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NEWS LETTER
DEPARTMENT OF CIVIL ENGINEERING

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VISION

To impart latest knowledge and skills so as to kindle innovation and creativity among students

MISSION

- To provide quality Education by preparing a strong willed, socially committed and Dynamic Engineers for the Future.
- To enrich their knowledge in the areas of academic, research and industry by moulding professionals in the field of Civil Engineering to build a sustainable world.
- To impart quality education and mould technically sound, ethically responsible professionals in the field of Civil Engineering.
- To prepare the students with a broad skill set of creativity, critical thinking and effective communication skills to meet the desired needs of the society.
- To develop state of the art infrastructure and research for effective teaching learning process.
- To strengthen soft skills especially for rural students through co-curricular and extracurricular activities.

FACULTY ACHIVEMENT

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Article

Bridging Strength Regimes in Recycled-Aggregate Concrete Through Experiments and Machine Learning

Sandhya Mathapati [1], Junead M [2], A.Ananthi [3], Viren Bhikaji Chandanshive [4], Mital J. Dholawala [5], P Jaishankar [6], Prashant Sunagar [7*]

[1] Department of Civil Engineering, Dr. Vishwanath Karad, MIT World Peace University, Pune, Maharashtra, India, 411038,
[2] Department of Civil Engineering, MIT ADT University, Pune
[3] Department of Civil engineering, J.J.College of Engineering and Technology (Autonomous) Tiruchirapalli- 620009
[4] Department of Civil Engineering, Vidyavardhini's College of Engineering and Technology, Vasai, Pin Code 416416, Maharashtra
[5]Civil engineering dependent, C.K.Pithawala College of Engineering and Technology, Surat- 395007, Gujarat,
[6] School of Civil Engineering, SASTRA Deemed to be University, Thanjavur -613401.
[7*] Dept. of Civil engineering, Sandip institute of technology and research, Nashik, India
Email: * prashant.sjce@gmail.com

Abstract: Recycled concrete aggregate (RCA) is recognized as a means of reducing the demand for virgin aggregates. However, the mortar that often adheres to aggregate particles, the resulting high absorption of RCA, and the heterogeneity of the interfacial transition zones between aggregate and matrix all have the potential to impact the strength of RCA-concrete. Conventional concretes are often classified as either normal- or high-strength based upon their compressive strength. An experimental program that utilized eight different concretes of M30/M80 composition, each with 0, 30, 60, and 100% replacement of natural aggregate with RCA, allowed for the determination of the mean compressive strength of each concrete between 1 and 28 days of curing. A leakage-controlled machine learning approach was developed in conjunction with the experimental analysis to model the relationship between various constituents of the concretes and their resulting strengths. Such variables included the curing age of the concretes, the fraction of RCA within each concrete, the water-to-binder ratio, the amount of binder, Alccofine (fine cement particles) within the concretes, and the dosage of superplasticizer. Each of these variables was used to train an artificial neural network (ANN), a Random Forest, an XGBoost model, and a radial-basis support vector regressor (SVR). The age trajectories of concretes of unseen compositions were used to hold-out samples for cross-validation to assess the models' accuracies. Results of the experiments indicated that concrete that utilized 30%, 60%, and 100% replacement of natural aggregate with RCA exhibited strength losses of 8.1%, 19.6%, and 23.7% for normal-strength concretes, and strength losses of 12.4%, 29.4%, and 38.8% for high-strength concretes, respectively. The 6-16-8-1 ANN produced the best results ($R^2 = 0.874 \pm 0.025$, RMSE = 7.12 ± 0.71 MPa, MAE = 5.11 ± 0.48 MPa, and MAPE = $16.17 \pm 1.45\%$), outperforming the SVR, Random Forest, and XGBoost models. The analysis of the models via SHAP diagrams indicated that the curing age of the concretes and the fraction of RCA within the concretes were the two most important variables that impacted the strength of the resulting concretes. Thus, approximately 30% of natural aggregate can be replaced with RCA in the concretes studied. Furthermore, these results indicate that machine learning approaches can be used as means of predicting the strength of concretes containing RCA, but with consideration of the leakage within the datasets and the generally limited generalizability of results based upon small sample sizes and averaging of results among samples.

Keywords: recycled concrete aggregate; high-strength concrete; artificial neural network; XGBoost; SHAP; grouped cross-validation; compressive strength

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Dr. A. Ananthi, Professor & HoD/Civil Engineering Department had published an article in International Journal of Computer Information Systems and Industrial Management, in title of "Bridging Strength Regimes in Recycled Aggregate Concrete through Experimental and Machine Learning" in Scopus Indexed Q_3 journal.

Dr. A. Ananthi, Professor & HoD/Civil Engineering Department had published an article in International Journal of Special Education, in title of "Intelligent Cyber-Physical Framework for Urban Flood Forecasting, Risk Assessment, and Resilience Planning" in Scopus Indexed Q3 journal.

2026, 41(10s), 1423-1434 INTERNATIONAL JOURNAL of SPECIAL EDUCATION

Intelligent Cyber-Physical Framework for Urban Flood Forecasting, Risk Assessment, and Resilience Planning

Vinod L [1], Urmila R. Kawade [2], Niranjan G Hiremath [3], A.Ananthi [4], Kamaldeep [5] and Prashant Sunagar [6]

[1] Assistant Professor, Department of Aeronautical Engineering, Nitte Meenakshi Institute of Technology (NMIT), Nitte (Deemed to be University)-Bengaluru 560064
[2] Associate Professor, Department of Civil Engineering, Dr.V.V.Patil COE, Ahilyanagar – 414001
[3] Assistant professor, Department of Civil Engineering, M S Ramaiah Institute of Technology Bangalore, Karnataka- 560054
[4] Professor, Department: Civil Engineering, J. J. College of engineering and technology, Tiruchirapalli – 620008
[5] School of Electrical Engineering, Shri Mata Vaishno Devi University
[6] Associate professor, Dept. of Civil engineering, Sandip institute of technology and research, nashik, India
prashant.sjce@gmail.com

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ABSTRACT:
Urban flooding is one of the essential problems of the urbanization of the Earth's landmasses. The traditional methods of flood management systems are lacking. The proposed system utilizes artificial intelligence to create a digital twin system for the management and mitigation of urban flooding. This system collects data from the environment using internet of things (IoT) devices, remote sensing, weather systems and flood models. Artificial intelligence algorithms such as deep learning, spatiotemporal modelling and predictive analytics are utilized to create predictions for flooding and mitigation strategies. The advantages of using this system will allow urban planning and management to create better emergency management and infrastructure plans for urban areas. The digital twin system can revolutionize flood management for urban areas to create a system that minimizes the damage of flooding and creates sustainable cities for the future.

Keywords: Digital Twin, Urban Flood Management, Artificial Intelligence, Predictive Modeling, Smart Cities, Climate Resilience.

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Article

Digital Integration of 5D BIM and Building Energy Modelling for Sustainable Construction Management

Santhosh D [1], Prakash T B [2], K.Pradeep [3], Soumita Bid [4], Geena George [5], Sadashiv S. Tavashi [6], Prashant Sunagar [7*]

[1]Department of Civil Engineering, M S Ramaiah Institute of technology
Bengaluru 560054
[2] Department of Civil engineering, B.M.S. college of Engineering, Bull temple road, Basavanagudi Bangalore – 560019
[3]Department of Civil engineering, J.J.College of Engineering and Technology (Autonomous)
Tiruchirapalli- 620009
[4]Civil engineering dependent, C.K.Pithawala College of Engineering and Technology, Surat- 395009
[5] East Point College of Engineering & Technology, Bangalore
[6] Anantrao pawar college of engineering and research, Parvati Pune 411009
[7*] Dept. of Civil engineering, Sandip institute of technology and research, Nashik, India
Email: * prashant.sjce@gmail.com

Abstract: The use of BIM technology is currently limited in several segments of the Indian construction industry. However, the application of BIM technology to two residential building projects in Bengaluru, India, shows the potential for BIM to enhance construction industry performance in terms of cost control, scheduling, and environmental impact. Five-dimensional BIM was used to construct a seven-storey residential building with basement parking using Autodesk Revit, AutoCAD, and Navisworks. This model allowed for the estimation of the total quantity of concrete that would be required for the construction of the buildings at 1,428.88 m³, as well as an estimation of the cost of constructing the concrete at approximately ₹39.57 lakh. Energy simulations were performed on the two-storey residential building in Bengaluru using Revit Green Building Studio and Autodesk Insight 360, as a way of estimating the energy that would be required to heat or cool the buildings according to the climate of Bengaluru. The energy simulations indicated that the heating and cooling energy use for the buildings was 163 kWh/m² per year - 7% more than the industry benchmark of 152 kWh/m² per year. The increased energy requirement by the residential buildings was attributed to the uninsulated walls constructed of brick masonry and the reinforced-concrete roof of the residential buildings. Additionally, a review of other construction industry projects that implemented BIM technology revealed cost savings of between ₹12.45 lakh and ₹16.60 crore, with the costs to implement BIM technology ranging between ₹1.20 lakh and ₹74.70 lakh. These results indicate that the implementation of BIM technology to residential construction projects in Bengaluru and other rapidly developing Indian cities has considerable potential to enhance the economic and environmental performance of construction projects.
Keywords: Building Information Modeling; 5D BIM; Quantity Takeoff; Clash Detection; 4D Scheduling; Building Energy Simulation

1. Introduction

The construction industry is generally characterized by fragmented information within the industry, conflicts within the documentation of construction projects, and low rates of productivity within the industry as a whole [1-3]. BIM aims to address each of these deficiencies by developing a digital model of a building and its parts (the building information model) that represents the construction project and enabling the owners of those projects to reuse those models after construction [1-3]. While many CAD software packages were published with models that represented construction projects in two-dimensional (2D) and three-dimensional (3D) representations, BIM also publishes construction models that represent projects in four-dimensional (4D) models of construction schedules, five-

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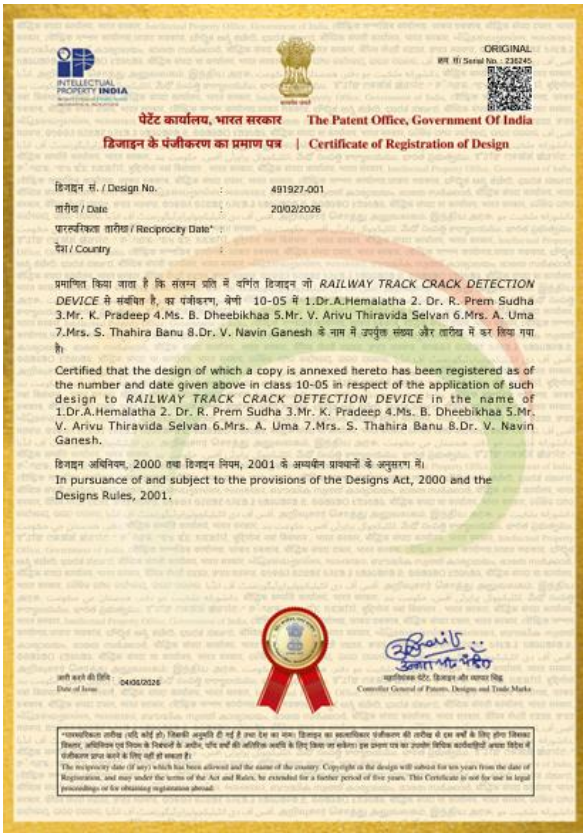
Mr. K. Pradeep, Assistant Professor has published a article in International Journal of Computer Information Systems and Industrial Management, in title of "Digital Integration of 5D BIM and Building Energy Modelling for Sustainable Construction Management" Scopus Indexed Q_3 journal.



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Mr. K. Pradeep, Assistant Professor has published a Design Patent in title of "FOLDABLE SCAFFOLDING SYSTEM FOR HIGH RISE CONSTRUCTION" design no: 493450-001, by Intellectual Property India in the date of 03.03.2026 and issued in 04.06.2026. And also Published a Design Patent in title of "RAILWAY TRACK CRACK DETECTION DEVICE" design no: 491927-001, by Intellectual Property India in the date of 20.2.2026 and issued in 04.06.2026.

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