MECHRONICLE

OCTOBER, 2024

Message from the HOD

I am delighted to present you the first issue of the newsletter '*MECHRONICLE*' from the Department of Mechanical Engineering, IIEST Shibpur.

It is issued with the objective of promoting communication and share valuable insights within our distinguished community, and, to celebrate our achievements and encourage the successors.

The foundation of the Mechanical Engineering Department can be traced back to the pre-independence era of the country. It was established in 1921 with the initiation of a diploma course programme in Mechanical Engineering. Then under erstwhile *Bengal Engineering College* (BEC) which was upgraded to *Bengal Engineering and Science University*, *Shibpur* (BESU) and subsequently converted to *Indian Institute of Engineering Science and Technology Shibpur* (IIEST). The department has completed 103 years of its illustrious existence.

Since beginning, the department has come a long way and has witnessed remarkable evolutions.

The first degree-level course in Mechanical Engineering started on 18th July 1930. Post-graduate courses came a little late, in the year 1954. Over the years, through its high level of teaching and research in discipline, the department has made significant contributions. The department cherished its heritage and bridged with state-of-the-art laboratories and smart classrooms. As a result, the department has an eminent presence of the alumni worldwide.

The department has more than hundred years of memories. We shall introspect in this newsletter, comparing then and now. In this newsletter, you will find highlights of our achievements, ongoing research and projects. You will also find updates regarding departmental planning and upcoming events like conferences, EDPs and FDPs and opportunities for collaboration,

As we have embarked on this journey together, let's continue to inspire and support each other. I look forward to your contributions and to see our department prosper more.

With best regards,

Prof. Subhas Chandra Mondal
Professor and Head,
Department of Mechanical Engineering

Editorial

The beginning of the history of Bengal Engineering College coincides with the initiation of technical education in India. The *Civil Engineering College* was opened on 24th November 1856 with 10 students and an

instructive staff of two namely the principal and the officiating professor of Mathematics.

In the year 1880, the college occupied the premises of Bishop's College, Shibpur. The first college session under the name of the *Government Engineering College, Howrah* started on 5th April 1880 with 73 students. Mr. S. F. Downing was the Principal of this college, whereas Mr. J. S. Slater, Mr. J. H. Gilliland, and Mr. Dwarka Nath Dutt were appointed as the Professor of Civil Engineering, Mathematics and Assistant Professor of Drawing and Surveying.

The college was affiliated with the *University of Calcutta* with effect from 1st April, 1880, by a resolution of the syndicate, passed on the 17th of April 1880. On the representation of the principal that the present designation (ending with Howrah) of the college was giving rise to postal irregularities and delays, the designation was changed to the *Civil Engineering College, Seebpore* By government order no. 395, dated 18th May, 1887 as Seebpore was the nearest post office.

Following up on the recommendations practical trainings were widened in 1902 and arrangements were made for such training in the Railway Workshops. A 100-ton testing machine was erected during this year, followed by the inauguration of a new Electric Power Plant in March 1904.

Sibpore College Patrika published in 1903 was the first attempt at the publication of a journal by students.

The University affiliation in the *Bengal Engineering Degree College* or *B. E. College* in all the branches of engineering, namely Mechanical, Civil, Electrical and Mining was granted as early as on 25th November, 1911. In pursuance to the policy recommended by the Industrial Commission which visited the College during 1916-17, the Mechanical and Electrical Engineering Classes were being developed independently of the Calcutta University. As suggested by the *Mookerjee Committee*, under the chairmanship of *Sir Rajendra Nath Mookerjee*, an alumnus of this college, various reforms happened during the period of 1919. By Government order no. 2448-Edn, dated the 29th November 1921, the various departments were reorganized.

1. Civil Engineer Classes
2. Mechanical and Electrical Engineering classes
3. Mining classes.

The control of the examinations in the improved Mechanical and Electrical Engineering courses were transferred to the newly formulated *Board of Control for Apprenticeship Training* with effect from March 1922.

Mr. Heaton was the then principal until he retired in 1921. Mr. T. H. Richardson took over as new principal. A diploma course of 3 years duration was started and the first exams were held in 1923. An associateship course in mechanical engineering was introduced and received the sanction from the government on 5th July 1922 and the first examination was held in March 1924.

After the lapse of several years, the students started the publication of an annual journal known as Bengal Engineering College Annuals or more popularly known as *BECA*. It is now published regularly at the time of the Annual Reunion meeting.

– Collected.

Content

Departmental Activities

Academic Arena

The Department offers 8-semester Undergraduate (UG) and 4-semester Postgraduate (PG) courses in Mechanical Engineering, with a current annual intake of 96 students in UG and 36 students in PG. A 10-semester Dual Degree B.Tech.-M.Tech. program is also in place.

Currently, the PG courses are available in three specializations, namely, Machine Design, Thermal Engineering, and Manufacturing Science, leading to the degree of Master of Technology.

Recently, inclined with the NEP 2020, the restructuring of the courses have been initiated to incorporate new and emerging fields into curriculum. More elective choices are being offered.

The department also has plans to introduce new courses in emerging fields such as advanced AI&ML Assisted Modeling of Mechanical Systems, Micro and Nano-Manufacturing, Additive Manufacturing, Biomedical Engineering, Hydrogen Energy, Zero-Emission Vehicles, Robotics.

Most of the graduated students are working in reputed Industries and R&D Laboratories, while some are engaged in research in India and abroad.

Infrastructural Planning and Development

Renovation of the electrical wiring is being planned and supposedly it will be done by January 2025.

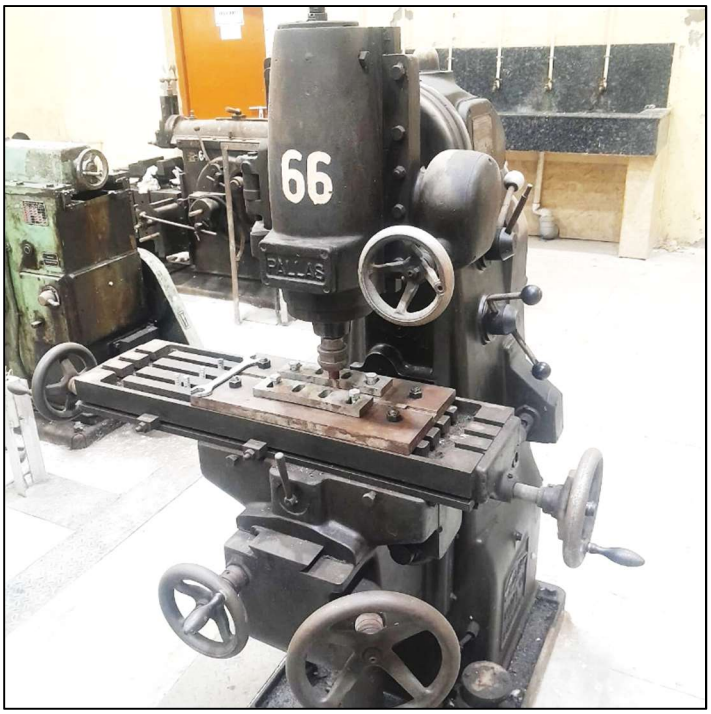
The faculty room, ME-310 has been interchanged with the PG Machine Design classroom.

Now the Department has a 'Ladies Toilet' in the second floor.

The Department has implemented 'Online Purchase Management Requisition System'

The department is preparing to set up a new Additive Manufacturing Lab.

Vertical Milling Machine, manufactured by Victoria Works, Victoria Road, London, located at IIEST Workshop is modified to a '*Friction Stir Welding Setup'*.



Alumni meet of the year 2024 was organized by the Office of the Dean, IRAA on 21st April 2024. It was attended by alumni of different batches and Departments.

Award ceremony was organized by the office of Dean IRAA on 21st April, 2024 in the Alumni Seminar Hall (IIEST, Shibpur).

Organized Tree Plantation Drive in the IIEST, Shibpur Campus sponsored by the 1989 alumni batch in the capacity of Dean, International Relations and Alumni Affairs (IRAA) on July 07, 2024

Conference/Workshop/Lecture Series

International Conference on Energy Resources and Technology for Sustainable Development (ICERTSD), which was huge success in 2013 and 2023, has been planned and approved for September 2025.

'P. C. Ganguly memorial Lecture Series' in the name of our eminent alumnus and funded by his family, has also been planned in 2025.

Research and Development

The department runs a full-time PhD program, where currently about 33 research scholars are engaged.

Sponsored Projects

Joint Research Project, Design, Fabrication and Testing of Functionally graded TPMS Scaffolds structure for biomedical implant and compact heat exchanger applications (TPN / 115112), INR 483000, Proposal for DST-JSPS Joint Research Project, submitted to INDIA-JAPAN Cooperative Science Programme (2025-27), Principal Investigator (India): Dr. Apurba Das, Co-I (India): Dr. Bidyut Pal, Principal Investigator (Japan): Prof. Kazuaki Inaba, Co-I (Japan): Prof. Kikuo Kishimoto, TPN/69976, Submitted on 07/09/2024, Submitted.

Consultancy Projects

Aritra Ganguly, Proposal to Design a Portable Solar Kit for Indian Railways in Freight segment, Consultancy Ongoing from Topgrip Instruments Limited.

A.Das, Approval of Design and Drawings for Ropeway at Naina Devi Ji Temple for Damodar Ropeways Ltd

A. Das, Design Vetting of Rigid Overhead Catenary System (ROCS), Consultancy for PPS International, Noida

A. Das, Comparative Study of Different Types of Welded Joints between Copper Flange and Seamless Copper Pipe, Consultancy for Austenite Engineers

A. Das. 13 Person Capacity Lifts At Plh Station In Connecting With Amrit Station Of Waltair Division, Consultancy for LT Elevators

Patents

Debabrata Dhupal, Subhadip Pradhan and Kanchan Kumari. APPARATUS FOR TEMPERATURE-CONTROLLED ABRASIVE MULTI-JET MACHINING. Application No. 202331068740. Filed on. 12-10-2023. Published on 12-01-2024. Institute affiliated to: IIEST Shibpur

Collaborations

Aritra Ganguly, Collaborative research work with Mechanical Engineering Department from IIT Madras. One PhD student registered there (myself as Co-supervisor) submitted his PhD thesis.

B.Pal. Imperial College London; IIT Delhi; IIT(ISM) Dhanbad; IIT Kharagpur; IIT Guwahati

Publications

Journal Publication

Subrata Mondal, Goutam Paul, Subhas Chandra Mondal, Koustov Mondol, Ziyauddin Seikh and Mukandar Sekh, Fabrication of Graphene Reinforced Aluminium Metal Matrix Composites for Advanced Tool Materials, accepted for publication, Journal of The Institution of Engineers (India): Series D SCOPUS, 2024

Vishwajeet Kumar; Subhas Chandra Mondal, Experimental Investigation and Optimization of WEDM Process Parameters for the Development of Ni?Based Hardfaced Turning Tool Insert Using Hybrid GA?CoCoSo Technique, J. Inst. Eng. India Ser. D, 2024

Sukhdev Gangwar; Subhas Chandra Mondal; Ajay Kumar; Ranjan Kumar Ghadai, Performance analysis and optimization of machining parameters using coated tungsten carbide cutting tool developed by novel S3P coating method, 10.1007/s12008-024-01852-9, International Journal on Interactive Design and Manufacturing (IJIDeM), Springer Publications, 2024

Subham Kundu; Subhas Chandra Mondal, Electro-thermal and mechanical property analysis of powder metallurgy processed, multi-stage ball milled aluminium-copper-multi walled carbon nanotube composite, 6 (2), DOI 10.1088/2631-8695/ad58a4, Engineering Research Express, 2024

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Sahoo, P.K. and Chatterjee, S., 2024. Effects and applications of non-resonant high-frequency excitation on nonlinear systems: a literature review. Nonlinear Dynamics, pp.1-60.

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Indranil Sinha, Ambarish Datta, Bijan Kumar Mandal,2024, Numerical Investigation on Energetic, Combustion, and Emissions Parameters of a Diesel Engine Fueled With Diesel/Butanol and Diesel/Pentanol,2024, ASME Journal of Thermal

Science and Engineering Applications, 16(8), 10.1115/1.4065489

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Sah, S., Sardar, S., Guha, A. and Das, D., 2024. Electrical discharge machining of hybrid metal matrix composites: a comprehensive review. The International Journal of Advanced Manufacturing Technology, 1-80.

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Animesh Talapatra, Debasis Datta, Experimental and Molecular Dynamics Simulation Based Investigation to Understand Tribological Performance of Graphene Reinforced Thermoplastic Polyurethane (Gr/TPU) Nanocomposites, 196, Tribology International, 2024

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Conference Proceedings

Gangwar Sukhdev, Ghadai, Ranjan Kumar, Mondal Subhas Chandra, and Gupta Mukul, A Comparative Study of MCDM Techniques for Optimizing CVD Process Parameters in SiCN Thin Film Coating Deposition., International Union of Materials Research Society International Conference In Asia (IUMRS-ICA 2024) at UGC-DAE Consortium for Scientific Research, Indore December, 2024

Maity, Arindam, Bhattacharyya, Bijoy, Mondal, S. C. and Doloi, B., Experimental Investigation into Jet Electrochemical Micromachining for Performance Improvement during Machining of Ti6Al4V, Proceedings in the 13th International Conference on Precision, Meso, Micro, and Nano Engineering, COPEN 13, at NIT Calicut during December 13-15, 2024

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Mukesh Kumar, Aritra Ganguly Proceedings of the 1st International Conference on Fluid, Thermal and Energy Analysis of Different Heating Rates on the Thermal Degradation of Chlorella Protothecoides Microalgal Bio-diesel Using Thermogravimetric Analysis (TGA)

Analysis of Different Heating Rates onthe Thermal Degradation of ChlorellaProtothecoides Microalgal BiodieselUsing Thermogravimetric Analysis (TGA) Mukesh Kumar, Aritra GangulyProceedings of the 1st International Conference on Fluid, Thermal and Energy.

Shitanshu Patra, Avishake Biswas, Sujai Boddana and Debasish Das*, Statistical and neural network modelling of tensile strength during friction stir welding of aerospace grade Aluminium alloys, 5th International Conference On Advanced Engineering Optimization Through Intelligent Techniques (AEOTIT) SVNIT Surat, Gujrat (28-30 Nov, 2024) [Hybrid Mode], 2024

Books

Gupta S, Ceby MS, Pal B, Chanda S, Mukherjee K (2024), Biomechanics of Joints and Implants: Concepts to Applications, 1st Edition, Springer Nature, Singapore, In Press (Submitted September 2024)

Book Chapters

Rwik Nag Biswas, Risha Giri, Aniket Prabhakar, Aritra Sreemany, Ranendra Roy, Bijan Kumar Mandal,

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Ghosh, S., Waste Heat Recovery from Fuel Cell. In Waste Heat Recovery, Its Utilization and Performance Assessment, Elsevier (In press)

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Outreach Activities

Invited Talks

B, Pal. ‘Design, development and analysis of orthopedic implants’ in an International Online Workshop on "Aeroelasticity, Biomechanics and Finite Element Analysis’ organized by the Department of Mechanical Engineering, IIT (ISM) Dhanbad, April 2024.

Industry Visit as Expert

A. Ganguly, Member of the expert committee constituted for the Breakdown investigation of a 500 KVA Kirloskar Make DG Set at S.N Bose National Centre for the Basic Sciences (An Autonomous Institute under Department of Science and Technology, Govt of India).

Achievements

Faculty Achievements

B, Pal. Joined as an Editorial Board Member of Scientific Reports, a Nature Portfolio journal published by Springer Nature, Sept 2024

D, Das obtained membership of Institution of Engineers (India), May 2024

Students Achievements

GAABESU Research Award: Poorva, Snehal and Abhishek

Higher Studies:

B. Sai Deepika	IIM Rohtak (MBA)
Samim molla	IIT Kharagpur (M. Tech. in Manufacturing Sciences)
Shankadeep Saha	IIT Kanpur (Direct Ph.D. on Robotics and Automation)
Shobhit Das	IIT Hyderabad (M. Tech. in Biomedical Engineering)
Shubhadeep Koley	University of Maryland (Ph.D. in Mechanical Engineering) Lehigh University (Ph.D. in Computer Science and Engg) Worcester Polytechnic Institute (MS in Robotics Engineering)
Prasoon Ravi	IIT Kanpur (M.Tech. in Aerospace Engineering)
Rituraj	IIT Kanpur (M. Tech. in Mechanical Engineering)
Parth Pravin Shinde	Macquarie University, Sydney (ME (Professional) in Mechatronics and Automation Engineering
Abhishek Rajput	IIT Kanpur (Direct Ph.D. in Mechanical Engineering)

GATE Rank:

Chandresh Patel	ME - 510 XE - 18
Prasoon Ravi	ME - 1186 XE - 197
Subhamoy Chataraj	XE - 245
Bagathi Prem Kumar	ME - 535 XE - 919
Rituraj	ME - 671 XE - 140
Shubra Ghosh	ME - 1288
Shobith Das	ME - 1664

Internship:

Subhadeep, Subhamoy and Prasoon	Surge
Shobhit	DAAD
Abhishek	IASc-INSA-NASI SRFP
Sowjanya and Rituraj	IIT Bombay
Samim	CSIR, Chennai

Students Corner

Society Activity

One day Industrial visit to Braithwaite & Co. Ltd accompanied by Dr. D. Das and Dr. M. Kumar

Speak Out for Engineers (SOfE):

Speak Out for Engineers (SOfE), organized by IMechE IIEST Shibpur in collaboration with the IMechE Young Member Panel India, is a prestigious public speaking competition that provides a platform for budding engineers to present technical topics. Participants deliver engaging and informative presentations, honing their communication skills and technical understanding. SOfE encourages students to articulate complex engineering concepts clearly and confidently, preparing them for real-world scenarios where effective communication is crucial. This event is a stepping stone for young engineers to gain recognition and build confidence in their professional journeys.

Yantra Search:

Yantra Search is a thrilling treasure hunt with a mechanical twist. Participants will solve puzzles and clues related to mechanical engineering concepts to find the hidden treasure. This event tests not only the participants' technical knowledge but also their problem-solving and teamwork skills, making it a perfect blend of fun and learning.

Death Race:

Death Race is a high-octane event where participants design and race their custom-built vehicles on a challenging track. The competition demands innovation, precision engineering, and speed, pushing the limits of both the machines and their creators. It's a test of design ingenuity and competitive spirit.

CADathon:

CADathon challenges participants to showcase their skills in computer-aided design (CAD). They will be given real-world engineering problems to solve using CAD software, testing their creativity, technical prowess, and ability to apply theoretical knowledge to practical scenarios.

Scrap Yard:

Scrap Yard is an innovative event where participants are given scrap materials and tasked with creating functional mechanical devices. This event encourages creativity, sustainability, and engineering acumen, as teams repurpose waste into useful machines, demonstrating the essence of mechanical engineering.

Heatovation:

Heatovation is an intense competition focused on thermal engineering. Participants must solve complex heat transfer problems and design innovative solutions to real-world thermal challenges. This event is perfect for those passionate about thermodynamics and its applications in various industries.

Drone Pursuit:

Drone Pursuit is an exciting event where participants design, build, and manoeuvre drones through an obstacle course. This event tests their understanding of aerodynamics, control systems, and real-time problem-solving abilities, all while navigating a challenging and dynamic environment.

IQ Ignition:

IQ Ignition is a quiz competition designed to ignite the intellect of participants. Covering a broad spectrum of mechanical engineering topics, this event assesses their depth of knowledge, quick thinking, and decision-making under pressure, making it a favorite among quiz enthusiasts.

BEing Memory:

BeING Memory is a heartwarming event that invites students to capture and share their cherished memories associated with the institute's iconic monuments. Participants submit a photograph of a significant monument within the campus along with a brief story or memory linked to it. This event fosters nostalgia, community bonding, and a deeper appreciation of the institute's rich heritage, creating a tapestry of shared experiences for all to enjoy.

Sharq Tank:

Sharq Tank, organized by ASME IIEST, is a dynamic platform where aspiring student entrepreneurs pitch their innovative startup ideas to a panel of professors and a student jury. This event aims to cultivate entrepreneurial spirit, critical thinking, and effective communication. Participants receive constructive feedback, mentorship, and the opportunity to refine their business concepts. Sharq Tank not only ignites creativity but also paves the way for the next generation of innovators to turn their ideas into reality.

Chai Par Charcha:

Chai Par Charcha, organized by ASME IIEST, is an engaging event where students gather over cups of chai to discuss trending news and current events. This informal discussion platform encourages the exchange of ideas, fosters critical thinking, and enhances general awareness. Guided by a mentor(students), the session

offers a relaxed atmosphere for participants to debate, reflect, and stay informed about the world around them, all while building a sense of community.

Truss Me:

Truss Me, organized by IMechE IIEST, is an exciting hands-on event where students design and build truss bridges using popsicle sticks. This challenge tests participants' understanding of structural mechanics, creativity, and teamwork as they construct bridges capable of bearing maximum load. Truss Me offers a fun and educational experience, allowing students to apply theoretical knowledge to practical design while competing for the strongest and innovative bridge.

Create and Design:

Create and Design, organized by IMechE IIEST, is a competitive CAD event where students showcase their proficiency in computer-aided design. Participants are challenged to create innovative and precise designs based on real-world engineering problems. This event fosters creativity, technical skill, and attention to detail, providing an excellent platform for budding engineers to demonstrate their design capabilities and push the boundaries of their imagination.

Prashnawali:

Prashnawali, organized by ASME IIEST, is an exhilarating quiz competition that tests participants' knowledge across various domains of mechanical engineering and general awareness. This fast-paced event challenges students to think on their feet, enhancing their problem-solving abilities and intellectual agility. Prashnawali provides a stimulating environment for learning, competition, and camaraderie, making it a favorite among quiz enthusiasts eager to showcase their expertise and quick thinking.

Teacher's Day Celebration:

The Teacher's Day Celebration, organized by SME IIEST, is a heartfelt event dedicated to honoring the dedication and contributions of the faculty members. This celebration includes a series of activities, performances, and tributes by students, expressing their gratitude and appreciation. The event fosters a sense of respect and camaraderie between students and teachers, creating a joyful and memorable occasion that strengthens the bond within the academic community.

Students Talk

Indian Temple Architecture: Subtractive Manufacturing Marvels of Ancient India

Introduction

Indian ancient technological marvels, such as the Kailasa Temple, showcase the richness and advancement of the ancient Indian education system. In contrast, we are now in an era where the present education system produces half a million engineers every year, yet 63% of them are employed in sectors where an engineering degree is not required. Shockingly, a recent employability report has found that over 80% of engineers in India are unemployable due to a lack of the technological skills demanded by employers. Despite significant technological advancements, the buildings we construct today have a

much shorter lifespan compared to those built in ancient times. While modern technology is focused on making things smarter, it often fails to ensure sustainability and durability.

With this context, we will delve into the temple architecture of India, exploring the ingenuity, sustainability, and enduring legacy of these ancient constructions.

Kailasa Temple: A Technological Marvel

Firstly, let us explore the technology and engineering skills employed in the construction of the Kailasa Temple, which was carved out of a single monolithic rock. This architectural marvel exemplifies such precision and intricacy that, even with modern technological advancements, replicating it would require immense effort and resources, and we could not guarantee the same level of accuracy in each sculpture.

The temple, built during the 8th century CE under the Rashtrakuta king Krishna I, involved the excavation of approximately 200,000 tons of basalt rock. The construction employed a top-down carving technique, a method chosen to ensure structural stability as the work progressed. This approach minimized the risk of proportionality and alignment of the entire structure.

To achieve this, ancient engineers used advanced tools such as iron chisels, hammers, and picks. The precision of the carvings indicates the use of templates or proportional guidelines for complex designs, especially collapse and allowed artisans to maintain the in the intricate sculptures and carvings that adorn the temple. The symmetrical layout, including the towering Shikhara, elaborate courtyards, and finely detailed sculptures, demonstrates the builders' deep understanding of geometry and structural engineering principles. Additionally, the temple's drainage system, designed to channel rainwater efficiently away from the structure, reflects the functional aspects of its engineering. The ability to integrate aesthetics, functionality, and sustainability into a single rock-cut structure speaks volumes about the technological ingenuity and artistic sophistication of the time.

Engineering Skills and Techniques

The engineering skills employed in the construction of the Kailasa Temple and other rock-cut structures demonstrate an advanced understanding of:

1. Structural Stability: The top-down carving technique ensured that the temple's structural integrity was maintained throughout the construction process. By starting from the top and moving downward, engineers minimized the risk of collapse and achieved proportional precision in their designs.

2. Material Properties: The choice of basalt rock for its durability and workability was a testament to the knowledge of materials science. Basalt's strength allowed intricate carvings to be preserved over centuries.

3. Mathematical Precision: The layout of the temple demonstrates the use of advanced geometry. Symmetrical alignment of sculptures and architectural elements points to detailed planning and execution.

4. Resource Management: The excavation of 200,000 tons of rock would have required meticulous planning and coordination of labor. The workforce included

skilled artisans, laborers, and architects, each contributing to this monumental project.

Other Rock-Cut Temple Marvels

● *Ajanta and Ellora Caves (Maharashtra):* The Ajanta caves, primarily Buddhist monasteries and chaityas (prayer halls), feature intricate frescoes complementing the architectural design. The Ellora caves, which house Hindu, Buddhist, and Jain shrines, showcase diverse styles, with each carving exuding religious symbolism and artistic brilliance.

● *Mahabalipuram (Tamil Nadu):* Mahabalipuram's Pancha Rathas (Five Chariots) are monolithic temples carved from single granite rocks. The Shore Temple, though primarily a structural temple, reflects the influence of rock-cut architectural techniques. The site's intricate carvings and unique designs exemplify the architectural ingenuity of the Pallava dynasty.

● *Udayagiri and Khandagiri Caves (Odisha):* These caves represent early Jain rock-cut architecture. The simplicity of their design, combined with their functionality, highlights the resourcefulness of the artisans of that era.

● *Elephanta Caves (Maharashtra):* The Elephanta Caves, dedicated to Lord Shiva, are another fine example of subtractive manufacturing. The Trimurti sculpture within the caves is a stunning representation of artistic mastery and engineering skill.

Lessons from Ancient Architectur

The marvels of Indian temple architecture offer several lessons for modern construction and engineering:

● *Durability:* Ancient structures like the Kailasa Temple have withstood the test of time, unlike many modern buildings that deteriorate within decades. This highlights the importance of material selection and design focused on longevity.

● *Sustainability:* The integration of functionality, aesthetics, and environmental considerations in ancient designs serves as a model for sustainable construction practices.

● *Innovation:* The advanced techniques and tools used in ancient India underscore the value of innovation driven by necessity and resource optimization.

India's Demographic Dividend and Path to the Future

Inspired by the marvel of the Kailasa Temple, it is time for India to rise to lead the world in technological innovation. The country's demographic dividend presents an unparalleled advantage: 65% of Indians are under 35, 50% are under 25, and 287 million individuals fall between the ages of 10 and 22. As the global population ages, India remains youthful, offering a workforce ready to shape the future.

By harnessing this immense potential and integrating the ancient technological ingenuity of our ancestors with modern advancements, India has the opportunity to transform itself into a first-world nation. Aligning the capabilities of our young population with sustainable and innovative practices could position India as a global leader in technology and engineering.

Conclusion

The temple architecture of ancient India, epitomized by the Kailasa Temple and other rock-cut marvels, reflects a remarkable confluence of art, engineering, and sustainability.

These structures serve as enduring testaments to the advanced knowledge and skills of their creators. In a world where modern technology often prioritizes convenience over durability, the lessons of ancient Indian architecture remain profoundly relevant.

As India moves forward, it must draw inspiration from these ancient achievements. By leveraging its youthful

workforce and aligning technological advancements with the timeless principles of sustainability and innovation, India can carve its path toward a prosperous future, echoing the brilliance of its architectural heritage.

– Siddamallah Harshabardhan
4th Year

Alumni Speaks

My Days at B. E. College (IIEST Shibpur)

Part - I

I joined Mechanical Engineering Department at B. E. College (IIEST Shibpur) in 1957 after passing I.Sc. from Presidency College, Calcutta. In our year the majority of first twenty rankers in I.Sc. was from Presidency College, Calcutta. I had the option of joining Medical College or Mechanical Engineering Department at Jadavpur University. I ranked 2nd at JU entrance depending on my I.Sc. results. There were only two scholarships available at JU at that time. I met Late P C V Mallick the renowned educationist and VC of JU at that time. He said that if there is any other candidate more deserving than me, he will get the scholarship,

I passed my I.Sc. Exam in 1957. Entrance to JU and Medical College in those days were governed by the results of I.Sc. Exam of Calcutta University. My name was at the top in the entrance list in the notice board of Calcutta Medical College in 1957. However in B. E. College there was a separate entrance examination including a drawing paper. The entrance exam took place at the B. E. College campus. For the drawing exam a candidate has to bring his own drawing board during the exam. In our times there were about 5000 students sitting for the entrance exam at BEC. The intake was about 300 students for BE (Civil, 100 in two sections, Mechanical & Electrical, about 50 each, Mining, Metallurgy, Architecture the rest).

As per the entrance notice at BEC, I ranked 4th, and was assured by the exam department that I will get a scholarship. In those days at BEC, there were 10 merit scholarships and another 10 for merit cum maintenance scholarships. The earnings of my family would not permit me to study without some scholarship. A scholar need not pay the tuition fees which was ₹25 per month. In addition he will get ₹50 per month as scholarship. However the problem of the scholarships distribution was that the total scholarship of ₹600 for twelve months was paid one time almost at the end of the season. The scholarship will be available to the scholar only if he passes all the papers in the bi yearly exams. I was lucky enough to receive the scholarship for all the four years. Our BE course at that time was of four year duration.

Staying in the designated hostels was compulsory for all students. All students including scholars have to pay the mess fees which was about ₹33 per month including both lunch and dinner. Cost of breakfast and afternoon snacks from floor boy was about ₹12 to ₹15 per month for my standard of consumption, which was the majority, it could go up to ₹30 for healthier eaters. Some of the students with home at Calcutta will positively get back to home every week end. However I used to return home every second or third week to save money.

Since the total scholarship of ₹600 for twelve months was paid one time almost at the end of the season, we had to take about ₹50 from our parents each month, for the mess fees etc. However when total scholarship of ₹600 was given to us, we somehow managed to appropriate a portion of that money for our expenses like cigarette etc. And the rest was returned to our parents. I do not smoke now, which habit I had discontinued from 1970s onwards. Smoking is very

bad for the health. I caught the habit of smoking during my school days at Bhutnath Mahamaya Institution in Kamardanga, which was situated in bustee area. At BEC I used to buy one Charminar cigarette cartoon having 50 nr packs containing 10 sticks each at a cost of ₹9 per cartoon. All my friends knew that at the end of dinner, at least one smoke will be available at my room.

One of the boarders were selected mess manager for a month. Each one of the boarders has to do a mess duty for a day at the hostel. The mess duty means supervising the issue of the requisite food raw materials like rice, atta, lentils, onions etc. from the store, inspection of the greens and fish supplied by the contractor and supervision of the goat meat slaughtered at one outside corner of the kitchen. For attending mess duty the student will be granted one day leave from attending the classes. Fish was for the day time lunch and small quantity of meat for the dinner at night. Rice, lentils and vegetable was for the taking, but non-veg item was supplied in a small earthen container, or the cook will deliver to each plate required small quantity only. Some were completely vegetarian, they will receive curd in lieu of fish etc. Each month there will be a grand feast. One stick of Wills Cigarette was given to each boarder at the end of the feast by the mess manager of the day. There was booking by a friend from each of the non-smokers.

Failing in the class weekly test was quite common. The pass mark was 50%. If a student got less than 50% in any weekly test a warning letter was sent to his guardian. The language of the warning letter was very severe. Like if your ward does not improve he will be thrown out of the college. I had received one or two such love letters. It was very difficult to convince my parents to disregard the letter. There was CNR meaning Can Not Repeat. A student will continue in the same year if he fails in the final exam for that year. CNR will be issued to a student for failing twice in the annual exam for any year.

To be continued…

(Above writing is all from memory, which is about 68 years back. There could be mistakes in the above writing. In the above 'me and I' had come to many times. I am sorry for that. However I do not know how to write about our time without such mentions.)

– Achyut Ghosh
(B.E., 1957-61)

- End -