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CIVILOHOLIC

BY DEPARTMENT OF CIVIL ENGINEERING

VOLUME 2

DR. B.C. ROY ENGNIEERING COLLEGE
DURGAPUR

Editor's Message

Dear Readers,

Its gives us immense pleasure to announce the second edition of our E-magazine "**CIVILOHOLIC**" of the Department of Civil Engineering of Dr. B. C. Roy Engineering College, Durgapur. We are proud and hopeful that the magazine would surely unfold the most innovative ideas of the students and the faculty members of our organization.

The magazine is to be viewed as a launch pad for the student's creative urges to blossom naturally. As the saying goes, mind like parachute works best when opened. This humble initiative is to set the bored and budding minds free allowing them to roam freely in the realm of imagination and experience. The enthusiastic work of our young writers and experienced faculty members are undoubtedly sufficient to hold the interest and admiration of the readers. We believe that success depends on the power to observe, perceive and explore. The magazine comprises contents related to technical aspects of Civil Engineering as well as poems, photography etc. We are sure that the hard work, positive attitude, continued relentless efforts and inventive ideas exhibited by our students to bring excellence to this treasure of trove would surely stir the mind of the readers.

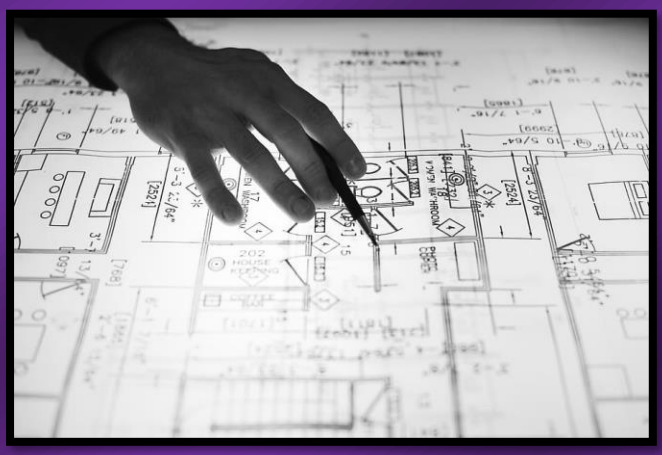
The herculean task of editing this magazine would not have been possible without the sincere support of *Prof.* **Koyndrik Bhattacharjee,** *Prof.* **Anupam Biswas** and student editorial team of 2nd year students **Shubhasis Paul, Subir Ghosh & Ankita Dhar**. It is a fine thing to have the ability but the ability to discover ability in others is the true test. I am thankful to all my co-editors who dipped in the turbulent water of the magazine and sailed it to the shore of publication. I am thankful to our *Head of the Department* **Dr. Sanjay Sengupta**, to give me the opportunity to be the editor of this magazine. Also I am thankful to Dr. Sanjay S. Pawar (Principal), Dr. K. M.Hossain(Vice-Principal), Mrs.R.Mitra(Registrar) and Dr. N.N. Pathak(Dean Students' Welfare) for their continuous support. I heartily wish all the readers my best wishes and hope this magazine will enjoy your critical acclaim and prove itself best.

Subhashis Chowdhury

Editor

Assistant Professor,Civil Engineering

CIVIL ENGINEERING DEPARTMENT



VISION

To transform the department into a global center of learning through synergic application of understanding, creativity, innovation and discipline.

MISSION

Our core mission is to educate, inside and outside the classroom to achieve excellence in education and train the leaders of tomorrow.
Our undergraduate degree programme aims to provide a great platform for learning by offering variety of subject choices covering broad/frontier areas of civil engineering.

OVERVIEW

Civil engineers shape the physical environment from the cities and buildings we live in, the way we travel such as the highway networks, bridges, railways, tunnels, the dams and water systems, the power plants and transmission towers, and what not. Civil Engineering is a profession wherein the knowledge of mathematical and physical sciences, gained through the study and experiments, are applied to utilize economically the materials and forces of nature in the design & construction of appealing, functional and safe structures for the progressive wellbeing of humanity.

LABORATORIES

- **Solid Mechanics Lab**
- **Surveying and Geometrics**
- **Fluid Mechanics Lab**
- **Engineering Geology Lab**
- **Soil Mechanics Lab**
- **Concrete Technology Lab**
- **Computer Aided Drawing Lab**
- **Water Resource Engineering Lab**
- **Environmental Engineering Lab**
- **Material Testing Lab**
- **Highway & Transportation Engg. Lab**

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Prof. **Koyndrik Bhattacharjee**
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Prof. **Subhashis Chowdhury**
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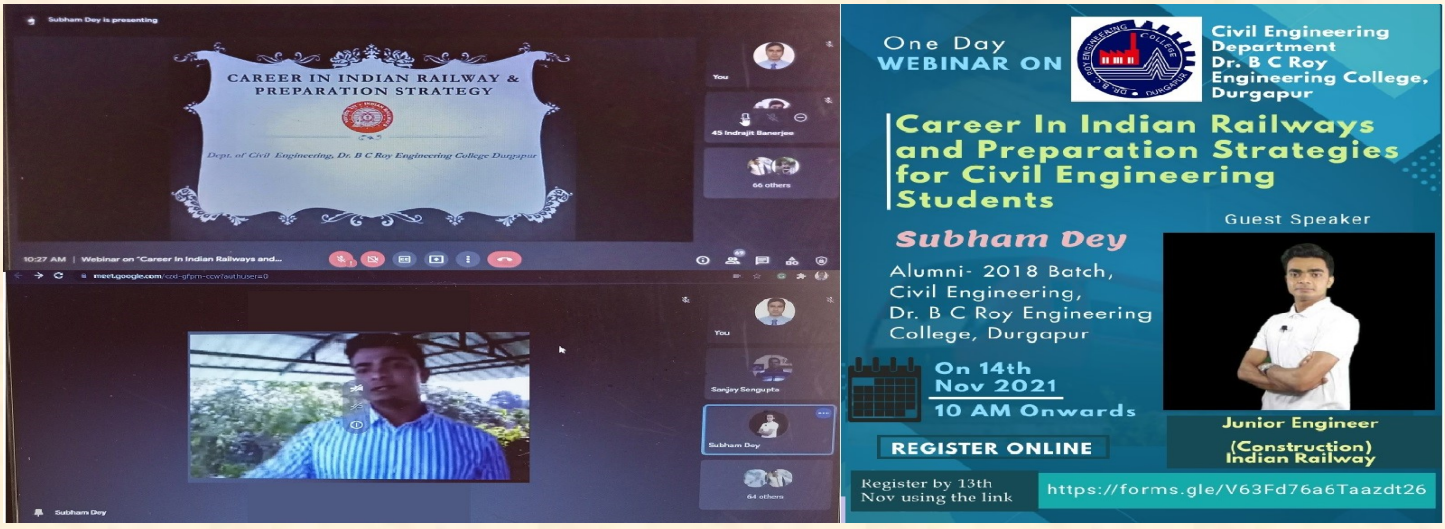
EDITOR and DESIGNER
2ND YEAR

SUBIR GHOSH
CO - EDITOR
2ND YEAR

ANKITA DHAR
CO - EDITOR
2ND YEAR

Events Throwback 2021-22

The webinar was organized on 1st of October, 2021 from 03:30 pm in Google meet virtual application. Mr. Trishit Chandra, our alumni of 2015-2019 batch has completed his M.Tech on Structural Engineering from NIT Kurukshetra and now pursuing his Ph.D. from IIT Chennai. He fabulously explained the nature of study, that one final year student should follow for their higher study perspective and guided them to understand different subjects and sub-brunches for a research purpose.



The resource person of the Webinar Mr. Subham Dey, Junior Engineer (Construction) Indian Railway, was Alumni of the 2014-2018 Batch CE Dept BCREC. In the webinar the overview of Indian Railways was given where different departments and recruiting competitive exams were discussed, the subjects and syllabus for the competitive exam for railways was discussed. Afterwards, the topics which need to be stressed for the

competition were reviewed; resource person interacted with students and cleared a lot of doubt regarding preparation strategies for competitive exams like RRB.

A One-Day Workshop on "Building Information Modelling using Revit" held on 19th February, 2022.

Industry expert Mr. Matindra Bera (Member, Indian BIM Association), a BIM Professional & Consultant, had shared his valuable experience with the participants. The event took place in the Seminar Hall of the Department.

Inspiring Engineers

Rajagopalan Vasudevan, is an Indian scientist who has worked mainly in waste management. He developed an innovative method to reuse plastic waste to construct better, more durable and very cost-effective roads.

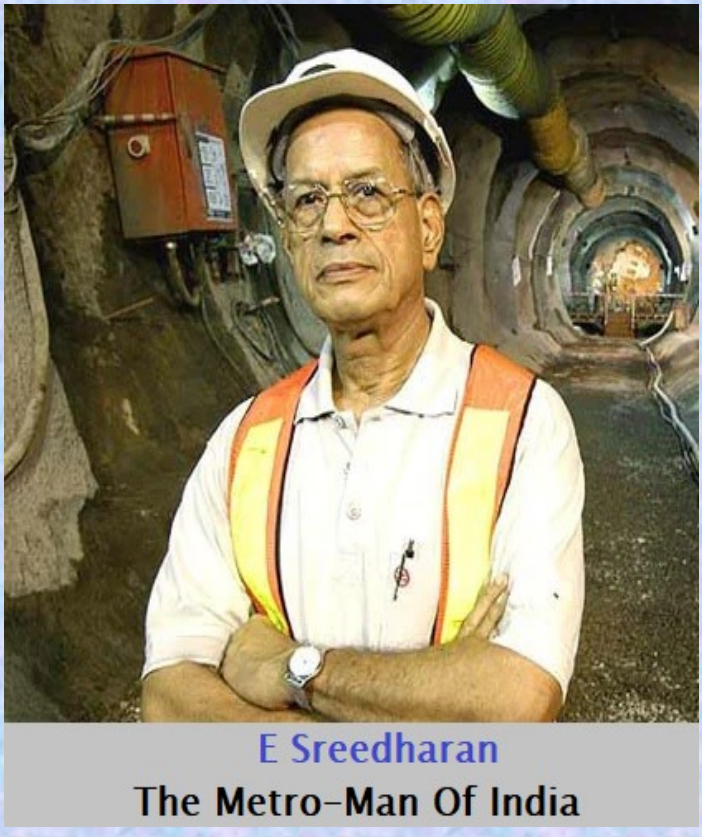
He thought up the idea of shredding plastic waste, mixing it with bitumen and using the polymerized mix in road construction. This method will help in making roads much faster and also will save environment from dangerous plastic waste.

The roads also show greater resistance to damages caused by heavy rains. His road construction method is now widely used to construct roads in rural India. He was awarded India's fourth highest civilian honour Padma Shri in 2018.

Elattuvalapil Sreedharan is an Indian engineer from Kerala. He is credited with changing the face of public transport in India with his leadership in building the Konkan Railway and the Delhi Metro while he served as the managing director of Delhi Metro Rail Corporation between 1995 and 2012.

In December 1964, a cyclone washed away parts of Pamban Bridge that connected Rameswaram to mainland Tamil Nadu. The Railways set a target of six months for the bridge to be repaired while Sreedharan's boss, under whose jurisdiction the bridge came, reduced it to three months. Sreedharan was put in-charge of the execution and he restored the bridge in just 46 days. The *Railway minister's Award* was given to him in recognition of this achievement.

In 1970, as the deputy chief engineer, he was put in charge of the implementation, planning and design of the Calcutta metro, the first ever metro in India.



Chewang Norphel (born 1935) is an Indian Civil Engineer from Ladakh, who has built 15 artificial glaciers. He has earned the nickname *Ice Man*.

In 1996, Norphel joined the *Leh Nutrition Project*, a non-governmental organisation, as project manager for watershed development.

Norphel noticed a small stream had frozen solid under the shade of a group of poplar trees, though it flowed freely elsewhere in his yard. He realized the reason for this phenomenon: the flowing water was moving too quickly to freeze, while the sluggish trickle of water beneath the trees was slow enough to freeze. Based on this, he created artificial glaciers by diverting a river into a valley, slowing the stream by constructing checks. The artificial glaciers increase the ground-water recharge, rejuvenating the spring and providing water for irrigation. He constructed them at lower elevations, so that they melt earlier, expanding the growing season.

By 2012, Norphel had built 12 artificial glaciers. Norphel's largest glacier is the one at the Phuktsey village.It is 1,000 ft long, 150 ft wide and 4 ft in depth. It can supply water for the entire village of 700 people and cost Rs 90,000 to make.

Documentary film-maker Aarti Shrivastava also directed a short film on his life titled *White Knight*, which was screened at film festivals in India and abroad.

Transmission Line Foundation work

"Foundation work safety procedures planning and methods"

By-kumari Amisha Das
Roll no_12001321018
1st year civil engineering students
of Dr B.C Roy Engineering College Durgapur

Articles-

Poem & Story-

Drawing & Photography-

ARTICLES

What is Civil Engineering

INTRODUCTION:- **Civil engineering is a professional engineering discipline that deals with the design, construction, and maintenance of the physical and naturally built environment, including public works such as roads, bridges, canals, dams, airports, sewage systems, pipelines, structural components of buildings, and railways.**

ARCHITECHTURE ENGINEERING :- Architectural engineering, also known as building engineering or architecture engineering, is an engineering discipline that deals with the technological aspects and multi-disciplinary approach to planning, design, construction and operation of buildings, such as analysis and integrated design of environmental systems (energy conservation, HVAC, plumbing, lighting, fire protection, acoustics, vertical and horizontal transportation, electrical power systems), structural systems, behaviour and properties of building components and materials,

PROFESSION:- *Engineering has been an aspect of life since the beginnings of human existence. The earliest practice of civil engineering may have commenced between 4000 and 2000 BC in ancient Egypt, the Indus Valley Civilization, and Mesopotamia (ancient Iraq) when humans started to abandon a nomadic existence, creating a need for the construction of shelter. During this time, transportation became increasingly important leading to the development of the wheel and sailin.*

In 1818 the Institution of Civil Engineers was founded in London, and in 1820 the eminent engineer Thomas Telford became its first president. The institution received a Royal Charter in 1828, formally recognising civil engineering as a profession. Its charter defined civil engineering as:

the art of directing the great sources of power in nature for the use and convenience of man, as the means of production and of traffic in states, both for external and internal trade, as applied in the construction of roads, bridges, aqueducts, canals, river navigation and docks for internal intercourse and exchange, and in the construction of ports, harbours, moles, breakwaters and lighthouses, and in the art of navigation by artificial power for the purposes of commerce, and in the construction and application of machinery, and in the drainage of cities and towns

EDUCATION: - Civil engineers typically possess an academic degree in civil engineering. The length of study is three to five years, and the completed degree is designated as a bachelor of technology, or a bachelor of engineering. The curriculum generally includes classes in physics, mathematics,

project management, design and specific topics in civil engineering. After taking basic courses in most sub-disciplines of civil engineering, they move on to specialize in one or more sub-disciplines at advanced levels. While an undergraduate degree (BEng/BSc) normally provides successful students with industry-accredited qualification, some academic institutions offer post-graduate degrees (MEng/MSc), which allow students to further specialize in their particular area of interest.

STRUCTURAL ENGINEERING:- Structural engineering is a sub-discipline of civil engineering in which structural engineers are trained to design the 'bones and muscles' that create the form and shape of man-made structures. Structural engineers also must understand and calculate the stability, strength, rigidity and earthquake-susceptibility of built structures for buildings and nonbuilding structures. The structural designs are integrated with those of other designers such as architects and building services engineer and often supervise the construction of projects by contractors on site. They can also be involved in the design of machinery, medical equipment, and vehicles where structural integrity affects functioning and safety. See glossary of structural engineering

AIHIK MAHINDER

1st Year, CIVIL ENGINEERING

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A **theodolite** is a precision optical instrument for measuring angles between designated visible points in the horizontal and vertical planes. The traditional use has been for land surveying, but it is also used extensively for building and infrastructure construction, and some specialized applications such as meteorology and rocket launching.

It consists of a moveable telescope mounted so it can rotate around horizontal and vertical axes and provide angular readouts. These indicate the orientation of the telescope, and are used to relate the first point sighted through the telescope to subsequent sightings of other points from the same theodolite position. These angles can be measured with accuracies down to micro radians or seconds of arc. From these readings a plan can be drawn, or objects can be positioned in accordance with an existing plan. The modern theodolite has evolved into what is known as a total station where angles and distances are measured electronically, and are read directly to computer memory.

In a transit theodolite, the telescope is short enough to rotate about the trunnion axis, turning the telescope through the vertical plane through the zenith; for non-transit instruments vertical rotation is restricted to a limited arc.

The optical level is sometimes mistaken for a theodolite, but it does not measure vertical angles, and is used only for leveling on a horizontal plane (though often combined with medium accuracy horizontal range and direction measurements).

Dumpy Level is a surveyor's level with a short telescope rigidly fixed and rotating only in a horizontal plane.
It is widely used in surveying and construction to measure height differences and to transfer, measure, and set heights of known objects or marks. It is also known as a Surveyor's level, Builder's level, Dumpy level or the historic "Y" level.
The primary advantage of using the Dumpy level over other leveling instruments is its greater accuracy. For most Tacheometric methods, a dumpy level is known for high precision values. A dumpy level's accuracy can be as high as 1:4000 for every 100 meters.
In a dumpy level, there are only two adjustments as the telescope is rigidly fixed to the spindle. 1. The axis of the bubble tube should be perpendicular to the vertical axis 2. The line of collimation should be parallel to the axis of the bubble tube.
The dumpy level instrument is set up on the top of the tripod. Foot screw is used to screw the device tightly on the tripod. As the level head is very sensitive, special care is required in this step. To work properly, it is very important to make the dumpy level completely horizontal.

SUBHAJIT DANDAPAT

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CE; 2ND YEAR

PRECAST CONCRETE TECHNOLOGY

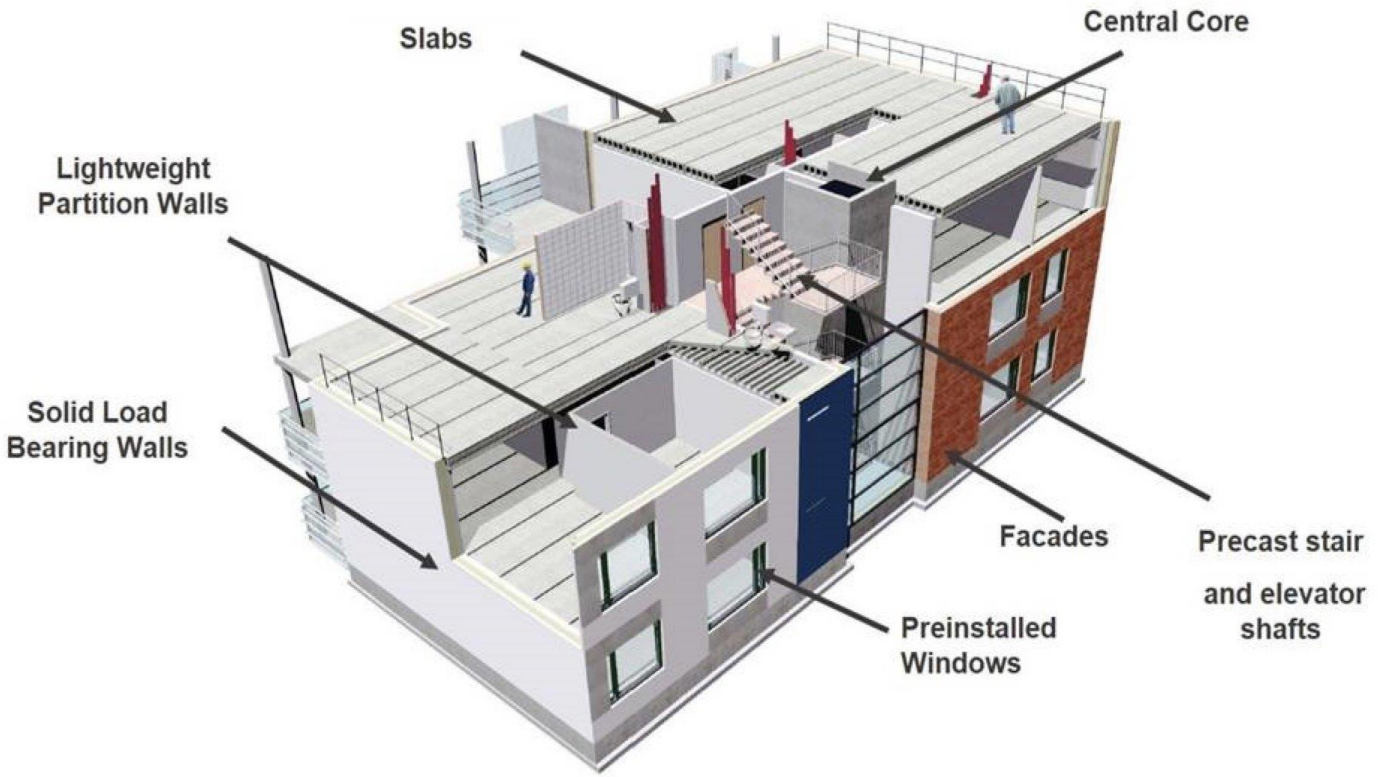
As the construction & Real Estate Sector in India & several countries booming rapidly .Today, we can see that the Indian& International construction majors are adopting precast concrete technology in constructing their latest projects. Precast concrete technology is a durable and versatile technology for construction. In this technology the different elements or panels of concrete are produced under strict quality control measures in state of the art factories by highly trained personnel, with virtually no wastage. There are dedicated precast factories which serve produce for multiple construction projects as well as on-site precast factories which serve a particular construction project.

Precast concrete technology consists of custom-designed precast concrete elements such as: roof slabs,

- beams
- columns
- wall panels
- partition walls
- load bearing walls

facades

- preinstalled windows
- staircases
- central core



These elements offer flexibility in size and shape with a variety of surface finishes and colour options. With precast concrete technology, the developers have a world of creative possibilities in application and design. Precast concrete technology also offers an abundance of choice for the engineers and architects to build unique high quality buildings.

In precast concrete technology, the precast elements are manufactured or cast in strictly controlled environment with state of the art machinery by the experts. These elements are then erected on the site with the help of the cranes. Then the precast elements are joined together as per specification with grouts and screed to provide the required strength and rigidity to the structure.

Key factors which are enabling the growth of precast concrete technology in India are:

- quality
- speed of construction
- value-for-money
- avoiding large labour force on site
- almost 1/3rd less delivery time than the conventional methods
- delivering quality products
- large spans can be achieved using prestressed elements

It is estimated that the precast concrete technology can save up to 64% of the time taken for similar projects using the old and traditional construction methods and technology

The following practical considerations make precast concrete technology the best choice for almost all types of construction projects:

- wastage-control
- speed of construction
- best of quality
- virtually no repair or reworking cost

There is a great potential in the Indian market to become a major hub for the precast concrete technology across the globe.

Ankur Ghosh

1st Year, Civil Dept.

Dr. B.C. Roy Engineering College

ARTICLE

LIGHT EMITTING CONCRETE

Concrete is the world's most widely used construction material due to its versatility, durability, sustainability, and economy. Concrete is a mixture of aggregates (sand + gravel or crushed stone) held together by a binder of cementitious paste, typically made up of Portland cement and water. It may also contain supplementary cementing materials (SCMs), such as fly ash or slag cement, and chemical admixtures.

Light-emitting cement is a green construction material designed to illuminate highways, roads, and bicycle lanes without using electricity. Light-emitting cement absorbs solar energy during the day and radiates light at night. This innovative cement was developed by Dr. Jose Carlos Rubio from the Michoacan University of Saint Nicholas of Hidalgo in Mexico. The research focused on modifying the microstructure of cement to absorb solar energy and emit light in darkness.

How that concrete made:

The light emitting concrete composition comprises light-emitting pigments. The light emitting pigments include a titanium powder, a sulphide powder and resins, cement, sand, gravel and water. The method of synthesizing a light emitting concrete structure comprises preparing slurry. The slurry is prepared by mixing sand, gravel, cement and water. Further, a light emitting pigment mixture is prepared. The light emitting pigment mixture is prepared by mixing a titanium powder, resins and a sulphide powder. The light-emitting pigment mixture is added to the slurry. The slurry is molded by adding the slurry in molds. The molds are further kept at a temperature of 15-20° C. for at least 12-14 hours. The slurry is cured at a temperature of less than 30° C. for 24 hours.

Is it Green Material?

Yes, it is environmentally friendly because the gel is made out of sand, dust, clay and water. The material has an estimated life span of 100 years because of the inorganic nature of the cement components. This new material is sun-resistant and more durable compared with other phosphorescent materials like plastics or paints, which decay with UV rays in the long run.The waste produced during the process is very less and helps in reducing energy consumptions shaping for a better future. The innovations of technologies to the next level don't stop in the construction industry. Scientists and Researchers are developing more reliable and eco-friendly construction products to make the lives of future generations easier

Advantages of light emitting concrete:

- The material is sustainable since it is formed by condensation of silicates usually found in clay, sand, or dust.
- The process is ecofriendly as the only gas released during manufacturing is water vapor.
- The cement is said to have a life span of 100 years and is being fabricated to emit green or blue light.
- The cement has the power to remain lit for about 12 hours after dark.
- The level of brightness can be adjusted during production.
- The cement is inorganic, and its material components are recyclable.
- It could reduce the overhead costs of decorating homes.

Disadvantage of Light emitting concrete:

- Cement is an opaque body that does not allow light to pass into its interior
- Although it is manufactured like ordinary cement, the change in the microscopic structure needed to make it glow modifies the structural properties of the material. It may not have the same applications as the ordinary cement and is intended to be used on surfaces as a coating material.

Conclusion:

The light-emitting concrete has garnered the attention of several countries, which shows the commercial demand for the material. Currently, the research is being carried out to move into a commercialization stage. The inclusion of light-emitting cement with plaster and other construction products is also under research and development.

Image Source: Internet

By: Rohit Prasad Mondal
Roll no.: 12001320054
Department of Civil Engineering (3rd year)

Evaluating/Assessing Student's learning

A vital reason why students join in a school or a university is so that they can "learn". It is the hope that the learning will prove to be useful in their career.

How can students and faculty members then measure how well the students are learning? The answer is assessment. The dictionary defines "assessment" as the process of measuring or evaluating something. What if that something is education? When a student joins a college/university/institute, he/she does the prescribed work according to the curriculum and ultimately gets a degree/diploma.

Now the all important question is the following what does getting that degree/diploma mean? In other words, how is a graduate of any university defined? What does it mean to be a graduate? What is the skill set that a "BCREC" graduate needs to possess when he/she enters the work force or pursues post graduate education? What are the goals and objectives of a university education? More importantly, how does the university ensure that each and every one of its graduates are meeting and exceeding those goals? These are just some of the questions that academic assessment attempts to answer. In a nutshell, academic assessment aims to measure student learning.

One of the major ways in which students learn at the university level is by taking various courses. Doing assessment at the course level amounts to creating a list of goals and objectives for the course. Although they are related, there is a difference between a goal and an objective. What is that difference? A goal is broad whereas an objective is narrow. A goal is abstract whereas an objective is more concrete. Let's consider the following example:

Goal: To learn how to be a good car driver.

Objectives:

1. To watch for people and other vehicles on the road.
2. To stop when the traffic light is red.
3. To push the accelerator when one wants to increase the speed.
4. And so on.

Goals: To provide all students with the skills and education in order

1. To be successful in the professional world.
2. To pursue graduate studies.
3. To make a positive impact on the society.

Here, we have three goals. Each goal can have one or more associated objectives. By fulfilling the associated objectives, a specific goal can be met.

Objectives for goal 1 (success in the professional world)

1. To work on real-life projects that has relevance to the industry.
2. To do one more internships in government/private organizations.
3. To maintain a good grade point average.
4. To be well versed with the various subjects associated with the branch

Objectives for goal 2 (pursue graduate studies)

1. To ensure that all the required course work has been completed.
2. To maintain a good grade point average.
3. To be well versed with the various subjects associated with the branch.
4. To write the GATE/GRE exam.

Objectives for goal 3 (make a positive impact on the society)

1. To do some kind of volunteer work.

Goal number 1 can be met by any/all programming courses. Goal number 2 can be met by having a requirement that all students need to complete an internship in an organization of their choice. For example, let's say that the department of computer science says that the following are two of its goals:

- ❖ All students learn to become good programmers
- ❖ All students get an opportunity to apply the concepts that they have learned to the real world.

Prof. **AMIT KOTAL**
Assistant Professor
(CIVIL DEPARTMENT, BCREC)

Earthquakes Overview & It's resisting steps

ABSTRACT:-

India is geographically diverse country. India consisted of plains, plateaus, mountains, rivers and seas. So day by day, India is becoming a good economic nation. In India factories, industries, real states, it sectors. But one thing same in these is many other fields and streams. But one things needed in this types of businesses they need a building. Every sector needed a good building for their business. But some natural phenomena such as rain, snow, heat, cold, hazards such as strong winds tsunami, earthquakes.

The development of earthquake resistant design of building is briefly reviewed. The state of the art of seismic design is discussed from the viewpoint of the performance criteriaof buildings.

India has a very high frequency of great earthquakes (magnitude greater than 7.5); during 1897-1950. Many earthquakes has done in India others city, states, villages. But in history four great earthquakes happened in our country.

INTRODUCTION:-

The concept of earthquakes magnitudes was first developed by Richter scale. The value of magnitude is obtained on the basis of recording of earthquakes ground motion on seismograph. In practice, there are several different definitions of magnitude; each could give a slightly different value of the magnitude.

There is a numerical scale for expressing the magnitude of an earthquake on the basis of seismograph oscillations. The more destructive earthquakes typically have magnitudes between about 5.5 and 8.9; it's a logarithmicscale and a difference of one represents an approximate thirtyfold difference in magnitude.

The Richter magnitude scale, also known as the local magnitude, assigns a number to quantify the amount of seismic energy released by an earthquake. It is a base-10 logarithm scale.

The state of art in earthquake engineering has reached a stage where earthquake resistant building construction can reduce the causalities from earthquake disasters. However, the application of such state of the art is prohibited in most seismically active region due to the economic and technical reasons.

Every year more than 3 million earthquakes take place, most of these unnoticed by humans. In contrast, a severe earthquake is the most frightening and catastrophic event of nature which can occur anywhere on the surface of our plant. Although usually lasting only seconds, a severe earthquake in a densely populated area may have catastrophic effects causing the death of hundreds and thousands of peoples, injuries, destruction and enormous damage to the economies of the affected area.

Hundreds of thousands of people have been killed by earthquakes despites scientists being able to predict and forewarn in advance and engineers construct earthquake safe buildings. Unfortunately earthquakes occur often in countries which are unable to afford earthquake safe construction.

In Indian history four great earthquakes occurred: Assam earthquake of 1897 (magnitude 8.7) (Oldham, 1899), Kangra earthquake of 1905 (magnitude 8.6) (Middlemiss, 1910) , Bihar Nepal earthquake of 1934(GSI, 1939) , and the Assam-Tibet earthquake of 1950 (magnitude 8.7) .

List of Earthquake(Seismic)zones in India:

Based on the past seismic history, Bureau of Indian Standards grouped the country into four seismic zones namele zone-II, zone-III, zone-IV and zone-V. Of all these four zones, Zone- V. Of all these four zones, Zone-V is the most seismic active region whereas Zone-II is the least.

Zone-V Covers entires northeastern India, some parts of Jammu and Kashmir, some parts of Ladakh, Himachal Pradesh, Uttarakhand , Rann of Kutch in Gujrat, Some parts of North Bihar and Andaman & Nicobar Islands.

Zone-IV Covers remaining parts of Jammu & Kashmir, Ladakh and Himachal Pradesh, Union Territory of Delhi , Sikkim , Northern parts of Uttar Pradesh, Bihar and West Bengal, Parts of Gujrat and small portions of Maharashtra near the west coast and Rajasthan.

Zone-III Comprises of Kerala, Goa , Lakshadweep islands , remaining parts of uttar Pradesh ,Gujrat and west Bengal, parts of Punjab, Rajasthan , Madhya Pradesh, Bihar, Jharkhand , ChHattisgarh , Maharashtra , Odisha , Andhra Prades,Tamil Nadu and Karnataka.

Zone-II Covers remaining parts of the country. Seismic zoning map of India helps in identifying the lowest, moderate as well as the highest hazardous or earthquake-prone areas in India. Also, such maps are used or looked before the construction of high rise building so as to check the level of seismology in any particular area. In the long run, this helps in saving lives.

So now may have come to know about the Earthquake zones in India.

What is an earthquake and how it's happen?

An earthquake is caused by a sudden slip on a fault. The tectonic plates are always slowly moving, but they get stuck at their edges due to friction. When the stress on the eddge overcomes the friction, there is an earthquake that release energy in waves that travel through the earth's crust and cause the shaking that we feel.

The tectonic plates are like a cracked shell pieces that rest on the hot and the earth is in a constant state of change.

How earthquakes affects on buildings?

The whole building load on the is vertically and the seismic wave forces are horizontally act , the inertia forces can cause shearing of the structure which can concentrate stresses this cause for the foundations are moved from their own places and the weak walls or joint in the structure and the buildings are collapsed. While columns can bend, the swaying motion , when intensified , snaps the building like matchsticks and collapses.

How to resistant buildings from the earthquakes?

There are some technical steps to resist earthquakes:

i) Create a flexible foundation

This type of foundation has a base with isolation involves constructing a building on top of flexible pads made by rubber, leads and steel. When the base of the foundation moves during the earth quake , on this time the isolators vibrate while the structure itself remains steady. This effectively helps to absorbs seismic waves and prevent them from travelling through a building.

ii) Shear wall & diagonal cross braces

Shear walls are a useful building technology that helps to transfer earthquake forces. Made of panels, these walls help a building keep its shape during movement. In most cases shear walls are supported by diagonal cross braces. These steel beams have the ability to support compression and tension, which helps to counteract the pressure and push forces back to the foundation.

Shear Walls

To help resistance swaying forces, engineers use vertical walls, known as shear walls , to stiffen the structural frame of the building. These can be used in place of braced frames or in addition to them.

Diagonal cross braces

Incorporate a variety of columns, braces , and beams to transfer seismic forces back to the ground. Cross braces incorporate two diagonal sections in an X – shape to build wall trusses.

Trusses

Trusses strengthen the diaphragm where the deck is weakest. Simply put , they are diagonal structures that are inserted into the rectangular areas of the frame.

iii) Moment resisting frames

Moment-resisting frames provide more flexibility in a building.

This frame is placed among the joints of the building and allows for the columns and beams to bend while the joints remain rigid.

Thus, the building is able to resist the larger forces of an earthquake.

Since shear walls limit a buildings flexibility, some designers choose moment-resisting frames to allow positive movement. Although columns and beams can bend, joints and connectors stay rigid. These features also give building designers more flexibility to create exterior walls, cellings, and arrange building contents.

iv) Horizontal Frame

Diaphragms are a central part of a building. Consisting of the floors of the building, the roof, and the beam.

It help to transfer the horizontal force to the vertical structures of the building.

Similar to a shear panel, a horizontal diaphragm is a horizontal truss or solid sheet element. It is placed between vertical elements to transfer lateral loads to the vertical elements, such as shear panels, vertical trusses or moment frames.

v) Use of pendulum

another damping method is pendulum power , used primarily in skyscrapers. Engineers suspend a large ball with steel cables with a system of hydraulics at the top of the building. When the building begins the sway, the ball acts as a pendulum and moves in the opposite direction to stabilize the direction.

When seismic activity causes the building to sway , the pendulum moves in the opposite direction , dissipating the energy. Engineers refer to such systems as tuned mass dampers because each endulum is tunned precisely to a structure’s natural vibrational frequency.

vi) Vibrational control Device (Dampers)

This methode involves placing dampers at each level of a building between a column and beam. Each damper consists of piston heads inside a cylinder filled with oil. When an earthquake occurs, the building transfers the vibration energy into the pistons. Pushes against the oil. The energy is transformed into heat. Doissipating the force of the vibrations.

In this method a high-rise building will severely swing in an earthquake or a strong wind,which will make it

difficult to maintain the safety and habitability even if the building is not damaged. The vibration control structure is to depress the vibration of the earthquake or the strong wind using the attached vibration

Recently materials like this have been invented, such as acombination of steel and rubber plates on buildings to absorbs the shock of the earthquake. Another easy safety thing for earthquakes is for the government of a city to invest in a proper seismograph centre, and make sure there is always at least one person monitoring it in case of an earthquake. Simple precautions are the most effective way to minimize earthquake damage.

Earthquake rare hard to understand and are dangerous to live through. Many people might have never experienced an earthquake or might never experience one. Whatever your situation everyone should be prepared and know how to deal with one. Predictions can be told, but is there evidence that proves it all? Forecasting of earthquake falls on knowledge of past earthquakes on a specific fault. Identifying the pattern can provide a clue to the size of the next earthquake. This could be possible if all earthquakes.

- Earthquake shake the ground surface, can cause buildings to collapse, disrupt transport and services, and can cause fires.

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Accidents Bring Tears, Safety Bring Cheers

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National Road Safety Week 2022 is celebrated from January 11, 2022, and extends to January 17, 2022. This year marks the 33rd Road Safety Week under the theme "Sadak Suraksha Jeevan Raksha". The tragedy of road accidents can be felt only by sufferers. It is true that unless one suffers a personal loss in a road accident, one does not take the subject seriously. Repeatedly, we read on the front pages of newspapers in the morning: "Five people were killed in an accident when a private deluxe bus rammed head-on with a truck; serious accidents- bus hits road side tree; 17 dead, 29 seriously injured; four senior officers killed as their car was crushed by a speeding bus or dumper; 12 persons were killed when a bus skidded off the National Highway; ten of marriage party dead as bus rolled into the valley; a family of four drowns as their car falls into road side canal."

Road conditions have improved in India, but unfortunately, improved roads have also led to the occurrence of many accidents. Growth in urbanization and in the number of vehicles in India has led to increased traffic congestion in urban centres and an increase in traffic accidents on road networks that were never designed for the volumes and types of traffic that they are now required to carry. In addition, unplanned urban growth has led to incompatible land uses and high levels of pedestrian-vehicle conflicts. 'Accidents are not natural, but they are caused' is a common cliche in the area of traffic safety. Thus, if accidents are caused by some, surely the ones responsible for them can be identified and appropriate remedial measures can be developed and implemented to the extent possible. Analysis of previous data indicates that about 66% of the accidents occur due to human error and 33% due to road parameters such as road and vehicle interaction, other road users and environmental factors. National Highways constitute about 2% of the total road length and carry more than 40% of

passenger traffic and 85% of goods traffic, which means they have registered more accidents, accounting for 20% of all accidents on national highways.

Accidents can be unintentional and sometimes random, but they are generally found to occur at some hazardous locations called "black spots." The areas covering these black spots are called "black areas" in traffic. Major road defects that can cause accidents are blind corners, lack of super elevation on curves that can cause vehicles to overturn, shoulders (sides of roads) in bad shape, slippery roads, and trees by the roadside. An accident Blackspotis a term used in road safety management to denote a place where road traffic accidents have historically been concentrated. It may have occurred for a variety of reasons, such as a sharp drop or corner in a straight road, so oncoming traffic is concealed, a hidden junction on a fast road, or poor or concealed warning signs at a cross-road. For some decades, treatment of accident blackspots (e.g. by signage, speed restrictions, improving sightlines, straightening bends, or speed cameras) was a mainstay of road safety policy, but current thinking has it that the benefits of these interventions are often overstated. Sixty per cent of the black spots on national highways in India, where more than 28,000 killings took place in road crashes in a period of three years, have been rectified now. A total of Rs 4,512.36 crore has been spent on rectifying these black spots, which led to 57,329 road crashes in 2016, 2017 and 2018, the National Highways Authority of India (NHAI) said in response to a query made under the Right to Information (RTI) Act.

Accidents tragically are not often due to ignorance but rather to carelessness, thoughtlessness, and overconfidence. Road accidents are associated with numerous problems, each of which needs to be addressed separately. Human, vehicle, and environmental factors play roles before, during, and after an accident. There are four main types of human behaviour that can cause accidents: excessive speeding, driving while under the influence of alcohol, and not wearing safety devices (eg. helmets and seat belts). There are also factors like poor road design and visibility, as well as poor trauma care systems, which can lead to accidents.For a state or city to carry out road safety work in a rational way, a coordinating body of decision makers has to be formed which includes representatives of different government departments

like PWD, Police, Transport, District Authorities, related Central Government Departments/Agencies and NGOs. The active role of the Decision Making Source (DMS) is necessary in enhancing road safety. The DMS should have a legal existence, enabling it to enforce decisions and manage a budget. The DMS should only have people who can make decisions for their own departments.Further, the DMS should be able to undertake studies or research from competent organizations/institutions in order to get the right information to implement decisions to sustain. They should also have financing powers or secure funding in order to implement safety measures that may not be included in the usual departmental budgets. Road safety is a multi-sectorial and multidimensional issue. It incorporates the development and management of road infrastructure, the provision of safer vehicles, legislation and law enforcement, mobility planning, the provision of health and hospital services, child safety, urban land use planning, etc. In other words, its ambit spans engineering aspects of both, roads and vehicles on the one hand and the provision of health and hospital services for trauma cases (in a post-crash scenario) on the other. Road safety is a shared and multi-sector responsibility of the government and a range of civil.

The World Report on Road Traffic Injury Prevention of the World Bank and World Health Organisation (WHO) in the year 2004 stated that road traffic injuries are a major but neglected global public health problem requiring dedicated and meticulous efforts for effective and sustainable prevention. According to official data from the Ministry of Road Transport and Highways, India ranks first in the number of deaths caused by road accidents across 199 countries. The data is evident enough to prove that road safety is a major public health concern. According to government data, India recorded 3,74,397 accidental deaths in 2020, with road crashes constituting over 35 per cent of such fatalities. The number of accidental deaths in 2020 was, however, lower than in 2019 when the figure stood at 4,21,104. The rate of 'accidental deaths' per lakh population stood at 27.7 in 2020, down from 31.4 the previous year. Dangerous or careless driving or overtaking contributed to 24.3 per cent of road accidents, and only 2.4 per cent of the road accidents were due to poor weather conditions.

Of all the systems that people have to deal with on a day-to-day basis, road transport is the most complex and most unsafe mode of transportation. It has been estimated that without any increased effort and new initiatives, the total number of road traffic injuries and deaths worldwide would rise by 65 per cent between 2000 and 2020, whereas in low-income and middle-income countries, deaths are expected to increase by as much as 80 per cent. The majority of such deaths are at present of "vulnerable road users" such as pedestrians, pedal cyclists, and motorcyclists'. In high income countries, deaths among car occupants continue to be predominant, but the risk per capita that vulnerable road users face is high. Obviously, the level of road deaths and injuries is unacceptable and, to a large extent, avoidable. There is an urgent need to recognise the worsening road safety situation in order to take appropriate action. Road traffic injury prevention and mitigation should be given the same attention and scale of resources that are currently being channelled towards other predominant health issues to avoid increasing human loss and injury on the roads, with their devastating human impact and large economic cost to society. With massive investment in roads and the exponential growth in the number of vehicles, it has become necessary to have a system that integrates all the disciplines that influence road safety and that at the same time has linkages with established institutions that cater to the different aspects of road safety, viz. engineering, education, enforcement, medical and behavioural sciences. The need of the hour is the establishment of a functional road safety and traffic management board at national and state level. The Government of India has already taken steps on the issue, and the primary objective of the Board would be to promote road safety and improve traffic management in India. Finally, non-profit groups and other groups should put all of their efforts into raising awareness about road safety so that people, especially the younger generation, understand the value of life and the theme: Accidents Bring Tears, Safety Brings Smiles.

Translucent concrete

Translucent concrete (also: light-transmitting concrete or transparent concrete) is a concrete based building material with light-transmissive properties due to embedded light optical elements — usually optical fibers. Light is conducted through the stone from one end to the other. Therefore, the fibers have to go through the whole object. This results in a certain light pattern on the other surface, depending on the fiber structure. Shadows cast onto one side appear as silhouettes through the material. Translucent concrete is used in fine architecture as a façade material and for cladding of interior walls. Light-transmitting concrete has also been applied to various design products.

Several ways of producing translucent concrete exist. All are based on a fine grain concrete (ca. 95%) and only 5% light conducting elements that are added during casting process. After setting, the concrete is cut to plates or stones with standard machinery for cutting stone materials.

Due to bends in the fibers and rough nesses on the cut surfaces of the fibers, light transmission is generally a bit less than half the incident light on the fibers, so given five percent fibers, about two percent. As the human eye's response to light is non-linear, this can still give useful day lighting.
In theory, the fibers could carry light around corners and over a distance of tens of meters, with the rate of loss with increasing length depending on the type of fiber and how it is bent.

Working with natural light it has to be ensured that enough light is available. Wall mounting systems need to be equipped with some form of lighting, designed to achieve uniform illumination on the full plate surface. Usually mounting systems similar to natural stone panels are used — e.g., LUCEM uses perforated mounting with visible screws, undercut anchors with agraffes or façade anchors.

History: Translucent concrete has been first mentioned in a 1935 Canadian patent. But since the development of optical glass fibers and polymer based optical fibers the rate of inventions and developments in this field has drastically increased. There have also been inventions that apply this concept to more technical applications like fissure detection. In the early 1990s forms like translucent concrete products popular today with fine & layered patterns were developed.

Today several companies produce translucent concrete with very different [citation needed] production systems. Some manufacturers are:

- Florak Bauunternehmung GmbH, Heinsberg/Germany
- LBM EFO, Berching/Germany
- LiTraCon Bt, Csongrád/Hungary
- LUCEM GmbH, Aachen/Germany
- Luccon Lichtbeton GmbH, Klaus/Austria
- LiCrete, by Gravelli/Czech Republic

Variants: Apart from fine fiber patterns due to the use of optical fibers or textiles some products with much coarser light pattern are available. The main advantage of these products is that on large scale objects the texture is still visible — while the texture of finer translucent concrete becomes indistinct at distance. Further pictograms and lettering can be realized with this technology.

An approach that does not use waveguides involves using transparent aggregate and binders. However, chemically this would not necessarily resemble concrete, and might resemble fiberglass. Unlike materials requiring alignment of optical fibers, however, it might be transported and poured using existing infrastructure.

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FUNGI CAN HELP CONCRETE HEAL ITS OWN CRACKS

Infrastructure support and facilitates our daily lives- think of the roads we drive on, the bridges and tunnels that help transport people and freight, the office buildings where we work and the dams that provide the water we drink. But it's no secret that American infrastructure is aging and in desperate need of rehabilitation.

(Concrete structures suffer from serious deterioration, cracks & various chemical & physical phenomena that occur during everyday use).

Concrete structures, in particular, suffer from serious deterioration. Cracks are very common due to various chemical and physical phenomena that occur during everyday use. Concrete shrinks as it dries, which can cause cracks. It can crack when there's movement underneath or thanks to freeze/thaw cycles over the course of the seasons. Simply putting too much weight on it can cause fractures. Even worse, the steel bars embedded in concrete as reinforcement can corrode over time.

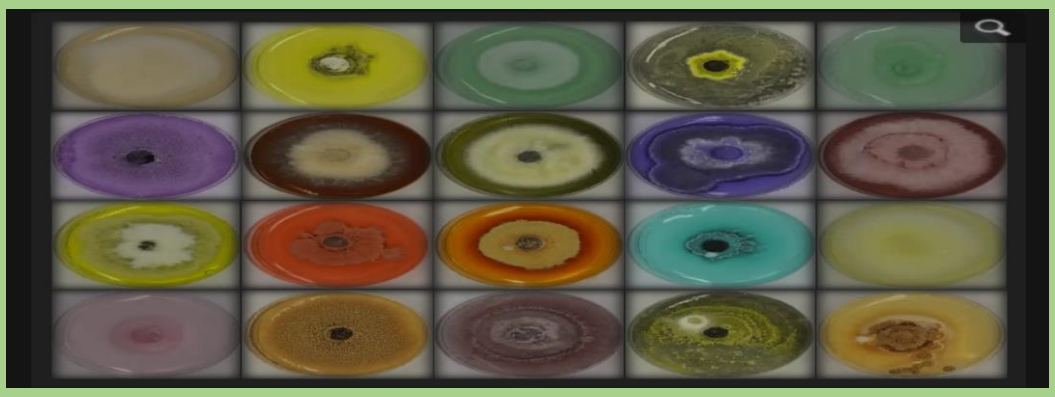
Very tiny cracks can be quite harmful because they provided an easy route in for liquids and gasses- and the harmful substances they might contain. For instance, micro-cracks can allow water and oxygen to infiltrate and then corrode the steel, leading to

structural failure. Even a slender breach just the width of a hair can allows enough water in to undermine the concrete's integrity.

But continuous maintenance and repair work is difficult because it usually requires an enormous or huge amount of labour and cost or investment.

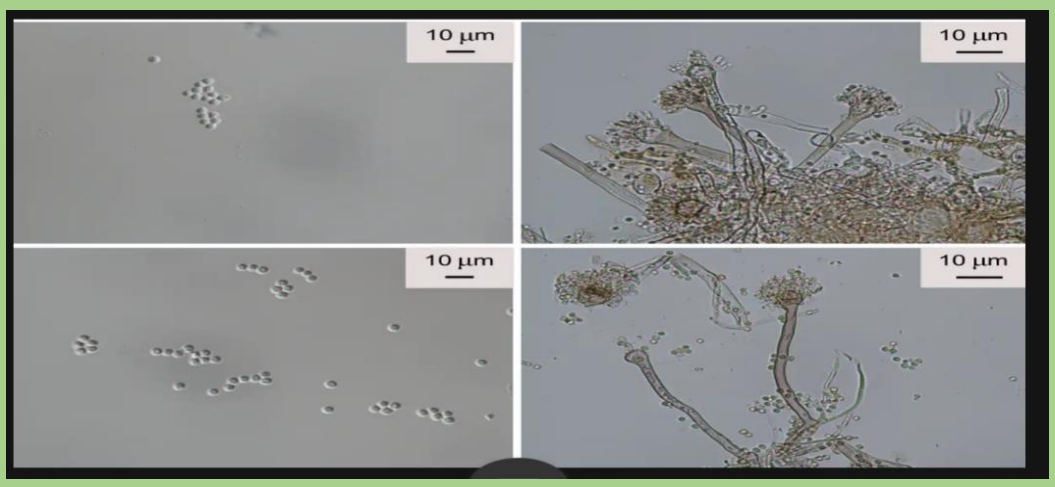
So, since 2013, Binghamton university (New York) trying to figure out how these harmful cracks could heal themselves without human intervention. The idea was originally inspired by the amazing ability of the human body to heal itself of cuts, bruises and broken bones. A person takes in nutrients which the body uses to produce new substitutes to heal damaged tissues. In the same way, we can provide necessary products to concrete to fill in cracks when damage happens.

Guangwen Zhou from (Binghamton university) and David Davies, Ning Zhang from (Rutgers university) they have found a fungus called Trichoderma reesei. That could help fill concrete cracks.



(After researches scientist found a fungus called **Trichoderma reesei**which is help to fill concrete cracks).

They initially screened about 20 different species of fungi in order to find one that could withstand the harsh conditions in concrete. Some we isolated from the roots of plants that grew in nutrient-poor soils, including from the new jersey pine barrens and the Canadian Rocky Mountains in Alberta.



(Once the spores {left} germinate with the addition of water, they grow into thread like hyphal mycelium {right}).

They found that as calcium hydroxide from concrete dissolved in water, the pH of fungal growth medium increased from a close-to-neutral original value of 6.5 all the way to a very alkaline 13.0. of all the fungi they have tasted, only T. reesei could survive this environment. After that they will take the fungi to use fill concrete cracks.

As the fungi grow, they'll work as a catalyst within the calcium-rich conditions of the concrete to promote precipitation of calcium carbonate crystals. These mineral deposits can fill in the cracks. When the cracks are completely filled and no more water can enter, the fungi will again form spores. If cracks form again and environmental conditions become favourable, the spores could wake up and repeat the process.

T. reesei is eco-friendly and non-pathogenic, posing no known risk to human health. Despite its widespread presence in topical soils,

there are no reports of adverse effects in aquatic or terrestrial plants or animal. In fact, T. reesei has a long history of carbohydrase enzymes, such as cellulase, which plays an important role in fermentation processes during wine making.

Future cement recipes may include fungi. Midtown Crossing at Turner Park, CC BY

(Future cement recipes may include fungi. Midtown crossing at turner park)

Concrete is a harsh environment for the fungus: very high pH values, relatively small pore sizes, severe moisture deficit, high temperatures in summer and low temperatures in winter, limited nutrient availability and possible exposure to ultraviolet rays from sunlight. All of these factors are present in the fungi's metabolic activities and make them vulnerable to death.

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Fiber-Reinforced concrete

Fiber Reinforced Concrete is a composite material consisting of fibrous material which increases its structural integrity. It includes mixtures of cement, mortar or concrete and discontinuous, discrete, uniformly dispersed suitable fibers. Fibers are usually used in concrete to control cracking due to plastic shrinkage and to drying shrinkage. They also reduce the permeability of concrete and thus reduce the bleeding of water.

Advantages of Fiber-reinforced concrete

- Fibers reinforced concrete may be useful where high tensile strength and reduced cracking are desirable or when conventional reinforcement cannot be placed
- It improves the impact strength of concrete, limits the crack growth and leads to a greater strain capacity of the composite material
- For industrial projects, macro-synthetic fibers are used to improve concrete's durability. Made from synthetic materials, these fibers are long and thick in size and may be used as a replacement for bar or fabric reinforcement
- Adding fibers to the concrete will improve its freeze-thaw resistance and help keep the concrete strong and attractive for extended periods.
- Improve mix cohesion, improving pumpability over long distances
- Increase resistance to plastic shrinkage during curing
- Minimizes steel reinforcement requirements
- Controls the crack widths tightly, thus improving durability
- Reduces segregation and bleed-water
- FRC, toughness is about 10 to 40 times that of plain concrete
- The addition of fibers increases fatigue strength
- Fibers increase the shear capacity of reinforced concrete beams

Different types of Fiber-reinforced concrete

Fibers for concrete are available in different sizes and shapes. The major factors affecting the characteristic of fiber-reinforced concrete are a water-cement ratio, percentage of fibers, diameter and length of fibers. Given below are different types of fiber-reinforced concrete used in construction.

Steel Fiber Reinforced Concrete

Steel fiber is a metal reinforcement. A certain amount of steel fiber in concrete can cause qualitative changes in concrete's physical property. It can greatly increase resistance to cracking, impact, fatigue, and bending, tenacity, durability, and others. For improving long-term behavior, enhancing strength, toughness, and stress resistance, SFRC is being used in structures such as flooring, housing, precast, bridges, tunneling, heavy-duty pavement, and mining. The types of steel fibers are defined by ASTM A820 are, Type I: cold-drawn wire, Type II; cut sheet, Type III: melt-extracted, Type IV: mill cut and Type V: modified cold-drawn wire.

Polypropylene Fiber Reinforced (PFR) Concrete

Polypropylene fiber reinforced concrete is also known as polypropene or PP. It is a synthetic fiber, transformed from propylene, and used in a variety of applications. These fibers are usually used in concrete to control cracking due to plastic shrinkage and drying shrinkage. They also reduce the permeability of concrete and thus reduce the bleeding of water. Polypropylene fiber belongs to the group of polyolefins and is partially crystalline and non-polar. It has similar properties as polyethylene, but it is harder and more heat resistant. It is a white rugged material with high chemical resistance. Polypropylene is manufactured from propylene gas in the presence of a catalyst such as titanium chloride. Polypropylene fiber displays good heat-insulating properties and is highly resistant to acids, alkalies, and organic solvents.

Glass Fiber Reinforced Concrete

Glass fiber reinforced concrete is a material consisting of numerous extremely fine fibers of glass. Glass fiber has roughly comparable mechanical properties to other fibers such as polymers and carbon fiber. Although not as rigid as carbon fiber, it is much cheaper and significantly less brittle when used in composites. Glass fibers are therefore used as a reinforcing agent for many polymer products; to form a very strong and relatively lightweight fiber-reinforced polymer (FRP) composite material called glass-reinforced plastic (GRP), also popularly known as “fiberglass”. This material contains little or no air or gas, is denser, and is a much poorer thermal insulator than is glass wool.

Polyester fibers

Polyester fibers are used in fiber-reinforced concrete for industrial and warehouse floors, pavements and overlays and precast products. Polyester micro- and macro-fibers are used in concrete to provide superior resistance to the formation of plastic shrinkage cracks versus welded wire fabric and to enhance toughness and the ability to deliver structural capacity when properly designed, respectively. Polyester micro- and macro-fibers are used in concrete to provide superior resistance to the formation of plastic shrinkage cracks versus welded wire fabric and to enhance toughness and the ability to deliver structural capacity when properly designed, respectively.

Carbon fibers

Carbon fibers are fibers about 5–10 micrometers in diameter and composed mostly of carbon atoms. Carbon fibers have several advantages including high stiffness, high tensile strength, low weight, high chemical resistance, high-temperature tolerance and low thermal expansion. Carbon fibers are usually combined with other materials to form a composite. When impregnated with a plastic resin and baked it forms carbon-fiber-reinforced polymer (often referred to as carbon fiber) which has a very high strength-to-weight ratio, and is extremely rigid although somewhat brittle. Carbon fibers are also composited with other materials, such as graphite, to form reinforced carbon composites, which have a very high heat tolerance.

Macro synthetic fibers

Macro synthetic fibers are made from a blend of polymers and were originally developed to provide an alternative to steel fibers in some applications. Initially, they were identified as a potential alternative to steel fibers in sprayed concrete, but increasing research and development showed that they had a role to play in the design and construction of ground-supported slabs and a wide range of other applications. They are particularly suitable for providing nominal reinforcement in aggressive environments, such as marine and coastal structures, as they do not suffer the problems of staining and spalling that can result from the corrosion of steel. Besides, because they are non-conducting, they have been used in tram and light railway developments.

Micro-synthetic fibers

Micro-synthetic fibers provide superior resistance to the formation of plastic shrinkage cracks versus welded wire reinforcement, they are unable to provide any resistance to further crack width openings caused by drying shrinkage, structural load or other forms of stress. However, these products should be regularly specified in any type of concrete to improve cracking resistance, spall protection, freeze-thaw durability and improve the homogeneity of concrete during placement.

Natural fibers

The natural fiber is directly obtainable from an animal, vegetable, or mineral source and convertible into nonwoven fabrics such as felt or paper or, after spinning into yarns, into woven cloth. A natural fiber may be further defined as an agglomeration of cells in which the diameter is negligible in comparison with the length. Although nature abounds in fibrous materials, especially cellulosic types such as cotton, wood, grains, and straw. The use of natural fibers in making concrete is recommended since several types of these fibers are available locally and are plentiful. The idea of using such fibers to improve the strength and durability of brittle materials is not new; for example, straw and horsehair are used to make bricks and plaster. Natural fibers are suitable for reinforcing concrete and are easily available in developing countries.

Cellulose fibers

Cellulose fibers are made with ethers or esters of cellulose, which can be obtained from the bark, wood or leaves of plants, or other plant-based material. In addition to cellulose, the fibers may also contain hemicellulose and lignin, with different percentages of these components altering the mechanical properties of the fibers. The main applications of cellulose fibers are in the textile industry, as chemical filters, and as fiber-reinforcement composites, due to their similar properties to engineered fibers, being another option for biocomposites and polymer composites.

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Width of National highway in India as per IRC

In India, as per the rules & guidelines of Indian Road Congress (IRC), width or right of way (ROW) of national highway in India is varies between 30m to 75m wide. It is about 30m wide for 2 lane NH, 45m wide for 4 lane NH, 60m wide for 6 lane NH and 75m wide for 8 lane NH which includes width of roadway + other necessities + future extension. This is ideal, desirable standard width of National Highway. However, their actual width is varying according to geometric design of Highway Engineering and depending on land availability and economic condition.

The area of land that are acquired for the road along its alignment is termed as the right of way (ROW). This includes width of roadway + other necessities + future extension. Width of formation or roadway comprise of width of carriageway + width of paved shoulder + width of unpaved shoulder. Other necessities are Road margin uses for parking cycling Footpath, drainage and bus stoppage.Future extension of national highway will be required due to increased road traffic day by day.

One lane width is 3.5m wide for carriageway, maximum shoulder width is about 4.6m and minimum of 2.5m, width of median will be varying 5m to 7m wide, other space uses for parking, footpath, bus stoppage, accommodation of stop vehicle, drainage and service lane along with its alignment and future extension.

Width of National highway in India as per IRC

Width of 2 lane National Highway as per IRC:-In India, as per the rules & guidelines of Indian Road Congress (IRC), total right of way of national highway in India is about 30m (100 feet) wide for two Lane Road. This includes width of 12m for roadways or built-up area those comprise of 2 lane carriage width of about 7m wide and paved shoulder width of 2.5m wide and rest about 18m will be used for future extension and development of Highway facilities. This figure might be little very according to geometric design of highway Engineering and land acquisition.

Width of 3 lane National Highway as per IRC:-In India, as per the rules & guidelines of Indian Road Congress (IRC), total right of way of national highway in India is about 30m (100 feet) wide for 3 Lane Road. This includes width of 16m for roadways or built-up area those comprise of 3 lane carriage width of about 10.5m wide and paved shoulder width of 2.75m wide and rest about 14m will be used for future extension and development of Highway facilities.

Width of 4 lane National Highway as per IRC:-In India, as per the rules & guidelines of Indian Road Congress (IRC), total right of way of national highway in India is about 45m (150 feet) wide for 4 Lane Road. This includes width of 27m for roadways or built-up area those comprise of 4 lane carriage width of about 14m wide, median of 5m wide along with kerb shyness, paved shoulder width of 4mwide and rest about 18m will be used for future extension and development of Highway facilities.

Width of 6 lane National Highway as per IRC:-India, as per the rules & guidelines of Indian Road Congress (IRC), total right of way of national highway in India is about 60m (200 feet) wide for 6 Lane Road. This includes width of 33m for roadways or built-up area those comprise of 6 lane carriage width of about 21m wide, median of 5m wide along with kerb shyness, paved shoulder width of 3.5m wide and rest about 27m will be used for future extension and development of Highway facilities.

Width of 8 lane National Highway as per IRC:-In India, as per the rules & guidelines of Indian Road Congress (IRC), total right of way of national highway in India is about 75m (250 feet) wide for 8 Lane Road. This includes width of 44m for roadways or built-up area those comprise of 8 lane carriage width of about 28m wide, median of 7m wide along with kerb shyness, paved shoulder width of 4.5m wide and rest about 31m will be used for future extension and development of Highway facilities.

ASIT MONDAL

12001321059

CIVIL ENGINEERING

2ND Year

Modern Construction Technology

Building construction methods have experienced significant face fit in recent times with innovative technology being harnessed optimally for improving the qualitative index of buildings. Nowadays A.I.(Artificial Intelligence) is used in building construction technology. This period of time is the revolution oftechnology. Many sectors can developed their sector with the help of technology. Now this is the time to take new technology , new construction method in our industry. In India many construction method apply in different state.

1.Precast Concrete Construction(Chennai)

In Indian construction history Chennai has grab the 1st position to adopted precast concrete construction method. Generally in construction concrete will prepare on the side but in this method concrete mix half and other half mix in the schwing stetter when the truck on the road.

This technique expedites construction turnaround time y blending the advantages of concrete pre-casting with the in situ building. Quality improves, whereas the cost of construction plummets.

Hybrid concrete structure are easy to build, competitive in nature and perform consistently. This method is time saving.

2. Formwork system (Lucknow)

Lucknow is called by the home town of “NABAB”. Here we see many types of buildings structure; many types of fort, temple, mosque etc. now 21st century lucknow adopted some new features in construction industry.

The formworks components are manufactured from extrude polyvinyl chloride. The extrusions consist of two layers are co-extrude during the manufacturing process to create a solid profile.

The rigid poly-vinyl chloride (PVC) based form work system serve as a permeability alloy place durable finish form-work for concrete walls.

3. Prefabricated sand witch panel (Indore)

The panels are made of fibrocement / calcium silicate boards on both sides with infill core of light weight concrete made of EPS granule balls, cement, sand, fly ash, adhesive and other bonding materials. The core material in slurry state is pushed under pressure into the preset moulds. Once set, the panels are moved for curing and transported to the site.

The panels have tongue and groove joints for construction of a building. U type channels are used to hold the panels with the structure. Additions clip should be welded with steel columns and beams to hold U channel firmly with the columns/beams and floors. The thickness of the panel shall determine the size of U channel.

Two panels are jointed with steel dowel bars at angel of 45 degree. Joints between two panels are filled with exterior grade superfine ready-mix plaster and finished with putty alter placing anti crack fiber tape to give uniform smooth surface ready for paint.

And this is also called cross-wall construction, the technology has gained momentum due to seamless adherence to specifications and ease as well as swiftness of construction.

4. Tunnel formwork (Rajkot)

Tunnel formwork is customized formwork replacing conventional steel/plywood shuttering system.it is mechanized system for cellular structure. It is based on two half shells which are placed together to form a room or cell. Several cells make an apartment. With tunnel forms, walls and slabs are cast in a single day. The structure is divided into phases. Each phase consist of a section of the structure that will be cast in one day. The phases determined by the program and the amount of the floor area that can be poured in one day. The formwork is set up for the day's pour in the morning. The reinforcement and services are positioned and concrete is poured in the afternoon. Once reinforcement is placed, concrete for walls and slabs shall be poured in one single operation. The formwork ids stripped the early next day and positioned for subsequent phases.

Expeditious work is achieved by deploying formwork and readily mixed concrete with the convenience and agility of factory conditions. Formworks in tunnel form are stacked and used at the site with cranes.

5. 3D volumetric Construction (Ranchi)

3D volumetric construction is a modular construction technology in which 3D units are produced in controlled factory setups using necessary construction and building materials. Using this modular construction technology, 3D units are produced in controlled factory settings using needful construction and building. In this construction technology building shapes view 3D type. Make structural blocks and all units with amenities installed for assemble. Blocks can be erected rapidly at site and properties of concrete like fire retardant, sound resistivity, thermal mass etc. are retained.

6. Light gauge steel frame (Agartala)

Steel structure building products independently. Light gauge steel framing is a construction technology using cold formed steel as the construction material. It can be used for roof system, floor systems, wall systems, roof panels, decks, or the entire buildings. They can also be used as individual framing members such as , joists, headers , and truss members.

Light steel frame members can also serve as both primary structures and secondary structures. An example of the light streel framing used as primary structure is the webbed steel trusses. Steel studs act as secondary structure by providing lateral support.

HOW A.I. HELPS IN CONSTRUCTION

Artificial intelligence is a science on the research and application of the law of the activities of human intelligence. It has been a far-reaching cross frontier subject, after the 50 year's advancement.

But nowadays A.I. is use different fields (Branch). This is the knowledge base system and this system have expertise in different fields. In branch of civil engineering have many problems like design, construction management, and program decision making.

Adam and Smith presented progress in the branch of adaptive civil engineering structures and reinforcement learning process were implemented within a control formwork on an active tensegrity structure.

Some technologies and application of A.I. which help in construction:

- **Building Information Modelling**

Better known as BIM is a new construction technology in India that is on the rise. This technique involves the use of 3-dimensional, computer-generated models of the building. With these models, the factors of the time and cost are added to give an overall bird's eye view of how the project will look in future.

For this help engineers and builders plan accordingly in the initial stages itself. With smart computer programing and date inputs, many developers can project into a computer. The thoughts that would once only reside entirely in the chief architect's mind. BIM is effectively used in countries and in certain parts of metropolitan India to help build buildings that require extensive planning.

- **Virtual Reality**

Many people these days are fascinated with the idea of virtual reality, the idea of being in a reality that is not your own. Mostly used for fun and adventurous way to pass the time is now a method to look at a building that has not even begun construction. This helps the architects to carefully look at the structure and plan while assessing the strengths and weakness the building may face in the long run.

This construction technology based on the premise that if one can see the structure before it's built, no matter how complex the plan, it can still be executed. This also helps in cutting down unnecessary costs and material wastage; therefore, it aids in a better building process.

*Among the many construction technology of India. A.I. has now made the idea of a smart city much more accessible to the future. With A.I helps we create larger, eco-friendly, and artistic structures that show the true nature of limitless imagination. With the rise of different kinds, both traditional and new construction technology in India. The construction sector is continually undergoing rapid change, with the increasing use of technology. Developers have been able to cut down costs and wastage of material in highly effective way.

Basu Bhowmick

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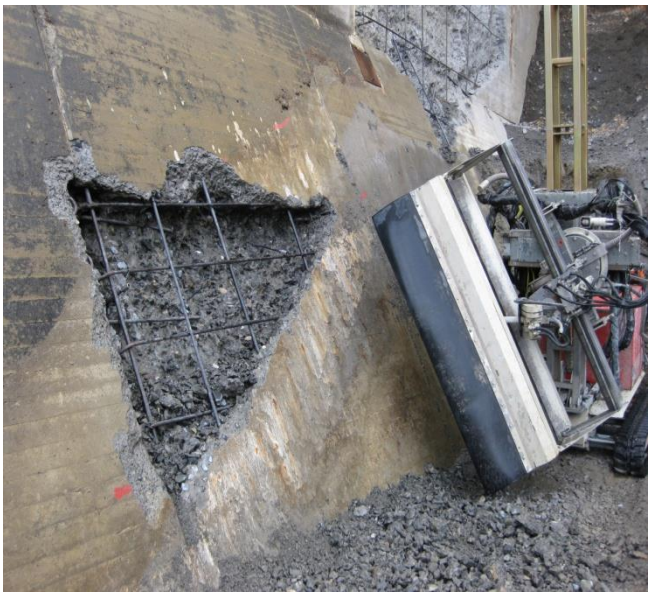
Finding a fix

Using water to address common concrete errors.



Pouring concrete is a complex process. One slight miscalculation on any of the numerous variables can spoil a whole batch. Unfortunately, mistakes aren't always evident right away, which can put timetables and budgets at risk. Fortunately, advances in concrete removal methods are making them easier to fix, without demolishing everything and starting over.

For large, multi-phase construction projects, hydro demolition, which some may refer to as hydro blasting, hydro-milling or water-jetting, offers a fast, cost-effective solution for concrete removal that can minimize the overall impact of errors. It's even been known to get contractors back on track for on-time project delivery.

Not sure about where this option might come in handy? Here is a look at a few common concrete issues that water-based hydro demolition can help solve.

- ***FORMWORK FAILURE***

Whether it's a minor shift or a full-on blowout, formwork failures can spell disaster in terms of lost productivity. Correcting the problem often relies on handheld equipment and a lot of slow, backbreaking work that can take a considerable physical toll on crewmembers.

It can also take a toll on the rebar, as heavy vibrations and chipping tools can damage rebar and leave microfractures in the remaining concrete. When this happens, contractors are often left with no choice but to demolish most, if not all, of the structure.

Hydrodemolition is an impact-free concrete removal method that is considerably faster than jackhammers and other handheld options. Using high-pressure water jets as powerful as 40,000 psi, hydrodemolition demolition equipment blasts away layers of concrete, descaling the rebar in the process.

The use of water minimizes the risk of micro fractures, creating a structurally sound foundation for any necessary concrete repairs. The use of high-tech, robotic systems can also minimize labour requirements, freeing up the rest of the crew to focus on other tasks like getting concrete forms back in place.

Hydro demolition may also help when other equipment just can't reach. I know of a small overpass project that experienced the shift of its formwork where water provided an ideal solution.

While part of the pour met specifications, the contractor needed to remove part of the deck and abutment to a depth of three feet (0.9 meters) and repour to correct the shift. Reaching the necessary depth with jackhammers wasn't possible without destroying rebar and overall structural integrity, so he turned to hydro demolition to remove the concrete to make a repair with minimal impact on the structure.

- ***CONCRETE SEGREGATION***

Another contractor was able to use hydro demolition's selective removal capabilities to help solve a difficult concrete segregation problem. When water infiltrated his forms and washed out the cement paste, just the aggregate was left behind. The contractor was able to set parameters for the hydro demolition robot to remove just the segregated material, leaving the sound concrete intact and ready for repair.

Hydro demolition robots allow contractors to adjust the robot's stroke to control the depth of cuts and vary the pressure of the water jet to match the task, whether that is removing loose, deteriorated concrete or lowering the sound concrete to a pre-determined depth. This enables pinpoint accuracy in concrete segregation and bleeding situations. Once the parameters are set, the robot meticulously maneuvers over the designated area, removing material according to set values.

- ***OFF-SPEC EMBEDDED MATERIALS***

Sometimes the concrete error isn't a result of the concrete mixture itself. Sometimes materials like rebar or anchors are placed in the wrong spot, or a design change necessitates their removal from set concrete.

In addition to setting parameters for stroke and pressure, cutting-edge hydro demolition machines can be programmed to cut geometric shapes. This allows contractors to remove just enough material to reach the embedded item, whether it's just below the surface or several feet down.

We worked with one contractor who discovered a need to replace bolts on anchors that were embedded a meter into the concrete. Not wanting to create a large hole and concerned about potential damage to the surrounding concrete as well as the rebar and anchors themselves, he turned to hydro demolotion.

His crew was able to cut circular holes that were just large enough to free the anchors. Not only did he minimizing the amount of concrete removed, he was also able to get through the job quickly, correcting more than a dozen anchors over a span of 12 hours.

- ***REPAIRING EXISTING STRUCTURES***

Sometimes repairs or changes are required for existing structures. For example, we had a contractor who needed to remove eight-foot-thick concrete pier on an active construction site for a hydropower plant. His crew was able to remove 4,944 cubic feet (140 cubic metres) in just 53 days. They averaged 141 cubic feet (4 cubic metres) per 12-hour shift. Once the demolition was complete, the contractor poured new concrete onto the bonding surface created by the hydrodemolition process.

The water's impact creates a rough, irregular profile that is ideal for bonding, and since the surface has already been washed and prepped, there isn't a need for additional steps like sandblasting.

COMPRESSIVE STRENGTH FAILURE

Fixes that require productivity and precision are prime candidates for hydrodemolition, and nowhere is that more apparent than when facing compressive strength failure. Once a failure has been identified, the use of robot-controlled water jets allow for fast, targeted removal of the weak material without damaging rebar or jeopardizing the structural integrity of the remaining concrete. When removal is complete, workers are left with a bonding surface that will provide a lasting correction.

Kumari Amisha Das

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Impact of Covid-19 in-Terms-of Social Acceptance

Recently, we are experiencing the resurgence of covid-19. In the deadly second wave, we have lost one of our beloved colleagues. Not only that, many relatives, friends and other people whom we know or don't know have lost their lives. Overall, it has already made amassive impact on our daily life. Meanwhile, I have experienced something which I am going to share with you. In the first week of January, many of our colleagues have been affected due to the covid. Till now, all of them have successfully beaten the disease caused by this. Many amongst them have joined their normal duties after that. But, their acceptance in society still remains to be a big question! In one of the meetings that I have attended lately, I have seen people running away from those who got affected by covid,maintaining a massive distance from them. That distance is not at all physical or social distance; more of a mental block or fear, which forced them to maintain the distance. However, maintaining all the covid norms as well as my ethics, I stood by them and sat beside one of them; obviously by maintaining the social distance and wearing two masks. The same people were loved and accepted by the colleagues; they were like partners on several team events in our college. They have enjoyed quite a lot of joyful moments together, both on and off the college campus. I am quite sure that the non-acceptance of the covid-victors is happening in different parts of this world. People are losing their minds in the fear of something unknown. Even we have seen doctors facing similar kinds of experiences in the society where they live.This should not happen to us. We are just going back to the medieval time when these occurrences were frequent. Let us not go back to that phase once again. Safety is obviously our first priority, but we should forget our human values. This non-acceptance is very agonizing and painful for any person. We all must stand by them, even during times of sickness. We don't really know who is going to need the help tomorrow; you might need a similar kind of support tomorrow. If you face similar behavior from the people, that will be shocking & upsetting for you. All we need to do is to support each and every human being at times of their need.

"NONE OF US, INCLUDING ME, EVER DO GREAT THINGS. BUT WE CAN ALL DO SMALL THINGS, WITH GREAT LOVE, AND TOGETHER WE CAN DO SOMETHING WONDERFUL."
– MOTHER TERESA

Soumyadip Das

Asst. Professor

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Waste management

Waste management (or waste disposal) includes the processes and actions required to manage waste from its inception to its final disposal. This includes the collection, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process and waste-related laws, technologies, economic mechanisms.

Waste can be solid, liquid, or gaseous and each type has different methods of disposal and management. Waste management deals with all types of waste, including industrial, biological, household, municipal, organic, biomedical, radioactive wastes. In some cases, waste can pose a threat to human health. Health issues are associated throughout the entire process of waste management. Health issues can also arise indirectly or directly. Directly, through the handling of solid waste, and indirectly through the consumption of water, soil and food. Waste is produced by human activity, for example, the extraction and processing of raw materials. Waste management is intended to reduce adverse effects of waste on human health, the environment, planetary resources and aesthetics. Proper management of waste is important for building sustainable and livable cities, but it remains a challenge for many developing countries and cities. A report found that effective waste management is relatively expensive, usually comprising 20%–50% of municipal budgets. A large portion of waste management practices deal with municipal solid waste (MSW) which is the bulk of the waste that is created by household, industrial, and commercial activity. According to the Intergovernmental Panel on Climate Change (IPCC), municipal solid waste is expected to reach approximately 3.4 Gt by 2050.

In the first systematic review of the scientific evidence around global waste, its management and its impact on human health and life, authors concluded that about a fourth of all the municipal solid terrestrial waste is not collected and an additional fourth is mismanaged after collection, often being burned in open and uncontrolled fires – or close to one billion tons per year when combined. They also found that broad priority areas each lack a "high-quality research base", partly due to the absence of "substantial research funding", which motivated scientists often require. Electronic waste (waste) includes discarded computer monitors, motherboards, mobile phones and chargers, compact discs (CDs), headphones, television sets, air conditioners and refrigerators.

According to the Global E-waste Monitor 2017, India generates ~ 2 million tons (Mte) of e-waste annually and ranks fifth among the e-waste producing countries, after the US, P.R. China, Japan and Germany.

• Recycling-

Recycling is a resource recovery practice that refers to the collection and reuse of waste materials such as empty beverage containers. This process involves breaking down and reusing materials that would otherwise be gotten rid of as trash. There are numerous benefits of recycling, and with so many new technologies making even more materials recyclable, it is possible to clean up the Earth. Recycling not only benefits the environment but also positively affects the economy. Materials for recycling may be collected separately from general waste using dedicated bins and collection vehicles, a procedure called kerbside collection. In some communities, the owner of the waste is required to separate the materials into different bins (e.g. for paper, plastics, metals) prior to its collection. In other communities, all recyclable materials are placed in a single bin for collection, and the sorting is handled later at a central facility. The latter method is known as "single-stream recycling."The type of material accepted for recycling varies by city and country. Each city and country has different recycling programs in place that can handle the various types of recyclable materials. However, certain variation in acceptance is reflected in the resale value of the material once it is reprocessed. Some of the types of recycling include waste paper and cardboard, plastic recycling, metal recycling, electronic devices, wood recycling, glass recycling, cloth and textile and so many more.

• Reuse-

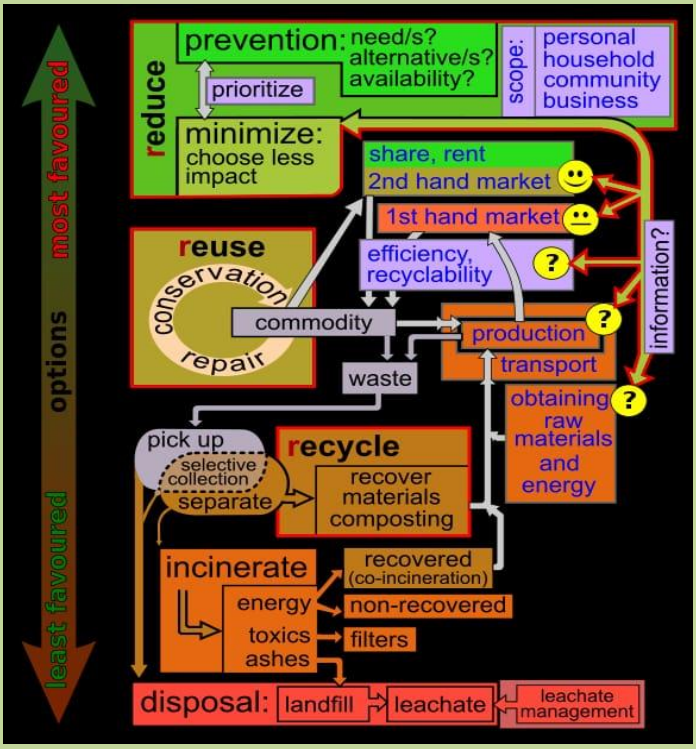
1: Recoverable materials that are organic in nature, sucis6as plant material, food scraps, and paper products, can be recovered through composting and digestion processes to decompose the organic matter. The resulting organic material is then recycled as mulch or compost for agricultural or landscaping purposes. In addition, waste gas from the process (such as methane) can be captured and used for generating electricity and heat (CHP/cogeneration) maximizing efficiencies. There are different types of composting and digestion methods and technologies.

2: Energy recovery from waste is the conversion of non-recyclable waste materials into usable heat, electricity, or fuel through a variety of processes, including combustion,

gasification, pyrolyzation, anaerobic digestion, and landfill gas recovery. This process is often called waste-to-energy. This process is often called waste-to-energy.

• Resource recovery-

Resource recovery is the systematic diversion of waste, which was intended for disposal, for a specific next use. It is the processing of recyclables to extract or recover materials and resources, or convert to energy.



Challenges in developing countries-Areas with developing economies often experience exhausted waste collection services and inadequately managed and uncontrolled dumpsites. The problems are worsening. Problems with governance complicate the situation. Waste management in these countries and cities is an ongoing challenge due to weak institutions, chronic under-resourcing and rapid urbanization. All of these challenges, along with the lack of understanding of different factors that contribute to the hierarchy of waste management, affect the treatment of needed.

• Technologies-

Traditionally, the waste management industry has been a late adopter of new technologies such as RFID (Radio Frequency Identification) tags, GPS and integrated software packages which enable better quality data to be collected without the use of estimation or manual data entry. This technology has been used widely by many organizations in some industrialized countries. Radio frequency identification is a tagging system for automatic identification of recyclable components of municipal solid waste stream.

Ankita Dhar

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Poetry & story

প্রিয় স্কুলবাড়ি

আমরা আজ খুব mature
পড়তে যাই কলেজে
স্কুলটা একবার ডেকে বলে
কি রে ,মনে পরে আমাকে ?
ছোট থেকে আজ হয়েছে বড় ,মন গুলো
শুধু রয়ে গেছে ...
কাঠের বেঞ্চে কলমে খোদাই নাম গুলো
খেলার মাঠ...ক্লাসরুম...কিংবা
স্যার-ম্যাম দের মজার নামে ডাকা
সেসব এখন সবই , মূল্যবান স্মৃতিতে রাখা
পরের দিনের খবর নেওয়া ,
কাল কখন আসবি বল ?
আজ সেসব ফুরিয়ে হয়েছে
আচ্ছা .. এবার রাখছি চল ..
শেষ দিন ...শেষ দেখা ...
সব স্মৃতিই রয়েছে এখনও মনে
আজও সেই প্রিয় ইউনিফর্মটা
রয়েছে আলমারির এক নির্জন কোণে

হবে নাকি ?আর একবার ,
কলেজ পালিয়ে অতীতের টানে গা
ভাসানো?

বৃষ্টি ভেজা সকালে ,ঘুম ভেঙে তোদের
সাথে দেব পাড়ি...আমার পুরনো
আবেগ জড়ানো অতীতের সেই
প্রিয় স্কুলবাড়ি॥

Farhan Ashiq
Roll- 12001321009
Civil engineering department

সমীকরন

এখনও রক্তের দাগ লেগে আছে

তোমার দু'খানি হাতে!

কত নামি দামী সুগন্ধি মেখেছি

তবুও সারা শরীরে ছড়িয়ে পড়েছে

ভ্যাপসা আঁশটে গন্ধ।

আজও মনে পড়ে সেদিনের

সেই উষ্ণ আলিঙ্গন ,

কতো ইফতার রাখী বন্ধন

কেটেছিল সাথে সাথে।

নামাজের সাথে কতো প্রার্থনা,

মিশে গেলে একসাথে,

হঠাৎ পলাশের লাল মেঘে

ছেয়ে গেল আশপাশ

তুমি আমি সে যে,

কবেই পৃথক ভিন্ন দুটি "জাত"।

ধর্ম নামক হিস্টিরিয়ায়

কেঁপে কেঁপে ওঠে হাত,

তোমার রহিম নাকি আমার রামের

মাথা নিতে হবে আজ!

তবেই না তুমি মুসলমান

আমি হব হিন্দু সম্রাট।

তবুও তোমার আমিনা আমার আমলে

পাশাপাশি যদি হাঁটে

সপ্তসূরের বীণাগুলো

নিজে নিজেই বেজে ওঠে।

Jhilik Bandyopadhyay
12001321050, 2nd Year
Civil Engineering, BCREC

Story-

POKKHIRAJ

Seven o'clock in the evening !!!

But in the winter in the village, a very serious message came to me ----------

The biggest desire in life was to be a journalist, I always wanted to, from that little one.

Tomorrow is the first day of my joining, the news I got yesterday,

Tomorrow the girl will go to the office, like a happy pigeon in the next room, my parents are busy in deep discussions about what to eat and send the girl to the office on the first day, not only that there is poverty, not even the extreme of the rich
Middle-class, yes, being a journalist from a middle-class family was not an easy thing to do.

However, the mother said that it is better to go ahead with the past, this is the time to eat today

"Never reach the pinnacle of success, let alone a speck of arrogance."

In the midst of all these thoughts of mine, yesterday's menu was fixed by the two happy pigeons in the next room,

"Khepi will go to work tomorrow, I will bring two-wheeled pona fish from the market," he said.

"So come on, the girl loves to eat thin fish soup,

How happy she would be to see her grandmother alive today.

"Yes go, you called your brother and gave the news, what did Chaitali say?"

"Chaitali called in the evening, very anxious

By

Aihik Mahinder

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ONLINE CLASS

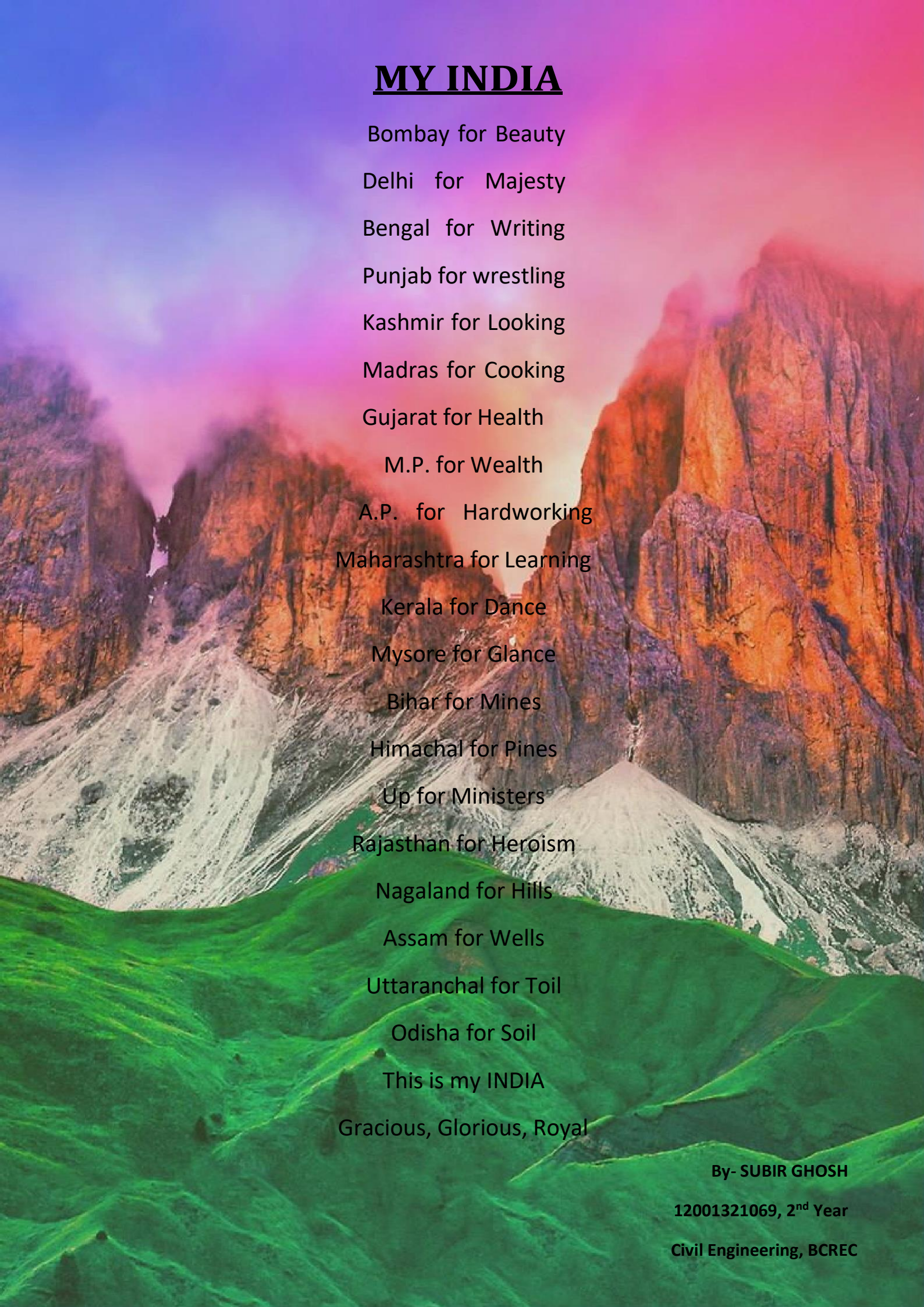
Online , online and online
It's the era of quarantine.
We are totally stuck in virtually combine,
And curiously waiting for it's deadline.

On first day of lockdown,
I heard our college is fully shutdown.
We doing our class regularly online.
Not feel enough good, but it's fine.

Teachers are in camera looks so BORING ,
And the lecture are continuously ignoring.
When teachers give question to finish,
We generally request to meet diminished.

We almost unaware with every theorem.
Net problem and nothing can audible becomes our genuine problem.
I pray that we overcome this situation and go to college again,
To give us relief from headache in our brain.

BY-
SUSMITA BAURI
12001321051, 2nd Year
CE Department, BCREC



MY INDIA

Bombay for Beauty

Delhi for Majesty

Bengal for Writing

Punjab for wrestling

Kashmir for Looking

Madras for Cooking

Gujarat for Health

M.P. for Wealth

A.P. for Hardworking

Maharashtra for Learning

Kerala for Dance

Mysore for Glance

Bihar for Mines

Himachal for Pines

Up for Ministers

Rajasthan for Heroism

Nagaland for Hills

Assam for Wells

Uttaranchal for Toil

Odisha for Soil

This is my INDIA

Gracious, Glorious, Royal

By- SUBIR GHOSH

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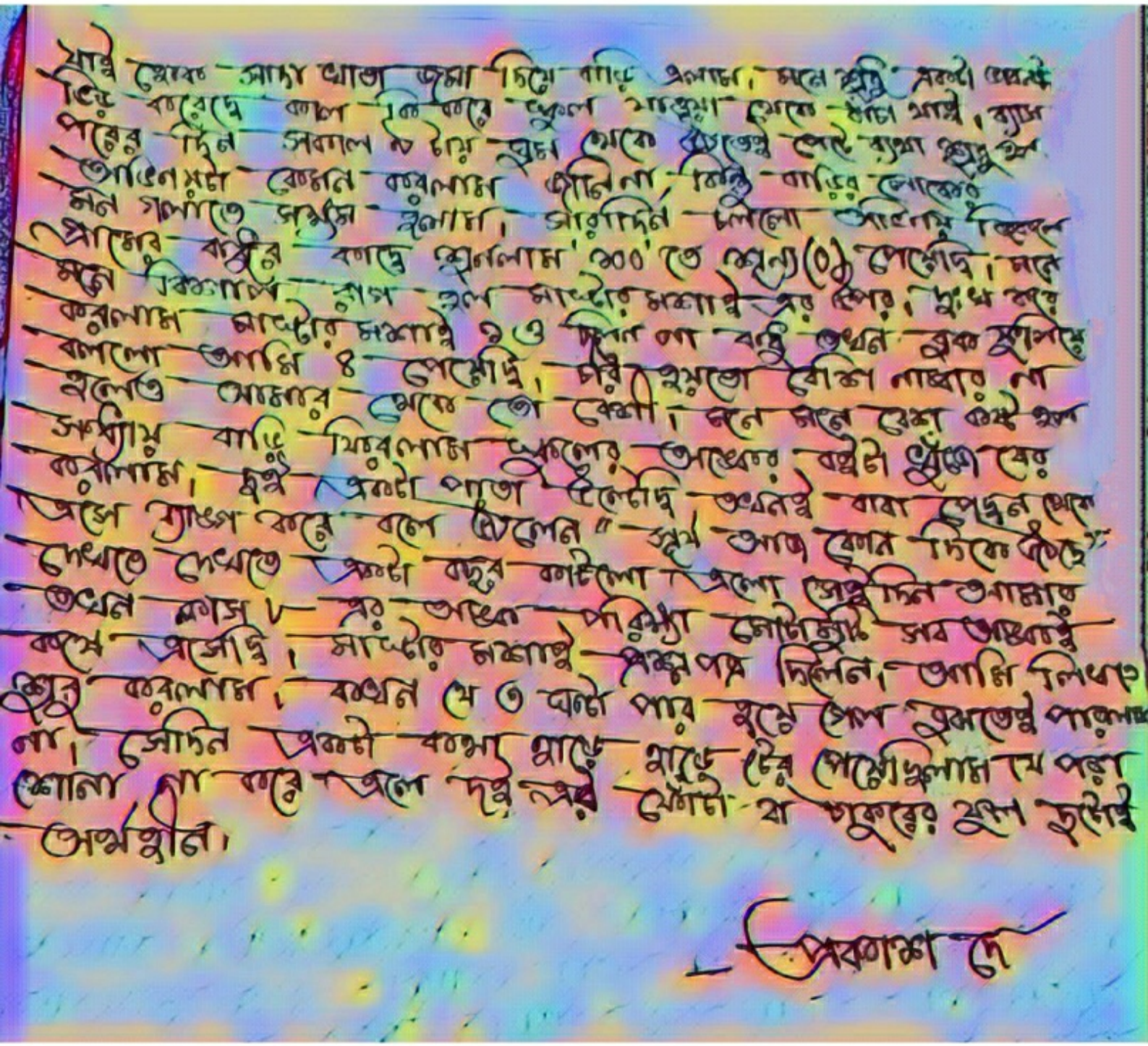
Civil Engineering, BCREC

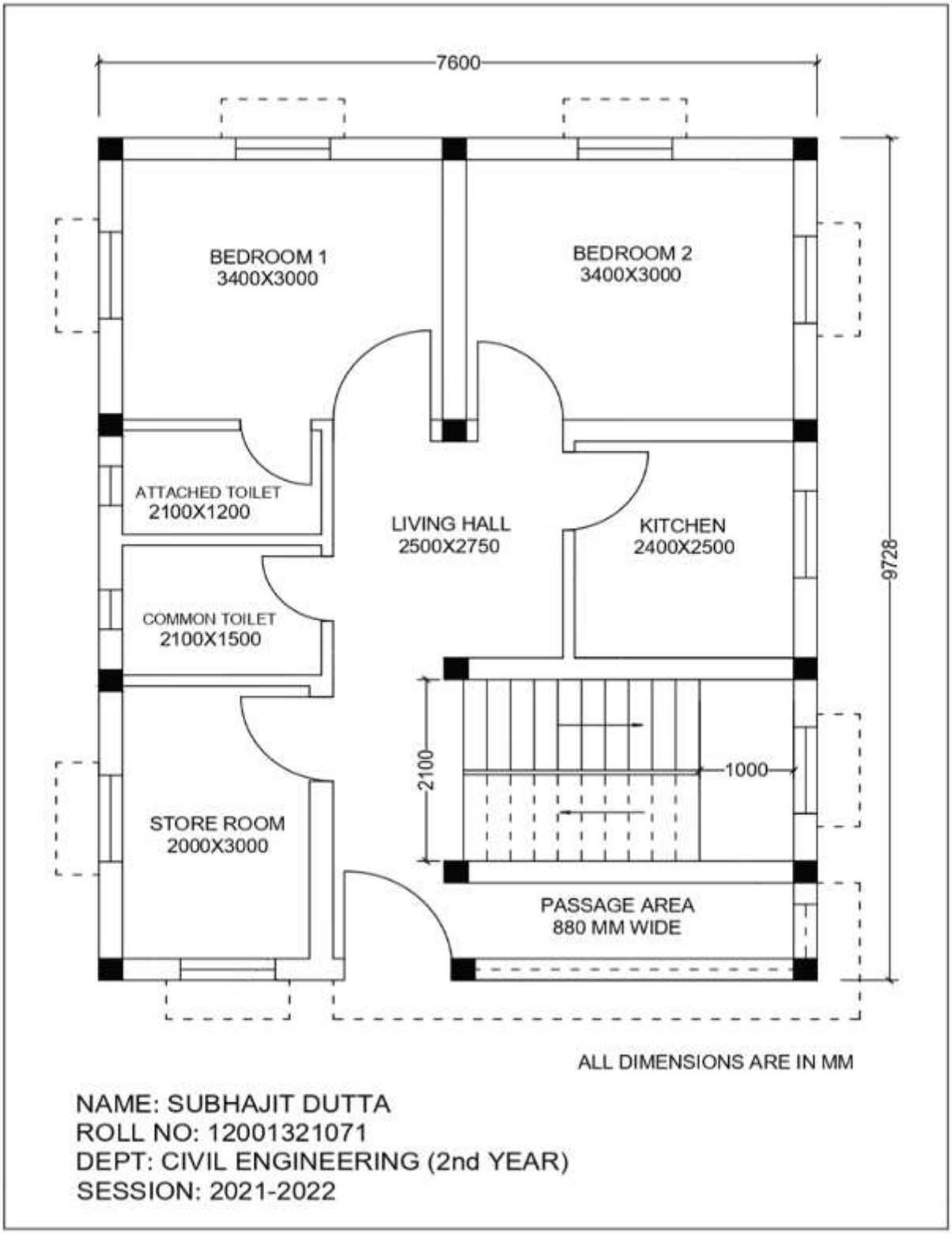
অঙ্কে কি কঠিন!

গল্পটা হয়তো বেশ কিছু আগের, সম্ভবত ৮ বছর পেরিয়ে গেছে, আমি তখন ক্লাস ৭-এ পড়ি। আমি বলতে অনিকেত রায়। অঙ্কে আমার বিরাট ভয়। পড়াশুনাটা আমার কাছে কষ্টের ব্যাপার। সম্ভবত সেদিন ছিলো সোমবার, স্কুলে অঙ্ক পরীক্ষার দিন। সকাল ১০:০০ টায় স্নান সেরে স্কুলে পৌঁছালাম, গিয়ে দেখি, সবাই পরীক্ষার হলে ঢুকে পড়েছে, আমিও তাড়াতাড়ি করে ঢুকে পড়লাম। মাস্টার মশাই আমাকে ব্যাগ বাইরে রেখে বসতে বললেন। গোটা পরীক্ষার হলটিকে আমি এক নজরে তাকালাম দেখি সবার কপালে দইয়ের ফোঁটা, পাশে ঠাকুরের ফুল। আমার সিট প্রথম বেঞ্চে পড়েছে। মাস্টারমশাই হাতে প্রশ্নপত্র দিয়ে গেলেন। প্রশ্ন হাতে নিতেই বুঝলাম হৃদপিণ্ডটা ছটফট করছে, হাত কাঁপছে। না না এতো ভাবার কিছু নেই এসব অঙ্কের বর্ণমালা। মাস্টার মশাই [illegible] হাসি নিয়ে বললেন ওরে অনিকেত বাবু যে সচেতন আমার অবস্থা দেখে একটু মজা নিলেন। আমি কোনো উত্তর না দিয়ে লিখতে শুরু করলাম কিন্তু মনে হল যেনো আমার দিকে তাকিয়ে সাদা কাগজটা ব্যঙ্গ করছে। অঙ্কের একটা কথা বলে নিই সাদামাটা বলতে 'উত্তরপত্র' কিন্তু উত্তর না, লিখলেও কি সেটা উত্তর পত্র?? আমার মনে প্রশ্ন জাগতো। যাই হোক পরীক্ষার সময় ৩ ঘন্টার মধ্যে ২৫ মিনিট পেরিয়েছে কিন্তু মনে হচ্ছে যেনো দেওয়ালে ঘড়ির কাঁটাগুলো যেনো কচ্ছপের গতিতে ছুটছে। মনে মনে ভাবলাম শুধু এই ফোঁটাটা নিলে হয়তো অনেক কিছু লিখতে পারতাম। যাই হোক, কোনো রকমে ৩ ঘণ্টা পার করলাম। হঠাৎ দেখি অঙ্কের মাস্টার মশাই হেসে এসে হাজির। গম্ভীর গলায় বললেন: কাল এসে সবাই অঙ্কের খাতাটা দেখে যাবে। হ্যাঁ ঠিকই বলেছেন আমাদের অঙ্কের মাস্টারমশাই একজন পরিশ্রমী মানুষ।



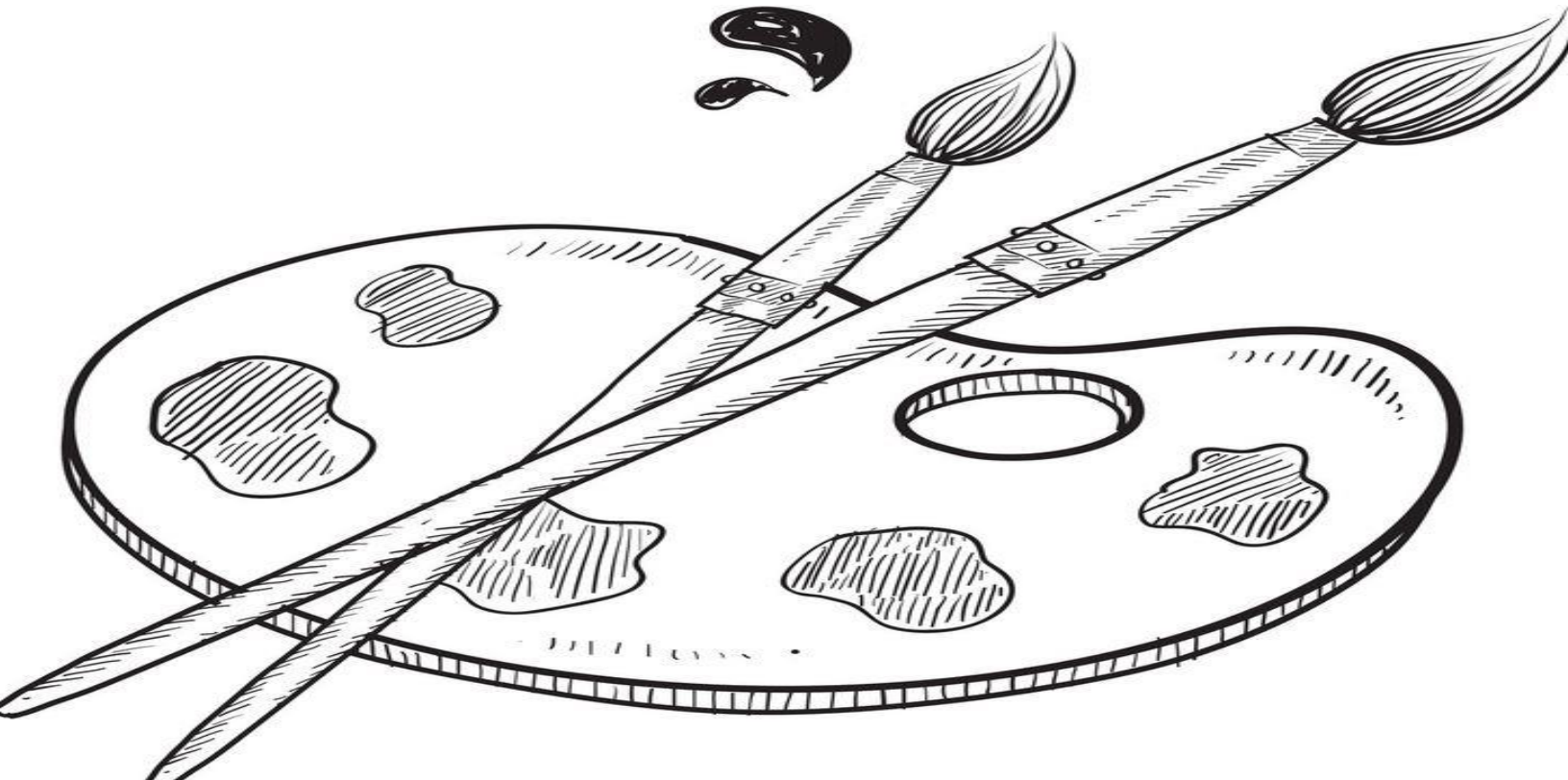
NAME-PRAKASH DE
CIVIL DEPARTMENT, 2ND YEAR
ROLL NO-12001321070

PLANNING OF A BUILDING



NAME: SUBHAJIT DUTTA
ROLL NO: 12001321071
DEPT: CIVIL ENGINEERING (2nd YEAR)
SESSION: 2021-2022

drawings

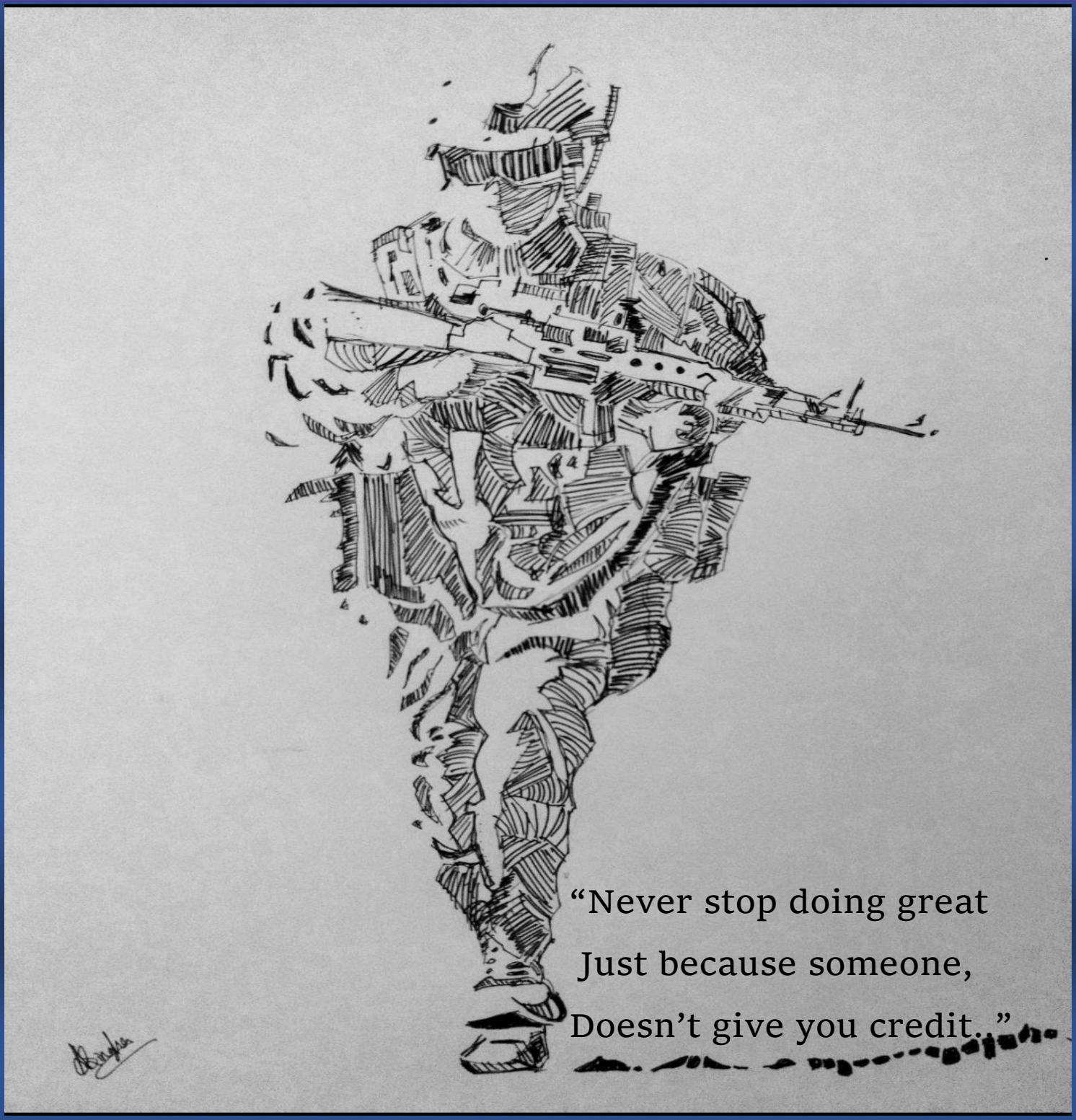


ANKITA DHAR

12001321056, 2ND YEAR

CIVIL DEPARTMENT, BCREC

Name - Aritra Mondal
Roll No - 2019157
Civil 2 nd yr



AYAN SINGHA

TECHNICAL ASST.

CIVIL DEPARTMENT, BCREC

Use Recyclable bags –

Plant & give water to a tree –

Clean water & save the life –

Say No!
To Single-Use
Plastics –

Name :– Deeya Chattopadhyay
Dept. :– B.Tech Civil
Yr :– 2nd
Univ. Roll no. :– 12001320025

Abhishek Kumar
12001320023, 2nd Year
Civil Department, BCREC

PALLABI ROY

12001320038, 3rd Year

CIVIL Department, BCREC

Manisha Dey
12001321016, 2nd Year
Civil Department, BCREC

PRITAM BISWAS

12001321010, 2ND YEAR

CE DEPARTMENT, BCREC

RITWICK KUMAR

12001320047, 3RD YEAR

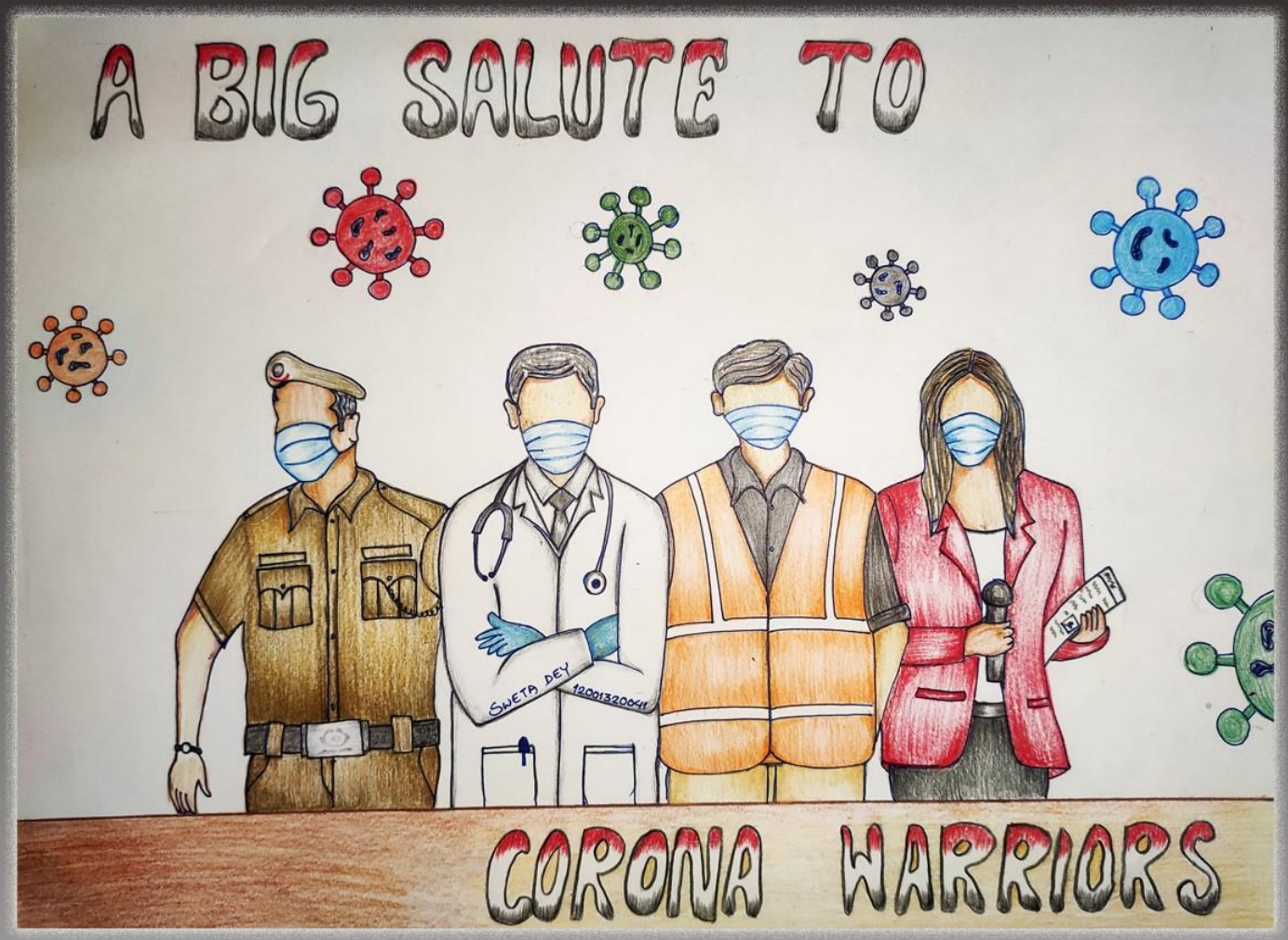
CIVIL DEPARTMENT, BCREC

Shubhasis Paul

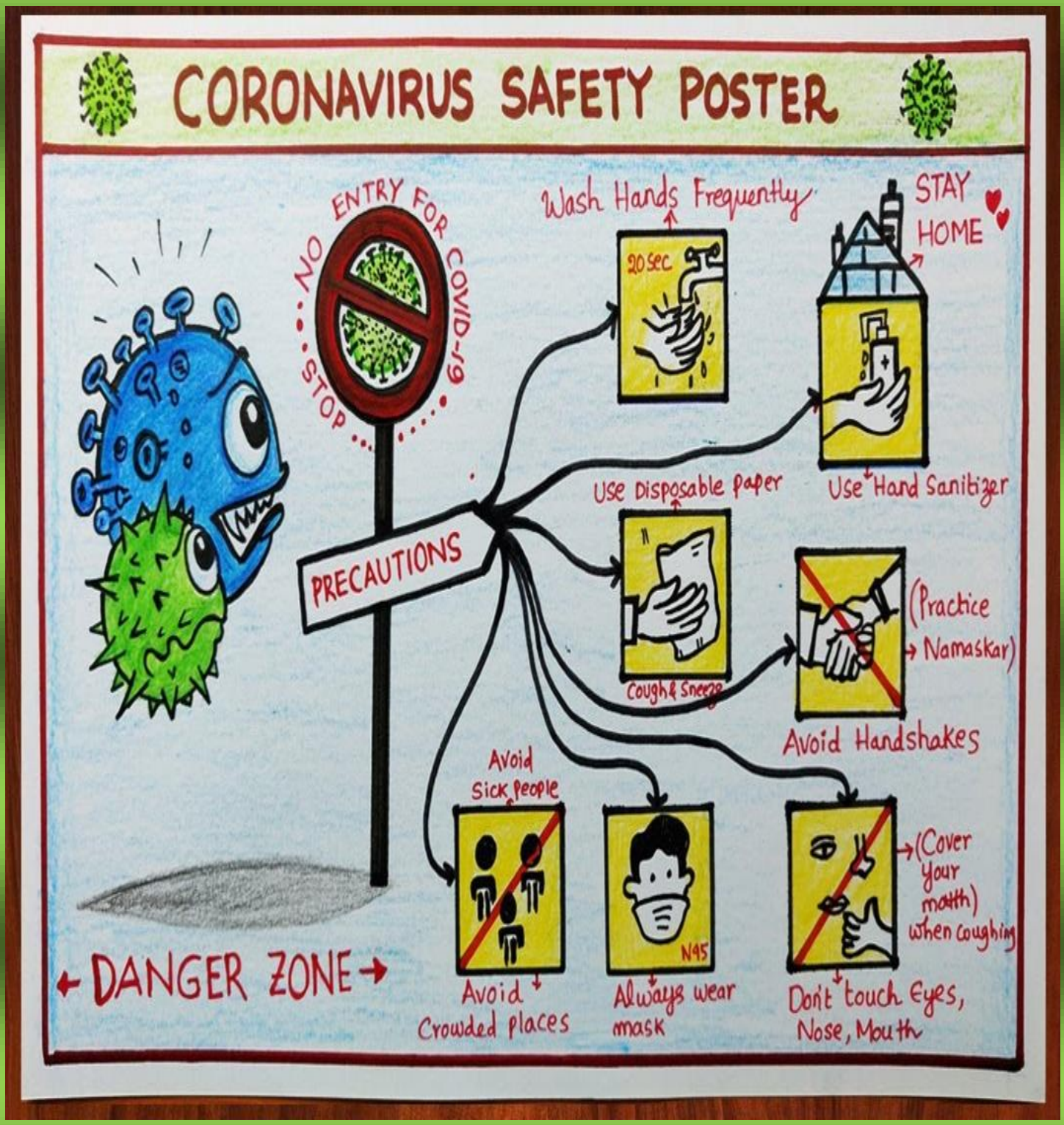
12001321048, 2nd Year

CE Department, BCREC

STAY HOME STAY SAFE



Name- Sweta Dey
Roll No- 12001320041
Department- Civil, Sem- 5th
Dr. B. C. Roy Engineering College (Durgapur)



TIMIR KANTI KONAR

12001321014, 2ND YEAR

CE Department, BCREC

Photography

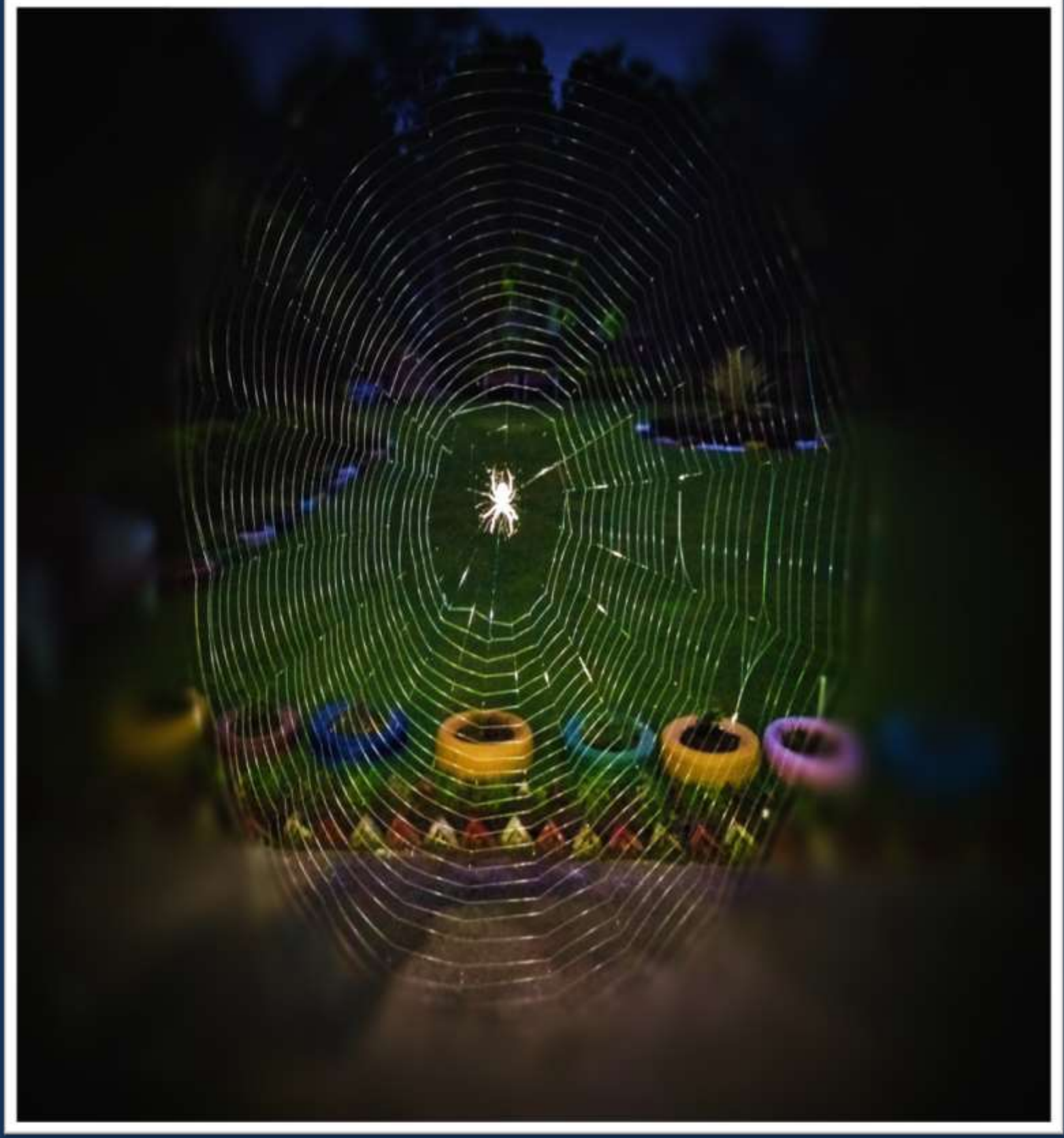
POTRAIT PHOTOGRAPHY- It is a type of photography aimed towards capturing the personality of an individual.

FOOD PHOTOGRAPHY- It falls under the category of still life photography, used to capture attractive and beautiful photos of food.

LANDSCAPE PHOTOGRAPHY- Landscape photographs captures the presence of nature but can also focus on manmade features.

By- RETHIK DAS
Roll- 12001321054
Department of Civil Engineering
Dr B.C Roy Engineering Collage , Durgapur

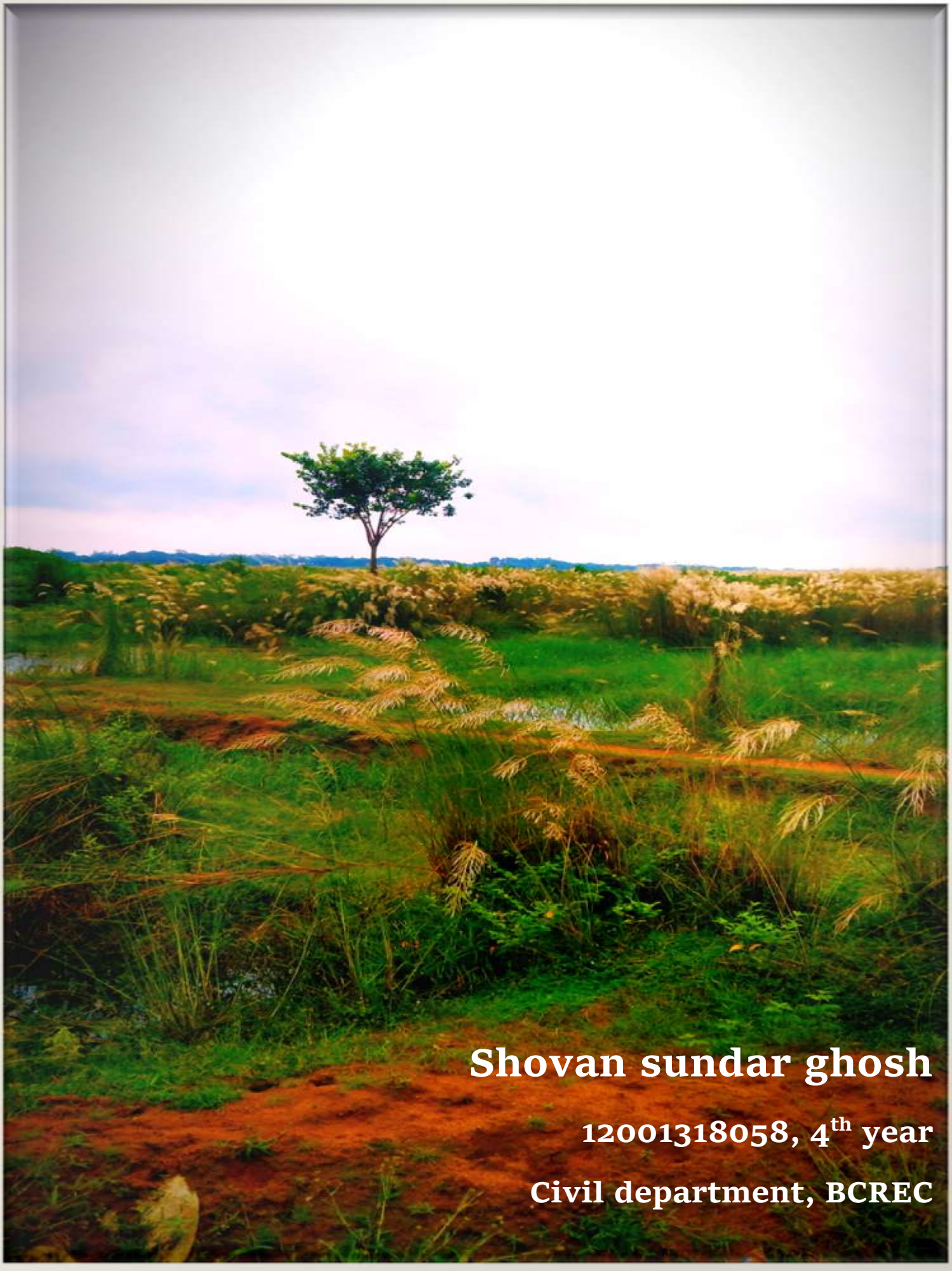
Debargha Ghosh
12001321047, 2nd Year
Civil Department, BCREC



ANUJ KUMAR

12001318088, 4TH YEAR

CIVIL DEPARTMENT, BCREC



Shovan sundar ghosh

12001318058, 4th year

Civil department, BCREC

Ritu Raj

12001318062, 4th Year

Civil Department, BCREC

MY PURULIA

Purulia is a land of natural beauty. The lush greenlandscape, verdant hills and dense forests make it a perfect tourist destination that gives a rustic ambience and peaceful surroundings to weary city dwellers. This western most district of West Bengal unravels her untapped mystery and wondrous beauty

CHHAU DANCE PURULIA VILLAGE PHOTO

PITHA AND MAHUA AY PURULIA

AYODHYA PAHAR PURULIA

PEARLTREE HOTEL AND RESORT PURULIA.

KASHIPUR RAJBARI PURULIA

SUBHAJIT BANERJEE

12001321065, 2nd Year

CE Department, BCREC

MAMUN RAHAMAN

12001321006,1st year

Civil department, BCREC

PHOTOGRAPHY

"Where words fail, music speaks."..

Never hide your wings..

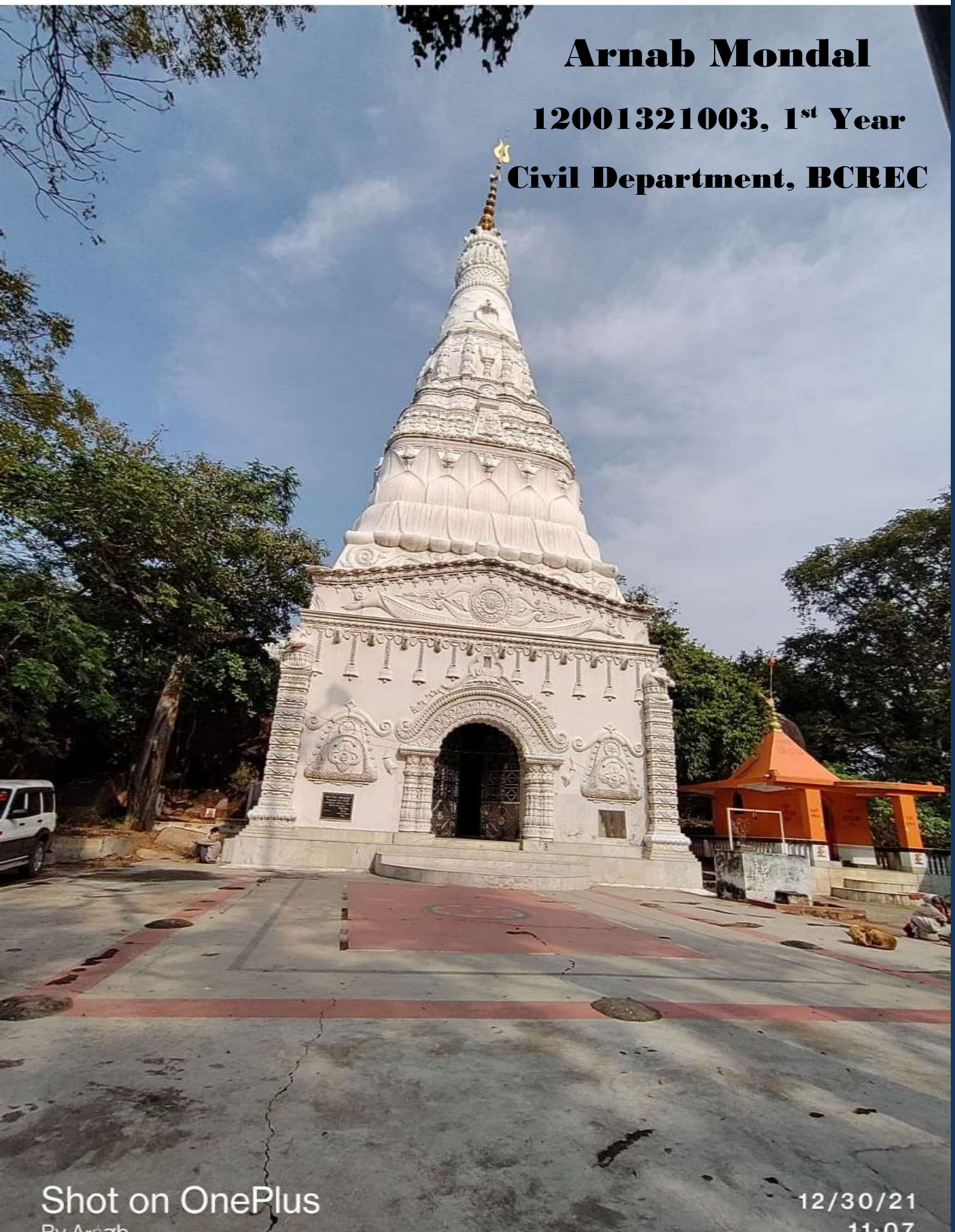
chop your own wood and it will warm you twice..

ANIRBAN SAHA
UNIV.ROLL NO-12001319047
DEPT.-CIVIL ENGINEERING
SEM-5TH

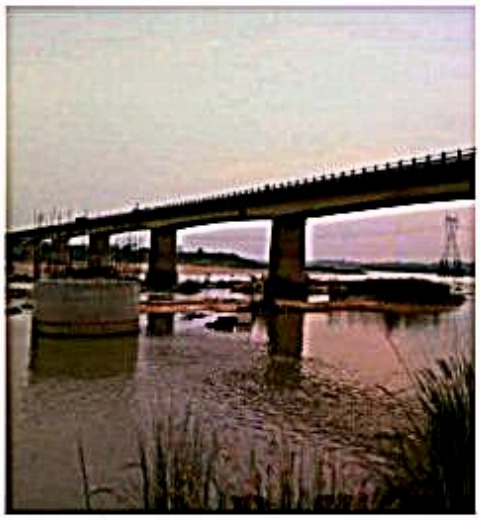
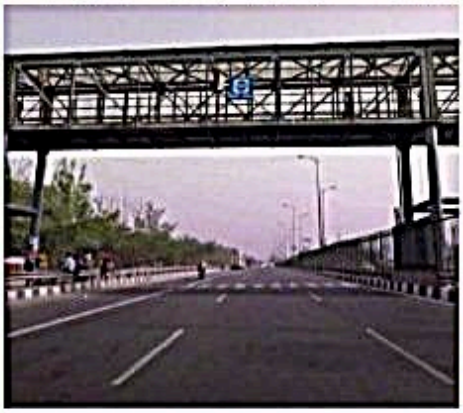
Arnab Mondal

12001321003, 1st Year

Civil Department, BCREC








Name-Sabyasachi Ghosh

Roll -12001321013

Branch- civil engineering

Year - 2nd , 3rd sem

session -2021-22

Degree - B.tech

DR. B.C engineering college,
Durgapur

E - Magazine

CIVILOHOLIC

Technical Articles, Literatures, Poetry, Drawings and Photography are invited for upcoming publication.

Guidelines for submission to the magazine:

1. *Topic of Article*: Technical or Literature
2. *Language*: English, Hindi and Bengali
3. *Word limit*: 2000
4. Articles are to be sent as *Microsoft Word document.*
5. *For Photography and Drawings* send photos only in jpg/jpeg/png format.
6. Provide particulars: NAME, Roll no/Registration No., Year, Branch/ Department, and Contact Number.
7. Students of DR. B. C. Roy Engineering College can send their creations.
8. Send your softcopies using this form: https://docs.google.com/forms/d/1ZTec2KQJtiyS734b2BdZyCPg-vCTcP_ZeBx65Vmp-YY/edit?gxids=7628
9. You can send suggestions if any at: subhashis.chowdhury@bcrec.ac.in

!!!THANK YOU!!!