# Bablu Kumar Patel

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## Professional Summary

GATE-qualified Civil Engineering graduate and M.Tech Transportation Engineering student at NIT Warangal with a focus on pavement analysis, bituminous mix design, and sustainable materials. Experienced in using reclaimed aggregates and Sugarcane Bagasse Ash (SCBA) in asphalt concrete and applying Support Vector Machine (SVM) based modeling for Marshall Stability prediction. Hands-on exposure to laboratory testing and field practices through a PWD internship, with strong skills in data analysis, mix design, and technical documentation.

## Education

**National Institute of Technology (NIT), Warangal** — **Warangal, Telangana**
*Master of Technology in Transportation Engineering* — *July 2025 – July 2027 (Expected)*

**Rajkiya Engineering College, Azamgarh** — **Azamgarh, Uttar Pradesh**
*Bachelor of Technology in Civil Engineering* — *Nov 2021 – July 2025*

- Academic Distinctions: Secured 92.6% in Senior Secondary (CBSE) and 94% in Secondary School (CBSE).

## Work Experience

**Summer Intern** — **July 2024 – Aug 2024**
*Public Works Department (PWD)* — *Gorakhpur, Uttar Pradesh*

- Completed a 4-week intensive field exposure program on public infrastructure projects, focusing on road and pavement works.
- Assisted in surveying operations including differential leveling, traversing, and preparation of cross-sections for road alignment.
- Supported quality control of construction materials through soil sample collection, laboratory testing, and pavement layer inspection.

## Projects

**Machine Learning Based Prediction of Marshall Stability of Waste Modified Asphalt Concrete** **2024 – 2025**

- B.Tech Final Year Project on the use of reclaimed aggregates and Sugarcane Bagasse Ash (SCBA) as sustainable materials in asphalt concrete.
- Prepared asphalt mixes with SCBA as a filler at 0%, 1%, 3% and 5% replacement levels and reclaimed aggregates as coarse aggregate; varied bitumen content from 4.0% to 8.0% to study effects on stability, flow and air voids.
- Cast and tested multiple Marshall specimens in accordance with IS and ASTM standards to evaluate Marshall Stability, flow value, air voids and volumetric properties.
- Performed Support Vector Machine (SVM) based modeling on experimental mix design data to analyze and predict the influence of SCBA content, reclaimed aggregates, and bitumen variation on Marshall Stability.
- Demonstrated the potential of SCBA and reclaimed aggregates to improve sustainability of flexible pavements while maintaining acceptable performance.

**Trip Generation Modeling: Neural Networks vs Linear Regression** **2025**

- Developed MLP neural network for trip generation modeling achieving $R^2$ of 94.2%, outperforming traditional linear regression by 4.8x.
- Processed 1,800+ household records using feature engineering and data preprocessing techniques.
- Identified earning members and household size as primary predictors through variable importance analysis.

## Technical Skills

**Transportation Engineering:** Pavement Design, Traffic Signal Design, Highway Planning, Geometric Design
**Civil Engineering Software:** STAAD.Pro, AutoCAD (2D Drafting), PTV VISSIM, IIT PAVE, Microsoft Project
**Data Analysis, Statistics & ML:** IBM SPSS, SVM Modeling, MS Excel (Advanced Functions, Pivot Tables, Data Visualization)
**Laboratory & Materials Testing:** Marshall Stability Testing, Asphalt Mix Design, Aggregate Testing, Concrete Testing, Soil Mechanics Tests (CBR, Compaction, Atterberg Limits)
**Programming:** Python (NumPy, Pandas, Matplotlib)

## Core Competencies

**Sustainable Pavement Design:** Waste-modified asphalt, SCBA-based fillers, reclaimed aggregates
**Project & Site Management:** Quality Control, Site Supervision, Material Estimation, Technical Documentation
**Research & Analytics:** Experimental design, regression analysis, SVM modeling, result interpretation

## Certifications & Workshops

**Developing Soft Skills and Personality** **NPTEL**

**Enhancing Soft Skills and Personality** **NPTEL**

**AutoCAD 2D Drafting and Design Workshop** **Learn Delta**

## Achievements

**GATE 2025 Qualified (Civil Engineering)** **2025**

- Successfully qualified in the national-level Graduate Aptitude Test in Engineering (GATE) in Civil Engineering.

## Languages

**English:** Fluent
**Hindi:** Native