KIIT POLYTECHNIC, BHUBANESWAR

BUILDING BLUEPRINT

NEWSLETTER OF CIVIL ENGINEERING DEPARTMENT

JULY- DEC 2023

MISSION

M1	*Producing civil engineers with quality technical skills matching contemporary industry needs to solve the real-life problems of the society.*
M2	*Providing students with an extensive and advanced education in the field of civil engineering fundamentals regarding mathematics and basic sciences, its applications and design to prepare students for higher learning.*
M3	*Guiding students to carry out interdisciplinary projects and supporting them for the development of products to meet the social needs.*
M4	*Creating an ambiance where students can be involved with collaborative work with different industries and in other utility sectors of civil engineering and motivated towards entrepreneurship and social responsibility*
M5	*Providing advanced skill related to all civil engineering applications to enhance Employability.*
M6	*To promote the spirit of enquiry, innovation, life skills and to encourage lifelong learning.*

VISION

To be a progressive school that brings the civil engineering with quality technical knowledge, continuous education, promote high end research and innovation to meet the current and future challenges in civil engineering.

MESSAGE FROM THE DESK OF HOD

I congratulate the Civil Engineering department on the release of their newsletter BUILDING BLUEPRINT. Due to unwavering dedication and teamwork, the department has experienced numerous outstanding successes in all areas. Your commitment to excellence has been truly amazing, from conducting ground-breaking research to creating an environment that is stimulating forlearning.

Your successes not only highlight the depth of your knowledge but also the collaborative nature of the department. I have no doubt that this momentum will push your department's understanding and advancement in the areas of renewable energy and artificial intelligence to new heights.

Dr. Sanjukta Sahoo

[HOD, CIVIL ENGINEERING]

CONTENTS

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FACULTY ACHIEVEMENTS

1. Dr. S. Sahoo

ACCOLADES

1 Funded Project: SERB Power Grant DST- 2021
2 Published Patent: 202231003134A (18/02/2022), 202331007739 (10/02/2023)

Awards and Honors:
Invited Keynote Speaker, Department of Environmental Science, Delhi University, New Delhi 5th August 2024
Invited Guest speaker, Department of Civil engineering, NITK, Surathkal, Karnataka, 25th April 2024
Invited Guest speaker, Department of Civil engineering, BOSE, Odisha, 21th April 2024
Received " India Green Award for Top Sustainable Champion-2024" at Udaypur, Rajastan for innovative environmental work at chilika, Odisha
Received "National Environmental Science Academy Distinguished Scientist of the Year Award-2023 at CSIR-NBRI, Lucknow for outstanding contribution in the field of carbon capture.
Invited Keynote Speaker in the GPCC-2023 organized at CSIR-NBRI, Lucknow on date 14th -16th December, 2023
Invited Guest Speaker at University of SAN CARLOS, CEBU-Philippines for a talk on Concrete Research and Carbon Capture, 25th November, 2023
Honored for 'Best Teacher Award" in Odisha Technological Conclave 2023 on Engineer's Day
Awarded from Hon'ble Education Minister Sri Dharmendra Pradhan Ji as AICTE Translator
Awarded a Bronze Medal on 25th year Silver Jubilee of KIIT from Hon'ble founder Sri Achyuta Samanta, 16th Feb, 2023
Invited Guest Speaker, DRDO, LEH on National Science Day, 28th February 2023
Invited Guest Lecture, Department of Botany, Delhi University, 24th December 2022
Received "Best Polytechnic Faculty Award for Odisha" from ISTE, 2022 at PDE College KalaBuragi, Karnataka
Key Organizing Committee Member, National Workshop & Training Program, 24th -25th January, 2023
Syllabus Committee Expert, Civil Engineering, SCTE & VT, Odisha
Received "Best Polytechnic Faculty Award for Odisha" from ISTE, 2022 at PDE College KalaBuragi, Karnataka
Invited Guest speaker, Department of Civil engineering, NIST, Odisha, 24th July 2022
BEST Polytechnic Faculty Award for Odisha, ISTE, 2021
BEST TEACHER Award for Odisha, ISTE, 2019
Er. Pratap Chandra Panda Award, The Institution of Engineers (India), during 62nd Annual Technical Session held on 28 March 2021
Prof. Dr. L K Bisoyi Award, The Institution of Engineers (India), during 60th Annual Technical Session held on 30 March 2019
Honoured as Session Chair, ICMPC-2020, Mathura, 19/02/2020
Honoured 'Best Faculty Award (All Odisha Colleges)'-2019
Honoured as Session Chair, SCBM-2018, NITK, 19/06/2018
Honoured as Session Chair, 42nd Indian Social Science Congress, KIIT DU, Bhubaneswar
Honoured as Session Chair, ICMPC-2019, Mathura
Awarded Best Technical Paper, DuraBI-2018, Curtin University, Malaysia
Awarded 'Best staff of the Year - 2016' in Teaching category, KIIT
REVIEWER OF:
Indian Concrete Journal
ICSCBM-2018
ICRTICE-2019
Research paper reviewer, Springer Book Chapters

Research paper reviewer, ICMPC-2019 conference

MEMBERS:
Life Member, ISTE, INDIA, No: LM52047
Life Member, Institute of Engineers, INDIA: M- 1633990
Chartered Engineer, Institute of Engineers, INDIA: M- 1633990
Executive Body Member, Indian Phycological

2. Mr. A.P.Dash
   - Attended a training program as resource person of the newly recruited junior engineer 2024 at STATE INSTITUTE FOR RURAL DEVELOPMENT AND PANCHAYATI RAJ
   - Course completed from Udemy-“ Comprehensive RCC design using IS 456:2000(LSM).

3. Mrs.S.Padhi
   - Attended a training program as resource person of the newly recruited junior engineer 2024 at STATE INSTITUTE FOR RURAL DEVELOPMENT AND PANCHAYATI RAJ
   - Course completed from Udemy-“Diploma in basic civil engineering for construction.

4. Mrs. A. Moharana
   - Course completed from Udemy-“Quantity surveying building estimation BBS with Excel and CAD.

5. Mr. C.Mishra
   - Course completed from Udemy-“ Comprehensive RCC design using IS 456:2000(LSM).

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'BLUE ECONOMY' CAN IMPROVE LIVES, OCEAN ECOSYSTEM

Dr Dinabandhu Sahoo & Dr Sanjukta Sahoo

Though the ocean covers nearly 71% of the earth's surface and 3.5 billion people depend upon it for food and other needs, its resources are yet to be fully exploited due to lack of accessibility into the deep ocean and technological constraints.

'Blue Economy' or ocean-based economy is the sustainable use of ocean resources for economic growth, improved livelihoods and jobs while preserving the health of the ocean ecosystems.

According to the World Wide Fund for Nature (WWF), the 'Blue Economy' is estimated to be worth $24 trillion, with an annual benefit of $2.5 trillion every year. Blue economy activities include maritime shipping, fishing, aquaculture, coastal tourism, renewable energy, water desalination, undersea cabling, seabed extractive industries, deep sea mining, marine biotechnology, etc.

Meanwhile, the increasing levels of carbon dioxide in the atmosphere are causing climate change. The result is increasing temperature, frequent cyclonic storms in coastal areas, acidification of the ocean, loss of biodiversity, bleaching of corals, decreased fisheries productivity, rapid degradation of ecosystems and many more.

To address some of these challenges, scientists have devised and developed different technologies, including artificial reef constructions and deployment as well as the creation of underwater forests with seaweeds.

Artificial reefs are man-made structures made up of different types of materials, such as special concrete, steel frames, etc, which can mimic some of the characteristics of the natural reefs.

Artificial reef construction and deployment is a multi-billion-dollar industry, and several countries like the USA, France, Japan, China, Korea, and Australia have deployed millions of such reefs on their sea coasts to boost their economy.

DINABANDHU SAHOO AND SANJUKTA SAHOO

Around the world, approximately 5,00,000 reef balls have been deployed in 3,400 artificial reef and beach restoration projects in more than 70 countries.

Artificial reefs with specific designs and materials will not only provide habitat to several marine species but also reduce wave action, protecting the coast against cyclonic storms.

Additionally, it is a good substrate for seaweeds and some specific types of aquatic, which can sequester carbon dioxide from water quickly. Artificial reefs play a major role in creating enhanced fisheries and aquaculture, advanced tourism and better economic and employment opportunities.

Where does India stand?

India has a 7,517-kilometre-long coastline. About 4 million fisherfolk are dependent on the coastal economy, making India the second largest fish-producing nation in the world. Realising the importance of the fisheries sector in the country, the Centre established a new ministry of fisheries, animal husbandry and dairying in 2019.

Further, the Centre also launched a new scheme, 'Pradhan Mantri Matsya Sampada Yojana (PMMSY)' to boost the marine sector and to bring about ecologically healthy, economically viable, and socially inclusive development of the fisheries sector of India.

In the budget 2024, 'Blue Economy' 2.0 was also announced to boost fisheries and aquaculture, which aims to generate 50 lakh employment opportunities.

Realising the vast application of artificial reefs in the ocean ecosystem, the authors, who have been relentlessly working on this area for a long time, were instrumental in the deployment of the first artificial reefs in Odisha. Now, they are planning to create artificial coloured coral reefs similar to natural corals to boost marine tourism across the country.

(Dinabandhu Sahoo is a marine biologist and senior professor at Delhi University; Sanjukta Sahoo is head, civil engineering department at KIIT, Bhubaneswar. They are working on artificial reefs)


52nd NATIONAL ANNUAL FACULTY CONVENTION


ODISHA TECHNOLOGICAL CONCLAVE
2023
Organised by
Theme
Odisha Technological Conclave 2023
Best Teacher Award

Mrs. S. Padhi   giving training to newly recruited junior engineers of Odisha government.

EXPOSURE VISIT

40-Member KIIT Polytechnic Delegation Heads for Singapore KIIT Polytechnic to Be Modeled After Nanyang Polytechnic.

MOU SIGNED WITH ULTRATECH CEMENT

Dr. Saranjit Singh, VC, KIIT-DU praised the entire ULTRATECH CEMENT Group for their efforts and chose KIIT Polytechnic as the institution to sign such a type of MoU. Dr. Jnyana Ranjan Mohanty, Registrar wished all success and thanked the ULTRATECH CEMENT team for this kind of initiative undertaken to make the students industry-ready. Dr. Tanmaya Mohanty, Principal briefed about the program genesis and assured support from the institution and the facilties in the wonderful Endeavour made by ULTRATECH.

TRAINING PROGRAMME

Civil engineering students from KIIT Polytechnic Civil Branch are participating in a training programme at THL.

PHOTOGRAHY CLUB

"KIIT Polytechnic's Photography Club captures the vibrant spirit of our campus, offering students a creative platform to explore and showcase their photography skills.

Department of Civil Engineering

KIIT POLYTECHNIC

(A constituent wing of KIIT Group of Institutions)

STRENGTH PROPERTIES OF SUSTAINABLE CONCRETE MADE WITH WASTE PLASTIC COARSE AGGREGATE

Objective

The main objectives of this study are:

1. To obtain a suitable mix for natural concrete and concrete with waste plastics with the required strength and workability.
2. To determine the workability, compressive strength and splitting tensile strength characteristics of concrete with waste plastics.
3. To compare the workability and strength for concrete with and without waste plastic.

Methodology

METHODS OF PREPARATION:-

- CUTTING OF PLASTIC INTO SMALL PIECES
- SAND COATING OF PLASTIC PIECES
- SUN DRYING
- CASTING OF CUBES BY REPLACING 10% AGGREGATES
- CURING

Figure 1. Making of Plastic aggregates

Figure 2. Compacting of concrete

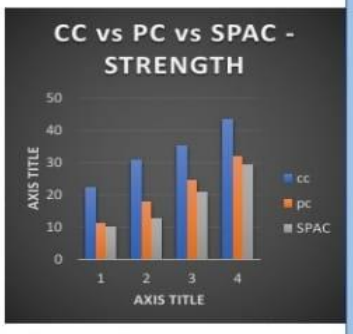
Figure 3. Tamping of concrete

Figure 4. Water absorption

Figure 5. Broken concrete cube

Figure 6. Compressive strength Testing machine

Result



Interpretation

The productive use of waste material represents a means of alleviating some of the problems of solid waste management. The reuse of wastes is important from different points of view. It helps to save and sustain natural resources that are not replenished, it decreases the pollution of the environment and it also helps to save and recycle energy production processes. Wastes and industrial by-products should be considered as potentially valuable resources merely awaiting appropriate treatment and application. Plastic wastes are among these wastes; their disposal has harmful effects on the environment due to their long biodegradation period, and therefore one of the logical methods for reduction of their negative effects is the application of these materials in other industries .

Socio-Economic Implication

Plastic aggregates might be the replacement for natural aggregates for which the problem regarding the availability of natural aggregates can be solved and the problem of increasing number of waste plastic can be reduced drastically .

Eco-friendliness

Plastic is considered as the most deadliest substance on the planet as it's resistance property to any kind of effect and lifespan. But in this project we are using plastic as a material with out even burning is hence it's completely eco-friendly.

Project Team

Students

1. Bimlendu Kumar
2. Subhadra Sahoo

Supervisor

Mr. Abhijeet Prasad Dash

(Lecturer of Civil Engineering Department)

Coordinator

Dr. Sanjukta Sahoo

(Head of the Department of Civil Engineering)

Department of Civil Engineering
KIIT POLYTECHNIC
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Study of compressive strength characteristics of porous concrete

Objective

Objective Definition: The objective of assessing the compressive strength of porous concrete is to determine its ability to withstand axial loading and resist deformation under compressive forces. By subjecting the material to controlled compression tests, researchers aim to quantify its structural integrity and performance characteristics. Understanding the compressive strength of porous concrete is crucial for designing durable and resilient infrastructure, such as pavements, retaining walls, and structural elements.

Methodology

We take the 3 cubes out of water from both batches at the end of 7 days with dry cloth. Then measured the dimensions of the surface in which the load is to be applied. Let be 'L' and 'B' respectively
Then we place the cube in compression testing machine and apply the load uniformly at the rate of 35N/mm2.
Noted the load at which the cube fails. Let it be 'P'.
Calculated the compressive strength of the cube by using formula P/A. Where A is the area of loaded surface (i.e. L×B).
Repeated the same procedure (steps 10 to 13) for other two cubes.
Then repeated the whole procedure (Step 10 to 14) to find the compressive strength of the cube at the end of 14 days and 28 days.

Figure 1. Mold testing

Figure 2. Mixing of aggregate

Figure 3. Mixing of concrete

Figure 4. Testing of cube

Figure 5. Mixing of cement

Figure 6. Weight of cube.

Result

The type and grade of concrete : OPC; M20

The compressive strength of concrete mix with 100% fine aggregate at the end of

1. 7 days : 21.242 N/mm2.
2. 14 days : 23.083 N/mm2.
3. 28 days : 23.703 N/ mm2.

The compressive strength of concrete mix with 20% fine aggregate at the end of

1. 7 days : 25.264 N/mm2.
2. 14 days : 35.403 N/mm2.
3. 28 days : 39.374 N/ mm2.

The compressive strength of concrete mix with 0% fine aggregate at the end of

1. 28 days : 25.078 N/ mm2.

Interpretation

The compressive strength of porous concrete is influenced by various factors including porosity, aggregate type, and curing conditions. Research suggests that as porosity increases, compressive strength tends to decrease due to reduced contact between aggregate particles. However, the specific conclusion may vary depending on the mix design and testing parameters. In general, porous concrete can exhibit lower compressive strength compared to traditional concrete but offers benefits such as improved drainage and reduced runoff. Therefore, careful consideration of the intended application and performance requirements is essential when utilizing porous concrete in construction projects.

Socio-Economic Implication

Infrastructure Improvement
Environmental Impact
Urban Heat Island Mitigation
Job Creation and Economic Growth
Resilience to Climate Change

Eco-friendliness

Stormwater Management
Heat Island Mitigation
Carbon Footprint Reduction
Biodiversity Promotion
Longevity and Durability

Project Team

Students
1.A.Prem Kumar
2.Advika pati
3.Anand Kumar Choudhary
4.Aristha Panda
5.Bhabotosh dakua

Supervisor : Chiranjeevi Mishra

Coordinator : Sanjukta Sahoo

Department of Civil Engineering
KIIT POLYTECHNIC
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STRENGTH STUDY OF BRICK MADE UP OF AGRO WASTE AND COMPARED WITH NORMAL & FLYASH BRICK

Objective

1.Utilization of Local Waste Materials:
Develop sun dried bricks incorporating various locally available waste materials to promote cost-effectiveness and eco-friendliness in construction.
2. Study of Waste Material Influence on Strength:
Investigate the effects of incorporating sawdust & rice husk into brick production at varying proportions to understand their impact on brick strength.
3. Compressive Strength Assessment with Mineral Admixtures:
Determine the compressive strength of different types of burnt bricks incorporating mineral admixtures over various curing periods (7 days, 14days, 28 days) to evaluate their structural performance.
4. Comparison of Normal and Waste Material Bricks:
Compare the strength characteristics of conventional sun dried bricks with those containing sawdust & rice husk at 10% replacement levels to assess the viability of waste material integration in brick production.

Methodology

1. Utilization of Locally Sourced Soil as Main Material:
- Employ locally available soil as the primary component for brick production to ensure accessibility and affordability.

2. Incorporation of Waste Materials in Brick Production:
- Integrate waste materials such as sawdust & rice husk into the brick composition 10% levels to explore their potential impact on brick properties.

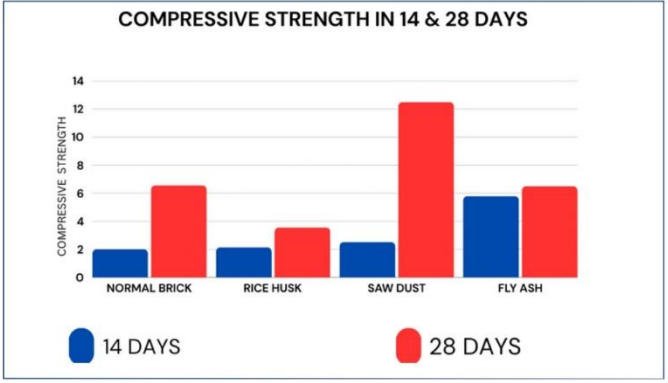
3. Brick Casting and sundry Process:
- Cast bricks using molds of specific sizes and subject them to the sundry process to attain desired strength and durability.

4. Evaluation of Compressive Strength:
- Assess the compressive strength of 4 different types of bricks, including variations with sawdust & rice husk at 10% incorporation levels, at 7, 14, and 28 days of curing to determine their structural performance over time.






Result



Interpretation

Bio bricks can vary in strength compared to traditional clay and fly ash bricks, with some bio bricks matching or even surpassing the strength of traditional bricks, while others may have slightly lower strength levels.

A comparative study of the strength characteristics of bio-bricks and fly ash bricks against standard bricks, along with their socio-economic implications, can inform decisions regarding sustainable construction practices, potentially leading to cost savings, job creation, and environmental benefits.

Eco-friendliness

A comparative analysis of the strength properties of bio-bricks and fly ash bricks compared to standard bricks can provide valuable insights for optimizing construction materials, potentially leading to cost-effective solutions and enhanced economic viability in building projects.

Project Team

Students
1.RASHIQ KHONDOKAR.
2.POHAR DEBBARMA
3. KASHRAY HANSDAH
4.SASMITA DEHURY
5.MUNA DIBAKA

Supervisor : MRS. ANANYASHREE MOHARANA
[LECTURER/CIVIL ENGINEERING]

Coordinator : MRS. SANJUKATA SAHOO
[HEAD OF THE DEPARTMENT]

Department of Civil Engineering
KIIT POLYTECHNIC
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Salt Resistance of Artificial Reef replaced with crushed Seashell

Objective

- **Assess salt resistance of artificial reef with crushed seashell.**
- **Evaluate durability of seashell-replaced artificial reef under saltwater exposure.**
- **Investigate impact of crushed seashell on structural integrity of artificial reef.**
- **Compare salt resistance between conventional and seashell-replaced reefs.**
- **Provide insights for utilizing seashell as sustainable material in reef construction.**

Methodology

- **Material Collection:** Obtain crushed seashells, concrete mix ingredients, and curing materials.
- **Mix Design:** Determine proportions for replacing a percentage of cement with seashell powder (e.g., 10% and 20%).
- **Concrete Preparation:** Mix batches with designated proportions of seashell powder.
- **Batch Division:** Segregate batches for testing under regular and saltwater exposure.
- **Reef Formation:** Create artificial reef structures using the prepared concrete batches.
- **Placement:** Install reef structures in designated saltwater environments.
- **Monitoring:** Regularly assess the condition and integrity of the reefs over a set period.
- **Data Collection:** Record observations on reef degradation, structural integrity, and marine life colonization.

Figure 1. Concrete Mixture

Figure 2. Grease the Mold

Figure 3. Wt. of seashell powder

Figure 4. Mixing Concrete

Figure 5. Casting Cube

Figure 6. Curing in water tank

Result

	7 Days	14 Days	28 Days
Normal water	39.58 N/mm²	45.93 N/mm²	47.70 N/mm²
Seawater	38.74 N/mm²	41.08 N/mm²	51.08 N/mm²
Normal water	30.86 N/mm²	31.65 N/mm²	39.78 N/mm²
Seawater	25.15 N/mm²	28.65 N/mm²	29.43 N/mm²

Interpretation

- **Seashell Replacement:** Seashell-infused artificial reefs display promising salt resistance properties.
- **Structural Integrity:** Comparative analysis reveals variations in reef durability under different saltwater exposure conditions.
- **Seawater Curing Influence:** Seawater immersion enhances salt resistance, bolstering reef longevity.
- **Sustainable Material Use:** Integration of crushed seashells promotes eco-friendly practices in reef construction.
- **Practical Benefits:** Insights gained aid in designing resilient artificial reefs for marine habitat restoration.
- **Environmental Impact:** Utilizing seashells reduces dependence on conventional reef materials, potentially mitigating ecological harm.
- **Future Directions:** Further research could optimize seashell proportions and reef designs for enhanced salt resistance and ecological efficacy.

Socio-Economic Implication

- **Cost-Efficiency:** Seashell integration cuts reef costs.
- **Resource Utilization:** Less cement, more natural resources saved.
- **Local Economy Boost:** Supports coastal industries.
- **Environmental Preservation:** Cuts emissions, eco-friendly reefs.
- **Infrastructure Sustainability:** Durable reefs, less maintenance.
- **Market Expansion:** Innovates construction, promotes competition.

Eco-friendliness

- **Waste Utilization:** Seashell powder repurposes waste, reducing landfill burden.
- **CO2 Reduction:** Less cement means lower emissions during production.
- **Resource Conservation:** Seashell use reduces exploitation of marine resources.
- **Sustainable Water Usage**: Seawater curing aligns with eco-friendly practices.
- **Biodiversity Protection:** Less cement demand safeguards vulnerable ecosystems.
- **Renewable Source:** Seashells replenish naturally, ensuring sustainability.

Project Team

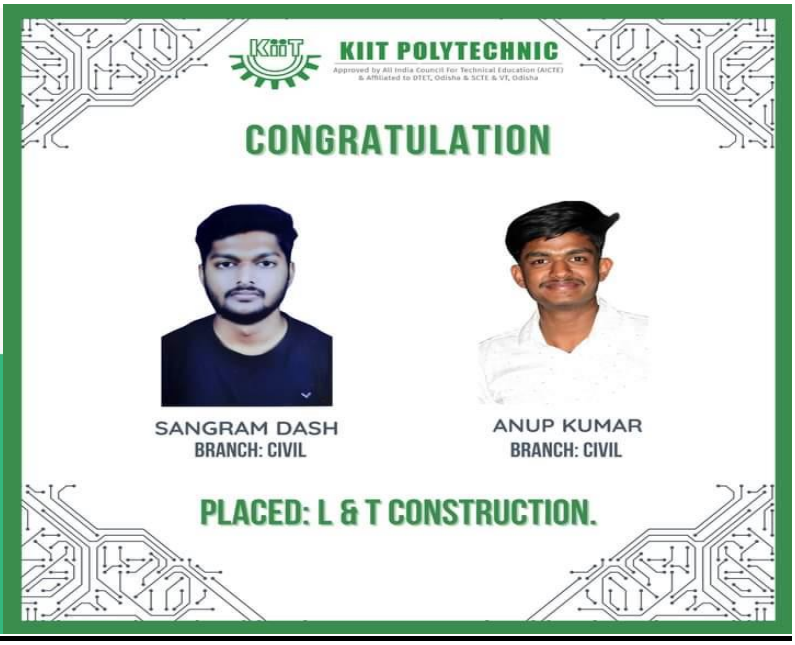
Students
1. Shaktisagar Sahoo
2. Sidhant Nayak
3. Swagat Panigrahi
4. Sujal Sahoo

Supervisor

Coordinator
Mrs. Suchismita Padhi

STUDENT ACHIEVEMENT

Six of our students were successfully placed, demonstrating the strong industry alignment and technical proficiency of our CIVIL Department.



STAR PERFORMERS

3rd YEAR |

ADVIKA PATI

2nd YEAR |

BIMLENDU KUMAR