A MAGAZINE BY DEPARTMENT OF CIVIL ENGINEERING
ACADEMIC YEAR 2021-2022

"OVER and UNDER"

EMAARAT

VOLUME 06
ISSUE 01

THAKUR COLLEGE OF ENGINEERING & TECHNOLOGY

Thakur College of Engineering & Technology (TCET) was established in the academic year 2001-02 with a clear objective of providing quality technical education in tune with international standards and contemporary global requirements. The College is recognized by the All India Council for Technical Education (AICTE) & Govt. of Maharashtra and is affiliated with the University of Mumbai (UOM). All the courses at the U.G. level, eligible for accreditation in 2011 i.e. Electronics & Telecommunication (EXTC), Information Technology (IT) and Computer Engineering (CMPN) were accredited by NBA for three years w.e.f. 16.9.2011. Moreover, these programmes are also given permanent affiliation w.e.f. A.Y. 2015-16. The management's commitment to excellence and relevance in technical education is reflected in the marvellous infrastructure that is comparable to the finest institution of its type in the country.

The imposing fivestoried building - housing state-of-the-art computer laboratories, spacious classrooms, well-equipped laboratories, workshops, computer centre with a server room, a well-stocked library, wide and well lit clean corridors and a large canteen, conference hall, seminar halls has set new standards in providing facilities of international level. The application of modern technology in the teaching-learning process and effective day-to-day governance of the college makes TCET unique. Key initiatives like teacher guardian scheme, book bank scheme, induction of resource books, yearly organisation of events (like Multicon-W, technical and cultural festivals etc.) make TCET an institute with a difference. Thus, within just 15 years of its existence, TCET has carved out a niche for itself as one of the leading engineering Colleges under the University of Mumbai in Maharashtra

"MOVE FORWARD. GOOD THINGS ARE UP AHEAD."

"TO BECOME A DEPARTMENT OF NATIONAL RELEVANCE IN THE FIELD OF CIVIL ENGINEERING"

DEPARTMENT VISION

DEPARTMENT MISSION

"THE DEPARTMENT OF CIVIL ENGINEERING IS COMMITTED TO PROVIDE UNDERGRADUATE STUDENTS WITH SOUND KNOWLEDGE IN THE FIELD OF CIVIL ENGINEERING AND BUILD IN THEIR LEADERSHIP AND MANAGERIAL SKILLS ALONG WITH INCULCATING THE CULTURE OF LIFELONG LEARNING AND SOCIAL SENSITIVITY"

DR . SANJAY KUMAR

PhD (Mechanical Engineering)
M.Tech (Industrial Engineering & Management)
B.E (Production Engineering)

"The weakest ink is better than the strongest memory."

Education is the basis of all progress. Its purpose is to inculcate humanitarian values, wisdom, compassion, courage, and reliability in students. Academic excellence along with active participation in co-curricular activities complete the process of education and it gives me immense pleasure that the institute is progressing in all its endeavors towards the overall development of the students. The Department of Civil Engineering TCET's EMAARAT is going to give the same pleasure to all the brilliant minds that traverse through the portals of this temple of learning.

I am happy to see the amount of enthusiasm of eminent members of the college to contribute to the magazine. Not to be outdone, our students have devoted time and plunged into creating powerful and informative articles. I congratulate the editorial team and the faculty of the civil department for their untiring efforts in publishing the magazine. This shows the positive and creative energy of faculty members and students present in the college.

We proudly publish the 6th volume of our departmental magazine. One of the most. We intend to continue presenting the talent and creativity of our staff and students through EMAARAT every year. I am sure this venture will go a long way in shaping young minds & sharpening their creative talents.

DR . SEEMA JAGTAP

PhD Technology (Civil Engineering)
M.Tech Civil (Hydraulics Engineering)
B.E (Civil Engineering)

It is very much apparent that we live today in a world that is so very different from the one we grew up in, the one we were educated in. Change in today's world is riding at an accelerated pace and we need to pause and reflect it on the entire education system. I firmly believe that students must be taught how to think, not what to think. That reminds me of the great words of wisdom by Aristotle, "Educating the mind without educating the heart is no education at all. "We as the essential parts of the science and civil engineering fraternity, it becomes our duty to look through the horizon of any information we receive, appreciate and acknowledge the findings of our civilization, and to also address its flaws.

We here at TCET Civil Department are proud to provide the students with a platform through our departmental magazine "EMAARAT" to exhibit their grit and guts. The magazine reflects as the mirror of the findings and qualitative research of the students.

I feel privileged to be a part of such a fascinating venture, our students, behind the editorial and digitization of the magazine, and those who have provided us with their thoughts, both have done a spectacular job, and deserve an enormous amount of gratitude that I here want to convey on the behalf of the department. Also, throughout the academic year, our ASCE Students Chapter has provided us with the best opportunities and experiences the student fraternity could ask for. My greeting and best wishes for all those associated with the effort of the publication of this magazine.

> **"Determination is doing what needs to be done even when you don't feel like doing it."**

MRS. RUTUJA SHINDE

M.E (Water Resources & Environmental Engineering)
B.Tech (Civil)

Education is not a mere accumulation of facts; it is the preparation of life itself. Education is knowledge imbued with wisdom and ethics. It develops the personality of the students, molds their character, and develops mental skills to help them cope with the problems and challenges of the complex world of today.

One of the most significant character traits that need to be instilled in our youth during their education is a finely ingrained attitude of service- before self. The aim is to make them successful not only in life but also conscious of their duties and responsibilities towards their fellow citizens. It gives me immense pleasure to pen words for yet another issue of our Civil department magazine “EMAARAT”. The magazine aims to put together the best creative work of our students. I am thankful to TCET and the rest of its fraternity and extended family for letting me with numerous ventures like this magazine.

It is always a pleasure to be a part of a team that strives to bring out the talents of students and staff. TCET has always been striving to keep itself ahead of the competition and the results are now for everyone to see. My message to students is that you should endeavor to be better human beings, while foraying in competitive life, realizing your dreams, and when you get the opportunity flash it out with your genuine talent among you.

> “You may never know what results come of your action, but if you do nothing there will be no result.”

MST. HARSHAD VHATKAR

ASCE WEBMASTER
SE B STUDENT

"Creativity is inventing, experimenting, growing, taking risks, breaking rules, making mistakes, and having fun."
-- Mary Lou Cook

Being in the creative team is the same job as mom and dad in one person. The strategy and tactics for the stories, the cover design, the theme, the layout, those are our children. They need to be nurtured, guided, given rules, socialized, corrected, taught, and nurtured some more.

To me, creativity is optimum unbiased solutions to complicated issues unleashed through any medium – digital, written, spoken. In this process, we envision what isn't and we figure out how to bring it to pass.
Some have argued that teamwork can offer greater creativity and productivity than working as an individual. From my experience perspective, I would agree with this. Combining ideas and experiences from various minds can greatly increase the success of the project. Relating to the title 'EMAARAT' I believe, you can't build a great building on a weak foundation. You must have a solid foundation if you're going to have a strong superstructure. Our team, I call it my solid foundation, we have collectively worked on every aspect of the design that is in front of you. From rough designs to collocating elements for creating the final design, we have poured our heart out to build our strong superstructure.

A vote of thanks to everyone who has constantly contributed to the success of the magazine!

I hope you enjoy the read!

> **"A leader is not the one who only takes the lead but the one who makes sure no one is left behind."**

MISS. SHRESHTHA BHARGAVA

ASCE PUBLICATION HEAD
SE A STUDENT

> **“Always dream and shoot higher than you know you can do. Don’t bother just to be better than your contemporaries or predecessors. Try to be better than yourself.”**

EMARAAT has been a perfect platform to show up our findings and the knowledge we gained, the creativity and artwork we display, the writing skills we grasped, and most importantly the experience we shared. This magazine gives the wholesome of all what we learned and acquired.

Creativity? It can be defined in multiple ways, if you ask a creative person what inspired them to create something, they might not be able to give you one concrete answer. Because being creative is all about expressing yourself.

Doing it all the time, regardless of our mood, gives us ownership of our writing ability. It takes it out of the realm of conjuring where we stand on the rock of isolation, begging the winds for inspiration, and it makes it something as doable as picking up a hammer and pounding a nail. Writing may be an art, but it is certainly a craft. It is an easy and workable thing that can be as steady and reliable as a chore.

Some painters transform the sun into a yellow spot, and then some with their art and their intelligence, transform a yellow spot into the sun.

On behalf of our team, I would like to offer a word of thanks to our readers, contributors, authors, editors, and anonymous reviewers, all of whom have volunteered to contribute to the success of the magazine EMAARAT.

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SANJEEV NAHAR
SENIOR VICE PRESIDENT,
RAHEJA

Can you tell us a little about your journey from a civil engineer to present fame & success?

I have done my graduation in civil engineering in 1989 from SGITS Indore. From 1989 to 1997 I have worked for industrial building construction and constructed one glucose and one distillery unit. From 97 onward I am working bridge construction field. I was in charge of the construction of 9km long elevated wider of DMRC, Hyderabad metro, many highway projects, and Railway over bridges. Presently I working in Mumbai metro project for the last 5 years.

What efforts do you recommend a student to put during his/her study years, which would be helpful to make him/her to ready for industry life?

Students should be sincere in the study and basic concepts should be clear, which will be helpful in the future during their career. He/she should attend internship/training under the guidance experienced professional to clear his basic concept.

In the current age of growing opportunities in entrepreneurship & research work, what is the scope of civil engineering students in the field as fresher?

As India is a developing country there is a lot of scope for freshers in the infrastructure development projects like Bullet Train, Metro Train in Metropolitan cities, new railway lines, Flyovers, Express highways & railway dedicated freight corridor connecting metropolitan cities, etc. There is also scope for Design, contract management, planning, environment, etc.

What are your predictions about innovations & development in the field of civil engineering?

There is a lot of scope for Innovation & development in civil engineering. Many Iconic bridges are under construction for Metro, Railway and Highways, etc. High-rise buildings, dams, monuments, large span bridges with new technology are also under construction.

CHIEF PROJECT EXECUTION EXPERT

“SANJAY BHARGAVA”

SYSTRA GC

What is your advice for aspiring civil engineers in the field of research, innovation & ideas?

As civil engineers, they should always be interested to learn the construction technology, software like Primavera, AutoCAD, MIDAS, STAAD, SketchUp, etc

Do you believe in this age of industrialization is it possible to maintain a balance between environment & construction?

Yes, now there is environment-friendly construction technology.

What are the qualities in a student, industries hunt for?

He/she should be sincere and dedicated towards work and Honest. They should be interested to learn & implementing the technology, quality conscious.

According to you what is the most important invention in the field of civil engineering to present?

Iconic bridges, large span bridges, high rise buildings

According to you how important is job experience in the field of civil engineering?

The performance of a civil engineer improves with the experience.

Can you suggest some new projects for students, which can bring change in the engineering field?

Bullet Train, Metro Train in Metropolitan cities, new railway lines, Flyovers, Express highways & railway dedicated freight corridor connecting metropolitan cities, etc. Projects include Design, contract management, planning.

Can you tell us a little about your journey from a civil engineer to present fame & success?

I have done my civil engineering from Shree LR Tiwari college of engineering in 2019 from Mumbai, during my studies I was also working with different companies, I started working since my 2nd year of engineering I always stand with quote 'never stop yourself from gaining experience' I am currently working as project manager in Heritage Infra Mega Structure India Pvt Ltd.

What efforts do you recommend a student to put during his/her study years, which would be helpful to make him/her to ready for industry life?

Firstly Basic knowledge should be strong. The person should be keen to gain knowledge. Should do internship and learn as much as possible.

In the current age of growing opportunities in entrepreneurship & research work, what the scope of civil engineering students in the field as fresher?

Civil is the backbone of the humanity, Government has launched many schemes for the freshers like MSME where you can make your company and gain various benefits also in Maharashtra if you have company and you are an engineer you can take PWD CPWD works get registered or panel with them.

What are your predications about innovations & development in the field of civil engineering?

The best innovation currently happening is in building repair there are various technologies to repair the Detoriated parts in building, soon we will be able to design the building via 3D Printing.

PROJECT INCHARGE

“NARAYAN GUPTA”

HERITAGE INFRA MEGA STRUCTURE INDIA PVT. LTD.

What is your advice for aspiring civil engineers in the field of research, innovation & ideas?

Learn different types of software, keep yourself updated with new research & technology this will help you to create more interest in the field.

Do you believe in this age of industrialization is it possible to maintain a balance between environment & constructions?

Yes it is, we should switch to green building, this not only helps environment but also one's personal health.

What are the qualities in a student, industries hunts for?

Honesty and Sincerity towards the work, The basic knowledge of the particular work.

According to you what is the most important invention in the field of civil engineering till present?

The iconic statue of Sardar Patel which is situated at Gujarat, the bridges,

According to you how important is a job experience in the field of civil engineering?

Job allows you to convert your knowledge into experience, as a fresher's one can do interns in industry and learn, job also teaches you time management, sincerity towards the work, develop your communications skills.

Can you suggest some new project for student, which can bring change in engineering field?

3D Printing with concrete, advance steel structures, replacement of cement, wooden structures etc.

Can you tell us a little about your journey from a civil engineer to present fame & success?

I am not a Civil engineer, I was in BSF (Border Security Forces) after that I joined industry where I learned a lot from scratch I have 25 years of experience in this field, now I am the proprietor of Puja and Co. We do all the repair and rehabilitation work all over India we work with government, Semi government, PSU and many more.

What efforts do you recommend a student to put during his/her study years, which would be helpful to make him/her to ready for industry life?

Knowledge is the most important thing, student should clear their basics, try to do training in companies or do job of 1-2 months at least and get experience this will help you a lot in industry life.

In the current age of growing opportunities in entrepreneurship & research work, what the scope of civil engineering students in the field as fresher?

There is a lot of scope for student in New infrastructures projects, also government have noms for companies that they should have supervisors and 1 engineer at least in project costing 1-10 lakhs.

What are your predications about innovations & development in the field of civil engineering?

There are lot of new innovation on verge of start on large scale, hyperloop one of the biggest innovation and development in transportation is on verge to start.

What is your advice for aspiring civil engineers in the field of research, innovation & ideas?

Try doing mini project that will help you to build interest in the field, after that start searching for the problems and bring solutions to that through your ideas.

PROPRIETOR

“PAPPU VERMA”

PUJA & CO.

Do you believe in this age of industrialization is it possible to maintain a balance between environment & constructions?

Yes, why not! There is so much increase in Global warming every nation is trying to switch to renewable energy.

What are the qualities in a student, industries hunts for?

Basic knowledge, software knowledge like Auto-Cad, revit, etc. Honesty towards work.

According to you what is the most important invention in the field of civil engineering till present?

New foundation technology, bridges new concrete technology etc.

According to you how important is a job experience in the field of civil engineering?

Experience always plays a critical role in any field, experience make you perfect for work, if an experienced person is working on any project basically the outcome of that project will be more

Can you suggest some new project for student, which can bring change in engineering field?

City planning, construction planning, foundation design, etc.

Can you tell us a little about your journey from a civil engineer to present fame & success?

Our college is from a remote village but since I did my project on slip forming, the latest technology from HCC the top company, I got my first job in a Swedish collaboration firm, BYGGING INDIA LTD. My journey started from a contracting firm and kept on moving and learning all traits of engineering across the greenfield projects, besides my project. Then after 5 years, I was selected as company head in kk engineering. Seeing my bridge projects at Katraj ghat, my career shifted from contracting to real estate when KUMAR builders approached me to have the same quality in their projects. Then I shifted to the Lodha group, I was a hard-core civil Engineer, but my boss taught me soft(human) skills and administrative knowledge that laid my careers growth from project manager to SrVP with a promotion every year as head of North Mumbai. Thereafter I joined the Runwal group, and in 2016 had a break in my career for 1.5 years. With being a freelance advisor during this period, I again got the opportunity with Raheja Universal as vice President EPC. The company closes its office at the start of 2020 and the covid came in. Presently I'm working with VS engineering services VP.

What efforts do you recommend a student to put during his/her study years, which would be helpful to make him/her to ready for industry life?

I can suggest those who want to excel in execution or wants to head big contracting or builder's firm. Other than basic studies focus on your ability to speak well, cultured behaviour, highly expressive with optimism and positivity. Administration of general traits of college functions, social function, travel trips. Secondly auto cad, /Primavera MSP. Thirdly to do any full-time MBA from a reputed college and also gain some Knowledge during your course about empathy, emotion, and care. For others who want to excel can do environment-related updates and structural design software courses.

SENIOR VICE PRESIDENT

"SANJEEV NAHAR"

RAHEJA

In the current age of growing opportunities in entrepreneurship & research work, what is the scope of civil engineering students in the field as fresher?

Freshers are the key to the success of any entrepreneurship. Every entrepreneur looks fashionable as a person without any skill and hands. Join the company of your choice and forget the PayScale if you conflict with your knowledge and skill within six months you will get the pay scale of your choice. The most important thing is to join the company and the profile of your choice. Health is of great importance.

What are your predictions about innovations & development in the field of civil engineering?

Innovation and development in the field of civil engineering and allied engineering which is somewhere or the other related to civil engineering are being developed on day-to-day basis and at a very high speed. Computers are being a great boon in developing different aspects of work especially the BIM technology software for bar bending schedule the clash analysis this special mechanical machinery to lift and shift of precast engineering elements. New materials for building lighter, faster better-quality products and houses at a very reasonable cost. Industries with respect to civil engineering are doing regular research and development to develop products from the available resource and also to redevelop the used and thrown material from the old construction.

What is your advice for aspiring civil engineers in the field of research, innovation & ideas?

I would request all the engineers to read the books or magazines available in the market on a monthly quarterly and quarterly monthly or bi-monthly basis. Such that they can analyse the market development the research and development going across and based on the same they can choose the field of their choice and father India career growth.

Whenever one that's a chance should visit the nearby sides whether it is a building or a foundation for excavation or a breach or some structural fabrication work even if it is a small fabrication also it helps you to think differently.

Do you believe in this age of industrialization is it possible to maintain a balance between environment & construction?

Well, I agree that balancing environment and construction is not that easy but we can surely keep on improving on a day-to-day basis with research and development and using of mechanized and better tools machinery use of proper safety tools and tackles that will short help us to control our environment to a great extent. Father with more and more research we can keep on improving the same on regular basis.

What are the qualities in a student, industries hunt for?

Marks of 10/12 and engineering.
Attitude.
Other activities.
Mainly communication and listening skills.

According to you what is the most important invention in the field of civil engineering to present?

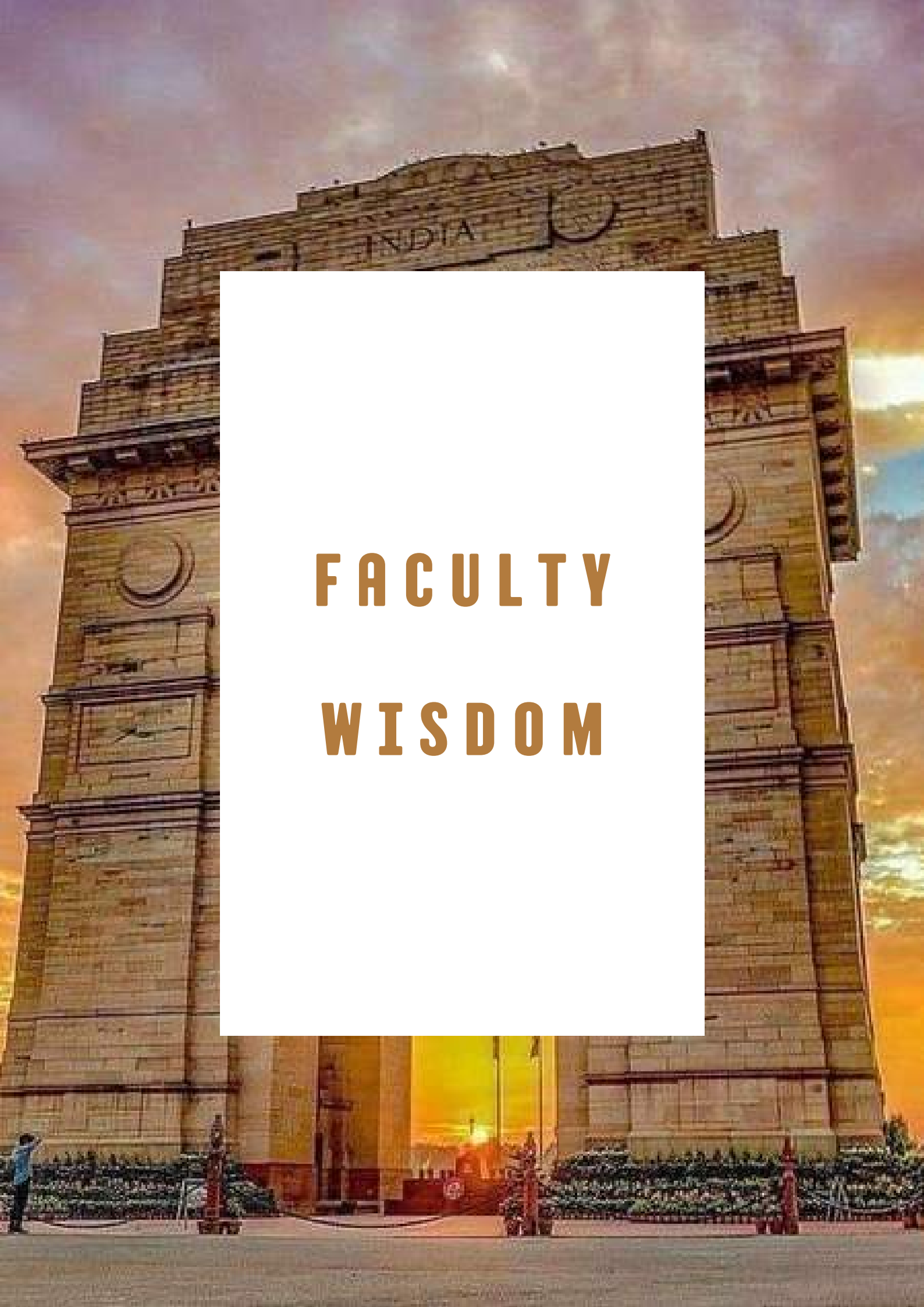
Project management software, mobile phones, and BIM, Cranes, hydraulics boom, higher building heights.

According to you how important is job experience in the field of civil engineering?

It's directly related to second best after military

Can you suggest some new projects for students, which can bring change in the engineering field?

Bridges start and end. Gravy loft retaining walls, precast buildings, toilet pods, metro stations.



FACULTY WISDOM

TIMELINE

- **ARTICLE 1**

STUDY ON USE OF RECYCLED CONCRETE AGGREGATES AND GROUND GRANULATED BLAST FURNACE SLAG IN CONCRETE

- MISS. DIPIKA D. DALVI

- **ARTICLE 2**

ESTIMATION OF ENVIRONMENTAL RISKS IN CONSTRUCTION PROJECTS - A NEURAL NETWORK APPROACH

- MRS. SHIVI SRIVASTAVA DHOLE

- **ARTICLE 3**

STRENGTHENING TECHNIQUE FOR RC BEAM USING CARBON AND ARAMID FIBER

- MRS. SUPRIYA SHINDE

- **ARTICLE 4**

DEVELOPMENT AND IMPACT OF RAILWAY LINE PROJECT TO LEH AND TAWANG

- MRS. ASHWINI PUREKAR

STUDY ON USE OF RECYCLED CONCRETE AGGREGATES AND GROUND GRANULATED BLAST FURNACE SLAG IN CONCRETE

- Miss. Dipika D. Dalvi

Consumption of concrete is increasing every year. Additional cement materials can be used in place of cement and recycled compounds for natural clusters. The basic goal is to make things that change and because of these costs, the natural impact of concrete can be reduced. The exploration work was carried out with an M35 mixture, considering five concrete mixes. B. R. Hemalatha researched that waste generated by the construction industry because of construction, repairs, demolition of various buildings, commercial and industrial sites is called construction and demolition (C&D) waste. C&D waste is commonly used for landfill as a landfill, resulting in a shortage of landfill in major cities. If these wastes are used for sustainable construction, it can reduce the amount of waste disposal and will also help conserve integrated natural resources. Basil Johny learned that the rapid increase in production and use of concrete has resulted in an increase in the use of natural aggregate and cement that covers a large portion of concrete. Debris and additional cement materials such as fly ash, silica fume, flatulated blast furnace slag, rice husk ash and metakaolin can be used as part of standard Portland cement replacement. S. Manzi said a large portion was found in construction waste and demolition. These scales are obtained by crushing the demolished concrete, followed by filtration and removal of contaminants such as reinforcement, paper, wood, plastics, gypsum etc. Iron and steel are the basic building blocks of modern civilization.

The main objective of this study was to use waste such as recycled concrete aggregates, to determine the basic characteristics of reconstituted composite concrete depending on the return of a percentage of cement by cracked furnace slag, and to compare them with cement structures. concrete made with aggregate natural concrete control. The performance of recycled concrete mixtures is satisfactory. But recycled concrete aggregates have a lower density than natural aggregates due to porosity. Much research has been done to improve the durability of reconstituted concrete mixtures by adding mineral mixtures.

METHODS

It is important to note that the replacement of the coarse natural coating with a mixture of recycled concrete in a building concrete is acceptable. Also, the feasibility of using GGBS instead of cement was also tested. The experimental study was performed on five strong concrete mixes of the target element 35 MPa. Four of them had 0%, 55%, 65%, and 75% cement replacement with GGBS respectively 100% natural ingredients with recycled concrete joints and one sample of standard mix. Tests were performed on these statistics to detect Bulk congestion, absorption, and filter analysis. Slump testing is performed on this new concrete. With solid concrete, 7 and 28 days of compressive strength are determined.

PROPERTIES OF MATERIALS

The concentration of aggregate rough aggregates of 10 mm and 20 mm was found to be 25% and 30% less respectively than those of rough natural concentrations. The higher the density, the lower is the empty filling that must be filled with sand and cement. A sample that provides a minimum of voids or one that provides a large volume density is considered the correct aggregate sample for making a conservative mix. So, using recycled aggregates will not save and concrete will not be as strong as new natural concrete, to overcome this problem GGBS is used as a mineral mixture. It has been observed that the gravitational force of certain recycled aggregates is within the range of gravity of certain new natural aggregates as expected. The water absorption rate of recycled concrete compounds is seen to be 6 to 7 times higher than that of new natural composites. 53 Grade Ordinary Portland Cement and GGBS (Grade 120) with different scales are used as a bond. Silicate and aluminate impurities from ore and coke are incorporated into the furnace with flux reducing the viscosity of slag. In a furnace the slag floats over the metal and is cut to separate. To obtain the correct recycling of slag or saturation, the melting of the slag requires rapid cooling or quenching below 800 ° C to prevent the glitter of merwinite and mellite.

Cooling and separating slag granulation process can be used when the melted slag is under jet streams of water or air under pressure. For proper recycling, the acquired pieces are low to achieve the same penalty as Portland Cement. The main components of blast furnace slag are CaO (30-50%), SiO2 (28-38%), Al2O3 (8-24%), and MgO (1-18%). In general, increasing the CaO content of slag results in a higher slag base and an increase in compressive strength. The content of MgO and Al2O3 shows the same trend up to 10-12% respectively and 14%, otherwise no further improvements can be found. The glass content of slags to be mixed with Portland cement usually varies between 90-100% and depends on the cooling method and the temperature at which the cooling begins.

The chemical composition and properties of the cement and GGBS used in this study as provided by the manufacturer are shown in the table below. Cooling and separating slag granulation process can be used when the melted slag is under jet streams of water or air under pressure. For proper recycling, the acquired pieces are low to achieve the same penalty as Portland Cement. The main components of blast furnace slag are CaO (30-50%), SiO2 (28-38%), Al2O3 (8-24%), and MgO (1-18%). In general, increasing the CaO content of slag results in a higher slag base and an increase in compressive strength. The content of MgO and Al2O3 shows the same trend up to 10-12% respectively and 14%, otherwise no further improvements can be found. The glass content of slags to be mixed with Portland cement usually varies between 90-100% and depends on the cooling method and the temperature at which the cooling begins. The chemical composition and properties of the cement and GGBS used in this study as provided by the manufacturer are shown in the table below.

Chemical Composition and Physical Properties of Cement and GGBS

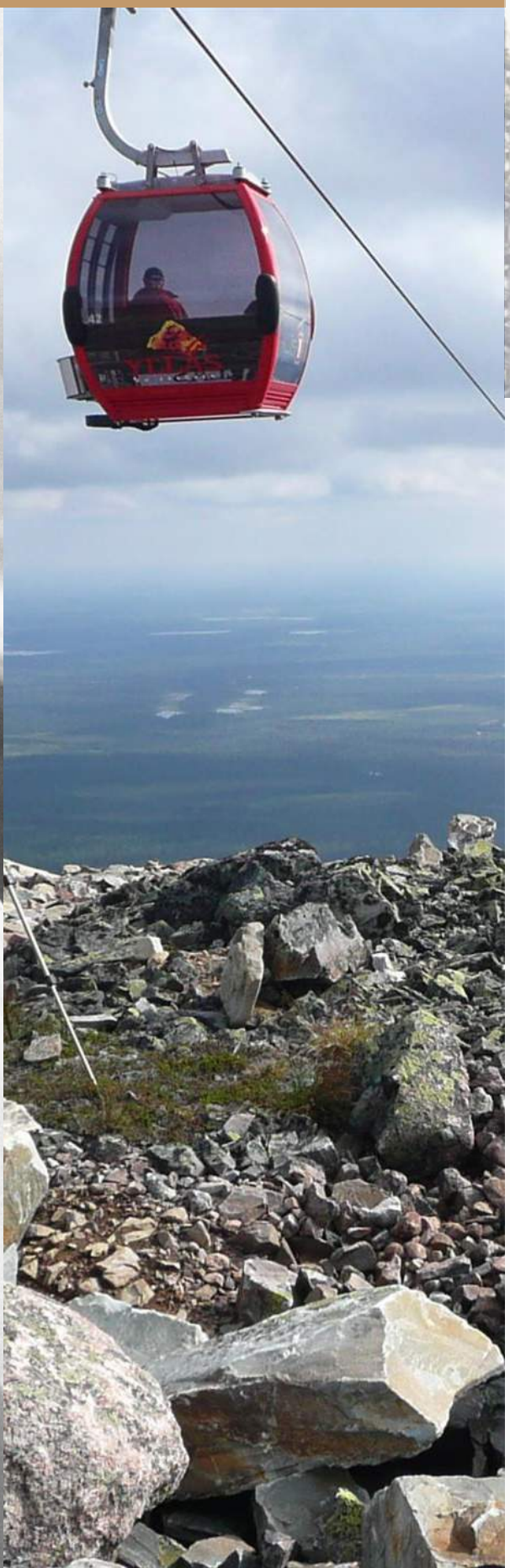
Sr. No.	Chemical Composition	Cement	GGBS
1	CaO (Wt %)	63.25	39.84
2	SiO_2 (Wt %)	20.80	38.00
3	Al_2O_3 (Wt %)	4.61	7.52
4	Fe_2O_3 (Wt %)	2.59	0.31
5	MgO (Wt %)	4.17	10.54
6	Na_2O (Wt %)	0.16	0.32
7	K_2O (Wt %)	0.50	0.38
8	SO_3 (Wt %)	2.70	0.16
9	LOI (Wt %)	0.90	1.42
10	Fineness (m^2/kg)	364	554
11	Specific gravity	3.15	3.00

SAMPLES USED

Five different integration projects were investigated considering the target capacity of 35 MPa. The first mixture was prepared with standard ingredients and that is why it is considered a control mixture. The following mix contains 100% of the coarse-converted natural concrete. The remaining three mixtures contain a 100% change in the coarse natural concrete and 55%, 65% and 75% of the GGBS cement exchange. These combinations are named Mix1, Mix2, Mix3, Mix4 and Mix5 as shown in the table below. The pressurizing power of 7 days and 28 days of these compounds is available and presented in this study.

Material	Mix 1 (%)	Mix 2 (%)	Mix 3 (%)	Mix 4 (%)	Mix 5 (%)
Cement	100	100	45	35	25
GGBS	0	0	55	65	75
Natural Aggregate	100	0	0	0	0
Recycled Concrete Coarse Aggregate	0	100	100	100	100
River Sand	100	100	100	100	100

It was noted that 100% of the coarse materials recycled into ordinary concrete provide poor performance and low strength. The increase in depressive power is reflected in the replacement of GGBS with OPC with 100% mixing of recycled aggregates. These powers diminished with an increase in GGBS percentage as OPC replacement. Mix3 i.e., 55% GGBS instead of OPC and 100% of the recycled coarse aggregates produce a compact strength equal to that of conventional concrete and very high between experimental mixtures. Therefore, reconstituted composite concrete with a suitable GGBS component instead of cement can be used in everyday construction with minimal value and where additional savings are required.



ESTIMATION OF ENVIRONMENTAL RISKS IN CONSTRUCTION PROJECTS - A NEURAL NETWORK APPROACH

- Mrs. Shivi Srivastava Dhole

Nowadays there is an urgent necessity to develop new ways for evaluating environmental risks, mainly based on new modeling techniques. This necessity is a critical problem for any country, due to the high development of the urban areas. In addition, knowledge is absent on this topic within many government agencies. This research article aims to develop a neural network approach to assess the impact of environmental risks in construction projects. The objectives are: to create a human intuition approach to advice government agencies towards the impacts of environmental risks, to store knowledge about risks in a single tool, to forecast the possible values of risks for developing appropriate contingency measures, to develop a flexible tool for use as an expert's opinion for similar future projects and to examine the feasibility of neural networks for pattern recognition. The data used for creating, training, and testing the neural network was obtained from private contractors who are constantly involved with environmental risks. It was possible to demonstrate with the results, the pattern recognition of this neural approach, whilst testing the network with unknown data. In conclusion, this new approach for evaluating environmental risks in construction projects is an alternative tool that can be simulated for obtaining the impacts of the probable risk for a specific project.

The methodology has the potential in modelling environmental risks, providing valuable outcomes for project managers working in government agencies. Introduction In developing countries, several problems arise due to the development of construction projects, especially in dense urban areas where the infrastructure has a very poor quality or is not sufficient to provide an acceptable level of service. This research article aims to develop a neural network approach to assess the impact of environmental risks in construction projects Risk management is not a new topic anymore in construction projects; however, it is important to formalize its use not only within projects but also to involve the company. In this research article, the description and then the application of risk management is oriented to establish, at a company level, a risk management system.

The system demonstrates the possibility to classify and evaluate environmental risks qualitatively and quantitatively. In addition, neural networks are introduced into the system to provide a new way of assessing environmental risks. Neural networks, as part of artificial intelligence, exhibit the feasibility of being used as a simulation technique for forecasting the possible values risks. Finally, by using real data obtained from 50 different projects from diverse contractors. The system demonstrates, with the results, its reliability and workability. Current problem and situation the principal problem present concerning the analysis and evaluation of environmental risks in construction projects in the absence of experts in both public and private agencies. It is, indeed, a critical problem because the country's infrastructure requires a considerable number of investments to be improved, causing this boom of massive construction projects in urban areas. This situation is more critical when infrastructure projects are required in areas that are surrounded by natural eco-systems, industrial and inhabitant's zones. It is not enough only to import "state of the art" techniques designed in developed countries, because the necessities, as well as the government and contractor's resources, are different and more limited than those of a developed country. Is not possible to provide feasible solutions for many environmental problems that exist, causing the necessity to search for alternative methods for satisfying these problems. System definition the system can be used as a methodical approach for quantifying, in terms of money, the environmental risks involved in construction projects. The system can be considered a human-intuition approach, which integrates the tools of Neural Network and Risk Management for the use and benefits of the contractor. ". In other words, the system will provide more realistic project costs because the total environmental risk value will be calculated based on experience and 10 predefined environmental risks. A system is a flexible tool that can be used within different types of construction projects and also within a variety of evaluation areas.

System objectives : 1. To offer to the contractor a practical and useful environmental risk management tool, ready to be used at the bidding phase of a construction project.

2. To develop a practical neuronal model for predicting the total environmental risk cost in construction projects.

3. Refine, write up and disseminate the results of the study and develop further the innovative findings and strategies.

Neural networks Also referred to as connectionist architectures, parallel distributed processing, and neuromorphic systems, an artificial neural network (ANN) is an information processing paradigm inspired by the way the densely interconnected, parallel structure of the mammalian brain processes information. Artificial neural networks are collections of mathematical models that emulate some of the observed properties of biological nervous systems and draw on the analogies of adaptive biological learning. The key element of the ANN paradigm is the novel structure of the information processing system. It is composed of a large number of highly interconnected processing elements that are analogous to neurons and are tied together with weighted connections that are analogous to synapses Battelle Memorial Institute. Today ANNs are being applied to an increasing number of real-world problems of considerable complexity (for example: in quality control, financial forecasting, economic forecasting, process modelling, and management). They are good pattern recognition engines and robust classifiers, with the ability to generalize in making decisions about imprecise input data. They offer ideal solutions to a variety of classification problems such as speech, character, and signal recognition, as well as functional prediction and system modelling where the physical processes are not understood or are highly complex. System structures the structure of the system is divided into three different sub-structures; each one describes the system from a general to a specific representation of its workability. The sub-structures are 1. General system approach 2. Neural structure 3. System structure Environmental risks for this work, a risk checklist was designed to obtain the input and output data from the contractors related to environmental risks.

Risk Number	Risk Description	Specific Risks
1	Releases to air	Ozone-depleting substances, Greenhouse gases, Dust, Vehicle emissions, Fumes from burning, Volatiles from solvents, paints and glues
2	Releases to water	Discharge from sedimentation basins, Spillages from storage depots, Soil erosion and generation of sediment in run-off, Pollution sources (oils, fuels, wastewater, drilling fluids, concrete washings and residues), Acid sulphate soils (surface runoff), Contaminated land (surface runoff and groundwater pollution), Stormwater drainage and flooding, Sewage collection and domestic wastewater (construction sites).
3	Waste management and disposal	Demolition wastes, Construction wastes, Packaging wastes, Litter/garbage, Contaminated waste handling and disposal.
4	Contamination of land	Runoff from areas of contaminated land, Encapsulation and remediation design, Chemical storage, Fuel installations.
5	Impact on local communities	Level of community participation, Access and traffic disruptions, Noise, Construction noise, Dust
6	Use of raw materials and natural resources	Energy usage (construction requirements), Construction materials, Life cycle impacts of construction materials
7	Ecological conservation	Identification and protection of ecosystems, Noise impacts on

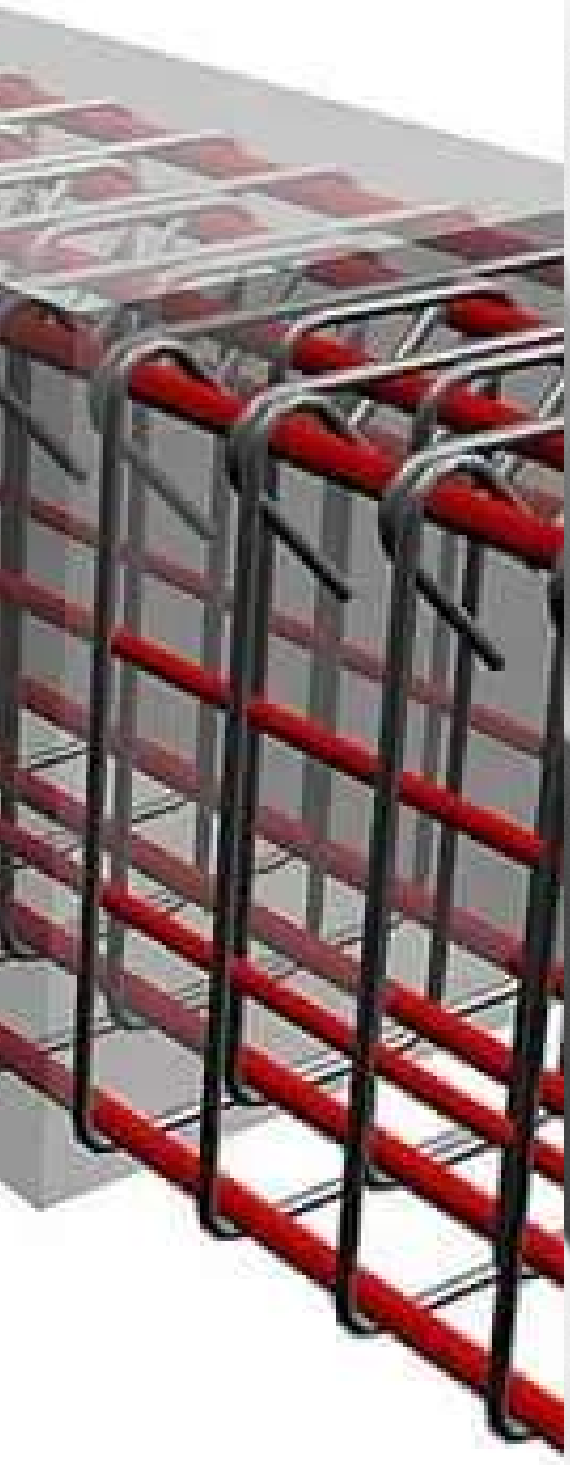
CONCLUSIONS:

The system offers to the contractor a considerable advantage in predicting the possible value of the total environmental risk. With this value, the contractor can include this extra cost into the project cost, or even discuss this additional cost with the client. With the neural system it was possible to evaluate the environmental risks in two ways : qualitative because the risks were classified as extremely high, very high, etc) and quantitative because it was possible to evaluate risks from 0 (Extreme low) until 100 (Extreme high).

This is a great advantage because two different types of results can be obtained with a single tool. The neural system is a very flexible technique; it can be used with different types of projects because the risks are adjustable. The complete process to implement the neural system is simple and practical. On the other side, the project manager must know neural networks,

STRENGTHENING TECHNIQUE FOR RC BEAM USING CARBON AND ARAMID FIBER

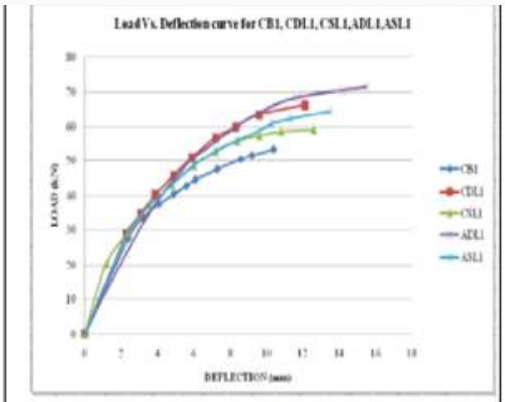
- Mrs. Supriya Shinde



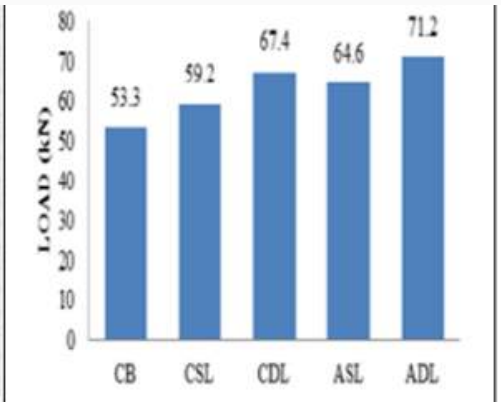
Fiber-reinforced polymers (FRP) have been used for many years in the automotive and aerospace industries. In the construction industry, they can be used for cladding or structural elements in a highly aggressive environment. Now a day's buildings are found to be damaged because of changes in the function of building, exposure to environmental conditions, and due to use of older codal provisions. Today deterioration of RC structure is one of the major problems in civil industry. A mostly large number of buildings are constructed as per older design codes in different parts of the world, thus are structurally unsafe according to present design codes, since replacement of such deteriorated structure takes plenty of money and time. Nowadays, it is necessary to find repair techniques suitable in terms of low costs and fast processing time. Demolition of existing and construction of new structures is a costly, time-consuming, and resource-intensive operation. An externally bonded FRP sheet can be used to increase as flexural strength of reinforced concrete beams. Reinforced concrete beams externally reinforced with fiber-reinforced polymer sheets are a good retrofitting technique. Aramid and carbon fiber composites play a major role in improving the strength of the structure and do so at a significantly low cost than new structure construction costs. Fiber wrapping is the new technology for reinforced concrete structures. It is used for strengthening structural members without disturbance to other members as compared to other conventional methods. This article presents the flexural behavior of aramid and carbon fiber reinforced polymer (AFRP) strengthened reinforced concrete (RC) beams of M20 grade concrete. The experimental program included strengthening and testing of simply supported rectangular cross-section beam of size 1800mm x 100mm x 200 mm strengthened with aramid and carbon fiber polymer sheets. Total fifteen specimens were tested out of which three beam specimens were tested as control beams and remaining for the number of layers of fiber.

The effects of strengthening on load-carrying capacity and the effect of damage degree are discussed in detail. The results indicate that the load-carrying capacity of beams was significantly increased as the number of layers increased. To study the flexural behavior of the beam, the specimens were only subjected to a two-point loading mechanism.

The beams were wrapped with AFRP and CFRP sheets in a single layer and double layers along the length at the bottom face of the beam. The present work includes a comparison between AFRP and CFRP by considering the effect of the number of layers. Thus, it is a feasible method for strengthening and retrofitting RC beams.



Load versus deflection curve for comparison of CB1, CSL1, CDL1 ADL1, and ASL1.



Load carried by types of wrapping fiber

CB – Control beam, CSL – Carbon Single layer wrapping, CDL – Carbon Double layer wrapping, ASL – Aramid Single layer wrapping, ADL – Aramid Double layer wrapping.

Following conclusions are drawn from the test result and values load and deflection. Average load carried by the control beam is 53.2 kN. The average maximum load carried by the CDL beam is 13.35% more as compared to the CSL beam and 21.63% more as compared to CB. The average maximum load carried by the ASL beam is 11.15% more as compared to the ADL beam and 25.19% more as compared to CB. The average maximum load carried by the ADL beam is 4.63% more as compared to the CDL beam and 25.19% more as compared to CB. The average maximum load carried by the ASL beam is 8.45% more as compared to the CSL beam and 17.11% more as compared to CB. The flexural capacity of all the strengthened beams was enhanced as compared to the control beam. Reinforced concrete beams strengthened with aramid and carbon fiber sheets exhibited a significant increase in their cracking and ultimate strength as well as ultimate bends deformations. Initial cracks appear for higher loads in the case of strengthened beams. The load-carrying capacity of the strengthened beam fully wrapped on the tension side with aramid and carbon fiber was found to be maximum than the controlled beams. The load-carrying capacity of the strengthened beam wrapped with Aramid and carbon fiber strip was found to be greater than the controlled beams. The strips are placed on the tension side so that strength of the normal beam increases.

DEVELOPMENT AND IMPACT OF RAILWAY LINE PROJECT TO LEH AND TAWANG

- Mrs. Ashwini Purekar

Abstract - The Indian Railways is all eager to expand railway connectivity in Arunachal Pradesh, and is planning to make all efforts to turn this into a reality. Development of Bhalukpong - Tawang railway line will prove to be useful from a security point of view besides accelerating socio-economic development of the people. Jammu and Kashmir (J&K) termed as "Paradise on Earth" which is most popular tourist destinations of the world. Ladakh, also known as, "Moon on Earth" with its naked peaks and barren lands is a famous destination for adventure tourism, known across the world. Bilaspur-Manali-Leh will reduce the distance between Delhi to Leh from the present 40 hours to 20 hours. The new railway brings a significant reduction in transport costs and is projected to facilitate increased movements of goods. J&K tourism will get capable of not only earning credibility back to the economy but also could be helpful in accelerating economic growth in short to medium term by generating revenues and employment opportunities.

Keywords: DEM, Geological hazard map, Electrification, BRO, LAC.

I. INTRODUCTION

Indian Railways' ambitious Bilaspur-Manali-Leh line along the India-China border, is touted to be the world's highest rail track. After its completion Taglang La will become the highest railway station in the world at a height of 5,359 metres above sea level. This new rail line will not only increase tourism but, will also help the armed forces. It might prove to be significant for Ladakh's development as well. Railway Ministry has proposed for the project to be declared a national project.

The railways should use aircraft-like pressurized coaches in trains for the Bilaspur-Manali-Leh line along the India- China border, which will be the world's highest rail track, so that passengers do not have breathing difficulties on board.

Tawang is a centre of Buddhist culture and religion. Its proximity to the north-eastern border and LAC (line of actual control)adds additional strategic significance to this region. The glorious beauty of Tawang is ever so slightly surmounted by the treacherous and challenging journey to this destination. Accessibility to Tawang from mainland Arunachal Pradesh is essential given its strategic character.

India's North-East, especially important regions like Tawang, face major infrastructural problems, including bad roads, according to CMDE RS Vasan, director of the Chennai Centre for China Studies.

·So, it is very important to develop strategic road network to accelerate the development of Bhalukpong- Tawang rail corridor. Making electric railway network which will reduce the stress of pollution for corresponding area and provide clean environment condition to maintain ecological balance.

·Attracting private sectors to invest in project.

II. PURPOSE AND SCOPE

BRO still employs manual labour at these high altitudes despite the many advances in technology. Private sector participation in these road projects is completely absent, albeit possessing the means (technology, manpower and experience) to deliver these challenging projects. Reluctance to bid for these projects can be attributed to unattractive returns and difficult working conditions. Hence BRO is burdened with construction and even partly maintenance with limited resources and backward technology. Road transports necessary construction equipment's, manpower, construction materials and goods required to lay down railway tracks thereby first aimed to provide good connectivity of roads and approaches at the corresponding area.

Motivations:

Despite the strategic significance of the corridor leading to Bomdila, Selapass, Tawang and Bumla Pass, the state of the road infrastructure is deplorable. Accessibility to food, proper sanitation, waste disposal and more importantly transport and logistics are some of the key concerns which motivates us to build a strong road network for easement of railway construction.

Kokan railways electrification motivates us to develop electric locomotive railway track for Leh and Tawang region.

Electrification of Kokan railway is in progress at an estimated cost of ₹8 billion, and in February 2021, a test train ran on the line for the first time using electric power. Electrification will be completed on the full line by July2021. The Qinghai-Tibet railway which uses world's first pressurized coaches. Running for over 1,956kmfrom Xining, capital of China's Qinghai province to Lhasa, through some of the planet's harshest natural conditions, it is an impressive catalogue of world records. With its highest point at an altitude of 5,072m – 200m or more above the Peruvian railway, further it motivates to use pressurized coaches to reduce breathing problem and provide air comfort to passengers.

III. STRATEGY AND PLANNING

Providing a steady and reliable signaling and communication system over so long a distance in such a harsh environment presented its own problems, not least in terms of guaranteeing the continuity of electrical supply.

To meet this need, an assistant solar power supply system or hydropower plant should be established. It found that Arunachal Pradesh, Jammu and Kashmir is one of states with high potentials for hydropower generation. This offers huge opportunity to the state when the requirement for the energy is increasing at very high speed in India and demand for electricity is expected to rise because of positive policy response to electric locomotives.

The thin air at this altitude made construction difficult, although special oxygen facilities should provide for the workforce, and poses a challenge for passengers too. Aircraft cabins are pressurized because the air is very thin at the altitude planes fly. To prevent complications, the cabins of many aircraft should be adjusted to near sea-level pressure, which makes breathing almost the same as at sea level.

·Before embarking, a passenger health registration card must be filled in – requiring travelers to read and sign a high- altitude travel disclaimer.

IV. DESIGN

Rangapara is existing railway junction of north-east railway corridor near Bhalukpong, Bhalukpong station is closed permanently now but there exists railway route here. Railway line from Bhalukpong to Tawang will be 198 km of which 177 km will be underground tunnels with very little disturbance to the ecology. This shows that around 80% of rail line will pass through tunnels. Construction of tunnel require heavy machines that should be transported on the site if there exist good road networks. Optimized network should be prepared for which we need to look for local parameter like DEM, Drainage map, Geological hazard map, also need to design 3- dimensional criteria to find best route.

DEM gives detail of how slope and aspect of area is changing, drainage map gives detail about river and existing streams, geological hazard map gives detail of fold, faults and dykes these all contribute to find best possible route.

Public safety and national safety is major aspect involved when we consider such projects. There are a number of threats to public safety and national security in the physical world that do not emanate from the cyber domain but which could be mitigated or even eliminated through deployment of appropriate technologies. There are several important facets of public safety, the most important of which is the maintenance of law and order. Technological interventions could be extremely beneficial in maintaining general law and order.

Also, public safety from animals should be taken into consideration. Public safety networks, which basically pertain to proper communication and sharing of information between different agencies charged with the responsibility of ensuring public safety, therefore assume critical importance.

Climate study should also take into consideration as these two areas has wide aggressive environment and weather condition.

V. IMPLEMENTATION AND EXPECTED OUTCOMES

While tunneling operation we will may come up with numerous technical problems due to poor geological condition, logistics and climate problem so we need to deploy several safeguards to such problem which will ease project construction, safe site condition and ultimately cost of project. In order to save lives during train collisions and accidents, technologies similar to deployable airbags need to be developed. Given the age of our country's transportation infrastructure, technologies for sensing and predicting bridge and tunnel collapse would also be extremely important. Use of technology to predict crowd behaviour and identify miscreants in crowded areas would enhance public security.

A sound policy should be devised to exploit the potential in the sectors of strength. The development of potential sectors such as horticulture, handloom and handicrafts, biotechnology, tourism and information technology will have strong inter- linkages with the rest of the sectors. In a nutshell, sound policy and good governance can lead the state of Jammu and Kashmir to a faster development path.

Mitigation Measures:

While interacting with villagers about the project area, it is found that they are very well conversant with the utility and positive impact of the new railway project. They were also expecting adequate compensation of loss of their assets during process of land acquisition. Government authorities have organized the interaction with the villagers and their representatives like Gram Panchayat's, Revenue Officials, etc.

Before taking up the process of land acquisition. The local development of the area shall bring about growth as well as economic development due to construction of this new railway line. Such new railway line projects will play most powerful role in connecting residents of the area and creating awareness.

It will reduce the distance between Delhi to Leh from the present 40 hours to 20 hours. Tourism holds a strategic place in J&K economy by providing economic benefits like Employment, Foreign Exchange, Infrastructure development and development of local industries like Handicrafts and Handlooms which has placed J&K always in the limelight at the national as well as international level. It is estimated that almost 50-60% of total population of J&K is directly and/or indirectly engaged in tourism related activities. Tourism contributes about 15% to State Gross Domestic Product.

VI. FUTURE SCOPE

Once this railway line is developed, we can find easy accessibility to reach in interior part of the J&K state. Further approaches and new railway line combining to this line will provide new railway corridor for the state which will increase the potential in tourism, economy and other sector.

Considering the economic base and natural conditions in J&K, there are many sectors which could offer huge opportunities to the investors. Those sectors include hydropower generation, transportation, tourism, pharmaceuticals, biotechnology information technology, horticulture, sericulture, dairy products, food processing and real estate etc. But to make these into attractive investment opportunities, there is need for policy response from the government as the Article 370 and 35A along with continued disturbance have already costed to the growth and development of the state economy (Kiran, 2019) however the government has already repealed Article 370. This may open gates of opportunities if there is proper policy response from the government.

VII. LIMITATIONS

Uncertain hazard conditions like land sliding, cloud bursting, avalanches can create trouble while construction phase or complete stoppage of project. To overcome from this condition each site should be geologically investigated and equipped to manage such hazard. Additionally, effect of change in climate should also be considered with the use of projected climate data from climate model.

Attracting investors is challenging task in such project due to low and long-term returns. Therefore, govt need to provide some leverages or any other attractive benefits such that they can start to invest without hesitation.

CONCLUSION:

The monitoring of implementation as well as disbursal of amount of compensation to the land owners shall be an effective tool to mitigate the grievances of the land owners. There is not doubt in the overall perspective that the Bhanupali-Bilaspur- Beri New Railway Line Project would provide connectivity of the region with National Railway Network. In addition, it will give a boost for tourism, industrial development and general awareness in the project area. As a state with unique features and a strategic location, the speedy development of Jammu and Kashmir needs an integrated approach. The top priority of the government should be to create a secure environment by improving the law- and-order situation in the state. State finance should also receive proper attention in order to ensure better fiscal management.

STUDENTS CONTRIBUTION

Winners embrace hard work. They love the discipline of it, the trade-off they're making to win. Losers, on the other hand, see it as punishment. And that's the difference.

- Lou Holtz

TIMELINE

"An investment in knowledge pays the best interest."

01

REVIEW ON DESIGN OF FIBER REINFORCEMENT ROAD CONSTRUCTION

The traditional corridors are small to their needs for continuous nutrition and rehabilitation- payment in conjunction with regular adjustments, pointing to yard the width of the concrete floor area.

02

FLYING CAR : NEED OF TOMORROW, TODAY.

In the present times; the road crisis is one of the biggest problems in the world and the main reason for this is rapid population growth.

03

SUSTAINABLE SOLAR ENERGY-A NEED IN THE RESIDENTIAL BUILDINGS.

Given that residential energy consumption is expected to increase by almost eight times by 2050, it is important that India develops energy efficiency strategies aimed at the residential sector in order to curb this rising demand for energy.

04

FORMWORK USING BIM BY

Exploring design and construction of formwork using BIM technology. Aluminium formwork is a new type of formwork system.

05

STUDY ON EFFECT OF GEOGRID ON CONCRETE CUBES

There are three types of geogrids, uniaxial geogrid which it is extended on the longitudinal direction only and the stress can be transferred on the longitudinal direction only.

06

VERTICAL FARMING

Vertical Farming is a high level of agricultural technology which is carried out since there is no available land.

07

COMPARATIVE ANALYSIS OF STRUCTURE FOR CALAMITY BY USING VARIOUS SOFTWARE

The idea of building high-rise buildings was introduced back then to accommodate more people.

08

UNDERSTANDING THE ZEPI AND THE FUTURE OF ZNE BUILDING PERFORMANCE

Housing is one of the basic human needs. There are many benefits of getting a house, but we can stay indoors when we understand that the electricity we use is made of gasoline for a limited and abundant residual fuel pollution is increasing in their system.

09

EVALUATION OF PLASTIC WASTE MODIFIED BINDER FOR ROAD CONSTRUCTION

The use of plastic waste in bituminous compounds improves its properties and strength. In addition, it will also be a solution for plastic disposal and various defects in the area covered with pots, potholes, tile, ruts, etc.

10

SMART ROADS: HIGHWAY TOWARDS SAFETY

Converting cities into smart cities is one of the most positive changes in the world. India has allocated billions of budgets to build smart cities.

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MICROBIAL FUEL CELL - BIOELECTRICITY GENERATION

This brief review focuses on the latest technological advances of Microbial Fuel Cell (MFC), its development and implementation of real-world applications.

12

USE OF ECO- FRIENDLY CONSTRUCTION MATERIALS FOR SUSTAINING THE STRENGTH IN CONCRETE

The use of waste as an alternative to traditional concrete products has increased in popularity in recent years, resulting in the overuse of natural resources.

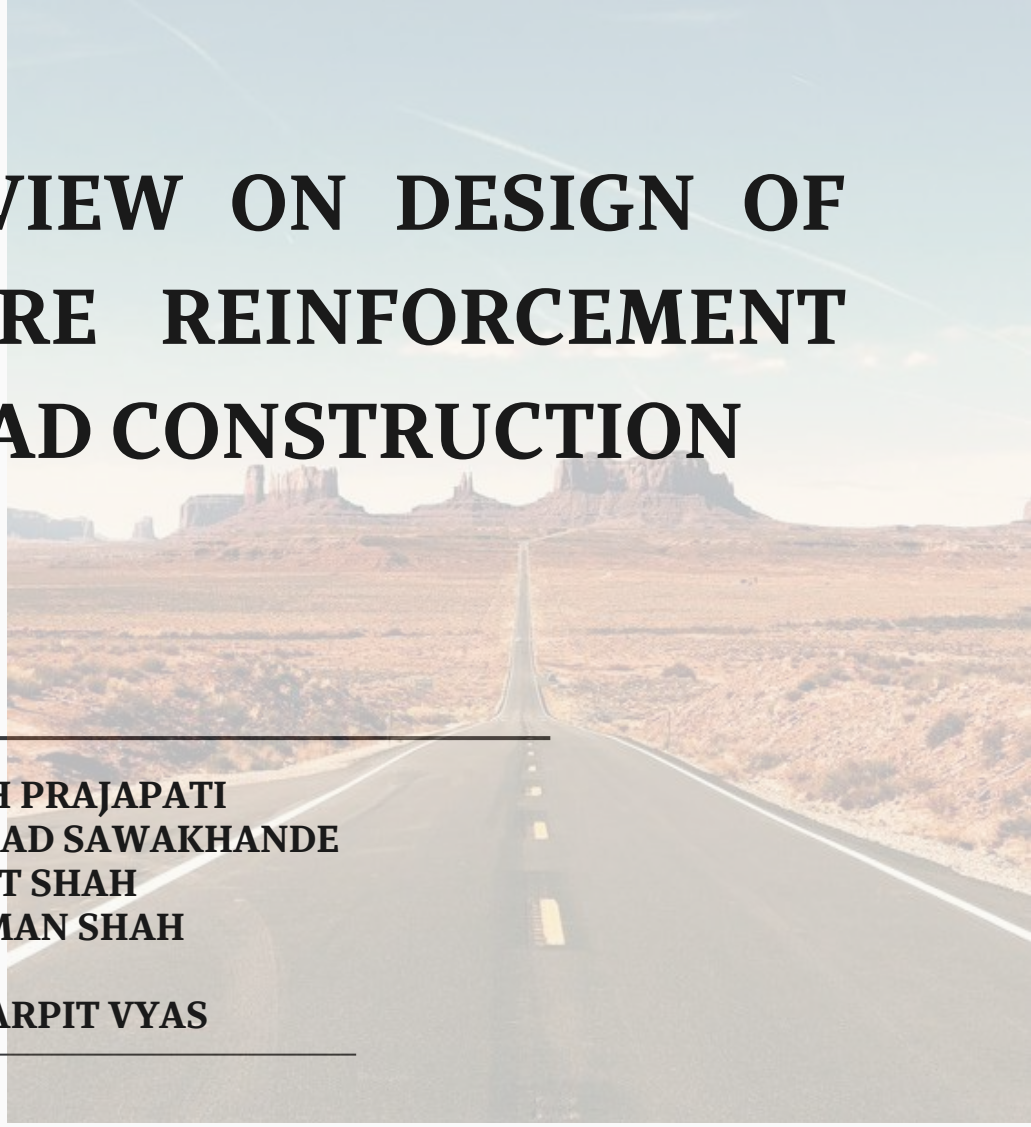
13

SEISMIC RESPONSE OF IRREGULAR BUILDING

Earthquakes or seismic structures are designed to protect buildings to a greater or lesser degree from earthquakes.

“Don't wait. The time will never be just right.”

REVIEW ON DESIGN OF FIBRE REINFORCEMENT ROAD CONSTRUCTION



DINESH PRAJAPATI
HARSHAD SAWAKHANDE
AKSHAT SHAH
DHRUMAN SHAH

PROF. ARPIT VYAS

ROAD TRANSPORT IS UNDOUBTEDLY BY THE LIFELINE OF A NATION AND ITS DEVELOPMENT ARE IMPORTANT ANXIETY.

The traditional corridors are small to their needs for continuous nutrition and rehabilitation- payment in conjunction with regular adjustments, pointing to yard the width of the concrete floor area.

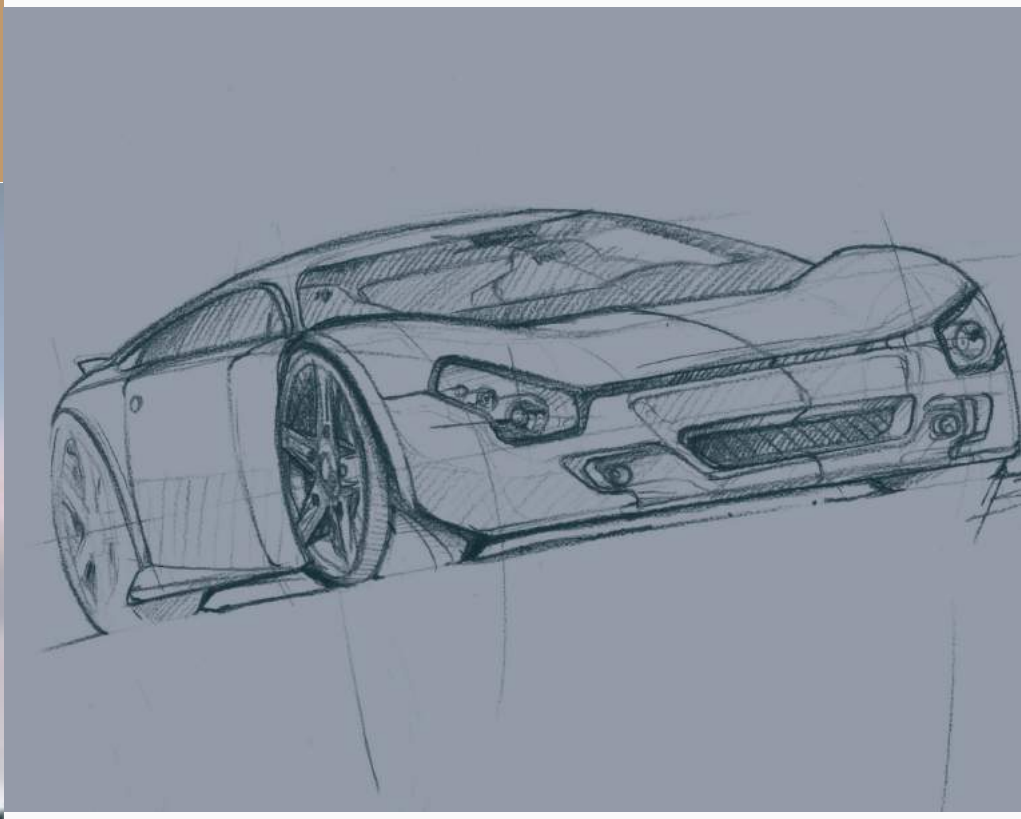
The concrete is weakened by friction and is extremely painful. The idea of using threads to improve the characteristics of building materials is very old. Concrete is currently the most widely used material built into the world. This height of concrete over other building materials is due to its high compression power and other benefits such as water resistance, low storage costs, easy to access stiffness of required size and size, bottom costs, less energy in production, and so on.

Concrete strengthening is paramount how to preventing the cracking of the concrete made strong pressure. Reinforcing concrete using discrete threads, randomly arranged, are acceptable. Methods of fibre-reinforced concrete (FRC) failures can be a failure of the bond between the fibre and the matrix or a failure of the material. From a structural point of view, concrete is considered a lack of sensitivity to another post-punk behavioural loosening in stress due to the limited difficulty of material complexity. Reinforced plastic fibre (PFRC) requires special consideration of construction processes and procedures in order to obtain efficiency.

The initial cost is 15-20% higher compared to the reduction in repair and renovation activities, which makes reinforced Plastic fibre (PFRC) concrete cheaper than the easy paved road by 30-35%. The characteristics of reinforced steel fibre (SFRCC), such as flexural strength, are surprisingly better than those of reinforced concrete (RCC). Therefore, the use of stainless steel may be suggested in the construction of an active mortar well. Type of fibre-reinforced concrete: Steel Fibre Reinforced Concrete, Polypropylene Fibre Reinforced Concrete, Glass Fibre Reinforced Concrete, Polyesters Fibre, Carbon Fibre, Macro Synthetic Fibre, Natural Fibre, Micro Synthetic Fibre.

Reinforced concrete of fibres can help where strong strength and reduced cracking are desirable or where normal reinforcement can be placed. Improves the impact force of concrete, limits the growth of cracks and leads to the greater composite material. In industrial projects, macro-synthetic fibres are used to improve concrete strength. Made of synthetic materials, these fibres are long and dense as well can be used as a bar replacement or fabric reinforcement. Adding fibres to the concrete will improve its frost resistance and help keep the concrete strong and attractive for a long time. Improve mixing, improve long-distance pumping.

Increase plastic shrinkage during curing. Reduces steel reinforcement requirements. It controls the rigidity of the width firmly, thus improving the rigidity. Reduce separation from bleeding. FRC, the hardness is about 10 to 40 times the bare concrete. The addition of fibres increases the potential for fatigue. Fabrics increase the shear volume of reinforced concrete beams. Fibre-reinforced concrete is more durable compared to non-reinforced concrete. Many unusual structures or concrete are placed under special conditions. The major role of fibres is to control cracking due to plastic shrinkage and shrinkage reduction, providing additional energy absorption capacity. It has also been reported that fibres can improve the static strength of concrete with its impact strength, tensile strength, ductility and flexural strength. Many reinforced concrete structures contain various reinforcing materials, made of steel, polymers or other composite materials; may or may not be combined with the reinforcement of traditional steel. The final compound will have some sort of failure, depending on the combination of materials used. Needless to say, these new construction methods are needed to ensure the long-term durability of these special concrete cones. Methods will certainly apply to the forthcoming concrete R&D application.



FLYING CAR : NEED OF TOMORROW, TODAY.

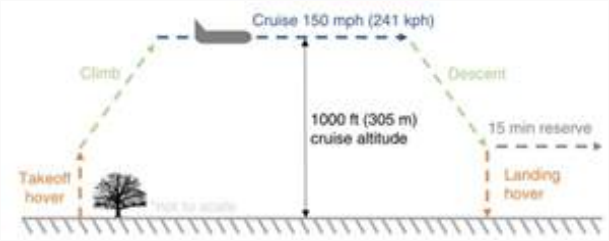
LAVKUSH DUBEY
DEVENDRA GUPTA
SHIVKUMAR BIND
SHIVAM YADAV

PROF. VIMAL GOSAR

In the present times; the road crisis is one of the biggest problems in the world and the main reason for this is rapid population growth. The government is trying to overcome them by increasing the width of the roads, using road signs, in terms of fixed speed, more flyover etc. To decrease traffic, the government is focusing more on infrastructure but still in traffic; emergency vehicles such as an ambulance, firefighters and police vans faced a major problem. We, therefore, propose in this paper the concept of 'FLYING CAR' which will assist in the event of an emergency so that the government can provide better services in the future. It could be used as an ambulance, during natural disasters and many times for commercial purposes. It has a unique concept as it has two guarded propellers which will help the car to lift in an upward direction. It also has one main rotor and a tail rotor.

This vehicle has a special form like an ordinary vehicle referred to as an aerodynamic form. Allowing it to fly and making it much easier, this car is made of very simple materials like Nanosteel and Aluminium alloy. The car has two engines in which the first engine controls two guarded propellers and a vehicle control system on the road. The second engine will control the main rotor as well as the tail rotor. As the two pilots have a lot of power due to such speed to lift the car easily upside down. When the car is lifted to the desired height, the second engine will start both rotors. When the main rotor controls the car in the air then the first engine stops. And the main rotor is adjusted by its operator by focusing on the centre of gravity.

- Main rotor: The main rotor is a system that generates the aerodynamic lift which balances the weight of the car and aerodynamic thrust thereby providing acceleration to the car. It has two rotor blades.
- Tail rotor: The tail rotor is vertical smaller than the main rotor which is mounted at the end of the tail of the flying car. Its distance from the centre of gravity helps it to move in the forward direction, it also controls the torque effect created by the main rotor.
- Previous existing system: Many times government puts forward many systems to control accident cases and traffic jams like changes in traffic rules, lasers and radar etc., but still they are not much effective to control it.
- Change in the present system: Nanosteel is the best option to make the flying car lighter over the other materials.
- Electric motor: Since other motors create so much noise pollution and are larger in size, hence we are using an electric motor that has the capabilities to handle heavy load and is smaller in size.
- Sensors: We are also using a motion sensor that will give commands to the microprocessor that is programmed to control the speed of the motor and to turn the car.
- Blades: Blades are made up of carbon fibre because they have better strength than the other material.
- Battery: Battery is the main power resource for the motors which has the capability to take a load of motors so that they could run properly. Although we have an alarm system that will alert us half an hour before the battery gets discharged. We also have solar panels on top of the car so that the battery gets charged.
- VTOL(Vertical take-off and landing): This flying car has a great ability of vertical take-off and land. VTOL has five phases that are as follows :
  (1) Take-off hover
  (2) Climb
  (3) Cruise
  (4) Descent
  (5) Landing hover

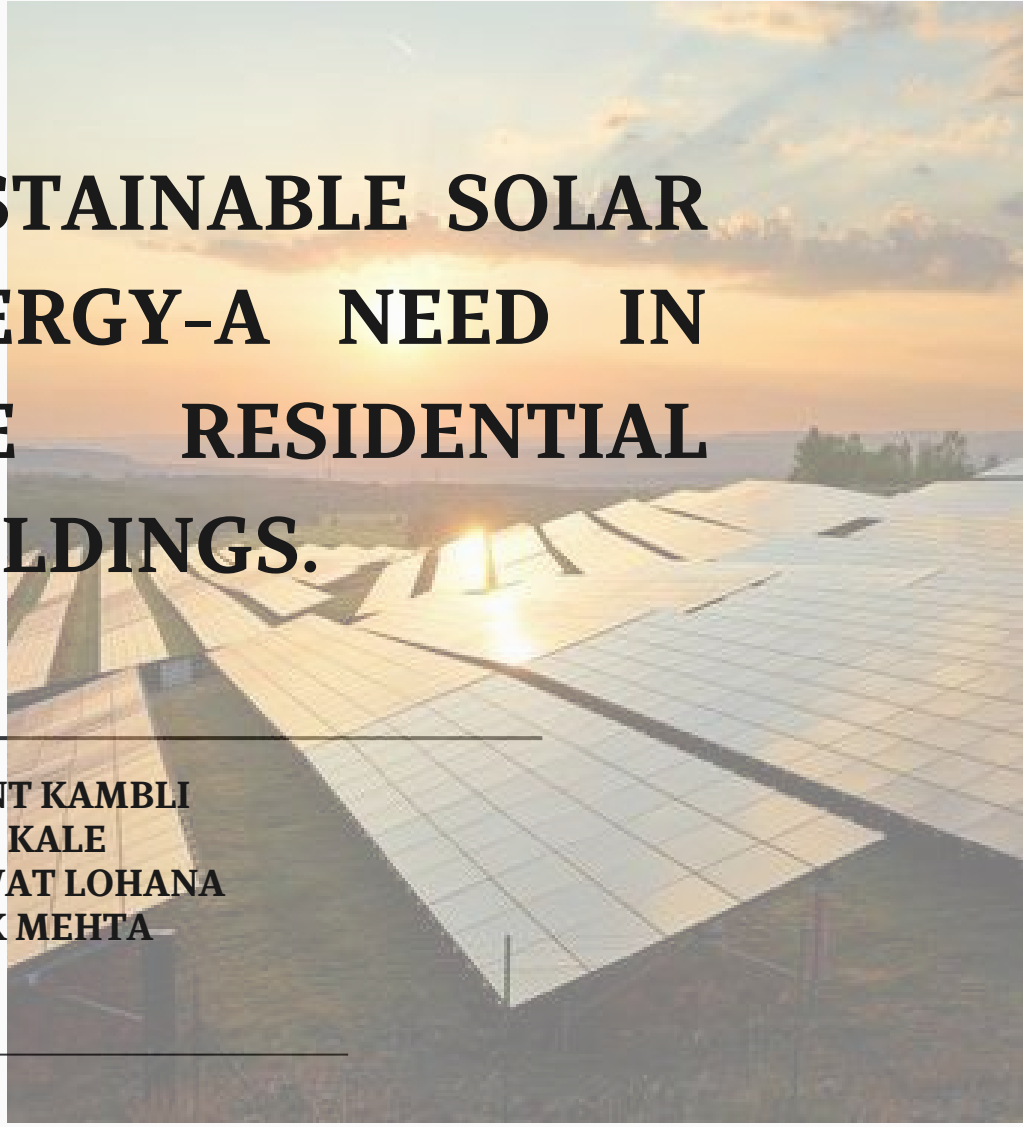


CONCLUSION :-

After the success of this project, we will be able to overcome many problems. We can use these vehicles in case of emergencies such as accidents, etc. It will help people to escape from any natural disaster. It can certainly be used to control traffic. It will also save people's time and money. Thanks to this project, vertical and horizontal positioning are possible. In the construction of such vehicles, as it is less expensive than other aircraft and is very useful in the event of an emergency. We'll be able to eliminate traffic problems and also have to charge power when in flying mode. Thanks to these cars, a completely new industry will be created and more people will get jobs as well. With this technology, the vertical positioning of vehicles (VTOL) will also be possible.

Every act of creation is first an act of destruction.

SUSTAINABLE SOLAR ENERGY-A NEED IN THE RESIDENTIAL BUILDINGS.



NISHANT KAMBLI
VISHAL KALE
BHAGWAT LOHANA
BHAVIK MEHTA

WHY IS THERE A NEED TO HAVE SUSTAINABLE SOLAR ENERGY IN THE RESIDENTIAL BUILDINGS?

Given that residential energy consumption is expected to increase by almost eight times by 2050, it is important that India develops energy efficiency strategies aimed at the residential sector in order to curb this rising demand for energy. The benefits of solar energy in addition to renewable energy, as well as its long-term sustainability and resistance to global climate change, have led nations around the world to apply solar laws. However, compared to foreign customers, India's willingness and acceptance of solar roofs is very small.

The article provides a breakpoint, rebate discount, and internal analysis of the return rate of subsidized and non-subsidized solar roof systems, using a breakpoint, a fixed payment period, and an internal return rate. The economy is now in a state of flux, and power is becoming more and more expensive day by day.

Comparisons of current energy use with solar improvements give a clearer picture of whether greater efficiency can be achieved in an existing residential building. Solar energy is one of the most widely used forms of renewable energy worldwide. Solar energy is a form of energy that can be used as a source of natural heat, as in other energy-efficient systems, or as the conversion of solar energy into electricity, commonly known as photovoltaics.

It is more suitable for a business building where it may be profitable to access renewable resources, primarily to save money on electricity bills while also being green and cool. According to a study by the Energy Information Administration and the United States Department of Energy, there is a global trend in which global energy consumption is growing at a faster rate than rising.

Energy consumption in developed countries is much higher compared to the rate of increase in 1.3 per cent by 0.8 per cent. In contrast, in developing countries such as India, growth rates are expected to be 1.3 per cent, but energy consumption is expected to increase by 4.3 per cent, according to Proceedings of the 2009 ASEE Gulf-Southwest Annual Conference Baylor University. This pattern will place a huge strain on the energy system. India's development sector is growing at a high rate, with a growth rate of 10% compared to the global average of 5.2 per cent. For this reason, energy efficiency in the construction industry is very important.

The necessary equipment for this is described further. Photovoltaic (PV) cells, more commonly known as solar cells, are made of different materials known as semiconductors, the most common of which are silicon. When sunlight strikes a cell, part of the sun's energy is absorbed by the semiconductor material. This force pulls electrons loosely inside the semiconductor, enabling them to move freely. Electrical energy is the movement of electrons. This current, when paired with cell power (which may be the result of a built-in cell field of energy or fields), defines a photovoltaic cell capacity (or wattage).

Solar transformers are machines that convert current (DC) current made from solar panels into alternating current (AC) needed by housing. One of the most important components of a solar power system is a solar inverter. Converts photovoltaic (DC) photovoltaic (PV) power output to 240V current (AC). This interchangeable power is usually brought to your home to control your equipment. Solar panels do not appear to be connected directly to the roof. The panels are connected to a racking system attached to the roof and tilted to receive high sunlight. The monitoring system will show you how much power is generated per hour, day or year to test the performance of your PV system. The system can also detect possible changes in performance. Solar batteries are often used to store solar energy for later use or if you want to use them overnight. When the power grid is not available, storage batteries enable the PV system to work. You will need to connect your solar panels with an electric gadget if you want it to control during power loss.

SOLUTION:

Site inspection is the first step and allows the PV designer to estimate the desired amount of electricity throughout the building by providing a carpet area on the roof of the house, allowing the designer to calculate the maximum amount of solar panels (predetermined size) required for the building.

The next step in the design test is to determine the size of other structures such as water tanks, buildings that add value to the building, etc., so that the design can be limited to prevent shadows from falling on the panel, and save energy production costs less. The third step in the test site is to select the best position for the inverter and solar distribution boxes so that the DC operation is as short as possible. The higher the loss, the DC wires are longer. As a result, DC wires that carry output from the panels should be designed in such a way that they are short, long, and allow for small losses. The next step is to establish a local grid meter room, which allows the designer to calculate the AC run from the inverter and provide a convenient place to attach the net meter.

After determining the specification of the set value, the designer builds a structure in the design process (AutoCAD founder, Google Sketchup, etc.) to simulate the structure by providing a predefined solar panel location, taking into account shadows and other limitations. Available solar radiation, Albedo factor, and a few angular values are limited to connecting to the roof are major limitations. This gives the designer an estimate of how many panels can be installed on the roof, allowing them to determine the maximum power output that can be taken from the installed panels.

Next, we do the load calculations. This process involves calculating the amount of actual load used within a building and finding the kWh number required for the building. This can be done with a simple calculation that includes a summary of all AC loads used on a given day, as well as calculating the maximum operating hours and length of operation of the equipment. The traditional method of measuring common load is to use the previous energy inflows of the building; apart from student comfort, the process requires nothing. The measurement is completed by multiplying the output of the machine output by the number of hours operating daily, resulting in Watt Hour or unit. To use it in the quality work unit, we simply divide the results by 1000, referring to the household electrical unit.

Advances in design and pre-installation, precise size drawing, precise panel placement when considering shadows and available space, calculation of line number sequence, precision inverter size, solar input alignment and thus distribution boxes, cable size performance, cable size resolution of AC and DC, etc. are all part of the process. Adoption of the layout allows the designated engineer to inspect the building to be installed on the roof of the house with minimal errors, ensuring that the customer gets the promised operating system. Each energy-producing company has its own cost per unit of energy, calculated with the company's profit in mind.

Jan Kleissl, professor of environmental engineering at UC San Diego Jacobs School of Engineering, and colleagues have published what they say are the first peer-reviewed estimates of cooling benefits provided by solar photovoltaic panels in the next issue of Solar Energy. Research data were obtained within three days. In fact, the panels act as roof blinds. Instead of the sun setting on the roof, which causes heat to be forced through the roof into the roof of the building, photovoltaic panels absorb heat. The wind blows between the panels and the roof and removes excess heat.

Other things to keep in mind when installing panels are: Identifying building materials on the roof of the house: High quality, well-maintained PPE should be used in all solar installations. Cell phones and other electronic devices are not permitted for use during installation to avoid any interruptions. The connection of the modules to the crane or forklift should be done by a qualified professional. Crane speeds should be maintained at less than 10 km per hour while loading modules. Lifting equipment is maintained at a safe rate by installation personnel to avoid accidents. To ensure smooth operation, the jack or boom of the lifting equipment must be lubricated and maintained regularly.

The track is cleaned and removed by anybody barriers when the modules are lifted from the roof. To easily manage modules, appropriate project teams are established. During the installation of a solar power station, instructions are given and must be followed by everyone. To avoid any damage to the modules, the entire installation team is regularly instructed. A thorough test is performed when the cable is moved to ensure that it is not damaged. The whole process should be done under the strict supervision of qualified personnel. As the modules are physically placed, hand-resistant hand gloves are used.

NO COSTS ARE SAVED TO ENSURE NO ONE IS INJURED.

The speed of the tedious machine is usually maintained at less than 10 miles per hour during the process. When repairing electrodes, handling back-mounted materials, and connecting the electrical panel, workers adhere strictly to the use of cotton gloves, PVC, and leather. During system overheating, welding glasses, face shields, and aprons are also used.

As can be seen from the quantitative analysis and cleanliness of the PV system, it is without a doubt one of the most important power generation systems available at the moment. The cost per kilowatt-hour continues to be less than the cost of the non-renewable energy source provided in our system. Solar energy contributes to the supply of renewable energy; therefore, the government should provide certain incentives to promote solar energy use in metropolitan areas.

THE CAMPAIGN WILL ALSO HELP REDUCE GREENHOUSE GAS EMISSIONS.

It is, therefore, reasonable to conclude that installing solar roof systems is costly for customers and can play a significant role in meeting the energy needs of domestic consumers.

On the one hand, the system will benefit customers financially, and on the other hand, it will provide continuous electricity.

FORMWORK USING BIM

RITESH VISHWAKARMA
RUGVED TELANG
VANSH SINGH

MENTOR : MR. SWAPNIL RAUT

Exploring design and construction of formwork using BIM technology. Aluminium formwork is a new type of formwork system. It is easy to install and disassemble, can be turned over many times, has a good forming effect, and has the advantages of green environmental protection. BIM technology has the advantages of visualization, simulation and synergy.

Using BIM technology to design, mould and construct aluminium formwork, effectively improving the design efficiency, optimization of the model. BIM technology is a building information model and a digital technology based on 3D virtual technology. Aluminium formwork has a short construction period and is easy to assemble and disassemble. Only one set of templates is needed for the entire project, which effectively reduces the cost of construction.

Variables used in the BIM environments for storing informative data about building elements are called parameters. Thermal, mechanical, geometrical or visual properties of building elements in the BIM environment is stored using these variables and fewer technical flaws and errors. Advantages of parametric modelling abilities include generation and updating of building information leading to reduced time and effort. Important features of BIM from the aspect of reusability of its data are information management, updating, editing, and interoperability, which are possible through parametric modelling only. BIM has been a key area of interest for many researchers in the industry for the enhancement of the design and construction processes. The model that gets generated through BIM authoring tools is an object-oriented, parametric, and intelligent digital representation of building facilities.

The data available in the BIM environment is more than just 3D solids hence differentiating it from conventional Computer-Aided Design and Drafting (CADD) tools. The semantics associated with BIM objects facilitate their recognition for computational design tasks. This is difficult in the CADD environment.

The major factors in layout planning are cost, constructability, safety, quality, and characteristics of the building and therefore the site. BIM (Building Information Modelling) provide more precise information about the shape, dimensions, and structure of the buildings that can be found on the existing 2D-based drawings. The system can improve productivity (reduction of workload and work time) and economic efficiency (reduction of formwork types and rational form dimension selection). Using the BIM technique to rationalize the formwork layout, incorporating the particular site characteristics and imparting the parametric change during construction. It also provides the background concepts and techniques required to adopt BIM as a simplified and intriguing tool to carry out the 4D Schedule and 5D Cost of the concrete formwork systems. While the formwork layout is important as formwork selection in improving productivity, there are few studies on formwork layout.

The application of BIM technology in the design and construction of aluminium formwork in construction engineering can utilize the advantages of visualization, coordination and simulation of BIM technology, and combine the advantages of aluminium formwork construction to optimize the design, mould matching, processing and processing of aluminium formwork.

The construction process, through three-dimensional cross-over and three-dimensional inspection, has greatly improved the use efficiency of the aluminium formwork and reduced the construction cost.

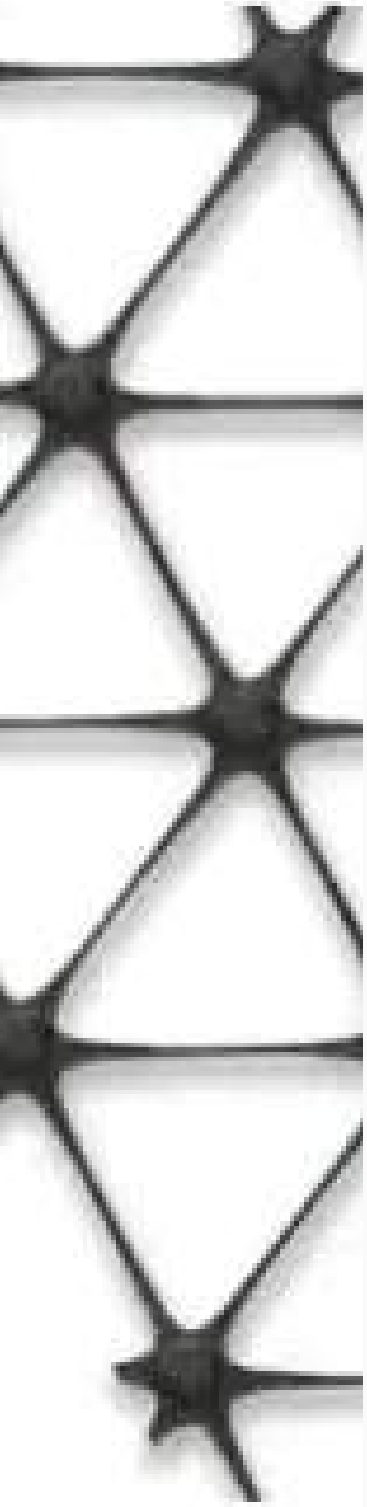
In the future, BIM technology should be further studied in-depth and its technical achievements should be applied to the design and construction of construction projects to promote the sustainable development of the construction industry.

Nothing is particularly hard if you divide it into small jobs.

STUDY ON EFFECT OF GEOGRID ON CONCRETE CUBES

ROSHAN SHARMA
OM KARZORE
TANISHQ THAKUR
ROHIT RATHOD

MENTOR : MS. ASHWINI SHANBAG



There are three types of geogrids, uniaxial geogrid which is extended in the longitudinal direction only and the stress can be transferred on the longitudinal direction only and biaxial geogrid, which is extended in the two directions (longitudinal and transverse) which led to the distribution of the stress in both directions. Since the strength is equal along both axes these geogrids are mostly favoured in construction, finally triaxle geogrids are also used and it's had multi-directional properties that leverage triangular geometry and the construction of geogrid has the most stable shapes, which lead to providing greater stability and stiffness than other two types. The purpose of this current work is to investigate the effect of the geogrid layer on the structural behaviour of reinforced concrete beams. In the present experimental investigation, the work investigated the effects of calcium chloride as an admixture in Geosynthetic fibre (geogrid) concrete. Also studied the compressive strength and tensile strength of plain concrete and geogrid reinforced concrete by adding calcium chloride in various ratios (0.2, 0.5, and 0.8) and to determine the optimum value of calcium. The objective of this paper is to investigate the effect of geogrid on concrete cubes.

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The compressive strength, of concrete, is measured and comparative analysis is made. The parameters of this investigation include the compressive strength of concrete specimens' cubes of (150mm X 150mm X 150mm) size.

M25 grade concrete is used for testing. This study explores the effects of geogrid on some mechanical properties of concrete. The aim of this work is to highlight the use of geogrid for tensile reinforcement of soil.

Two types of concrete cubes sets were prepared and tested in terms of compression, stress-strain manners and workability evaluation through weight and permeability tests. During the tests, it was noted that the load-deflection curve for beams with geogrid layer was stiffer and the percentage of stiffening was increased with the increase of the flexural reinforcement ratio. The maximum applied load for beams with geogrid layer were higher than conventional beams without geogrid layer under the same conditions, while, the deflection values for beams with geogrid layer was lower than conventional beams without geogrid layer. The first crack load of beams with geogrid was greater than conventional beams without a geogrid layer. So, the geogrids layer offer great enhancements to concrete properties and performance from the first cracking load, load-deflection response, reduce the crack's width and number and ultimate strength of tested in comparison to the conventional beams.

From experiments, we can see that when geogrid is applied to the concrete, it reduces the movement in the concrete particles and increases the stability and provides a better grip to the concrete.

The load-deflection curve for the geogrid layer was stiffer and the percentage of stiffening was increased with the increase of the flexural reinforcement ratio.

The maximum applied load with geogrid layer were higher than conventional without geogrid layer under the same conditions, while, the deflection values for cubes with geogrid layer was lower than conventional cubes without geogrid layer. The first crack load of a cube with geogrid was greater than the conventional cube without a geogrid layer. So, the geogrids layer offers great enhancements to concrete properties and performance from the first cracking load, load-deflection response, reducing the crack's width and number and ultimate strength of tested in comparison to the conventional beams.

VERTICAL FARMING

SHUBHAM GADAKH
LAVKUSH DUBEY
SHIVKUMAR BIND
DEVENDRA GUPTA

MENTOR : RUTUJA SHINDE

Vertical Farming is a high level of agricultural technology which is carried out since there is no available land and so on complete building requirements for farming mode, this is a new method or a higher-level approach. With this, the paper is about how to work, harvest strategies, water, and plant management ploughing, and withdrawal process and some renewable natural resources are used such as windmills, solar, etc., where they are not the same as conventional agriculture processes, other habits have to make a good withdrawal process.

Direct farming is a growing practice produced in vertical layers. This practice can use soil, hydroponic, or growing aeroponic pathways. That's right, farms trying to produce food in challenging areas, such as where arable land is not available or not available. The road helps the mountain cities, deserts, and towns grow different types of fruits and vegetables through designs such as skyscrapers and accurate agricultural methods.

Methods used for Vertical Farming: Hydroponics, Aeroponics, Aquaponics

Vertical Farming has several benefits, which makes it promising the future of agriculture. The world demand is very low, water consumption is less than 80 per cent, groundwater reused and stored, it does not kill insects anymore in the case of high-tech farms there is no reality depending on the weather. The vertical farm makes farming inside the blocking the city, literally. And when the nearby farms, production is faster brought in and always new; compared to in the refrigerator product commonly found in supermarkets. Reduction in travel reduces fuel costs & paid withdrawals and thus reduced transport corruption. However, like everything else vertical farming has its problems. In the beginning high cost of established vertical ploughing, the program is a big problem. In moreover, there are construction costs properties and its automation as a computer and monitoring systems, remote systems and software's, automatic racking and stacking systems, LED set lighting systems, climate control system, etc.

Benefits of Vertical Farming are:

1. Ensures Consistent Crop Production.
2. Uses Space Optimally.
3. Reduces Usage of Water.
4. Cuts Down on Transport Cost.
5. Less Labour Costs.
6. Energy Efficient.
7. Doesn't Involve Chemicals or Pesticides.
8. Limits Occupational Hazards

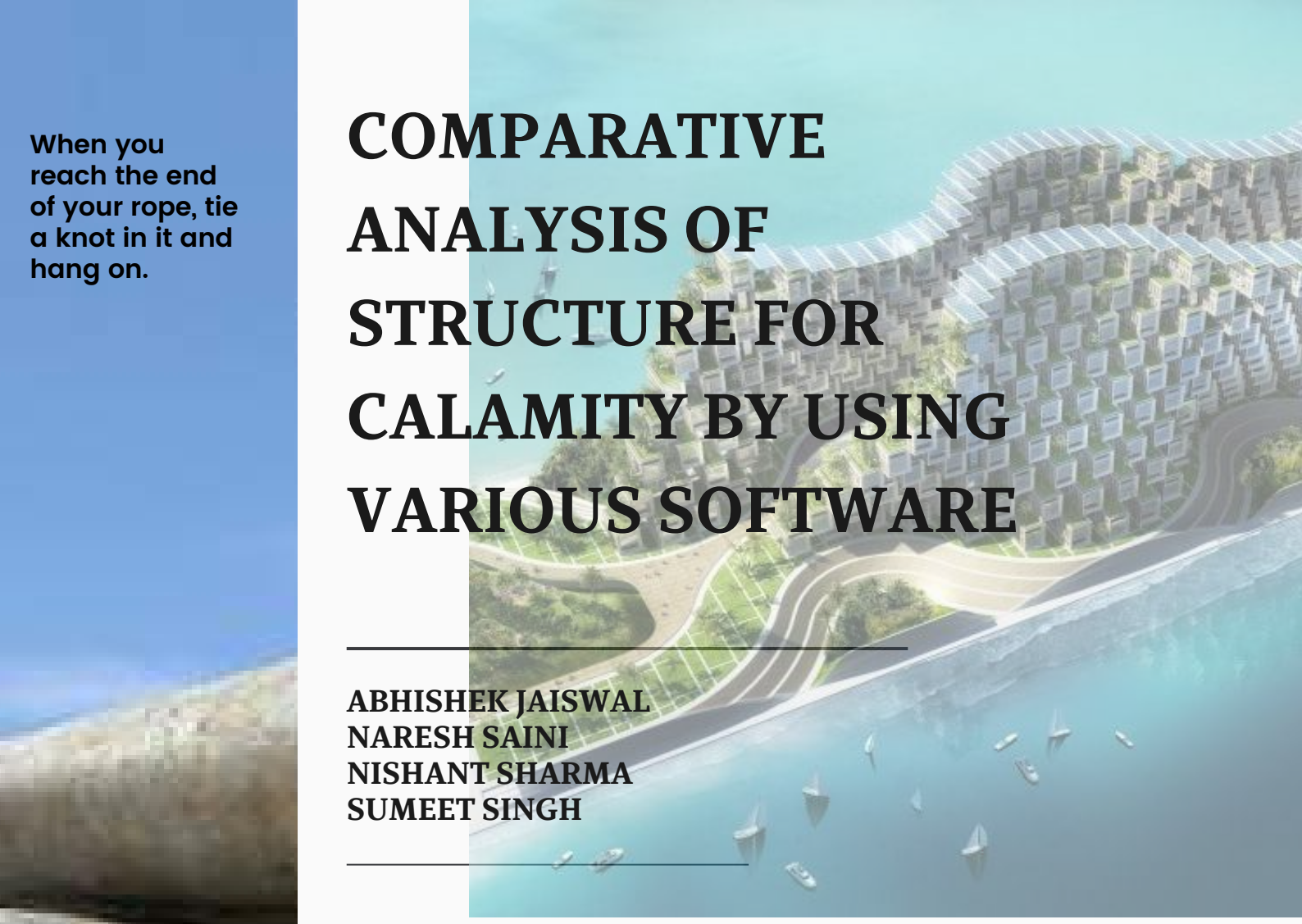
As compared to traditional farming; Direct farming reduces travel costs as has always been the case planted near residential areas. Due to this CO2 emissions are reduced.

Water - 70% of pure water goes to its agriculture.

Land- 25% of the world's land area is very high decay, and soil erosion, water the decay and loss of biodiversity.

Carbon Extraction - Water Excavation, pulling from deeper parks than ever before, using tractors and harvesters, traditional commercial farming indeed great power. Direct farming is declining discharge of moving goods by 98%.

When you reach the end of your rope, tie a knot in it and hang on.



COMPARATIVE ANALYSIS OF STRUCTURE FOR CALAMITY BY USING VARIOUS SOFTWARE

ABHISHEK JAISWAL
NARESH SAINI
NISHANT SHARMA
SUMEET SINGH

The idea of building high-rise buildings was introduced back then to accommodate more people. In the coming years and the growing population its peak time for many developments in the field of a sky scrapper. As we talk about development, we are faced with the challenge of supporting the current towers from the earthquake. Our research is based on an analysis of the various methods available and it is best to study its classification and its application. In terms of development, we need to develop these strategies more closely in India and also need to understand what works best in our natural environment. It focuses mainly on earthquake zones, especially in the northern parts. We have taken the case of circular seismic 2 with a medium soil class. The analysis was performed using software such as MIDAS GEN. Given the demands of lateral strength and resilience, as well as a disability under strong winds and earthquakes, as well as the integration of gravity and construction, the economic construction of high-rise buildings is a challenge.

Our approach to doing this research was to use software such as Midas Gen by looking at a specific structure and using a variety of methods and keeping records of its outcome so that we could understand which method was the best. Our analysis is based on the structure we have built and allows all-natural conditions to remain consistent. It receives three rounds of analysis in which we kept loads and earthquakes alike and changed routes.

SOLUTION:

The first case involves a simple structure with no additional accessories. The second case consists of a building covered with Shear walls on four sides and stairs and an elevator. The third case involves Frictional dampers on the edges of the building in all apartments.

In this case, the methods we are considering are the setting of Base, X-Bracing, Shear Walls, Seismic Dampers, and other methods of our research.
We have done information on many research papers and online data and reviewed videos to better understand the process.

The present comparative study applies the same pattern of earthquake structure to both RCC and Steel structures. Analysis of both construction models is done in software \ analysis parameters such as Story Stiffness, period, Frequency, Base Shear, Lateral forces, and Seismic weight are widely studied.

METHODS:

MODERN CONSTRUCTION TECHNIQUES FOR EARTHQUAKE RESISTANT BUILDINGS:

There are 2 techniques that have been used lately in modern construction so far which are as follows:
1. Seismic Dampers
2. Shear walls

1. SEISMIC DAMPERS

These dampers act as hydraulic shock absorbers in cars - most of the sudden jerks are absorbed by the hydraulic fluid and only a few are passed over the car chassis. When the force of an earthquake is transferred through them, the dampers absorb part of it and reduce the magnitude of the force
Types of seismic controllers include viscous dampers (energy absorbing silicone-based fluid between piston-cylinder configurations), collision dampers (energy absorbed by the frictional areas between them), and supply stations (power absorbed by steel) components. the magnitude of the force acting on the structure.

2. SHEAR WALLS

Shear walls are considered an important part of lateral load resistance systems and steel is well known for its ductile behaviour. Combining these two desirable structures, an effective load-resistant system was developed and has gained widespread use in Japan and North America. These walls are designed in such a way that they bend instead of collapsing under lateral loads. These walls are very thin and lightweight, thus reducing the weight of the building. In addition, these walls do not need treatment and that is why, it speeds up the construction process.

WIND IMPACT ON TALL BUILDING:

The tallest structures are critical wind structures, and lateral wind loads are often the controlling factor. The situation becomes more serious when the frequency of incoming winds meets the mass of the building. The pattern in which the air flows around a building is distorted by the mean flow, the flow rate, the formation of vortices and the rise of awakening. The structural response to the lateral wind is twofold:

(1) means a fraction equal to the minimum wind speed, and

(2) a variable component due to piercing. This is the basic principle of the "gust-factor" method and is considered in many design codes.

MATERIAL AND GEOMETRIC PROPERTIES

Sr. No.	Description Of Parameters	Column1
1	Grade of concrete	M30
2	Grade of Steel	Fe 440
3	Column (solid rectangle)	EC: 4500mmx4500mm
		IC: 3500MMx3000mm
4	Beam	5000mmx2300mm
5	SHS (damper)	100x100x6
6	Slab Thickness	150mm
7	Wall Thickness	200mm
8	Type of Bracing	X-Bracing
9	Type of Damper	Friction damper
10	Seismic Zone	Zone - III
11	Zone Factor	0.16
12	Importance Factor	1
13	Response Reduction Factor	5
14	Damping Percent	5%
15	Type of soil	II- Medium Soil

REPORT OF ANALYSIS:

The first case involves a simple structure with no additional accessories. The second case consists of a building covered with Shear walls on four sides and stairs and an elevator. The third case involves Frictional dampers on the edges of the building in all apartments.

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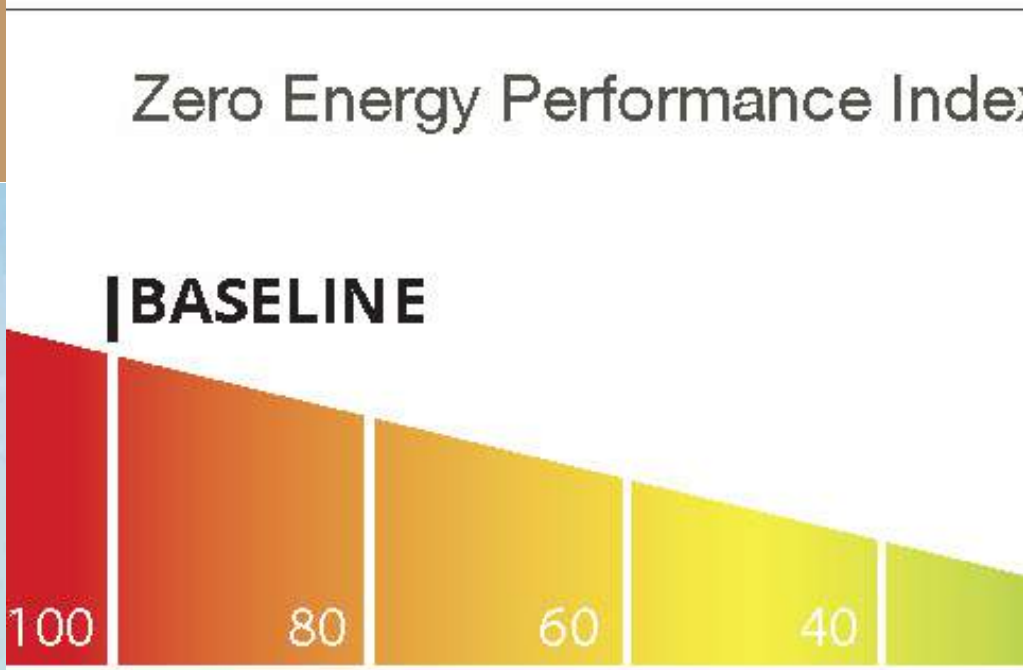

UNDERSTANDING THE ZEPI AND THE FUTURE OF ZNE BUILDING PERFORMANCE

SHUBHAM GADAKH
LAVKUSH DUBEY
SHIVKUMAR BIND
DEVENDRA GUPTA

MENTOR : RUTUJA SHINDE

Housing is one of the basic human needs. There are many benefits of getting a house, but we can stay indoors when we understand that the electricity we use is made of gasoline for a limited and abundant residual fuel pollution is increasing in their system, we can live in anyone's house that that obstructs natural resources or does not have good ventilation, we can stay indoors when electricity costs go up day by day. Electricity is a standard requirement in today's world. With population growth and development in India, a self-sufficiency capacity of 1598. TWH annually and in particular (64 %) comes from a coal-fired power plant. According to the present 24.01% residential sector, industrial sector 42.69%, agricultural sector 17.67%, commercial sector 8.04%, and the pull-down sector is 1.52% using total electricity per cent. From this, we know that the building sector of India accounts for almost 35% of total energy expenditure at a growth rate of 8%. And this is too big an increase in the consumption rate. A move towards renewal power is needed now, and it will be much easier with the properties of net-zero energy.

Zero energy (ZEB) facilities are also known as Zero net energy (ZNE) buildings. These buildings used the latest technology such as heat pumps, high-performance window installation, solar panels, photovoltaic cells, etc. We produce renewable energy equivalent to the total energy used. By building. These types of structures contribute very little to the emission of greenhouse gases during the operation of conventional structures. ZNE buildings also reduce operating costs by selling more renewable energy produced during operation and are also more powerful by saving 50% and 70% more energy than conventional buildings, and these buildings are more reliable, comfortable, sustainable than conventional buildings.

The 2015 International Construction Code (IGCC) includes several ongoing steps that will improve construction performance. Where one key provision refers to the zero-energy (ZEPI) performance indicator, which provides a scale for measuring trade-off performance. ZEPI represents a significant change in the performance measurement of buildings as it sets the target for actual energy consumption rather than using a predictable energy model to build energy efficiency to calculate a "better percentage than code" metric. ZEPI Zero's school refers to weak buildings. The 100 points refer to a building with moderate energy consumption built on the energy consumption building standards by the year 2000.
The most expensive step in reducing energy consumption usually occurs during the design process, which is why effective design and fulfilment of basic requirements are required.

DESIGN AND CONSTRUCTION

Passive energy efficiency

Site selection: - Site selection is the first and most important step in building ZNE buildings, an area with good ventilation, exposure to sunlight, or the environment.
Layout:-

The ridgeline needs to look east to west, so we have a roof facing south, it is important to give you enough space for solar panels to power the house, and the south-facing wall is the best place for windows that can collect sun in winter and can stop overheating during the summer.

Window position: - In ZNE buildings most windows face south and almost no windows face north. Because most sunlight comes from the South.

Thermal mass: - It is the most important part of ZNE buildings to have the right thermal weight, using wall heat, high slab floor and concrete tops in the kitchen provide a sufficient amount of heat retention and in the summer, it releases that excess heat

Covered structure: - To build a successful ZNE home that limits the air leakage required, we can use the construction of a sips panel of foam core with OSB on both sides of these panels made of 8 and 24 feet on one panel so that we have a whole wall with pre-cut windows, we may only lose 1 or 2 per cent.
Balanced insulation: - Having great insulation on the roof but not too much on the walls is not expensive. Using R5 windows with a value of 0.2 W / m2K can provide more air, we can save more energy as long as we add more cover installation

Heating and cooling equipment: - consider a ground-source heat pump. This part of the device has an average capacity of about 450 lights per year, these pumps pump hot water to the ground and heat that water, and we can use solar energy on it.

Effective lighting: - Having at least fluorescent and compact fluorescent lamps, but the brightest lights in this we can use LED lamps is not suitable for wasting 20 years and is very efficient.

ACTIVE ENERGY EFFICIENCY

It means the production of electricity by renewable energy or from highly efficient energy sources. Another example of renewable energy: -

Photovoltaics
Solar systems
Air engine systems
Biomass systems
Geothermal systems
Nuclear power

Adding solar panels, production meters, power grid when you generate more energy you can pull on the grid at night or if you don't produce enough power, these are some steps we can follow.

ADVANTAGES

• Separation of property owners from future energy price increases.
• More comfort due to very similar internal temperatures (this can be illustrated by comparison to other maps).
• Reduction of total ownership costs due to improved energy efficiency.
• Reduction of total monthly living expenses.
• Reduce the risk of loss due to grid cancellation.
• A small-to-medium increase in energy prices for homeowners reduces the need to reduce energy and carbon emissions taxes.
• Higher resale value as energy owners want more ZEBs than available.
• The value of a ZEB building compared to a conventional structure should increase each time energy costs increase.

Zero energy (ZEB) facilities are also known as Zero net energy (ZNE) buildings. These buildings used the latest technology such as heat pumps, high-performance window installation, solar panels, photovoltaic cells, etc. We produce renewable energy equivalent to the total energy used. By building. These types of structures contribute very little to the emission of greenhouse gases during the operation of conventional structures. ZNE buildings also reduce operating costs by selling more renewable energy produced during operation and are also more powerful by saving 50% and 70% more energy than conventional buildings, and these buildings are more reliable, comfortable, sustainable than conventional buildings.

• Contribute to greater social benefits, e.g., to provide renewable energy in the grid, reducing the need for grid expansion.

LIMITATIONS

• Very few designers or builders have the necessary skills or knowledge to build ZEBs.
• A possible reduction in the cost of renewable energy for a future service company may reduce the amount of investment invested in energy efficiency.
• The new cost of solar photovoltaic solar technology has been declining by about 17% per year and, therefore, will reduce the amount of money invested in the solar power system and current funding may be phased out as mass photovoltaic production will reduce future prices.
• The challenge of recovering high costs at the start of a real estate sale, but new energy rating systems are being introduced gradually.
• Initial costs can be high the effort required to understand, apply and qualify for ZEB funding, if any.

THE FUTURE PLAN

• Future buildings will focus more on renewable and sustainable energy sources through the efficient construction envelope and the use of energy-efficient and efficient resources that promote reduced energy efficiency.
Second, the global population and government focus on small-scale production and global warming, and the construction of ZNE will be in great demand.

Ideas are the root of creation.

EVALUATION OF PLASTIC WASTE MODIFIED BINDER FOR ROAD CONSTRUCTION

PREET VAGHANI
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SURYAVARDHAN VAISH
SAURAV SINGH

MENTOR : RUTUJA SHINDE

The use of plastic waste in bituminous compounds improves its properties and strength. In addition, it will also be a solution for plastic disposal and various defects in the area covered with pots, potholes, tile, ruts, etc. Waste plastic used polyethene, polystyrene, polypropylene. Garbage plastic is cut and covered on top of it and mixed with hot tar and the resulting mixture is used for road construction. This will not only strengthen the pavement but also increase its durability.

Titanium-di-Oxide is used as a smoke detector, which will absorb smoke in cars. This new technology will be useful in India's hot climate. It is economical and eco-friendly. In this paper, we have discussed the ground structures to be considered in the design of pavement, pavement design, flexible construction process, and plastic-smoke absorbent pavement.

Plastic waste has been used in the construction of paved roads in India for ten years now. It is evident that the use of plastics improves the rheological properties of bitumen and thus pavement. Extensive research has been done to determine the suitability of plastic waste in the construction of bituminous pavements. Dr R. Vasudevan has stated in his writings that the use of plastic in bitumen improves the binding properties of bitumen. Professor C.E.G Justo states that an 8 per cent increase in the weight of the manufactured plastic is desirable to save 0.4% of the bitumen by mixing as it improves the stability, strength, life, and other desirable properties of bitumen. Dense bituminous macadam with recycled plastics, especially low-density polyethene (LDPE) replacing 30% of compounds 2.36 - 5 mm, reduced the density of the mixture by 16% and showed a 250% increase in Marshall Stability. Zoorab and Suparma have shown that the use of recycled plastics in empty concrete clusters increases durability and fatigue health. D. N Little further work with the effect of plastic plastics and found resistance to the flexibility of low-density polyethene (LDPE) asphalt was reasonably better. Studies have shown that the use of recycled polyethene in bituminous pavement compounds reduces permanent degradation in the form of corrosion and low-temperature cracking.

I. THE BITUMEN OF PLASTIC AGGREGATE INTERACTION MODEL

Debris from the cut-off plastic is sprayed and spread over hot joints in such a way that the clusters are covered with a thin layer of molten plastic. The sealed plastic remains in a soft state at a temperature of 140oC to 160oC. Hot tar (160oC) is added and spread over these figures. At this temperature, both compounds and bitumen remain in a liquid state and can be easily dispersed visually.

This process is also aided by an increase in the area of communication. Comments can be defined as follows. Plastic is a polymer with long hydrocarbon chains and asphalt is a complex mixture of asphaltenes and maltenes are also long hydrocarbon chains. The plastic layer is already bonded to the aggregates. When the tar is mixed with a plastic container covered with plastic half of the bitumen disperses on the plastic layer and binds together thus forming a three-dimensional internal network between the plastic (polymer molecules) and bitumen which makes the bond stronger. Therefore, the design is more resistant to adverse weather conditions, with greater strength, higher cohesion, and fatigue resistance, peeling, and transformation, thereby extending its lifespan.

A. MATERIALS USED.

The materials used to conduct current research are:

1. Ratings
2. Bitumen
3. Plastic waste

1. WORK

Aggregates form a large part of the pedestrian structure and form the most widely used materials in road construction. The aggregates must bear the brunt of the pressure caused by tire loads on the paved road and overhead. They should also resist ageing due to the adverse action of vehicles. These are used in the construction of a paved road in concrete, cement, bituminous concrete, and other bituminous structures and also as a granular foundation study under the upper layers of paving. Aggregate structures are therefore of great importance to the highway engineer. Some of the desirable features of these figures are strength, durability, durability, stiffness, etc.

• Check aggregates

1. Crushing test
2. Los Angeles abrasion test
3. Impact assessment

2. BITUMEN

The bituminous materials used in the construction of the highway are broadly divided into asphalt and bitumen. Bitumen can also be divided into petroleum or bitumen as well as traditional bitumen. There are different species where native asphalt is found. These are the ones that occur in a pure or virtuous state in nature. The viscosity of bitumen is sometimes reduced by the diluent variable; this thing is called cutback. When bitumen is suspended in a well-separated state in a wet area and stabilized with a coating, the material is known as an emulsion. Tile is a viscous liquid found when organic matter such as wood and coal is emitted by carbon or destructively in the absence of air.

Bitumen comes in many forms. To determine the suitability of these binders' various physical tests have been specified by agencies such as ASTM, Asphalt Institute, British Standards Institution, and ISI. These tests include penetration test, ductility test, lubrication test, flash, and fire test, viscosity test, etc.

3. PLASTIC WASTE

Plastic waste such as carry bags, cups, disposable items, etc. are processed in a surgical machine and sprayed with different percentages over hot compounds.

ADVANTAGES:

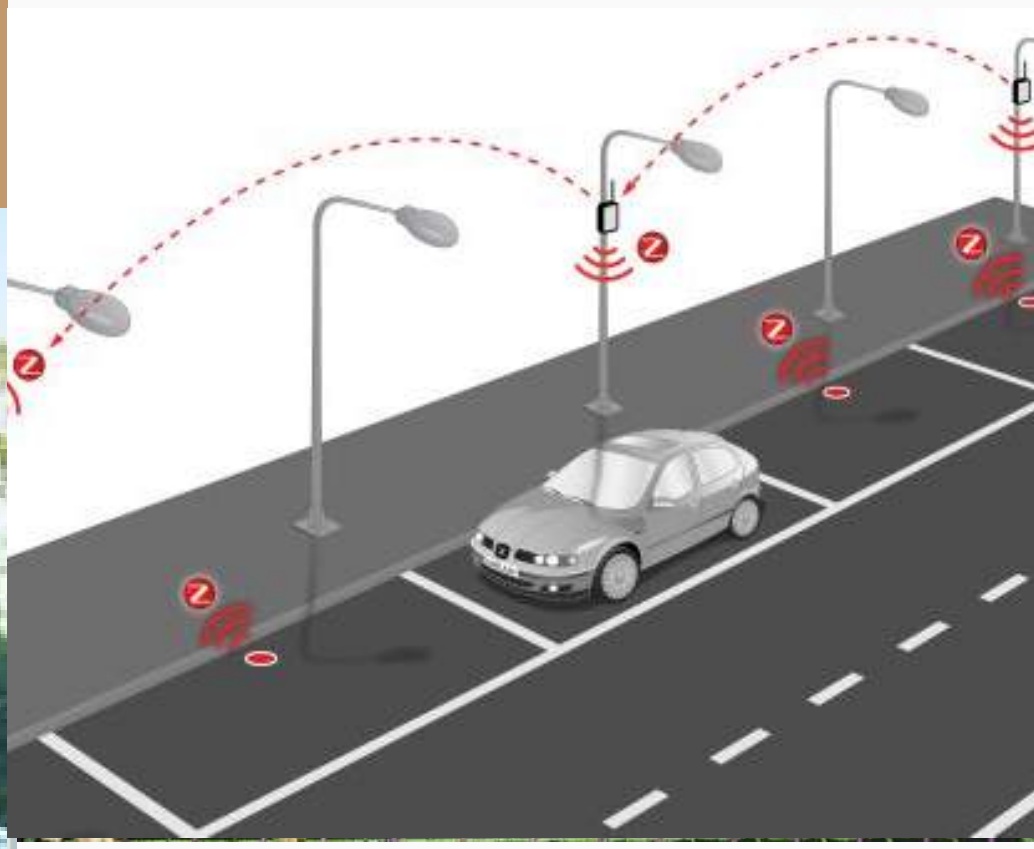
Reduce the need for tar by about 10%.
1. Develop environmentally friendly technologies.
2. Improvements in the health of road fatigue.
3. Increase Road capacity and efficiency.
4. Use a high percentage of plastic waste.
5. Gases emitted during road conditions are absorbed to absorb smoke.

DISADVANTAGES:

1. Toxins in plastic waste piled up will begin to be immersed.
2. But the presence of chlorine will release HCL gas.

CONCLUSION

Production of dirty plastics is increasing day by day. Plastics show adhesive material in its molten state. Plastic will increase the point of melting bitumen. Therefore, the use of dirty plastics in the travel area is one of the best ways to easily get rid of dirty plastics. In addition, plastic can be recycled, and using them in road construction will help to dispose of this plastic waste in an eco-friendly way.
The use of new technologies will not only strengthen road construction but will also save them and extend the life of the roads. Plastic roads will be more efficient in a country like India, where temperatures drop to 50oC and severe storms also cause turbulence, leaving potholes and potholes. It is hoped that shortly we will have strong, durable, and environmentally friendly roads that will free the world from all forms of plastic waste.



SMART ROADS: HIGHWAY TOWARDS SAFETY

LEANDER CARVALHO
KISHAN SHARAD KUMBHAR
TANAY BHAVSAR
RAGINI MAHAJAN

MENTOR : MR. VIMAL GOSAR

Converting cities into smart cities is one of the most positive changes in the world. India has allocated billions of budgets to build smart cities. One of the major contributors to this change of smart roads. Smart roads include highways that are eco-friendly and easy to use. Inexpensive and low-maintenance roads are also part of it. Providing safety, low power consumption, and reducing traffic flow is the ultimate goal of smart roads. Fuel wastage, time wastage, and pollution are growing problem in India that arises as a result of traffic jams. In addition to these problems, overcrowded roads and the unexpected time needed to move from one place to another creates major problems that lead to environmental damage.

Road transport is an Indian way of life. This transit includes goods and public transport that are the property of the individual and the nation. With the growth rate of motor vehicles increasing day by day, overcrowding has become a major problem for Indians. The average number of fatalities per 100 crashes increased from 28.5 in 2014 to 29.1 in 2015. Many of the mistakes that have led to accidents have been caused by human error. It is therefore believed that the replacement of vehicles and highways will reduce the risk of accidents, improve safety, reduce fuel consumption and improve the comfort and performance of drivers. This can be done using advanced technologies such as light sensors, Ultrasonic sensors, camera sensors, IoT devices, Interactive lighting systems, Solar routes, Glow in the Night, wind power systems, and advanced power lines. With the help of such automated systems, the chances of accidents can certainly be reduced to a large number. This will help the driver in many of the unpleasant aspects of driving activities. The disposal of plastic waste is a major threat to the environment. The biggest problems faced on highways are potholes and tiles. A plastic paved area will be the best solution for most of the problems. And self-sustaining concrete such as Bacterial Capsule, Induction Heating, Internal Curing, Chemical method arc can be used in the construction of smart roads.

A. Need for SMART ROADS

India's roads have a big role to play, with about 62.5% of people using the roads regularly. It contains 65% of the goods and 85% of other public transport. This leads to major road erosion, which must be maintained for the safety and longevity of roads. Projects should therefore be less expensive and environmentally friendly for the betterment of the nation.

B. Methods of construction and its specification

The construction and design of a building can include plastics as an alternative to asphalt. Plastics are perishable and a major problem in today's world.

So, using plastic waste to build highways is one of the smartest ways to eliminate the threat to the environment. Polymer plastic can bond with bitumen which creates a more efficient and stable bond due to increased communication. This results in better performance and better road health.

Self-adhesive concrete is another way to make roads clearer and more efficient, by reducing cracks or holes inroads, automatically repairing cracks and reducing human effort. It does so when cracks occur between 0.05-1mm, such cracks act as capillary that draws air and water into it, and reacts with a slightly dispersed cement that expands when exposed to air and water, calcium anhydrite matrix, water and carbon The dissolved dioxide enters the fracture and CO2 reacts with Ca2 + forming CaCO3 crystals, healing cracks, which may incorporate microfibers into it. But if cracks are too high to be managed by this process, it needs the need for other solutions. Self-adhesive concrete is also known as biological concrete. Calcium Hydroxide present in concrete matrix combines with atmospheric carbon dioxide to form Calcium Carbonate:
Reaction: - CO2 + Ca (OH) 2 CaCO3 + H2O
In all biological processes, the bacterial concrete process works best provided by: -
Ca(C3H5O2)2 + 7O2 CaCO3 + 5CO2 + 5H2O
The integration of technology and roads is needed, to transform it into a better-connected infrastructure to improve usability. There is therefore a great need to innovate in this sector. Smart roads can work better by incorporating these features into the system.
B.1 Photovoltaic pavement or piezoelectric generators on highways, so that more electricity can be generated and stored using solar energy.
B.2 Smart lights, is a sensory-based lighting system, which can detect the movement of a car, as the car approaches, the light is on or in sleep mode.
B.3 Electronic billboards display digital information and pictures, these programs can be used for navigation purposes. Even key ads can be made on an electronic board.

B.4 Strong paints are primarily visible due to fluctuations in temperature, for example, they glow like ice crystals when the temperature is cold, which indicates that highways are slippery and dangerous.
B.5 Drainage canals or environmentally friendly roads can be constructed to reduce water pollution by absorbing water and to reduce damage to concrete paved roads.
B.6 Snow and ice control systems should also be part of smart roads.
B.7 Road Police Drones, these drones are used on the roads leading to a complete process of gathering information and intelligence to investigate a particular incident.
B.8 Smart parking, designed to provide drivers with a great solution without having to search the parking space, costs, travel time, etc. This technology is used with the help of magnetic sensors and motor sensors. Smart car routes are not limited to better roads. It also includes smart traffic monitoring systems, which can make a significant contribution to traffic safety on highways. Robots with solar panels can be used, reducing the use of standard electricity. Unwanted accidents often occur in hair transplants where traffic jams are unaware of traffic coming from one side of the lane, in which case smart poles can be used to detect the vehicle and report it to the pole on the other side. a sharp curve, which then warns the traffic light by striking the wood to slow down and thus prevent accidents from occurring.
The world today is in the process of being able to use self-driving cars that will create a traffic environment. Managing such traffic personally is not possible, smart roads can be helpful in such matters. Future research is needed to determine the relationship between traffic and smart traffic control systems to avoid any kind of risk. Smart roads can be a link to combating carbon emissions, controlling congestion, reducing the use of common resources and increasing the interoperability of the plastic energy system. A multi-disciplinary approach should be followed to address the challenges. Improvements in similar costs should be discussed with the help of research. In addition, due caution should be exercised to influence tangible benefits.

When you reach the end of your rope, tie a knot in it and hang on.

MICROBIAL FUEL CELL - BIOELECTRICITY GENERATION

SATYANARAYAN GUPTA
DAKSH JAIN
SWAPNIL CHOPDE
AAKASH MOURYA

This brief review focuses on the latest technological advances of Microbial Fuel Cell (MFC), its development and implementation of real-world applications. Microbial Fuel Cells generate (bio) energy from waste, which can reduce pollution, but also reduce treatment costs. Although the technology is still considered "new", it has a long history since its acquisition, but only now that recent developments have allowed its implementation in real-world settings, such as the pre-trade. One important and interesting solution to the stated environmental and global problems is Microbial Fuel Cells (MFCs) representing a completely new way in which germs are used.

Introduction of these new energy sources MFC's operating principle depends on separating the small oxidation reaction and the reduction that triggers the normal redox reaction, allowing it to occur in two different phases. In the anodic component, exaelectron bacteria form oxidation of the substrate and transfer electrons, which are released from a series of cellular respirators to a metal electrode (i.e., anode). The electrons then flow to the outer electrical circuit to the cathodic area, where they lower the terminal electron receiver (TEA, usual oxygen).

Biocatalyst can be separated from oxygen by placing a membrane between two separate chambers that allow charging to be transmitted between electrodes, the anode chamber, where germs grow, and the cathode chamber, where electrons respond to air. Based on the transfer of electrons produced by active microorganisms from the media to the anode electrode, MFCs can be divided into two distinct groups: MFCs mediator and mediator MFCs.
Impact of the anode on MFCs

Microorganisms play an important role in the anode chamber and the electrons are produced. These generated electrons are used to reduce the electron receivers in the cathode as they pass through the outer cycle. Similarly, to complete the production cycle the protons must pierce the membrane of the proton exchange (PEM) from anode to cathode. It follows logically from what has been said that this process leads to electrical energy and the removal of organic waste at present as mentioned above the Anaerobic anode site is one of the key components of MFCs. All the important conditions for reducing biomass are given in the anode chamber. The chamber is filled with substrate, mediator (optional), microorganism, and anode electrode as electron receivers. The normal reaction in the anode chamber is summarized in
Eq. Impact of cathode on MFCs

The protons produced in the anode chamber move to the cathode through a proton exchange membrane that completes the electrical cycle. Electrons (produced at the anode site following Eq). Travel to the cathode chamber and transmit oxygen. This radical oxygen and ion-producing ions directly to the anode participate in the next reaction to create water dispersing in the form of ions that can penetrate the cathode and with the help of catalysts as follows:
The continuous current is generated by this process by a wire connecting the anode to the cathode. The concentration and types of oxidants (electron acceptor), proton detection, catalyst performance, and electrode structure and its catalytic ability affect the cathode reaction yield. Catalysis is required for anodic and cathodic reactions. In addition, because the appropriate catalyst can reduce the initiation capacity and improve the reaction rate, the presence of a corresponding catalyst is very important. Oxygen is often the ultimate receiver of electrons in the cathode due to its accessibility, strong oxidation potential, and non-product of chemical waste (water formed as the end product), which is free and does not produce toxic end products. Transfer of generated protons from the anode to the cathode chamber. The improved bio-strength between the metabolic activity of bacteria [reducing electron-producing electrons (e) and protons (H +)] and the receiving conditions of electrons (separated by membranes) leads to the production of live electricity in MFCs.
As may be included in the foregoing, the separator is one of the key components in MFCs that physically differentiate the cathodic and anodic biological responses (single-chamber MFC cathode). However, apart from the benefits of using separators, using separators can have negative effects. First, the protons produced in the anode chamber are transmitted through a separator, but the penetration of the substrate and oxygen is blocked by the separator.

Therefore, removing the substrate penetration of the substrate and oxygen will be improved; as a result, in MFC, columbic efficiency and microorganism activity will be reduced. Additionally, the increase in pH in the cathode chamber and the decrease in the anode chamber, i.e., pH separation, are major challenges. It is safe to say that pH separation will reduce system efficiency and stability. These problems are raised when a proton (not at a sufficient level) is transferred from the anode chamber to the cathode. Increasing the total internal resistance and total cost of MFCs is another challenge to using the separator. To address these issues, various divisions have been developed steadily over the past decade. To this it should be added here that classified building materials can be divided into three categories according to their filtering characteristics as follows: salt bridge, selective size dividers, and ion exchange membranes (IEMs). Needless to say, the normal ion exchange membrane based on the type of ionic groups integrated into the membrane matrix may be in two major phases such as the anion exchange membrane and the cation exchange membrane. These filters usually contain the ultrafiltration membrane (UFM), salt bridge, bipolar membrane (BP2M), cation exchange membrane (CEM), anion exchange membrane (AEM), glass filters, filter filters (MFM).), perforated fabrics, and other perforations filter materials.

APPLICATION

1. Using MFC technology as a sensor for pollution analysis and process monitoring is an alternative to biofuel cells.
2. Batteries are lifelong and should be replaced or recharged; therefore, MFCs are capable of empowering electrical chemical sensors and are small telemetry systems for transmitting signals received from remote receivers. Designing this type of system, having the right cathodic and anodic reaction is the first step. It is possible to use MFCs as a biological oxygen demand (BOD) sensor, and it is shown that this type of BOD sensor has excellent performance and production capacity and can be maintained for up to 5 years.

Different types of enzymatic glucose sensors have been developed.

3. Lokuqala The first type measures the amount of hydrogen peroxide produced and the lack of oxygen by the benefits of simplifying and assembling systems of smaller size. One uses chemical compounds such as ferrocene to transfer electrons to the electrode.
4. MFCs can have many other applications besides wastewater purification and renewable energy.
5. The first and most practical use of MFC is through this program to obtain electricity from a sustainable water infrastructure. And the ability to eliminate toxic substances, such as phenol and petroleum compounds is another way to use MFC. Biological electricity from a shipwreck is a possibility.

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USE OF ECO- FRIENDLY CONSTRUCTION MATERIALS FOR SUSTAINING THE STRENGTH IN CONCRETE

SAMAY KASLIWAL
RADHIKA JADHAV
CHAITALI KAMBLE
HITESH KUMAR

MENTOR: PROF. GHANSHYAM PAL

The use of waste as an alternative to traditional concrete products has increased in popularity in recent years, resulting in the overuse of natural resources. The use of waste in concrete has two benefits, dumping waste in the green and improving the strength and durability of concrete structures. Concrete is one of the most widely used man-made materials in the world, and it is widely used near water in the world. Production of concrete has increased and as a result, has reduced natural resources. Therefore, various studies have focused on the development of green concrete, which is a beneficial resource for conserving natural resources and reducing carbon emissions compared to conventional concrete. Concrete contains four ingredients, namely, solid aggregate, fine aggregate, cement and water. Raw concrete can be achieved by changing the binding or adding discarded or recycled materials.

We are traditionally used, earth bricks, concrete, and wood for construction. They have been, and continue to be, used in everyday construction, which means the continued demolition of wooden trees, as well as the extraction of materials to produce cement to bind sand, stones and bricks. For a better world, there are new processes, and more sustainable materials and raw materials that can be used in construction today. The development of additional solid materials can bring about a solid, sustainable material while reducing the amount of concrete required and subsequent CO2 emissions. Therefore, in this case, we will use coconut shells with durable and eco-friendly material in the concrete Supporting Materials Building Materials. Overall, this study highlights the conditions of other building materials and their effects on the development of strength in concrete.

The behaviour of Green Concrete (Mixed Concrete) using Industrial Waste AS Part of Cement Replacement [1]:

A 20% reduction rate replaced by SCBA, RHA and dust compound showed lower performance compared to other prices.

There is no significant decrease in the pressure values of 5%, 10% SCBA, RHA and ash compounds compared to conventional concrete mixtures. 10% variable strength replaced by concrete samples showed significantly higher values than all other mixtures. The compressive energy values of 15% and 20% of the modified compounds showed very low energy values than all other concrete mixes.

Effects of adding jute fibres to concrete [2]:

With this, it is concluded that by adding jute fibres the compressive strength and the separation strength increase to 33% and 10% respectively. Also, weight loss due to sulphate attacks is within the permissible limits. But an increase in the part of the fibre above a certain limit leads to a decrease in the compressive strength and strength of the concrete due to an increase in the partial fibre absorption of water which leads to an increase in porosity thus reducing the strength properties. Increased fibre aspect ratio also leads to a decrease in power characteristics.

Eco-friendly building materials [3]:

In terms of reducing the global environmental impact from the production and use of building materials, one of the most pressing requirements for the transmission of low pollution and energy-efficient production technologies and resource management systems in developing countries. The global urban sprawl has major impacts on resource demand, environmental degradation, technological development and the global trade in building materials. Except for a few periods of economic downturn, demand for building materials has intensified in most of the post-war period in the growing economies of developed countries.

Impacts of unconventional building materials on the development of concrete strength:

Case studies [4]:

Installation of glass fibre concrete has increased the compressive strength by at least 2%, by 10% instead. Overall, the importance of other building materials in the development of concrete strength has been studied by many researchers. The addition of Carbon fibre Reinforced Concrete reduces the compressive strength of concrete; therefore, it is not recommended. Rice husk ash can be replaced with cement due to its pozzolanic properties and a significant increase in strength was observed. GGPS is flexible with up to 40% and a significant increase in power of about 30% compared to the control mix as achieved.

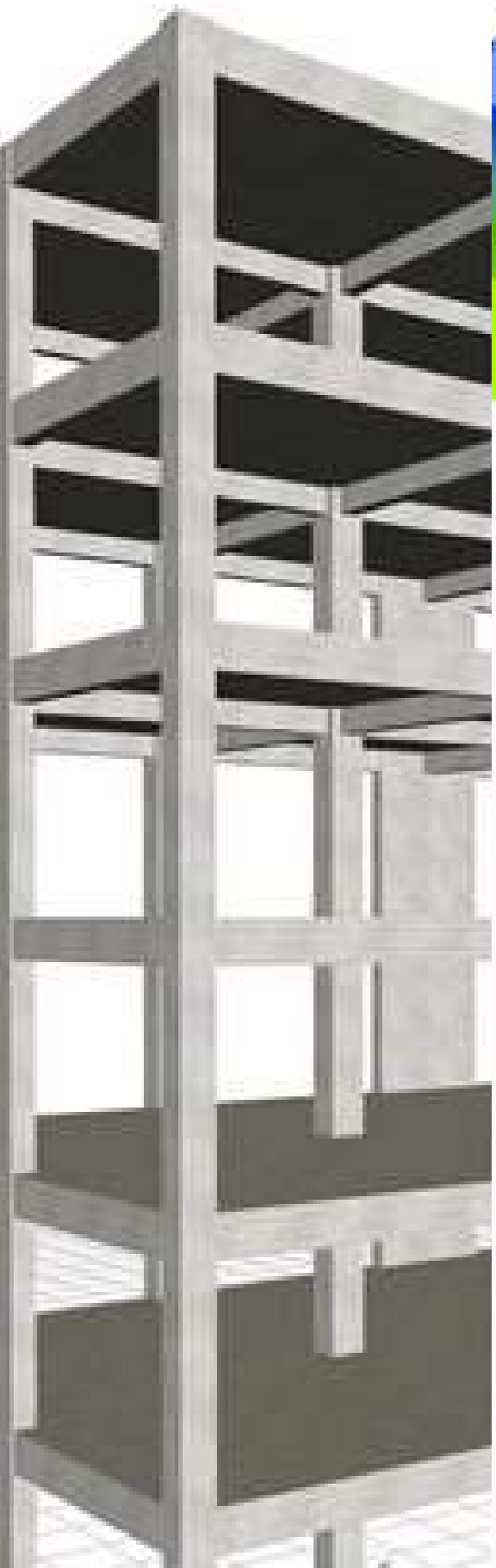
Sustainable Materials and Technologies for Sustainable Content Development [5]:

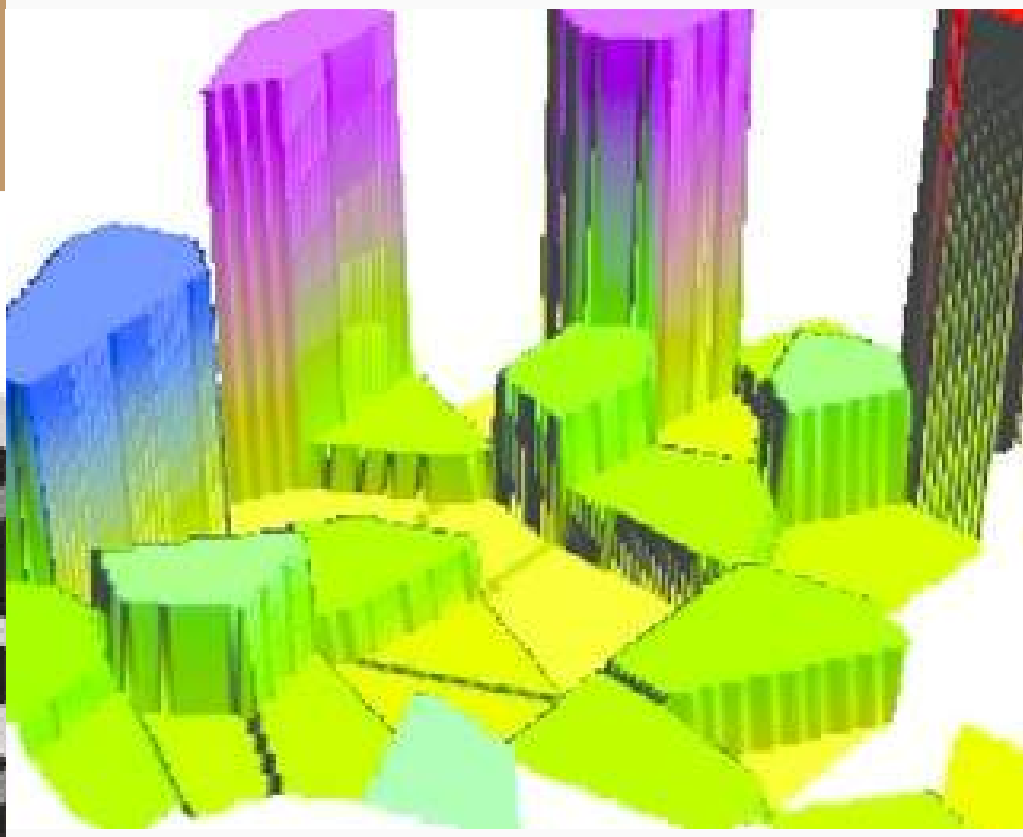
Sustainable use and technology not only reduce the cost of transportation and production, carbon emissions but also provide employment and skills development options for members of the public. The benefits of choosing sustainable building materials lie in the fact that they not only operate economically but also reduce toxic emissions thus reducing the impact on the universe.

The end of our project is under process, but the conclusion we have gained so far through the literature review is that we can use a variety of sustainable materials in concrete.

The use of sustainable materials increases the strength of concrete in terms of materials used. Using eco-friendly materials can reduce construction costs and gain much-needed energy. By using eco-friendly materials, we can save naturally occurring materials such as sand, etc. almost exhausted. This also reduces the impact on the environment. So, using such items can save resources, be less expensive, and benefit people.

The only impossible journey is the one you never begin.





SEISMIC RESPONSE OF IRREGULAR BUILDING

HRITIK KAMBLE
MUKESH LIMMAVAT
NISHANT GUPTA

Earthquakes or seismic structures are designed to protect buildings to a greater or lesser degree from earthquakes. Although no structure is completely safe from earthquake damage, the goal of earthquake-resistant construction is to erect structures that move better during earthquake operations than their regular counterparts. According to building codes, earthquake-resistant structures are intended to withstand the greatest seismic potential in their area. This means that loss of life should be minimized by preventing building collapse due to unusual earthquakes while loss of function should be limited to normal. At present, there are several design philosophies in seismic engineering, using experimental results, computer simulations, and observations from previous earthquakes to provide the necessary performance for earthquake threats in the area of interest.

These range from properly balancing the structure to strength and ductile enough to survive movement with acceptable damage, to equip us with foundation insulation, or use vibration control technology to minimize any strength and damage.

Construction of an earthquake-resistant structure and infrastructure using an earthquake design and construction code in northern Pakistan 2005, this study has shown that many parts of Pakistan are as vulnerable to natural disasters as earthquakes. Earthquakes are most common in the northern part of Pakistan (Khyber-Pakhtunkhwa and JK) and the western part of Pakistan (Especially Quetta and surrounding areas). The quake occurred because of a collision with the north-western part of the Indian plate and the Eurasian plate in the northern part of Pakistan in the JK region and north of the Khyber-Pakhtunkhwa. The devastation was more than expected because

• The construction techniques used were negative without considering the earthquake structure and the provisions.
• The construction of the wall was non-engineering and durable, and there were no good ties for the walls and floor.
• The foundation was shallow and thick to support the structure. The quality of the building materials was not up to standard. There were no details of the earthquake.
• Many of the storefront buildings have been found lying on the remodeled walls and easily collapsed by earthquakes.
• The mortar used on the walls was usually made of plaster or cement, making the walls collapse easily. Some buildings were erected on mountain slopes without proper proportions. Pakistan earthquake ranged from 1st to 4th; the area affected by the earthquake was in zone 2 which should be in zone 4. About 70% of the earthquake costs were related to reconstruction. Therefore, in reconstruction, the implementation of architecture and earthquakes is very important and necessary to develop the code and design of the earthquake under international standards and procedures.

➢ **Comparative Study of Vertical and Turbulent Earthquake Analysis of a Multi-Floor Building.**

A dynamic analysis of a G + 9 multi-story building. Linear seismic analysis was performed on a Seismic Coefficient Method and a flexible method (Response Spectrum Method) using STAAD-Pro as per IS-1893-2002-Part-1. Parameters such as bending moment, Axial strength, Torsion, Displacement, Nodal displacement, column storage capacity, etc. The authors conclude,
• Moments values are 35 to 45% higher in Dynamic analysis than values obtained in Static analysis.
• Torsion column values are not Static analysis and in Dynamic analysis torsion values are positive.
• Nodal Displacements rates are 50% higher in Dynamic analysis than rates obtained for Static analysis.
• Nodal shifts and bending times in columns and columns due to the magnitude of the earthquake showed significantly higher rates compared to those due to constant loads.

➢ **Multi-Earthquake Assessment Behaviour Study**

A two-story building with a floating column
In this integration work, the behaviour of buildings with floating and non-floating columns is analysed by earthquakes and gravity. Earthquake parameters such as lateral shift, base shear, base time, and in-store flooding are considered and comparisons between these parameters are provided between a standard building and a floating column structure. Comments below:
• Natural timelines obtained from evidence-based actions do not agree with natural analytical timelines. Therefore, a dynamic analysis should be performed before analysing these types of structures. Also, it can be concluded by analysis that natural time depends on the configuration of the structure.
• Lateral displacement increases with the height of the structure. The removal of floating column structures increases compared to the conventional structure.

• Inter store drift is also increasing as the number of stores increases.
• Store drift is above floating column structures because as the columns are removed the weight increases so it will be swept away.
• As size and durability increase base shear increases. Therefore, base shear is more than floating columns compared to normal properties.

Therefore, the study can conclude that until possibly, floating columns should be avoided especially, in seismic preferences.

➢ **Earthquake Analysis of Common & Direct Geometry**

Independent RCC Structural Framework

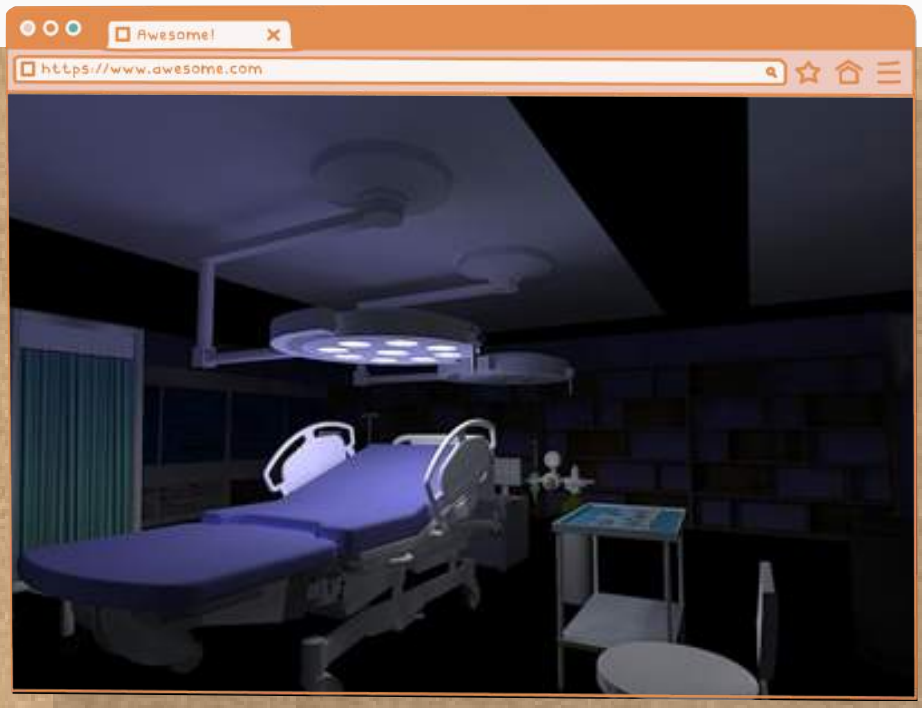
Comparison of results was done in stages for each level bay and bay wise at the same height of the building. Icon concluded that as the reversal rate increases cutting power also increases. The varying power of sensitive shear from standard to non-standard geometric is very high based on the work presented in the following text point-wise conclusions can be reached:

• It is concluded that as the reversal rate increases, the critical shear strength is also increasing. Normal construction frames have a much lower shear strength reverse unfamiliar frames.
• The critical bending time for unusual frames is over there is a common framework for all the heights of the building. This is because of a decrease in the strength of the structural frames due to obstacles. Thus, there is a need for more provision reinforcement of abnormal frames.
• An important seismic parameter of 4 bay construction frames reaches eight floors in height there are 8 compatible building frames. Therefore 4 the bay building is suitable for the height of a low-rise building.
• High-rise building (12th and 16th floors) 8 Bay adjustment should be chosen because they
• Usually with small numbers of critical earthquakes borders than 4 bay. Thus, this study showed that with the increase in the number of seismic ports your performance in both normal and reversible construction is progressing.
• A typical R-magnitude earthquake activity is found to be better than the corresponding frames that are unfamiliar to almost all charges.
• Reducing the risk of earthquakes through the use of seismic codes in construction is not just a physical and technical intervention. The implementation of seismic codes should be accompanied by a new paradigm shift in that a combination of technical and non-technical interventions is an important factor as a fundamental element in a broader disaster risk reduction framework. Here, a combination of the two is emerging, although technological interventions are still widespread.
• Finally, the implementation of appropriate earthquake codes for non-engineering construction is a key solution for making a significant difference in reducing the risk of earthquakes. There should be a balance between talking about the danger of a local earthquake and the importance of seismic codes to people, forcing them to use codes. Therefore, the building will continue to be renovated, keeping in mind some of the smaller figures and designs of the aforementioned building, Burj Khalifa and Antilia. The project undertaken will be on a small scale, which can demonstrate, the absorption of seismic waves to a certain extent.
RESIST-INELA is based on modern principles and methods of earthquake-resistant structures.
In both cases the parameter of the earthquake resistance test is removable and therefore the advantages of these methods in addition to the traditional practice of designing clear evacuation are better indicators of damage than the potential behaviour of non-structural elements controlled by building movement. plastic deformation.

ARTISTS' IMPRESSION

“EVERYTHING YOU CAN IMAGINE IS REAL”

HOSPITAL



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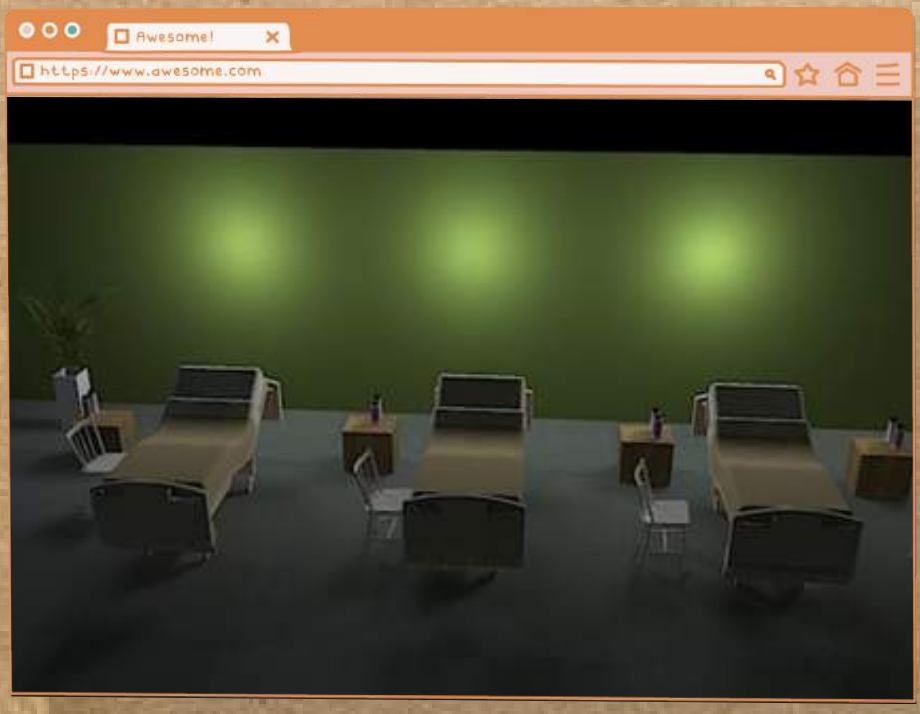

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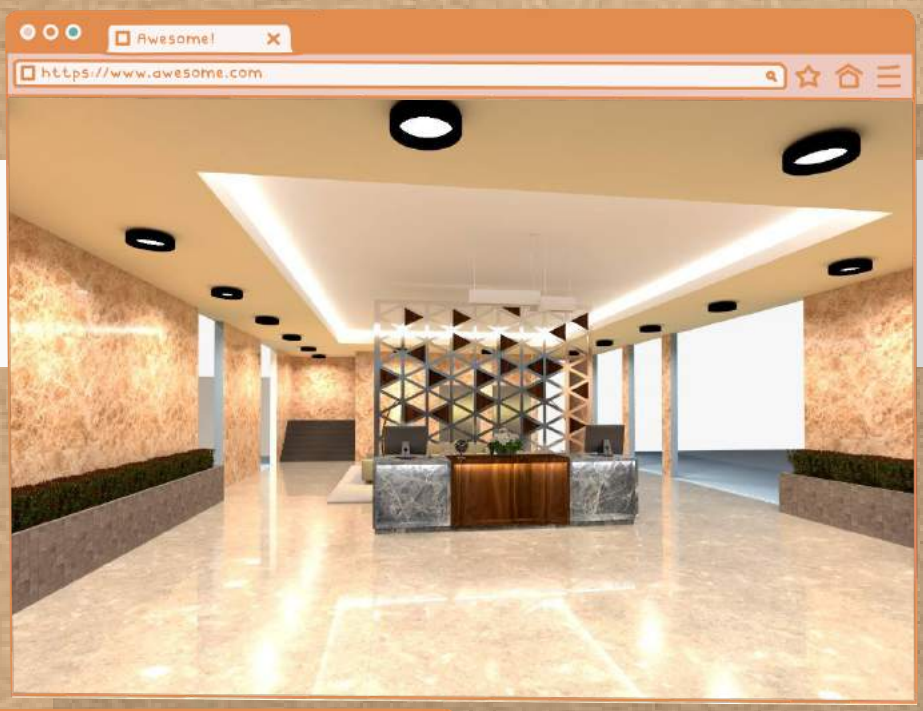

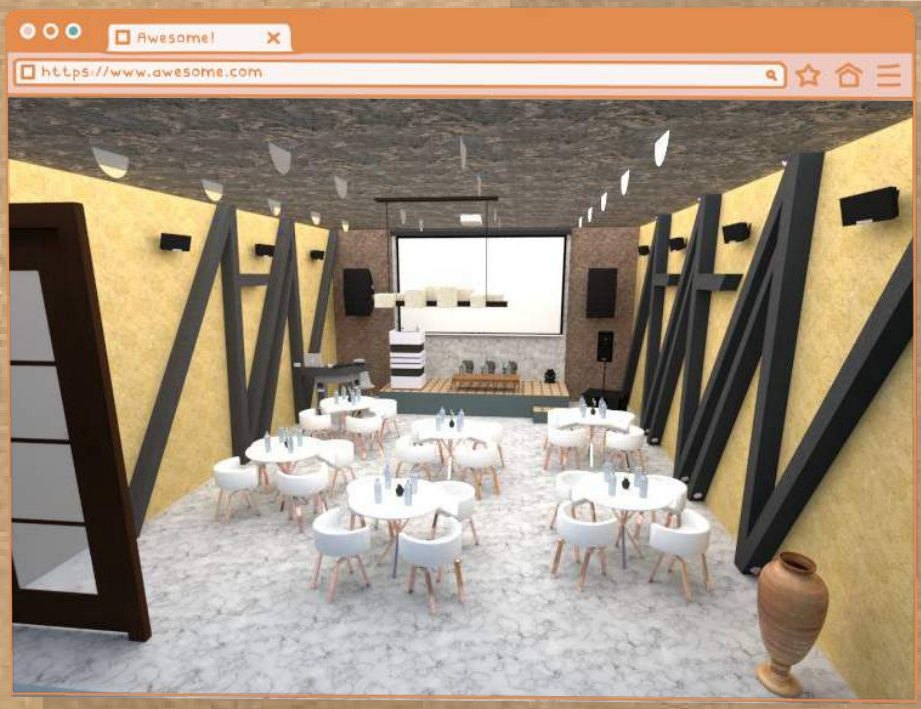

Aayush
Jain

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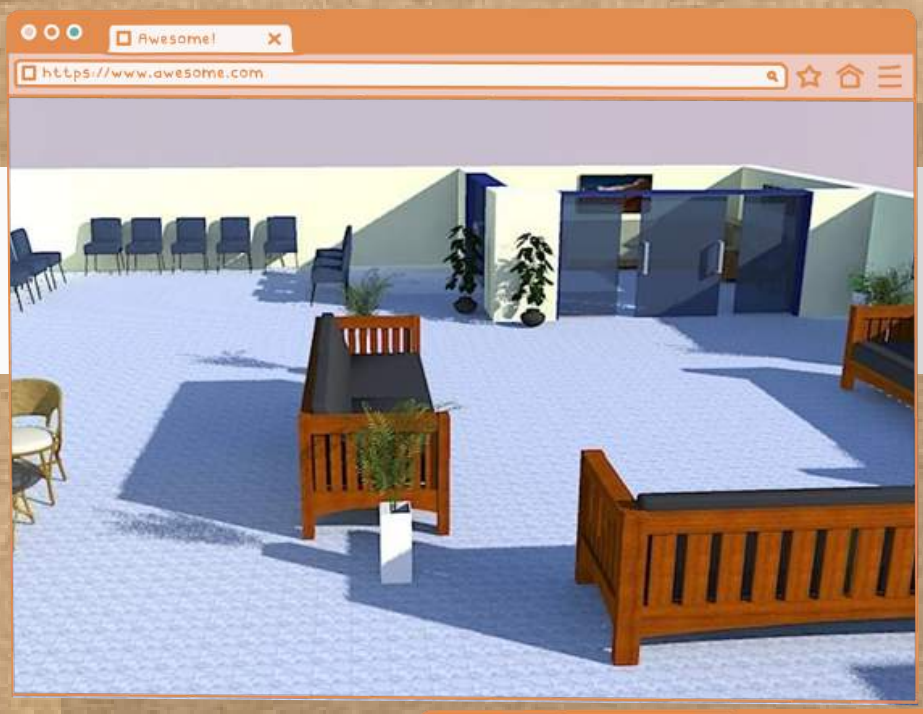
AIRPORT



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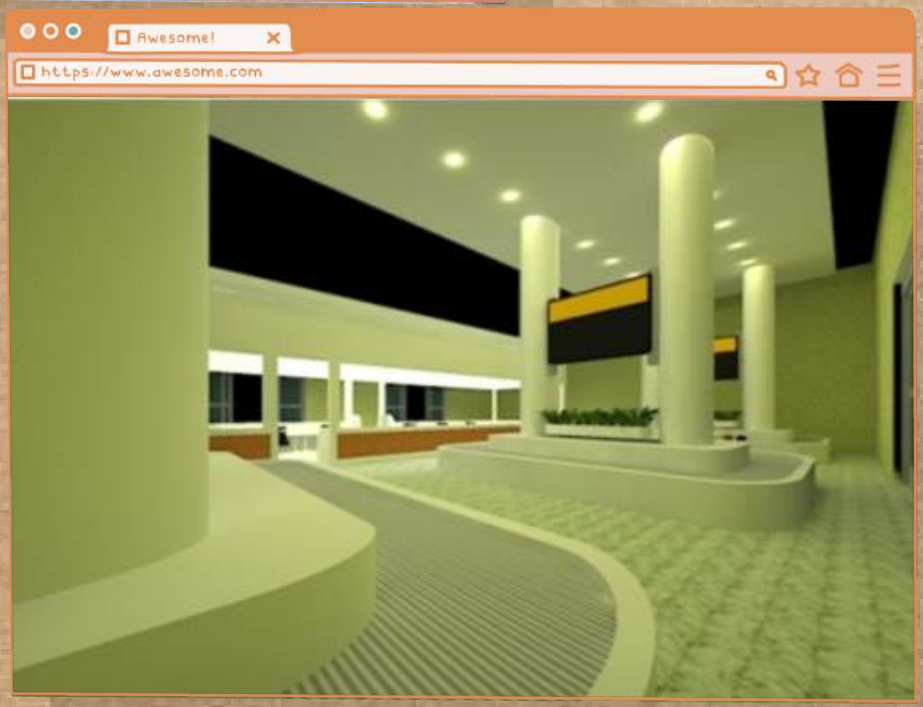
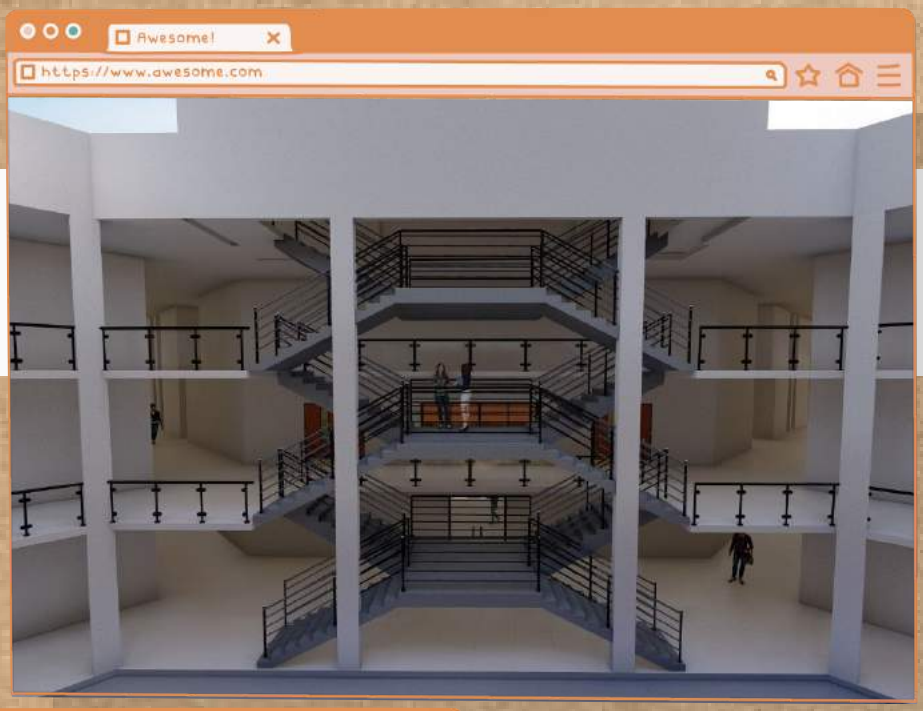
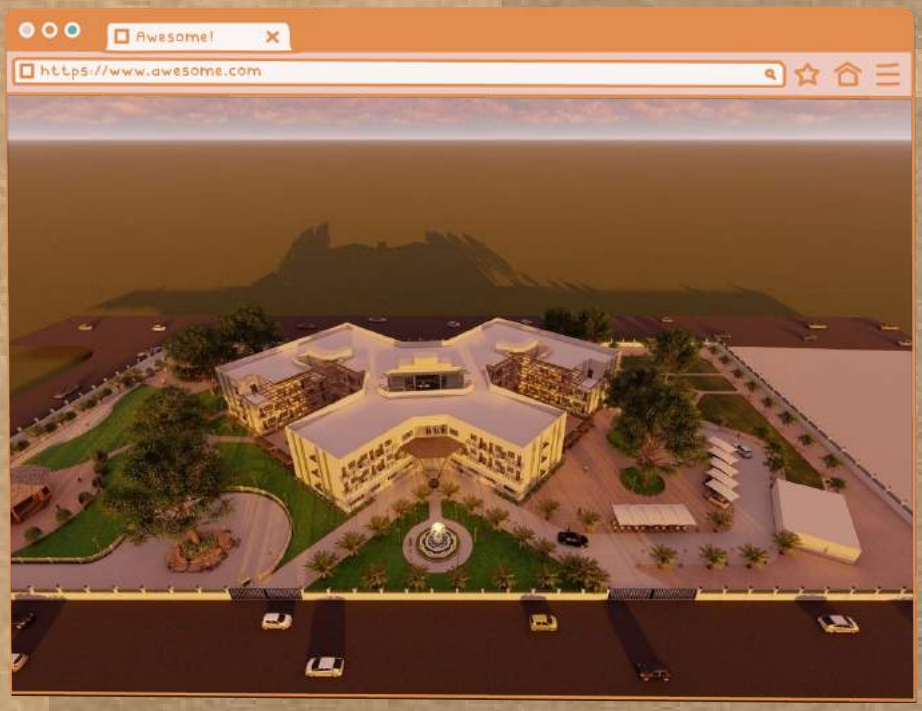


Chaitanya
Parmar

Prabhjyot
Panesar

HOSTEL





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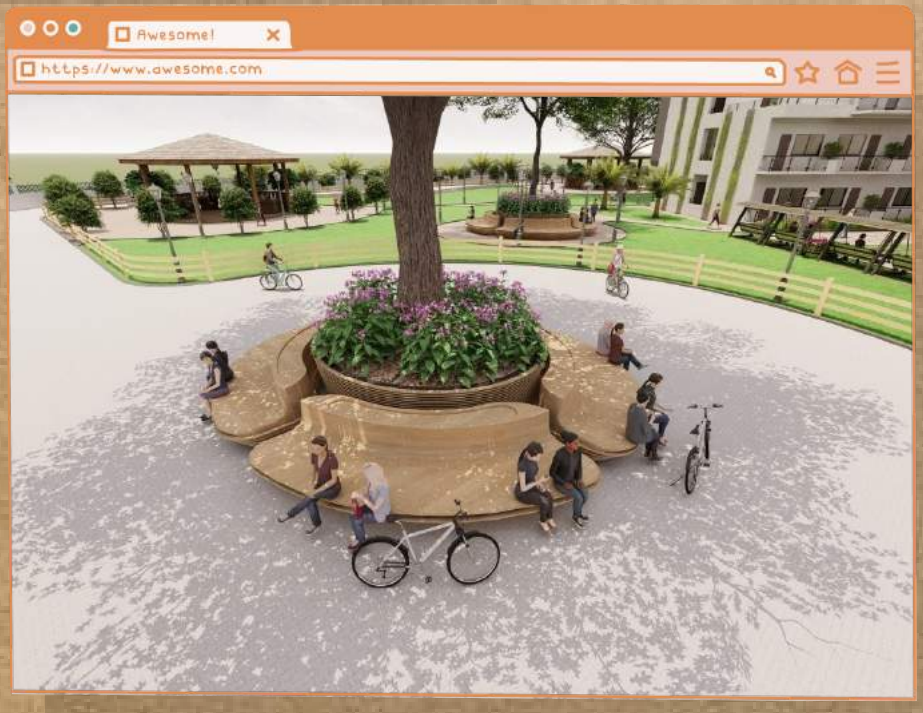
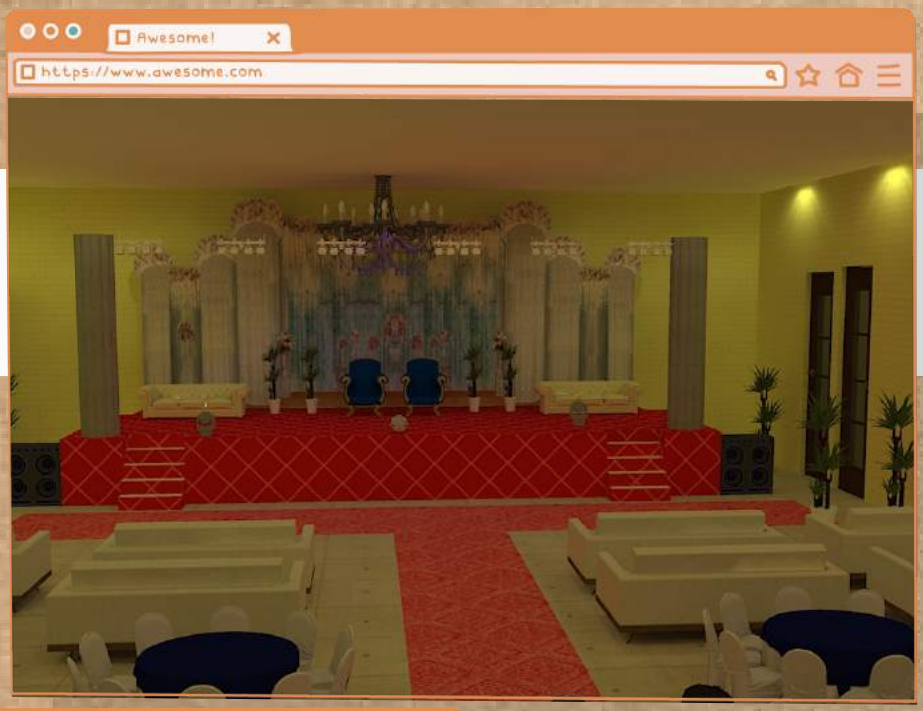
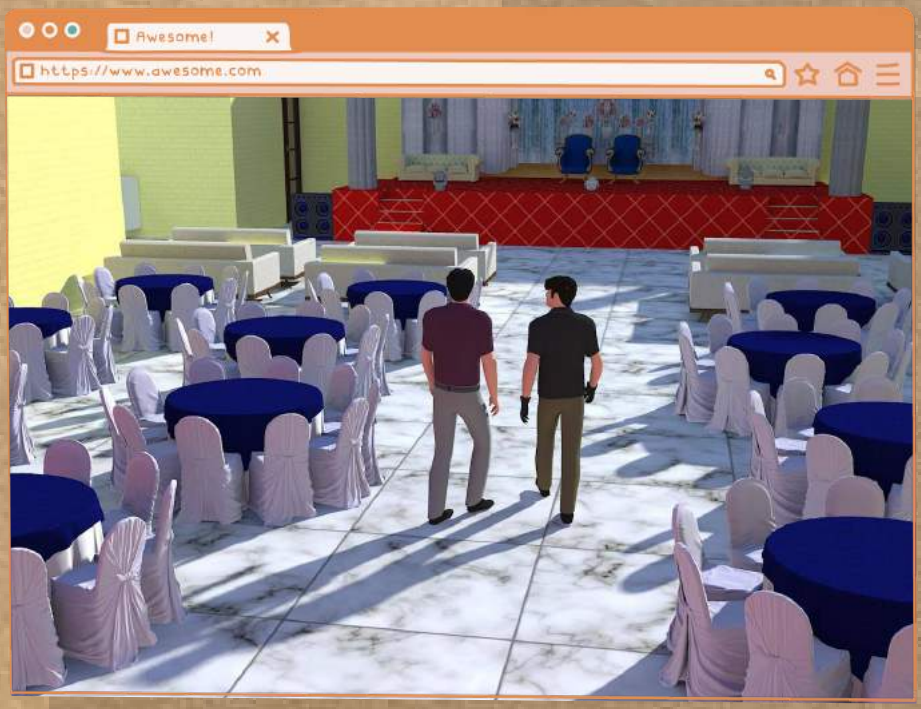
Nahar



BANQUET HALL

Harshad Vhatkar





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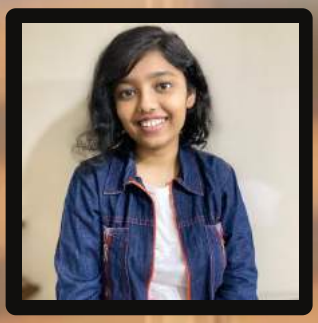







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THANK YOU !

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