the country, the demand for skilled civil engineers is growing with high pace. To meet the growing demand of construction noture is the institute started B.Tech course in Civil Engineering legariment are having latest equipment which are required for each purpose for faculty members and students. Civil Engineering legariment also provides consultancy services on various technical require in encircut

#### ABOUT NCDSC-2017

ABOUT NCDSC-2017 The Government of India, Ministry of Urban and development (MoUD) has launched the "Smart Clies Mission" on 25 June 2015 (http://moud.oov.in/cmait/smart-Clies Mission in core 25 June 2015 (http://moud.oov.in/cmait/smart-Clies Mission is to real-some of the core infrastructure eigenets in a smart cliv would include adequate electricity, water supply, sanitation, including solid wates management, efficient urban mobility and public transport, affordable housing & sustainable environment. The strategic components of the "Smart Clies Mission" and public transport, affordable housing & sustainable environment cliv extension (prenefield development). In along 2016, based on the All India Compatition, Jajour was selected as one of 20 smart. Clies in first round. Engineers have valar clies in accomplishment of the major elements of the "Smart Clies Mission" with this backforg, Department of Civil Engineering, Skrift, is organizing a two day Wordf.

World'. This conference is set up to provide a unique platform to bring the major stakeholders and experts of the urban development and governance to discuss and deliberate on the various models of smart city. The Conference also aims to highlight the initiatives and policies of the Indian Government & State Government to accelerate the smart cities professionals, researchers, industry persons etc. about the need for smart city. It will identify the research gaps to develop and innovate various projects in the field of smart cities. By the virtue of knowidde, multi-disciplinary skill can be developed for getting solutions of the engineering problems.

Shri Raja Ram Meel PATRONS Shri S.R. Meel, Chairman, SKIT HOD-CE Prof. L. N. Datt CONVENER Prof. D. K. Sharma CO-CONVENER Dr. Neha Shrivastava Er. Ankit Sha ORGANIZING SECRETARY Er. Kishan Lal Jain

#### NATIONAL ADVISORY COMMITTEE

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- Er. Chitranjan Kaushik, COO, Ecofirst Services Limited, Mumbai
- Dr. Hemant Kumar Sharma, ACE, RUIFDCO, Jaipur
- Er. Tarun Sharma, SE, JDA, Jaipu
- Er. K.K Sharma, S.E., Panchayati Raj Departr
- Dr. Meena Sharma, Manipal University, Jaipur

LOCAL ADVISORY COMMITTEE Mr. Jaipal Meel, Director, SKIT Prof. S. L. Surana, Director (Academics), SKIT Prof. S. K. Calla, Director (D&W), SKIT Prof. R.K. Pachar, Principal, SKIT Ms. Rachna Meel, Registrar, SKIT Prof. M.L. Bhargava, Advisor, SKIT Ms. Abha Meel, Advisor, SKIT Prof. H.O. Thakare, Chairman, CVDB (IEI) Prof. Praveen Jain, Chairman (IEI RSC) Prof. R.A. Gupta, Honorable Secretary (IEI RSC) Prof. N. K. Banthiya, HOD-ME Prof. S. K. Bhatnagar, HOD-EC Prof. C.M. Chaudhary, HOD-CSE Prof. Anii Chaudhary, HOD-IT Prof. Akash Saxena, HOD-EE Prof. S.P Garg, Dean-DMS Dr. Vikas Shrotriya, HOD-DMS Prof. Sudha Calla, Head, B. Tech.- I Year Prof. S.N Vijayvargiya, Dean-Rese Prof. R.K Jain, HOD- Physics Prof. Rohit Mukherji, HOD-Mathematics Dr. Niraja Saraswat, HOD-English Prof. Archana Saxena, HOD-Chemis SUB THEMES Urban Mobility & Trans Emerging Trends in Geo-Technic ion Pla toad Infrastruc and Drainag e Techno ties in Cor Innovative recommender Heritage & Architecture Green Energy (Renewable Energy) Resource Monitoring & Managemer

Water Management Air Quality Managemen Solid Waste Managemen

#### PAYMENT DETAIL

Model City in Indi

Fee can be paid via online transfer (www.smartcity.skit.ac.in) or as DD (in favor of " SWAMI KESHVANAND INSTITUTE OF TECHNOLOGY MANAGEMENT AND GRAMOTHAN", JAIPUR" payable at Jaipur)

#### CONTACT US

Er. Ankit Sharma (07737238044), Organizing Secretary Er. Kishan Lal Jain (08824431753), Organizing Secretary Email : smartcity@skit.ac.in

GYAN MANDIR AUDITORIUM, SKIT, JAIPUR Organized By SKIT - merene in france

bid.

Smart City



AUGUST 18-19, 2017

A TWO DAY NATIONAL CONFERENCE ON

DEVELOPMENT

**OF SMART CITIES FOR BETTER WORLD** NCDSC-2017

### VI. FACULTY MEMBERS

The following faculty members are serving in the area proposed for Centre of Excellence in Transportation Research

#### • Dr. Prachi Kushwaha

Designation: Assistant Professor

Qualification: B.E., M.Tech., PhD

Research Interest: Characterization and performace evaluation of road materials, warm mix technology, Bitumen stabilized materials, Foamed bitumen, Road safety Engineering

Email: prachi.kushwaha@skit.ac.in

#### • Er. Anirudh Mathur

Designation: Assistant Professor

Qualification: B.Tech., M.Tech., PhD\*, AMIE, LM-ICI, LM-IBC, LM-TRG Research Interest: Road Safety Engineering, Traffic Analysis and Improvement, Intelligent Transportation System Email: <u>anirudh.mathur@skit.ac.in</u>

#### • Er. Nishant Sachdeva

Designation: Assistant Professor

Qualification: B.Tech., M.Tech., PhD\*, AMIE, LM-ICI, eLM-IRC

Research Interest: Material Investigations (Road Material), Material Properties and Pavement design parameters, Ground Improvement Techniques, Grouting, Experimental Modelling

Email: nishant.sachdeva@skit.ac.in

#### • Er. Nikhil Kumar Sharma

Designation: Assistant Professor

Qualification: B.Tech., M.Tech.

Research Interest: Utilization of C&D waste in pavements, Use of plastic waste in flexible pavement, Road safety Audit, Modified the property of soil by applying ground improvement techniques

Email: nikhil.sharmacivil@skit.ac.in

#### • Er. Sitaram Saini

Designation: Assistant Professor

Qualification: B.Tech., M.Tech.

Research Interest: Utilization of sand stone waste in flexible pavement