



Taj Mahal
INDIA



Wall of China
CHINA



Pyramids
of Giza
EGYPT

EMAARAT

A WORLD FULL OF WONDERS

VOLUME 06

ISSUE 02



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 five-story 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

VISION

"To become a department of national relevance in the field of Civil Engineering"



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"





MRS. SEEMA JAGTAP

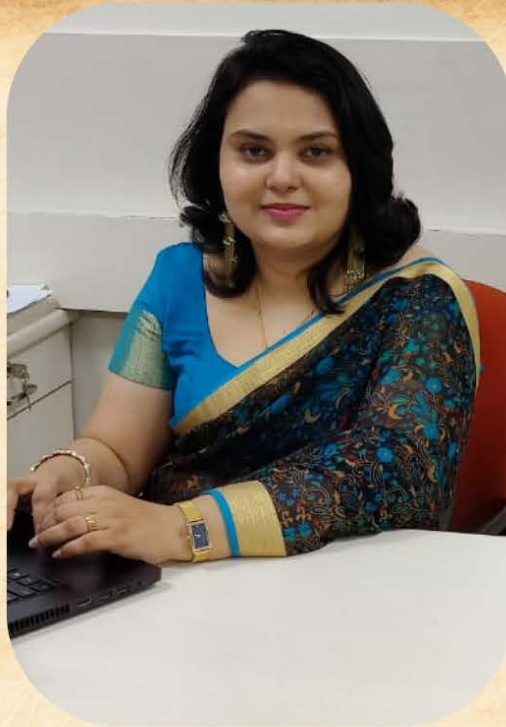
PHD technology (Civil Engineering)
M.Tech Civil (Hydraulics Engineering)
B.E (Civil Engineering)

“Determination is doing what needs to be done even when you don’t feel like doing it.”

It is very much apparent that we live today in a very different world from the one we grew up in, the one we were educated in. Change in today’s world is rising at an accelerated pace, and we need to pause and reflect on the entire education system. I mightily 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 responsibility to look through the horizon of any information we receive, appreciate and acknowledge the findings of our civilization, and 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 courage and instinctual. The magazine reflects as the mirrors the findings and qualitative research of the students.

I feel elite 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 extensive amount of gratitude that I here want to convey on 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 to all those associated with the effort of the publication of this magazine.



MRS. RUTUJA SHINDE

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

" Opportunities don't happen. You create them."

Education is not a mere accumulation of facts; it prepares life itself. Education is apprehension imbued with wisdom and ethics. It develops the temperament of the students, molds their identity, and develops mental skills to help them cope with the problems and challenges of the complex world of today. One of the most significant personality 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 in life and aware 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 seeks to put together the best creative work for our students. I am thankful to TCET and the rest of its community 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 attempt to be better human beings while foraying in ruthless life, realizing your dreams, and when you get the opportunity, flash it out with your genuine talent.



MISS. SHRESHTHA BHARGAVA

ASCE PUBLICATION HEAD
SE A STUDENT REPRESENTATIVE

" 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.



MST. HARSHAD VHATKAR

ASCE WEBMASTER
NIP STUDENT AMBASSADOR
SE B STUDENT REPRESENTATIVE

"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.

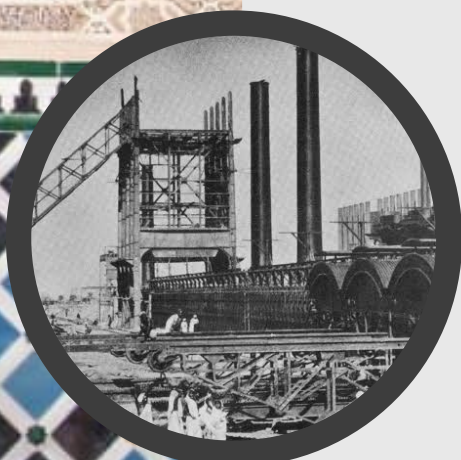
To me, creativity is optimum unbiased solutions to complicated issues unleashed through any medium - digital, written, spoken. In this process, we envision what isn't and we figure out how to bring it to pass. Some have argued that teamwork can offer greater creativity and productivity than working as 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!

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FACULTY WISDOM



INDUSTRIAL VENTURE



STUDENT CONTRIBUTION

The image features the Christ the Redeemer statue in Rio de Janeiro, Brazil, set against a backdrop of a city and mountains. A large, light-colored scroll is superimposed over the center of the image, containing text. The scroll is flanked by two white classical columns. The text on the scroll is as follows:

Explore *Christ the Redeemer*

There are elevators and escalators on Christ the Redeemer.

It took nine years to build.

There are elevators and escalators on Christ the Redeemer.

It will get darker with time.

Due to the statue's mountaintop position, it's prone to lightning strikes and gets hit around three to six times a year.

FACULTY WISDOM

*INFRASTRUCTURAL
PROJECT FOR FUTURE*
~PALLAVI PATIL

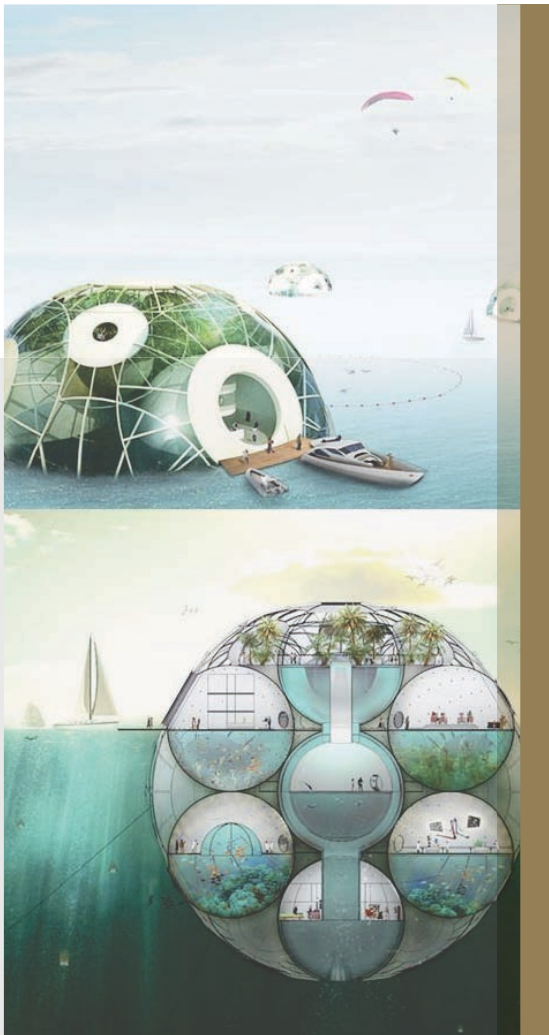
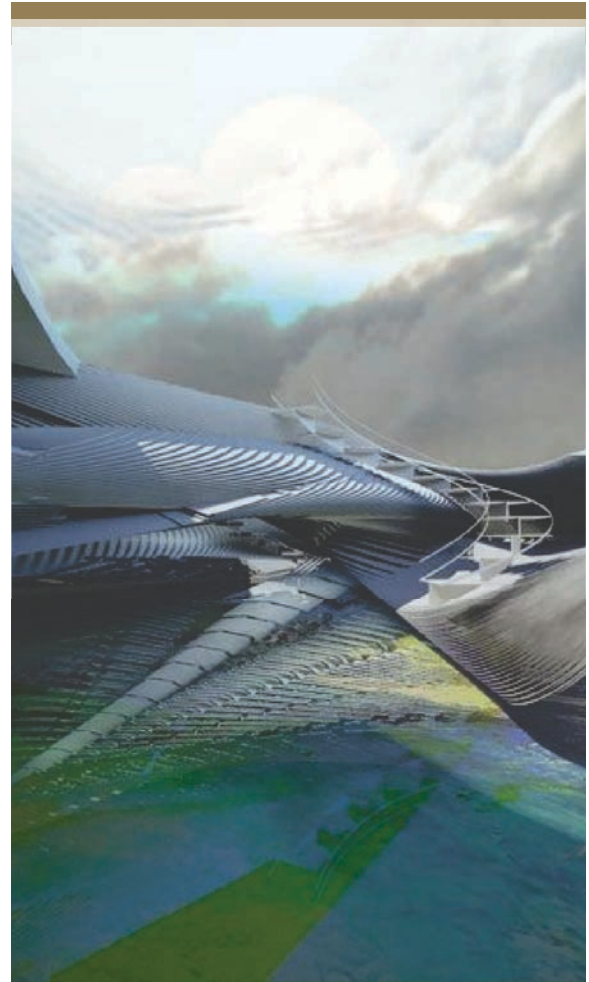


*MODIFIED ROTATING
BIOLOGICAL
CONTACTOR SYSTEM*
~SHRUTI PALSULE

*URBAN ENVIRONMENT
QUALITY IN
VISA KHAPATNAM*
~RESMA B VIJAY

Infrastructural Project for Future

~PALLAVI PATIL



The infrastructure industry is facing a global challenge in optimization for the past few decades in the field of resource management namely man, machine, material, and money (4Ms). A well-designed sound scheduling technique for future cities other than normal traditional methods needs to be carried out to keep the country's economic growth well within its boundaries. Various past research experts have shown that the **interdependency** of 4Ms and its varying consequences with the increase in duration directly affects the project cost.

Interdependency: The dependence of two or more people or things on each other.

Real Time: The actual time during which a process or event occurs.



Various past research experts have shown that the interdependency of 4Ms and its varying consequences with the increase in duration directly affects the project cost. To overcome this issue, the objective of this research emphasizes identifying a unique approach by **real-time** monitoring of 4Ms and hence providing an optimized solution by a methodology termed as **Re-Modified Minimum Moment Method (RMMM)** with considering a case study from the Mumbai region, stating post-project analysis. Results signify that RMMM gives better results in terms of optimization than the traditional method.



To overcome this issue, the objective of this research emphasizes identifying a unique approach by real-time monitoring of 4Ms and hence providing an optimized solution by a methodology termed as Re-Modified Minimum Moment Method (RMMM) with considering a case study from the Mumbai region, stating post-project analysis. Results signify that RMMM gives better results in terms of optimization than the traditional method. Many project-based industries are recognizing the importance of project planning, but the Infrastructural industry depends on scheduling skills. As they are working under changing environmental conditions and being involved in some complex and unique project, which requires multi-disciplinary collaboration for which they have to develop accurate planning and frequently modernize it. Nowadays there is an increase in the competition within the industry which ultimately forces the construction companies to provide products of good quality within limited durations, for lower costs, and under safe working conditions. In infrastructure project preparation, its schedule requires immediate changes in various uncertainties. Scheduling is not a simple concept of determining these quinces and the timings of activities within a project. A planner has to cope with several considerations and various constraints.

Therefore, while planning a project site availability, lag durations, output rate, working schedule, and atmospheric conditions are the measure issues which has to be analyzed. Applying the RMMM method to data that is collected from the site. In the backward cycle to calculate the improvement factor, skip the activity having **free float (FF)** zero from the CPM network. Select the activity having the largest value of resource rate. There is the possibility of having the same value of R, at that time choose the activity having the largest number of FF. If again there is a tie, then the activity which has the largest duration is to be selected. If again there is a tie, then choose the first activity in the queue. After calculating the Improvement factor, the activity will be shifted to the new position if the calculated improvement factor of that activity will be larger than zero or equal to zero. Still, the tie is observed in the value of IF, and then the largest value of the time unit is selected. No shifting of activity takes place if the value of the Improvement factor is negative. If shifting occurs, the resource rate of activity is subtracted from the daily resource sum hence the FF, lags, EFD, and ESD are updated in the network.

Free Float is the amount of time an activity can be delayed without impacting the Early Start date of any of its Immediate Successors.



Repeating the process for all the activities which can be shifted and hence the backward cycle completes. Again, the process is starting with the forwarding cycle. In the end, when the process gets finished, we will get the outcome. The above methodology is described in the figure. Various past research experts have shown that the interdependency of 4Ms and its varying consequences with the increase in duration directly affects the project cost. To overcome this issue, the objective of this research emphasizes identifying a unique approach by real-time monitoring of 4Ms and hence providing an optimized solution by a methodology termed as Re-Modified Minimum Moment Method (RMMM) with considering a case study from the Mumbai region, stating post-project analysis. Results signify that RMMM gives better results in terms of optimization than the traditional method.

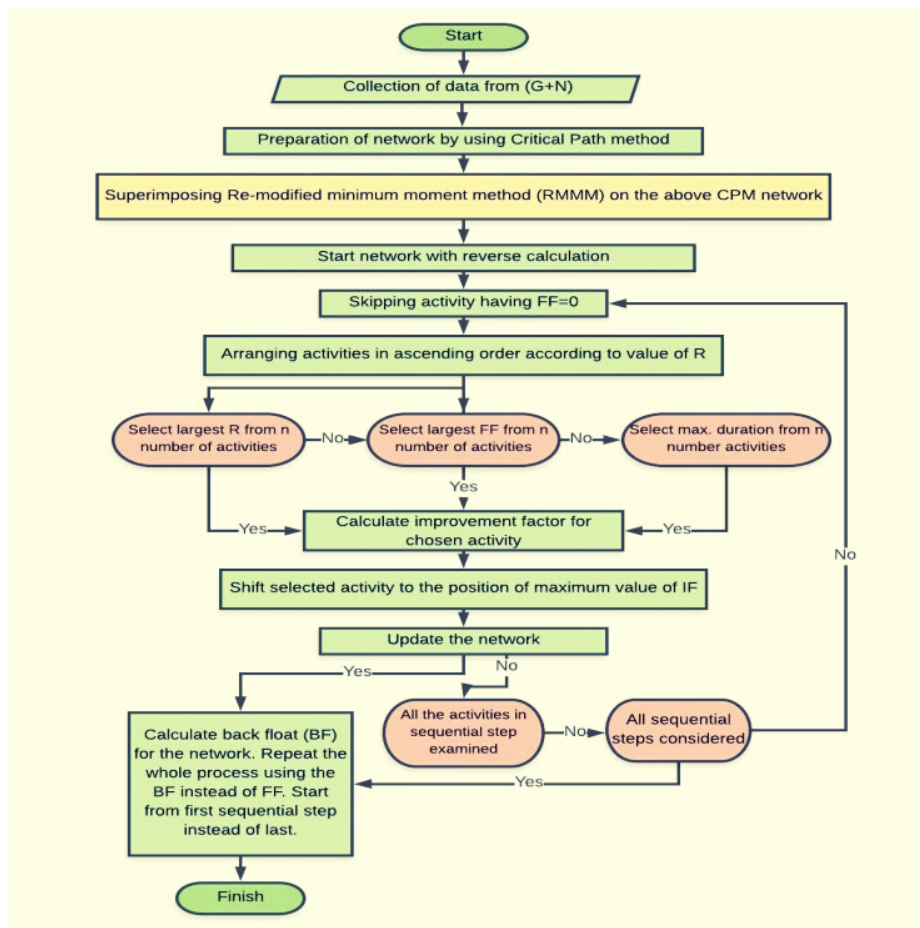


Fig.1 Flowchart on Re modified Minimum Moment Method

Re Modified Minimum Moment Method

In the sequential step of the network to select the criteria of activity, Re modification of the minimum moment method is considered. The assumptions made in the RMMM are the same as MM and MMM.

$$\text{Improvement Factor (activity J, S)} = R (\sum x - \sum w - mR)$$

ere,

IF = Improvement factor,

S = Count of shifting days,

$\sum x$ = Daily resources sum of x_1, x_2, \dots, x_m , to which deduction of m daily resource rates (R) is to be applied.

$\sum w$ = Daily resources sum of w_1, w_2, \dots, w_m , to which addition of m daily resource rates (R) is to be applied;

m = Least of either activity duration (t) or the activity is to be shifted (S) in days;

R = Resources rate.

To get the resource improvement factor, a minimum moment of the element exists when the histogram is shaped like a rectangle over this interval. This moment is the minimum possible for any resource histogram regardless of the total amount of the resource.

$$RIC = n \cdot \sum Y_i^2 / (\sum Y_i)^2$$

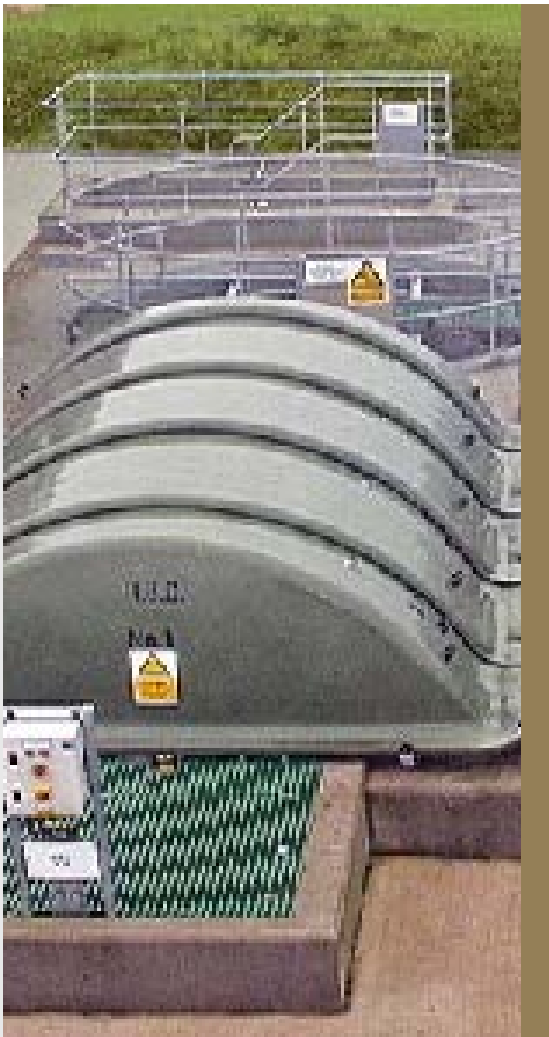
Where $\sum Y_i$ = Sum of daily resource sum at birthday

Ideally, the value of this coefficient would be one; hence, the nearer the value of the RIC is to one, the more closely the resource histogram is to a rectangle.

Re-modified minimum moment method is helpful to complete the work without any interruption. This can be achieved through proper scheduling of construction activities. The re-modified minimum moment method is helpful to minimize calculation and maximize output in terms of accuracy

MODIFIED ROTATING BIOLOGICAL CONTACTOR SYSTEM

~SHRUTI PALSULE

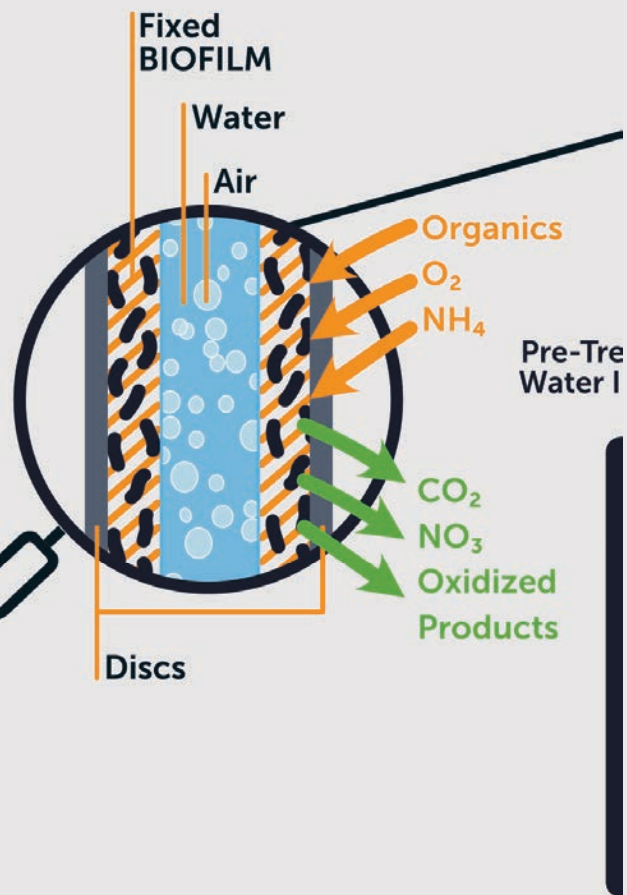


In developing countries, the problem of sanitation increases due to the increase in population density accompanied by an increase in water consumption. The disposal of domestic wastewater without any treatment into the drainage systems is considered a source of pollution threatening the population. Industrial wastewater discharge to the environment is one of the environmental problems which must be controlled.

Rotating biological contactors (RBC), also called rotating biological filters, are fixed-bed reactors consisting of stacks of rotating disks mounted on a horizontal shaft.



Wastewater from various industries is high in biodegradable organic materials (BOD) and is considered one of the most pollutant wastewater which required to be treated before being discharged into the environment. Current mainstream technologies for the treatment of domestic wastewater, such as activated sludge and tertiary nutrient removal are too costly to provide a satisfactory solution. **Rotating Biological Contactor (RBC)** system represents an excellent option for sewage treatment. The rotating biological contactor (RBC) represents a viable means for the secondary treatment of both municipal and industrial wastewaters. Although RBCs entail high initial capital costs, their low costs of operation and maintenance as well as their simple process control, increase their economic viability. In its simplest form, an RBC consists of a series of discs mounted on a horizontal shaft that is slowly rotated. The discs are typically made of a polymer material such as PVC, polystyrene, or polyethylene, and partly immersed in a wastewater stream.



About 40% of the disc surface is immersed in the waste water and micro-organisms grow on the discs to form a biofilm. The biofilm is submerged in the waste water flow and exposed to air alternately due to the rotation of the discs. During the periodic submersion the biofilm is brought into contact with the organic pollutants solubilized in the waste water flow. While exposed to air, a film of waste water is carried along the biofilm, which absorbs oxygen from the air, thereby aerating the waste water. Hence, in this process, the micro-organisms are provided with a steady supply of both organic material and dissolved oxygen. Shear forces are exerted on the biofilm due to the rotation of the discs through the waste water.

The rotation of the discs also humidifies the biofilm surface uniformly, and provides turbulence in the liquid phase. Moreover, the presence of a bulk liquid phase allows for accurate control of the main operating parameters such as pH, temperature and nutrient supply. The modified rotating biological contactor (RBC) system is capable of exploiting the main advantages of the waste water RBC, which is widely used and generally considered a very robust process.

These advantages are the imminent control of the biofilm growth through shear forces acting on the film due to the rotation of the discs, which allow stable long-term performance, as well as low maintenance requirements and an accurate control of the main process parameter, such as pH, temperature, and dissolve oxygen (DO) supply and concentration of nutrients. RBCs are often designed as a series of stages. The series arrangement results in a high degree of organic removal and denitrification, since micro-organisms that grow in a particular stage are adapted to the waste water of that particular stage. The residence time distribution approaches plug-flow in a multistage RBC, hence increasing the BOD removal. Therefore, the development of highly efficient and a properly designed modified RBC system with different arrangements of shafts and different rotating media can prove to be most efficient in BOD and COD removal.



ADVANTAGES

- 1) Short contact periods are required because of the large active surface.
- 2) Designed and constructed modified RBCs are capable of handling a wide range of flows.
- 3) Sloughed biomass generally has good settling characteristics and can easily be separated from the waste stream.
- 4) Operating costs are low because little skill is required in plant operation
- 5) Short retention time.
- 6) Elimination of the channelling to which conventional percolators are susceptible.
- 7) Lower sensitivity and better recovery from shock loadings.
- 8) Low energy requirements and more economy in operation and maintenance.
- 9) Low sludge production and superior process control.
- 10) Simple in operation and maintenance.

DISADVANTAGES

- 1) A lack of oxygen in the first stages limits the range of organic loading rates and influences the formation of **anaerobic layers** in the biofilm.
- 2) An excess organic loading rate to the first stage causes intensive biomass growth, which can create some operating problems (with shafts and media).
- 3) **Shaft bearing** and mechanical drive units require frequent maintenance. 2 and 3 of the step-feed RBC were higher than those of the control RBC even though the OLR to the stages of the step-feed RBC were higher and DO concentrations were lower. The presence of high influent $\text{NH}_3\text{-N}$ concentrations in stages 2 and 3 of the step-feed RBC be the reason for the higher removal percentages.

Shaft bearing is a rubber-lined composite or brass bearing through which the propeller shaft turns



Biodegradation is the process by which organic substances are decomposed by micro-organisms into simpler substances such as carbon dioxide, water and ammonia.

Overall, the literature review illustrates that:

1) The RBC system was operated at different organic loading rates and hydraulic retention times. The overall removal efficiency for COD significantly decreases with a decrease in total HRT from 10 to 24 hrs and an increase in OLR from 11 to 47g/m²/d. However, the effluent quality of soluble COD remains unaffected. Most of the COD was removed during 1st stage and nitrification took place in 2nd stage.

2) Rotating biological contactors (RBC) constitute a very unique and superior alternative for biodegradable matter and nitrogen removal on account of their feasibility, simplicity of design and operation, short start-up, less area requirement, and low energy consumption, low operating and maintenance cost and treatment efficiency.

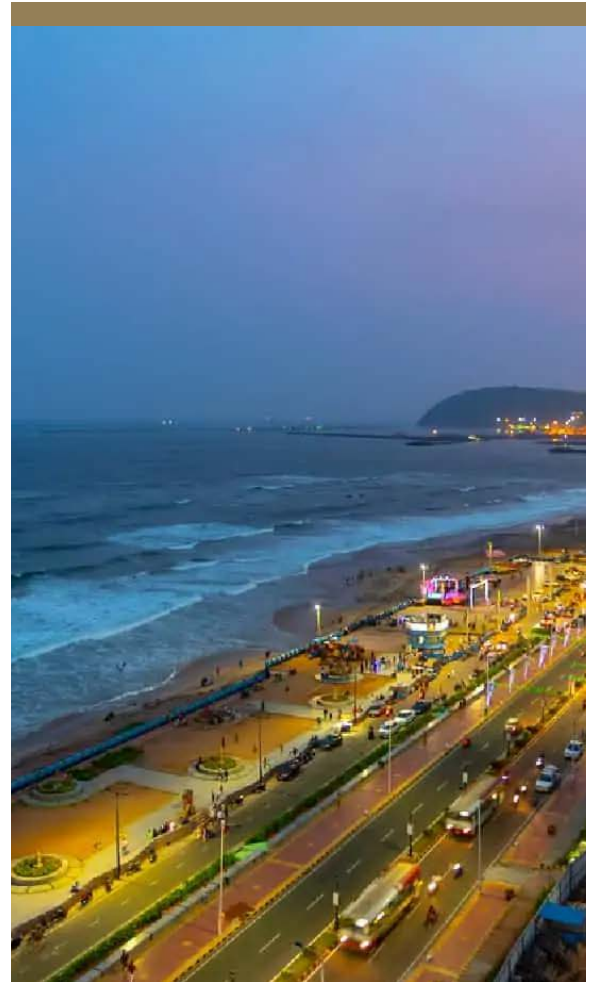
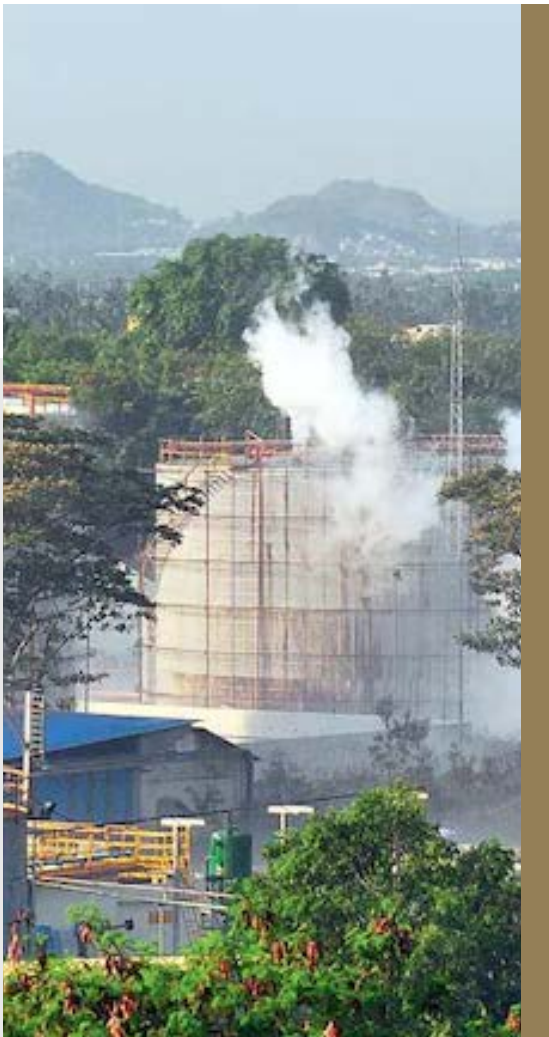
3) The modified RBC system was mass transfer limited for loadings below 150 g/m³h, whereas at higher inlet concentrations of pollutant, it becomes limited by **biodegradation** reaction inside the **biofilm**.

Biofilm: A thin but robust layer of mucilage adhering to a solid surface and containing a community of bacteria and other microorganisms.



Urban Environment Quality in Visakhapatnam

~RESMA B VIJAY



Increasing sprawl of urban areas due to development activities adversely affects the environment as the human footprint spreads over a larger area resulting in increased movement from one point to another. Urban growth both spatially and population-wise puts heavy pressure on infrastructure, particularly water supply, sewerage, solid waste, sanitation, road network, traffic, transportation, etc., unless infrastructure is improved, quality of life suffers.

Pollutant: A substance that pollutes something, especially water or the atmosphere



Most importantly, it impacts the economic development of the city and the investment climate big segment of the environment, quality of air has been deteriorating due to enhancement of emission from the transport sector, particularly in large metro cities, which has been a big challenge for scientists, politicians, planner sand even for common men. The lack of proper planning may lead to unsustainable development which is extremely undesirable

for the budding generations. The air pollution caused by the uncontrolled and above there holds industrial emissions, municipal waste incineration, vehicular traffic, etc. causes drastic degradation of quality and instability of environmental parameters. These parameters have to be stabilized and improved by proper protection measures. Major environmental variables characteristic of the city which are responsible for the degradation of the quality of the environment in the city area are considered for describing the environmental scenario of Visakhapatnam - the point and non-point sources of pollution of air, noise, water, land, soil, regimes s well as coastal and marine sectors have been taken into consideration.

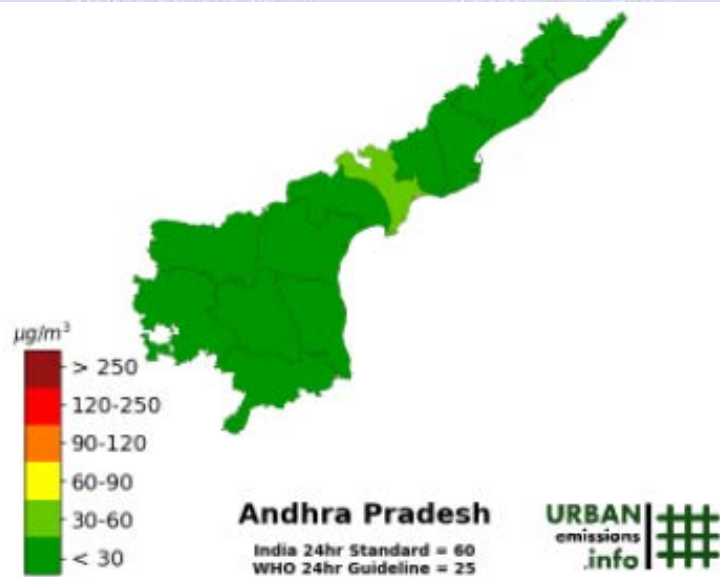
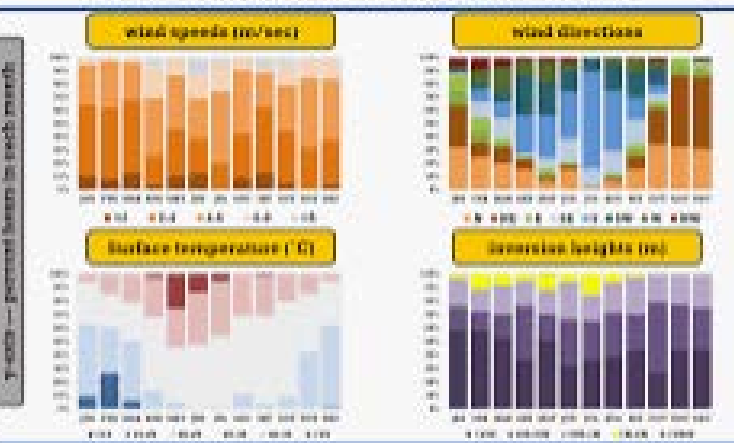
The environmental quality varies from region to region within the city area depending upon the assimilative capacity of a region, population density and the number of **pollutants** causing social damage, the level of valuation and appreciation of the surrounding environment by people in a region, etc. All these factors together accord different values regarding the environmental quality of different regions within the city.

The City of Visakhapatnam is one of the largest Municipal Corporations in India and delivers services to about 1.5 million residents spread across a huge geographical area of 515 Sq.km. There has been a significant migration into the city owing to continuing rapid industrialization and urbanization.

Topography: is the study of the forms and features of land surfaces.



METEOROLOGY in VISAKHAPATNAM



Topographically, Visakhapatnam is located northeast corner of Andhra Pradesh between 17°31'42'' - 17°55'29'' Northern Latitude to 83°2'5'' - 83°25'17'' Eastern latitude at an average elevation of 3 meters above sea level surrounded by Kailasa Hills on North, Yarada hills on South, Narva hills on west and Bay of Bengal on East. The city gets moderate rainfall of 1202 mm largely between June to October. On account of its elevation, Visakhapatnam is bestowed with a hot and humid climate comparable to those of temperature regions. Merging of the surrounding villages and municipalities is a significant contributing factor to the rapid increase in the percentage of the population. Greater Visakhapatnam Municipal Corporation (GVMC) has been divided into six zones totally consisting of 72 wards.

The **meteorological data** were obtained from the regional meteorological center (RMC), which is located at Beach Road, Visakhapatnam. The meteorological parameters include wind speed, wind directions, and other information, viz. humidity, rainfall, and temperature.

Meteorological Data: It consists of physical parameters that are measured directly by instrumentation



The study area is low-lying and surrounded by hills and is subjected to wet weather. The area experiences a lot of rainfall every year. The pre-monsoon months, March-April, have winds from North East. During monsoons, the predominant wind corridors are North East, North, and also south. The post-monsoon period, from October-November, is a period mixed with calm conditions and winds mainly from the North. The winter months, November to February, experience frequent calm conditions. The maximum number of calm periods observed is in the month of December and January.

The annual average temperature observed for maximum mean daily is 29.5°C and that of minimum mean daily temperature is 19.7°C. August is the hottest and January is the coldest month of the year. The annual average means the relative humidity is 82% in the morning and 70% in the evening. The climatic condition in the area is thus humid and tropical. The average rainfall from May to September is about 81% of the total contribution.

The highest rainfall occurs in the month of July followed by June. The average annual rainfall in the city of Visakhapatnam is 166cm. During the study period, the inversion levels (up to 150 to 200m) were observed to be very low, and the prevailing wind direction is observed to be from North-East and East. Based on the data collected the wind rose diagrams are presented for all the seasons of the year 2005 and for the month of February 2006 as in Fig. 1 and Fig. 2. The wind speed recorded mostly remained within 3kmph.

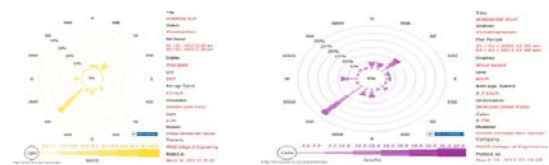


Fig. 1: Wind rose diagram for plot period 2005 to 2013 Fig. 2: Wind rose diagram for 2012-2013

AIR ENVIRONMENT

Air pollution can cause significant effects on the environment, and subsequently on humans, animals, vegetation, and materials.



It primarily affects the respiratory (e.g. by fine dust), circulatory (e.g. by carbon monoxide), and olfactory (e.g. by odours) systems in humans. In most cases, air pollution aggravates pre-existing diseases or degrades health status, making people more susceptible to other infections or the development of chronic respiratory and cardiovascular diseases. Environmental impacts from air pollution can include acidic deposition and reduction in invisibility.

Following the reconnaissance survey of the study area and taking into account the predominant environmental factors such as winds, topography, and details of existing industrial activities in the region, Ambient air quality was monitored at six stations. The selection of the Air quality monitoring station was done as per MoEF guidelines for conducting an EIA study. One station was set up at the project site (core Zone) and two are in the upwind direction and three are in the downwind direction of the project site. All the stations were not obstructed by hills or any such structures.

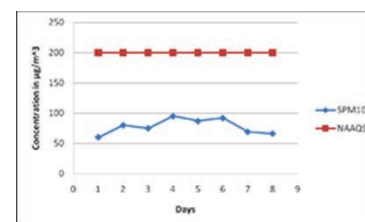


Fig. 3: SPM variation

High volume samplers were used to collect/measure the air pollutant concentration data at 24 hours averaging periods for a period starting from February to March 2007 at all the stations. The frequency of sampling was two consecutive days a week for a month.

TRAFFIC AND TRANSPORT.

The baseline traffic count studies are required for assessing the future traffic flow due to proposed activity i.e. landfill and compost facility. The traffic survey is therefore carried out at the NH-5 and the access road junction. However, traffic counting was done for all vehicles passing both ways on NH-5 and passing towards either side of NH-5

MoEF: Ministry of Environment, Forest and Climate Change

Attribute	Baseline status
Meteorology	The meteorological data were obtained from the regional meteorological center located at Beach Road, Visakhapatnam. The meteorological parameters include wind speed, wind directions, and other information, viz. humidity, rainfall, and temperature. The annual average temperature observed for maximum mean daily is 29.5 °C and that of minimum mean daily temperature is 19.7 °C. During the study period, the inversion levels (up to 150 to 200m) were observed to be very low, and the prevailing wind direction is observed to be from North-East and East.
Ambient Air Quality	Ambient air quality was monitored at six stations. The selection of air quality monitoring stations was done as per MoEF guidelines for conducting an EIA study. One station was set up at the project site (core Zone) and two are in the upwind direction and three are in the downwind direction of the project site. The pollutant concentration levels of NO _x , SO ₂ , and RPM (PM ₁₀ & SPM) were measured. It was observed that while the concentration levels of NO _x and SO ₂ were well within the prescribed limits at all locations, the SPM & PM concentrations exceeded the limits at two locations
Noise Levels	Noise monitoring was carried out at different locations at and around the site. The noise levels day & evening time noise levels recorded at the junction of NH-5 and the access road were found to exceed the noise standards due to heavy traffic.
Water Quality	The assessment of water quality in the study area was done and compared with the drinking water standards prescribed by CPCB. After studying the drainage pattern of the study area and its proximity to the site, 2 samples of surface waters were collected, one is, from C.C Tanks (passing through the proposed site) and the second is, from the water body(GhambeeramGedda) near the project site. The Physico-chemical parameters are well within the prescribed limits for the drinking water standards. The water quality concerning almost all was observed to be of good and acceptable quality except for the concentration of iron which was found to be very high.
Groundwater Availability	The aquifer in the area is composed of brownish soil mixed with loose sand. The average depth to groundwater is about 7 to 15m. Groundwater flow is generally west
Soil Quality	To assess the baseline soil quality in the study region, four soil samples were collected and analyzed at three locations. The surface soil at the proposed site is silty brown, mixed with fine-grained sand. The soil is mostly loose sandy for a significant depth and has more water contaminant filtering capacity. The share of oxygen and silica content in the soil is more compared to others, however, other macronutrients, nitrogen, phosphorus, and potassium have been found in very insignificant amounts. The depth of rock in the area is over about 100m. The soil is observed to be having high cation exchange capacity and low soluble ions. The soil is slightly acidic with low nitrogen and phosphate.
Socio-Economy	The study area is scarcely populated and because of wetland and forested (hills) steep slopes, there are no proper roads and other amenities of life. Around the site, a few numbers of small villages like MajjiValasa, BodamettaPalem, KapulaUppada, MajjiPeta, ChepalaUppada, BheemiliandLakshmipuram are situated. The land adjoining the site for the integrated waste management facility is acquired by SEZ. In the study area, a maximum number of people is found to be engaged as —another workersl in economic activities like Government/Private service, teachers, factory workers, commerce, etc. negligible population is involved in agricultural activities.

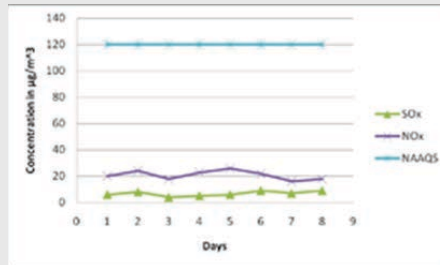


Fig. 4: Gaseous pollutant variation



Fig. 5: Traffic volume data

It was carried out during the morning and evening including peak hours of the working day and the non-working (weekend) day, at 0900 to 1300 hrs and 1600 to 1900 hrs.

The traffic counting includes 3 major compositions, viz. 2-wheelers, scooters, mopeds, and motorcycles; light vehicles comprising petrol and diesel-driven cars, taxis, vans, and auto; and heavy vehicles comprising mainly diesel-driven buses and trucks. The major composition of light vehicles and 2 wheelers are observed during the daytime and heavy vehicles i.e. trucks are observed during nighttime.

The traffic volume is mainly composed of commercial and private vehicles and is seen throughout the day. The curbside air quality is deteriorated due to the dust pollution, re-suspended and generated when big vehicles such as buses and trucks carrying stones from the quarries use the access road and the NH-5. The following Table describes the baseline status of the project area.

Mopeds: A light motor cycle



Explore

Great Wall of China

One of the many legends surrounding the wall tells of a helpful dragon who drew out the tracks for the wall, which the workers then followed.

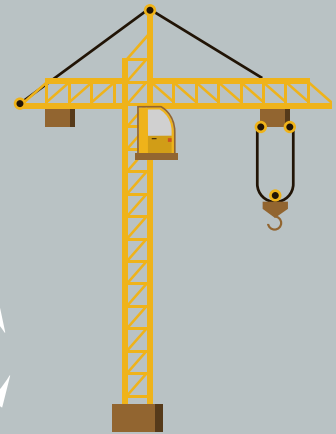
Made over the course of hundreds of years, the wall was built by over 6 different Chinese dynasties, and is over 2,300 years old.

A popular myth is that the Great Wall of China can be seen from space with the naked eye. Unfortunately, a high-tech lens is required to see the wall from the moon.

The Great Wall of China became a UNESCO World Heritage Site in December 1987. The wall is the longest man-made structure in the world, with a total length of 21,196.18 km.

INDEX

INDUSTRIAL VENTURE



	KEYNOTERS
01	<u>Rajkumar Dubey</u>
02	<u>Ambarish Kulkarni</u>
03	<u>Balasaheb Raykar</u>

Rajkumar Dubey

Founder of Aman Construction



“

*DETERMINATION IS
DOING WHAT NEEDS
TO BE DONE EVEN
WHEN YOU DON'T
FEEL LIKE DOING IT.*



20+ years of experience in construction and real estate having team of 40 + people as a business owner. Excellent understanding of the growing real estate Industry in the country. As a real estate development company formed in the year 2003-04 and have been growing rapidly with over 10 projects completed in south Mumbai, westerns suburbs of Mumbai and beyond.

Q. What's more important: innovation or integrity?

A. I think both innovation and integrity is important in a good business being with right integrity gives you good innovative idea, integrity is a person moral it should be strong.

Q. How did you win over your first customers? First investors? First business partners?

A. Investors care about how you are going to build a great company, and make everyone a lot of money. The more tempting you can make the market size, the more persuasive your deal will appear. Focus on big ideas, not lifestyle business.

Q. What's the best strategy to target a new market?

A. Firstly, Identify your current consumer base, then determine the marketing strategy do mass marketing with online marketing, advertise your products. After this pandemic we got to know that how powerful the online platform is. How you can use that to be in business.

Q. Where did the idea for your business come from?

A. I like to build, fix things that's where I got an idea to be in this field, whereas business ideas can come from a number of places. They could come from something as simple as a customer becoming frustrated with an existing product or service and developing an alternative to that product or service.

Q. How did you build your team?

A. Slowly and gradually I increased my team, in my first project it was only me and few daily wages worker, than after that I got some more projects my team members increased I kept good engineers & designer's.

Q. How important are technical skills on your team?

A. In our field it's very important to have technical skills. Good team is created with good technical skills. Technical skills can help you work more efficiently, boost your confidence and make you a more valuable candidate for employers.

Q. How do you keep your team motivated and boost productivity without causing burnout?

A. Don't over burden them with there work, let them do freely, have regular talk make them comfortable with your company. I personally keep meets on Saturday which keeps a good relationship with the employees I keep casual meets.

Q. What was your biggest failure and how did you pick up from it?

A. There was a time when I had a great loss, we were in loss for 2 years I took help from my friend and stared the business again I got one project, I learned from my failure.

Q. Who is the one entrepreneur that is your biggest example and inspiration?

A. My biggest inspiration is my Dad, he use to say that "Self confidence is a key to success". He has worked a lot in this field.

Q. What advice would you give to someone who is trying to become an entrepreneur ?

A. Never ever drop your dream.

Ambarish Kulkarni

Civil Engineer

“

*YOU MAY NEVER
KNOW WHAT RESULTS
COME OF YOUR
ACTION, BUT IF YOU
DO NOTHING THERE
WILL BE NO RESULT.*



Hi. I am Ambarish Kulkarni, A Civil Engineer. I completed my Diploma in Civil engineering in 2004, my bachelor's degree in 2007 and MBA in Infrastructure management in 2009. And after completing my MBA, I took admission in college of 'Real life experience of engineering' 'Pun intended'.

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

A. The journey is long and I will try to fit it in a little space. Site experience began with implant training during my diploma days. Thankfully my civil diploma was a sandwich pattern course and that helped correlate the textbook knowledge with the real life experience. The academic journey started with Diploma in Civil then bachelor's degree from Mumbai University and finally completing a full time MBA from VTU in Infrastructure management.

Above are just milestones to reach here, my journey consists of various other assignments as an individual. The best way to see it is in my CV where I have mentioned it more briefly. The journey was vast right from Architectural designing and structural designing, approvals, Liaison with various teams and government agencies, Costing, Budgeting, Project planning and Tendering, site execution till handing over to clients, customization as per client need and also being part of Sales and Marketing. After all these experiences I am also a registered Chartered Engineer.

Q. What kind of personality traits do you believe a civil engineer needs to be successful?

A. The most important personality trait I feel is command of the English Language. Both writing and speaking skills boost confidence and this impacts the delivery of the engineer. Secondly I feel that engineers should never be choosy and be open to having a wide approach. Constant research and study has made life simpler and one can bravely venture into various fields. Another important trait is presentation skills, technically or non-technically. One may relate this to the first point mentioned above, but here I am more elaborating the structure, format and style of presentation.

Q. What are the biggest challenges that you believe civil engineers face?

A. The biggest challenge that I have faced is mind-set. People in general are reluctant to accept the newer ideas. Having said that, the most challenging phenomena are corporate politics. I strongly feel that one has to focus on work and strive for the progress of the project. One should never indulge into any malpractice whatsoever.

Q. What do you believe should be the number-one priority for any civil engineer?

A. Number one priority is thorough knowledge of what you are doing so far and application of knowledge allied by fair communication skills. This will ensure greater success and confidence. Personal growth severely gets affected with partial knowledge and poor communication skills.

Q. 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?

A. The basics of civil engineering have remained the same for a long period of time. One should always have the basics right. Strong fundamentals and right logic will keep you strong. Innovation can originate even at grass root level. So, believe in yourself.

Q. How do you maintain a safe work environment?

A. In recent times, the safety on site has become a part of every major project. But what concerns me is the neglect which is common amongst the smaller contractors. This is not just in rural areas but also in urban projects. One of the major contributors to the lack of a safe work environment is cost cutting.

Q. Where do you see civil engineering in five years?

A. Being a core engineering stream, most of the fundamentals will remain the same. But with that, one should ensure innovation in materials, work methodology, finance and accounts and safety. With artificial intelligence the possibilities are now unlimited. Everything from basic communication to project planning apps, designing apps, reporting apps, calculations, measurements with the help of drones, cameras and access to vast knowledge. Most importantly, handling remote location sites through technology has improved. It is only after five years from now, that you can really gauge the progress. As of now we can safely say that the changes in the next five years will happen exponentially.

Q. Which Evolution you liked the most and why in the last 10 yrs.?

A. Smart phone! Yes, this is something that you can find in everyone's hand. It has become simpler to communicate ideas through You Tube, WhatsApp and various other platforms. Currently I am working on developing a common reporting platform for site measurements which will ensure faster approvals from clients for billing processes.

Q. What do you enjoy most about the job? What are its challenges?

A. Finding solutions. Reporting problems should always be accompanied with suggesting solutions. The appreciation from the client when I resolve their issues is what I enjoy the most. The biggest challenge is the failure to obtain desired results. But this should never discourage you from trying.

Q. What is your message to the younger generation?

A. Once, my dad told me that Civil engineers' integrity has the most impact on a country's development. Do not compromise values ever.

Balasaheb Raykar

Registered Electrical and Civil Government
Contractor



“

*THE WEAKEST INK IS
BETTER THAN THE
STRONGEST MEMORY.*



Hi. I am Balasaheb Raykar, A Registered Electrical and Civil Government Contractor. I have pursued my education from Government Polytechnic Pune's Student Association Gppians.

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

A. I was working as manager in forging industry for almost 20 years, after an incidence in my life and I was left with nothing but only self confidence which lead me to start an small business and today it has turned into Group of industries with great success.

Q. What kind of personality traits do you believe a civil engineer needs to be successful?

A. Talking about personality, each and every individual has unique traits which may lead one to be successful and according to me for an engineer to be successful he/she should have Courage, creativity and ambition to achieve more higher goals.

Q. What do you believe should be the number-one priority for any civil engineer?

A. To complete the project whole heartedly within given time and with proper management.

Q. 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?

A. Well theory knowledge is important for every engineer but only up to some extent what is going to be there with them is practical knowledge and their exposure to industry and real scenario onsite, which can be gained by internships. So I recommend Students to engage themselves in internships during their summer and winter break and learn new technologies.

Q. How do you maintain a safe work environment?

A. Maintaining a Safe work environment is 1st priority and can be achieved by providing safety gears to each and every individual, first aid and other essential services on site for safety.

Q. Where do you see civil engineering in five years?

A. I'll talk about its scenario in India, India being one of the developing countries it has vast scope for infrastructure development in coming years so I think future is immensely bright aided with technology.

Q. How do you define Success?

A. Success is an achievement of what you are trying to do, it's the best feeling in the world, no matter how big or small your impact is you should feel proud of your efforts.

Q. What is your message to the younger generation?

A. I will suggest the younger generation to be innovative. Our country needs a lot more innovation and no one can do it better than us, the 'Frugal (Jugadu) Civil Engineers'.

Explore *Colosseum*

1. Its original name was "Flavian Amphitheatre".

2. It was built over a lake.

3. The west exit was called the Gate of Death because this was the exit dead gladiators were carried through.

4. Popular greeting of "thumbs up" originates from here.

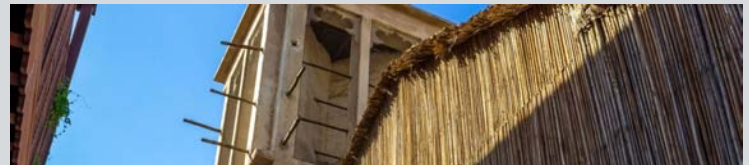
5. There are 80 entrances in the Colosseum.

STUDENT CONTRIBUTION

- 1 REVIEW ON RECYCLING OF BUILDING WASTE IN CONSTRUCTION



- 2 INNOVATIVE USE OF BACTERIA IN CONCRETE AS BREATHING CONCRETE



- 3 DICIPLINATOR

- 4 COLD MIX TECHNOLOGY USING GRANITE AGGREGATE AND RUBBER WASTE IN ROAD CONSTRUCTION



- 5 DESIGN OF HEAT-INDUCED POROUS BITUMINOUS CONCRETE PAVEMEN

- 6 URBAN ENVIORNMENT QUALITY IN VISAKHAPATNAM

- 7 TRAFFIC MANAGEMENT

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

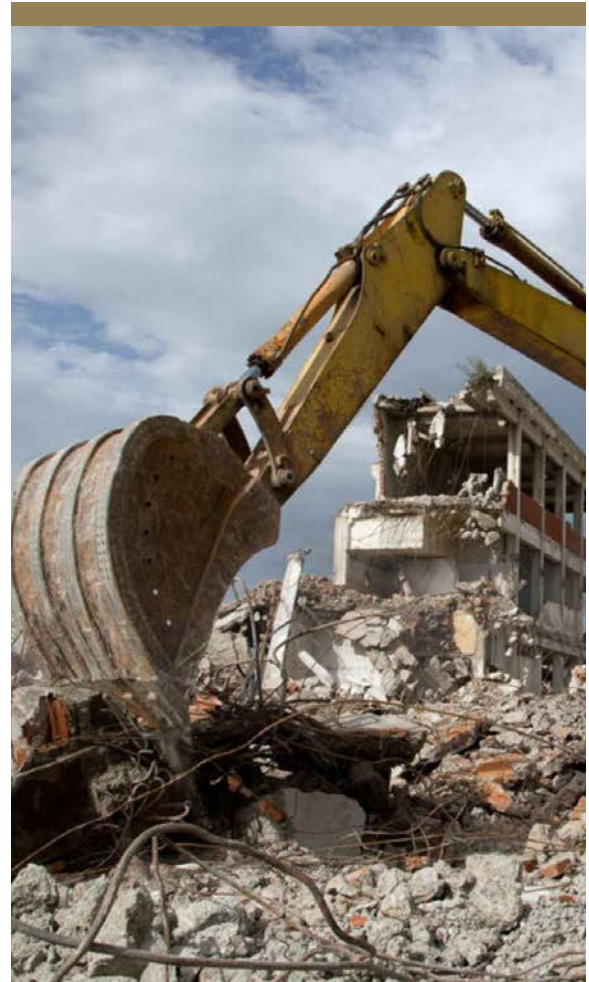
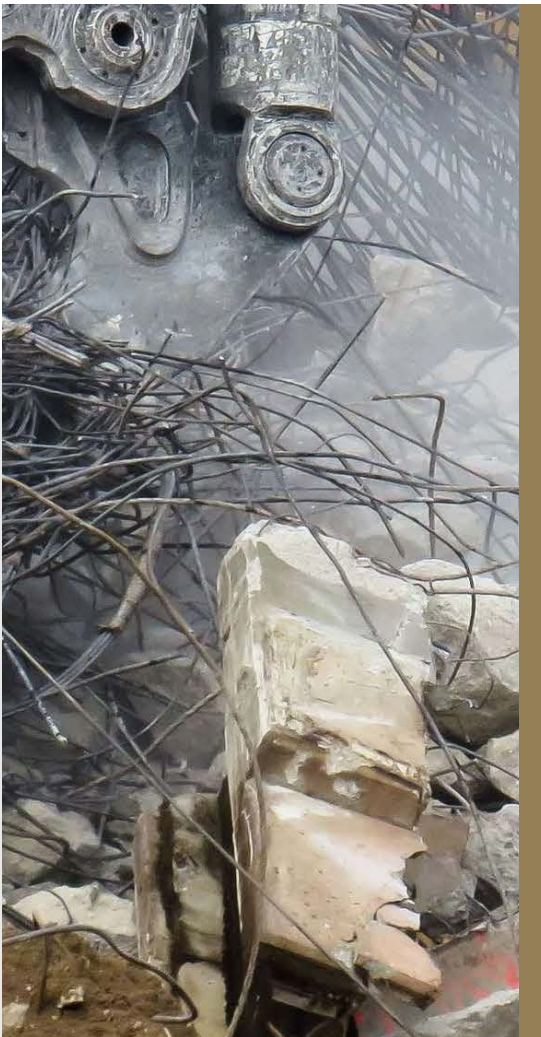
- 9 SOLUTION FOR EFFECTIVE SOLID WASTE DISPOSAL



- 10 VERTICAL FARMING

Review on Recycling of Building Waste in Construction

*YASH GHAG
PRAJAKTA PARIT
SHUBHAM ASTA
KULDEEP DEORA*



Construction waste and **demolition** waste are two types of garbage created during construction and demolition operations, respectively. Demolition garbage is created when old constructions such as buildings, bridges, malls, and highways are demolished.

In India, the construction sector produces between 20 and 32 million tons of garbage every year. In India, the majority of building and demolition **debris** is disposed of in landfills. This may result in contamination of the environment. The laws and regulations governing illegal landfilling disposal are not effectively implemented. This article is projected to minimize landfill disposal of building and demolition waste while also achieving the goal of reusing and recycling that material.

Debris: Remains

Demolition: The process of demolish



Recycling of plastic in concrete: Manufacturing activities, service sectors, and municipal solid wastes all produce a variety of waste products. The utilization of waste goods in concrete not only saves money but also aids in the reduction of disposal issues. Usage of recycled concrete aggregate in concrete: Recycled concrete aggregate is gaining popularity in the construction industry as a partial and complete substitute for natural coarse aggregate since it decreases the need for virgin material.

Recycled aggregate concrete's durability: To determine the durability of recycled aggregate concrete, it is necessary to examine its physical and mechanical qualities. Due to poor porosity, RAC harms high water to cement ratios. The durability is reduced, but the water to cement loss is smaller. The impact of recycled aggregates on concrete compressive strength: This article presents a systematic review relating to the effect on concrete compressive strength of various aspects related to the use of recycled aggregates.

Research on recycled concrete aggregates: According to several academics, recycled concrete aggregate is only suited for non-structural concrete applications. The concrete debris from the dismantled structure has been gathered, and coarse aggregate in various percentages has been utilized to make new concrete.

Research-based on the usage of recycled aggregates in pavements: This article gives brief information about RA aggregates. Different tests were conducted to analyze the percentage of RAs and NAs. For this design, M30 grade of concrete is being used.

Estimation of the Flexural & compressive test on NA & RAC: This research explained the reuse of demolished concrete as coarse aggregate for constructing a new structure. The strength of mixed concrete (NRC) comprising half natural concrete aggregate and RCA as the other half was determined.

Research on recycled aggregate in concrete applications: Solid waste has been an unavoidable by-product of the processes of developed societies. One of the outcomes of economic growth is a tremendous increase in the production of solid waste.



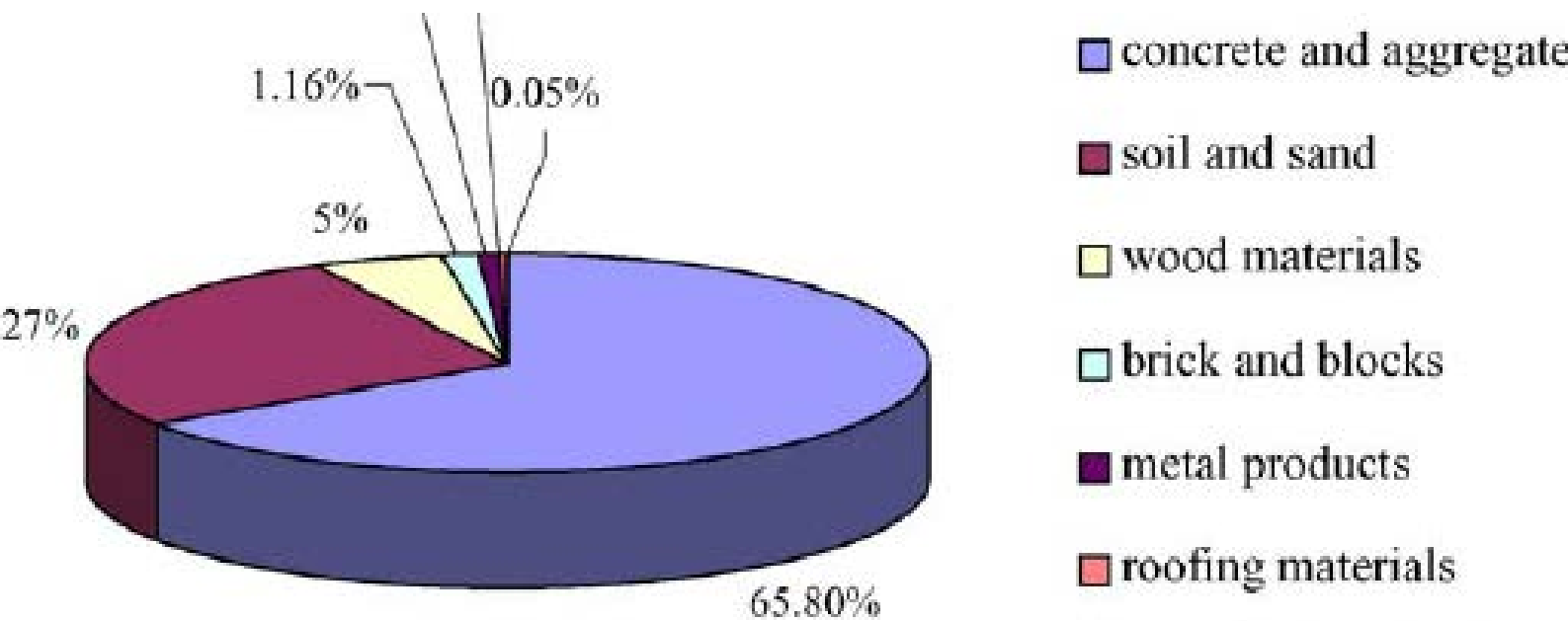
The strength of mixed concrete (NRC) comprising half natural concrete aggregate and RCA as the other half was determined.

Experimental research and analysis of self-compacting concrete:

Self-compacting concrete is a special type of concrete that can be placed and merged under its weight without any extra effort of vibration. This exceptional deformable property along with great cohesion property which makes it easier to handle without being segregated and causes bleeding to occur has made it extraordinary. Utilization of recycled aggregate in high-performance concrete: This article presents a review of the use of RA accumulated from construction demolition. This waste was then used in the production of concrete. using recycled materials in concrete production is an important and environmentally friendly solution. Recycled aggregates can also enhance the cement matrix and its mechanical properties. This behaviour of concrete also changes when the ratios of replacement are manipulated.

Recycling of chemicals and use of various types of concrete waste, 2019:

Recycling of concrete waste recycling and its reuse is essential to prevent negative environmental impacts. Sustainable circular cement can be obtained through effective recycling and the use of chemicals in concrete waste. Some of the methods which were included in signature reaction mechanisms are as follows, formation of calcium hydroxyapatite, desulfurization reaction, and the pozzolanic reaction, which is very effective in the management of concrete waste recycling and use.



Proposed Methodology

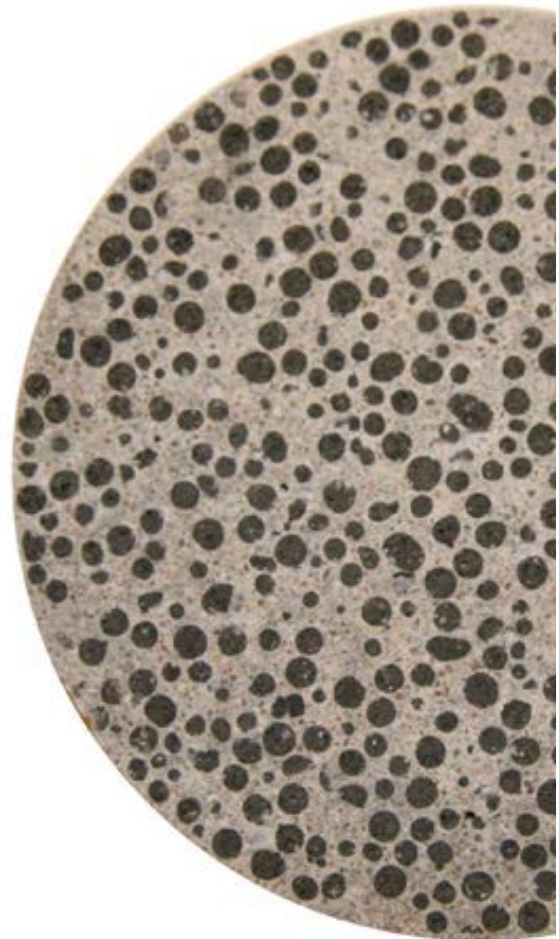
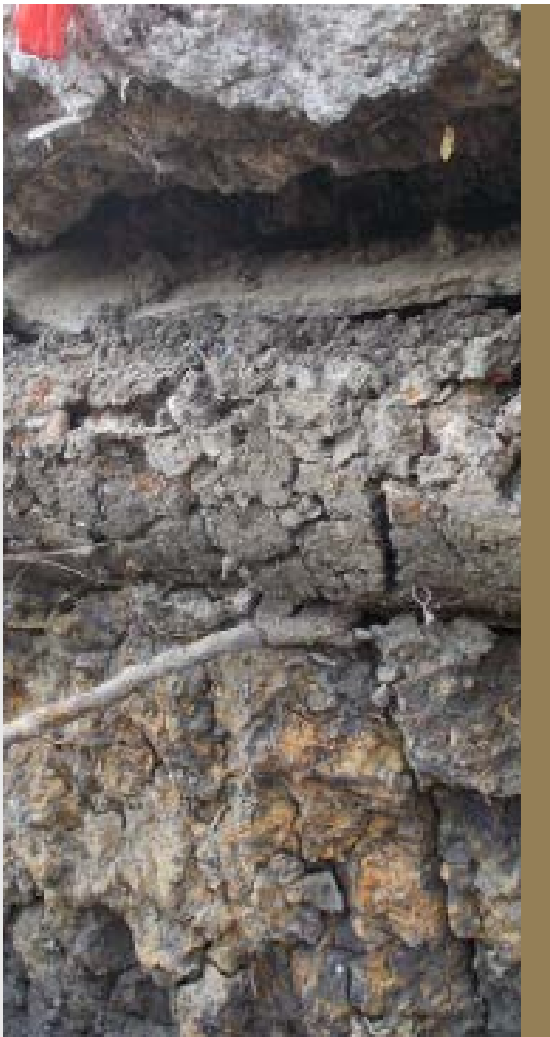
To achieve that the following method needs to be performed:

- **Locating Sites:** Identification of the site from where we can get the concrete waste as per the requirement.
E.g.: Demolished structure.
- **Collection:** Concrete waste from the site, Collection will be done by keeping in mind the quality of the concrete *i.e., whether collected concrete is usable or not.*
- **Separation:** Collected concrete will be cleaned in such a way that the extra materials and the waste should be removed and suitable concrete should be recovered.
- **Aggregate Crushing and Segregation:** Collected concrete aggregate will be crushed and segregated accordingly *i.e., Gauging*
- **Casting:** Blocks of grades M25, M30 · **Curing:** For achieving the required properties.
- **Testing:** Water absorption test, Total shrinkage test, Compressive test, Drop Test

To reduce the overall cost of the project by reducing the use of natural aggregates, which would also result in more revenue generation. Achieving better results in terms of quality, strength, and performance than the concrete which uses conventional methods of production. To get new and more techniques for the production of concrete by using steel and plastic as reinforcing materials, opening new opportunities in the construction industry. To achieve greater sustainable development by using recycled aggregates instead of natural aggregates. The concrete would be eco-friendly. Construction waste management is a part of a growing movement toward a sustainable world. The use of construction waste management techniques that rely on salvage, recycling, and reuse of materials has proven to have economic benefits for the construction industry. The theory on the basis of practical experiences envisages sustainable development planning as a process of continuous improvement.

INNOVATIVE USE OF BACTERIA IN CONCRETE AS BREATHING CONCRETE

*VANASHREE CHANDEKAR
HITESH DUBEY
ABHISEKH MISHRA
NIRDESH RATHOD*



Breathing concrete is the idea of production of such building materials which can release oxygen frequently. Cement releases carbon dioxide when calcium carbonate is thermally decomposed but by some friendly biological methods, we can compel cement to release oxygen as well. This research paper will let you explore some biological concepts and mixing of proper cement proportions to create "breathing concrete" and will shed some light on why and how we can make this idea more common in our lives. As our generation is evolving from more of a green environment to the industrial age, most of the metropolitan cities and towns in India are getting polluted. It's not just because of the toxic gases such as CO₂ released by the industries but also due to the cutting down of major oxygen-producing resources which are trees.



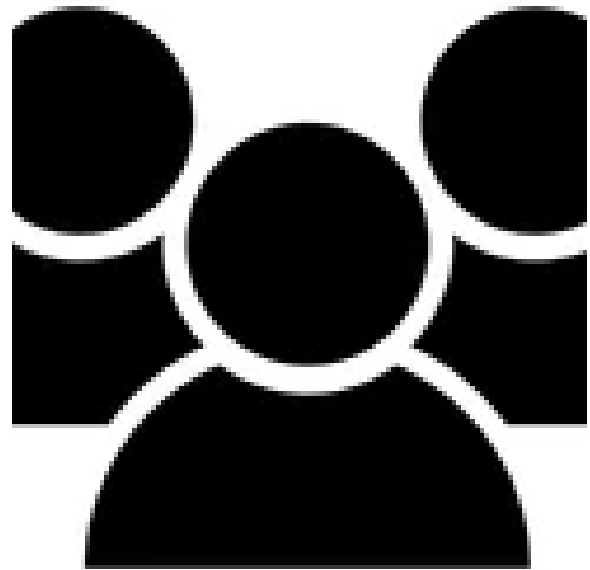
Also, a study suggests that Oxygen levels are decreasing globally due to fossil-fuel burning. Even though the changes are too small to have an impact on human health, but are of interest to the study of climate change and carbon dioxide. Now talking about oxygen, many types of bacteria produce oxygen when a suitable environment and nutrients are provided to them. The identification of this problem is that pollution and a decrease in the level of oxygen in the environment (soon) could be a great threat.

The main objectives of our project are to provide a green and sustainable environment, making the environment pollution free and maintaining an ecofriendly nature. Bacterial concrete can be made for oxygen production and the reduction of toxic gases from the environment. Also, using waste materials, fly ash, etc. which aren't much expensive can be used for an eco-friendly environment. Using a suitable mix design and providing strength to the bacterial concrete by giving the required nutrients is the only motive. Since we are using Pervious Concrete, it is difficult to achieve high Compressive Strength and cannot be used in heavy structures. The application has to be limited to gardens, parks, pavements, etc. The dwelling of **Cyanobacteria** and applications procedures are to be taken care of. Specifically, the bacteria cannot dwell under high and constant water flowing areas since the bacteria could be washed away. Talking about the mix design, the small size of coarse aggregates (12.5 to 16mm) should be able to give high compressive strength and at the same time produce a higher permeability rate. Bacterial concrete usually repairs cracks by itself giving making itself live more as well as is economical and sustainable. According to research, it has been observed that there is an improvement in the strength of concrete by adding more bacterial solutions in M20 grade

Cyanobacteria: a division of microorganisms that are related to the bacteria but are capable of photosynthesis. They are prokaryotic and represent the earliest known form of life on the earth.

DICIPLINATOR

~SHAIKH MAEED



As we all know, B.E.S.T (Brihanmumbai Electricity Supply and Transport) buses have a vital role in the life of a common man in Mumbai, but travelling by bus is the perfect choice in India. As we all know, the population of Mumbai is around 12,967,483 or 124 million, and about 29 lakh people commute daily by bus as a means of transport.

In 2017, there were 24 lakh bus commuters, but that number will drop in 2019-2020. For every 5km, it was only 5Rs for non-A.C. buses, and for A.C. buses, it is 6Rs. Overcrowded buses make it challenging to catch a particular bus. Because of affordability, the number of people waiting at bus stops has increased exponentially, creating improper queues at stops and depots. It is a very economical and profitable deal for the common person.



If people keep a proper queue, then all commuters will be able to board the bus. Maintaining an adequate queue disciplinator will help. The device will scan the queue, and if anyone tries to break the queue and commit any malpractice, they will be scanned and registered on the blacklist. When the blacklisted person tries to board the bus, his picture will be sent to the bus conductor, and he will be charged a penalty. As a result of this rule, proper queues will be maintained at the bus stops, and depots and women will feel safer on the bus.

A perfect example of the advantage of a disciplinator would be three people travelling by the same bus. Person A enters first, then Person B and person Centres last. Person A will grab the seat and stand for around 15 minutes, while Person B will enjoy the seat for 15 minutes. If a disciplinator is set up in a bus, each seat will contain a sensor and buzzer connected to a disciplinator. The disciplinator will assign equal time for sharing a seat.

seat-sharing = total time required to reach the destination / number of people assigned to each seat

Person A will get five minutes to enjoy the seat, and persons B and C will also enjoy the seat for five minutes. There are many advantages of disciplinator; like at every stop, this device will be installed, and this device will provide the commuter with a temporary ticket which will give the information about your seat no, where to stand, etc. so that they will get to enjoy the ride without any hassle. This system will help you decide to take a rickshaw or other mode of transportation to reach there at a specific time by tracking the bus using an app called disciplinator. Disciplinator is an innovative idea to bring change to public transportation, and this device will create a new era in the field of transportation. This device will drastically increase the standard of living and many things.

Explore

Taj Mahal

The Taj Mahal is made of wood that has to be moist to stay strong.

The Taj Mahal was built with 27 different types of stones.

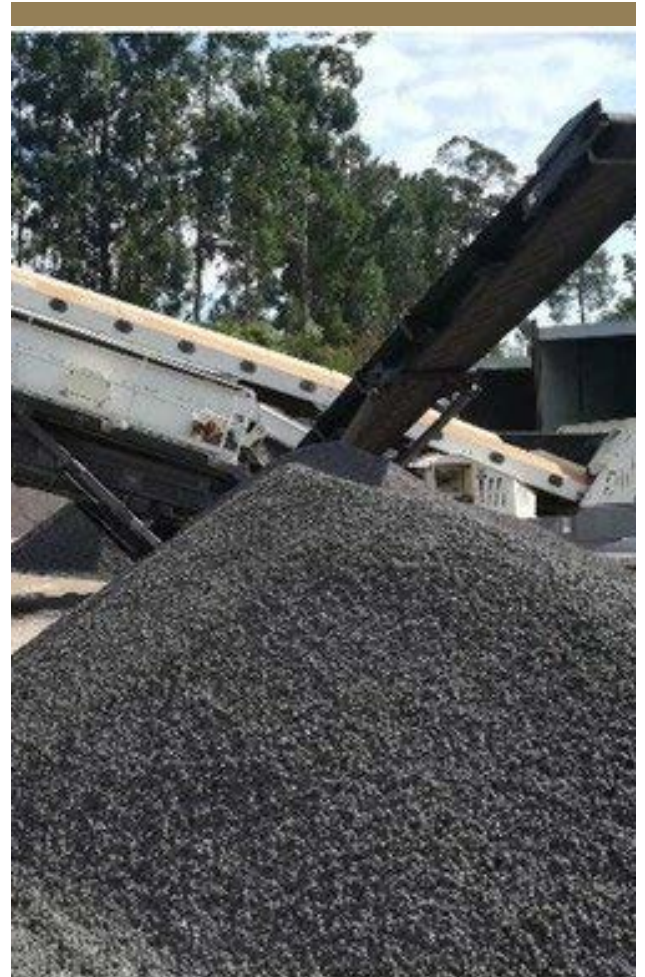
The Taj Mahal's fountains all work together.

The Taj Mahal's minarets are not perpendicular.

The Taj Mahal can change colours.

COLD MIX TECHNOLOGY USING GRANITE AGGREGATE AND RUBBER WASTE IN ROAD CONSTRUCTION

GAVRAV BAVDHANE



Hot Mix Asphalt is used as a paving mix for many decades in road construction. In India, 90 per cent of roads are constructed by bituminous pavements only. Certain limitations associated with hot mix asphalt use are re-emission of greenhouse gases from hot mix plant, the down of plants during the rainy season, problems in maintaining the paving temperature when hauling distances are more. Therefore, to overcome the disadvantages of hot mix asphalt, there is an increasing trend for using cold mix design with bitumen emulsion all over the world because of several advantages such as elimination of heating of binder and aggregate while producing mixes, this helps in protection of environment and energy conservation.



Due to vast fuel consumption because of hot mix technology in road construction, there is an increase in environmental pollution. This causes various harmful effects on the environment as well as on human health and also poses a loss to the country's economy. So, measures should be taken for improving this situation. Therefore, this article mainly focuses on the improvements which can be made to tackle this situation by adopting the cold mix technology instead of hot mix technology in road construction.

The following are the disadvantages of hot mix technologies:

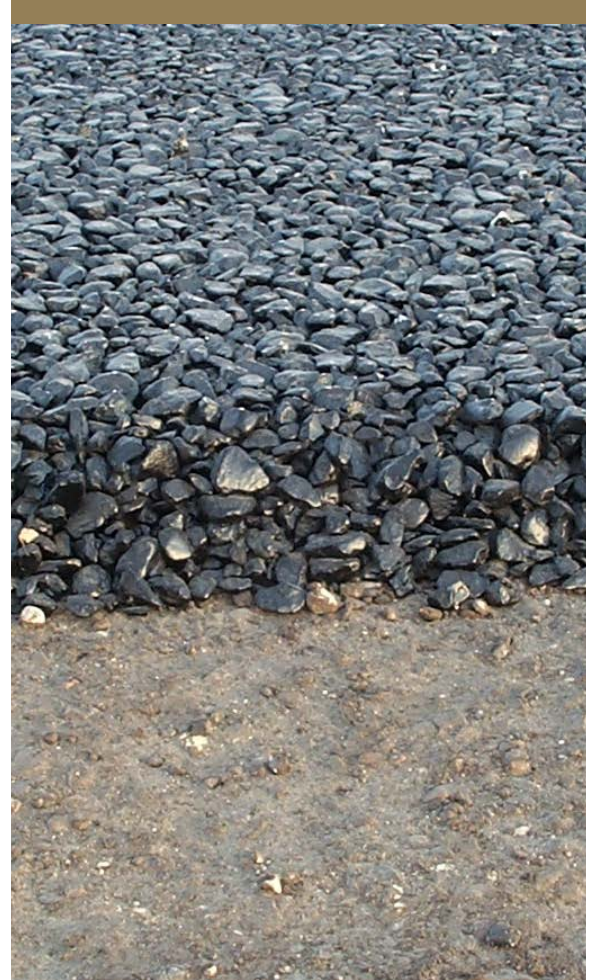
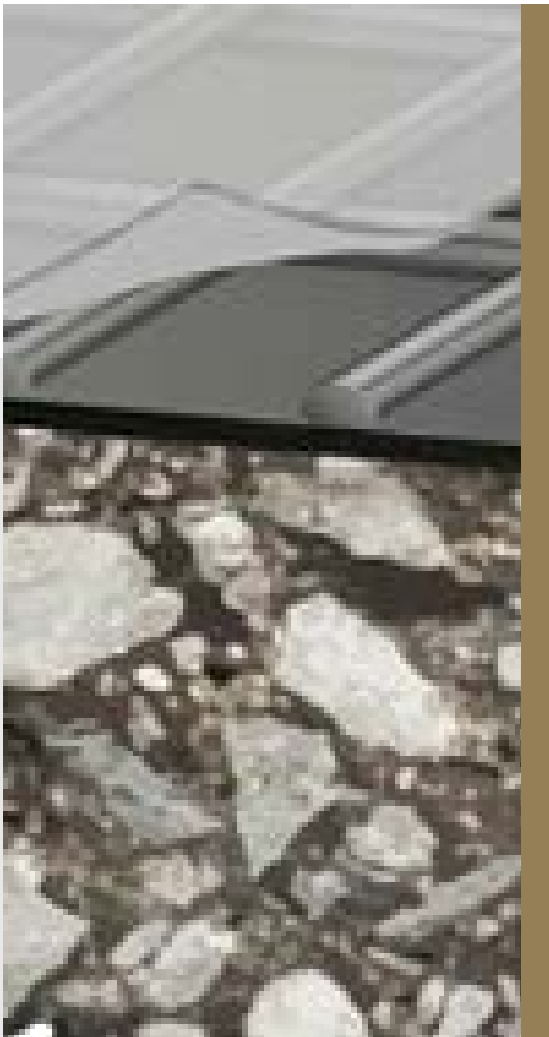
- High level of noise and air pollution.
- Emission of greenhouse gases. Compromise with the durability of bitumen due to ageing during heating
- High energy consumption. Unsafe for the maintenance crew.

Utilization of rubber waste: For a country like India, an efficient and durable with low maintenance cost road network is necessary for national integration and industrial development. Due to the improvement in living standards of the people, the use of vehicles has increased over the last few years, which results in rising in the vehicular density on roads. As vehicles are used frequently the wear and tear of their tires is obvious. Due to the wear and tear of tires, their life of tires reduces at last it becomes useless. The disposal of dese tires has become a serious problem. These tires are disposed of easily by either burning or by dumping. Disposal of tires by burning causes air pollution and dumping causes valuable land to be wasted for stacking up the tires. So, it is very important to dispose of these tires safely and economically.

It was found that granite waste used as the main material in the cold mix mixture is giving a good stability value as compared to basalt and granite plus basalt. It was found that granite used with rubber is good for road construction, maintenance and repair works for the road with heavy as well as medium traffic. The 0% of water absorption in the mix design is giving good stability to the final product

DESIGN OF HEAT-INDUCED POROUS BITUMINOUS CONCRETE PAVEMEN

*AYUSH JAIN
JAYESH KUMAWAT
MAYANK MEHRA*



The design of 'Heat-Induced **Porous Bituminous Concrete Pavement**' is done to observe the healing effect of bitumen mastic and porous bituminous concrete caused by induction heating. This research paper will let you know how damaged bitumen concrete can be healed many times by simply inducing them with heat. There are many crises related to the road where water clogging and potholes are two major problems.

These problems can be dealt with by using Porous bituminous concrete using additional steel fibres to make roads.

Porous Bituminous Concrete Pavement: Allow water to drain through the pavement surface into a stone recharge bed and infiltrate into the soils below the pavement.



In the research, it was observed that the bituminous concrete recovered at a better rate and quality when heat is induced on it. based on these findings, we intend to test the self-healing rate of bitumen concrete, which can also be increased by adding steel fiber in it to reduce aging. Adding steel fiber to the bitumen concrete will make it electrically conductive which will result in making the pavement suitable for inducing heat to observe the effects of healing.

The problem statement identified here is that when the road made by porous **bituminous concrete** is in use there is a chance of coarse aggregates getting free from the binder. This problem arises due to the ageing of the binder, and it is known as ravelling. But we can effectively deal with this problem by adding steel fibres in the porous bituminous concrete which will reinforce the binder and help the pavement heal when induced by heat. The basic approach will be to use porous bitumen concrete consisting of damaging samples and then heat them via induction energy. Design of Porous concrete mixes as per Indian and some other standards. Further Development of Heat induction mechanism. The development of an induction machine that will be used to heat the road will be necessary to heal the road to increase its durability. It was found that a completely fractured bitumen beam that was used in the experiment containing steel fibre type 000 can be healed many times due to induction heating. It has been observed that adding steel fibres to the concrete had a better healing effect than usual samples. If it is too early porous bitumen concrete can heal the damage.

Bitumen concrete: A mixture of petroleum by-products and gravel used for paving to form a smooth, permanent surface.

ENSURING UNIVERSAL ECO- FRIENDLY WASTE MANAGEMENT

*UTKARSH BHOIR
SANIKA GURAV
GAVRAV BAVDHANE
VAISHNAVI BHAT
AYUSH KASLIWAL*



Waste management is a comprehensive discipline including the control of waste generation, storage, transfer, and disposal in the best way for public health. While the benefits of solid waste management have been realized all over the world, now it's time for eco-friendly methods to swell. By using these techniques, we can save our precious environment in many ways. Recycling refers to an Eco-friendly Waste Management System that protects the environment and secures the well-being of the community. Materials such as plastics, paper, glass, and aluminium can be recycled and reused over and over again. The recycling process begins with the sorting of household and commercial waste into various categories. Next, all of these materials are sent to the recycling unit to be processed into new materials.



Waste reduction is the practice of lessening or eliminating the number of materials initially used. Reusable serving utensils and trays instead of disposable items are perfect examples of waste reduction. Alternatively, the reduction of the amount you buy is the most essential of all the options to manage waste wisely. If each household mitigates its waste, the problem will be reduced as well. Reuse is also preferred as an eco-friendly solid waste management option after waste reduction. Reuse refers to using a material again in its current form. Some common examples are used in household items such as books, clothing, kitchen wares, etc. When we look at the things thrown away, it can be seen that those materials can be reused to solve everyday problems and meet the needs.



It is sufficient to say that we require a more stringent integrated and strategic waste prevention framework to effectively address wastage-related issues. There is an urgent need to build upon existing systems instead of attempting to replace them blindly with models from developed countries. To prevent any epidemic and to make each city a healthy city economically and environmentally, there is an urgent need for a well-defined strategic waste management plan and a strong implementation of the same in India. To achieve financial sustainability, socio-economic and environmental goals in the field of waste management, there is a need to systematically analyze the strengths and weaknesses of the community as well as the municipal corporation, based on which an effective waste management system can be evolved with the participation of various stakeholders in India.

Here are a few tips to achieve this goal.

1. Keep ourselves informed: We must be in the know about what is happening on the environment front.

Read about how untreated sewage is thrown into the rivers, attend public lectures about air pollution, & keep in touch with new policies that affect our environment. The more informed we are, the better equipped we are to fight such issues.

2. Consume less:

Motto: Refuse..... Reduce.... Reuse... Recycle. This means consuming fewer resources, reusing whatever we can, and finally recycling what cannot be reused. This process greatly reduces the garbage.

3. Say 'No' to plastic bags: One of the biggest sources of pollution in Indian cities is the ubiquitous plastic bag. Refuse to accept one. Instead, carry a cloth shopping bag with us.

4. Separate our garbage: India has one of the world's most efficient recycling mechanisms. Use the service of our raddiwalla. Newspapers, bottle cans, and other such recyclables can fetch us money and, in the process, we can help to save the environment. Rag pickers, too, perform a vital function for the city. Kitchen garbage (biodegradable) should be separated from non-biodegradable waste



5. **Compost our organic waste:** Start a vermiculture bin. We can convince our neighbours to start a vermiculture bin also to produce manure.

6. **Stop burning garbage:** Ask our neighbours to desist from burning solid wastes. It may seem harmless but smoke emitted from leaves contributes to air pollution. Also, when there is plastic in the heap, it emits dangerous toxic fumes. Leaves can be converted to fertilizer through composting & plastic can be recycled.



Explore

Machu Picchu

Each stone was precisely cut to fit together so tightly that no mortar was needed to keep the walls standing.

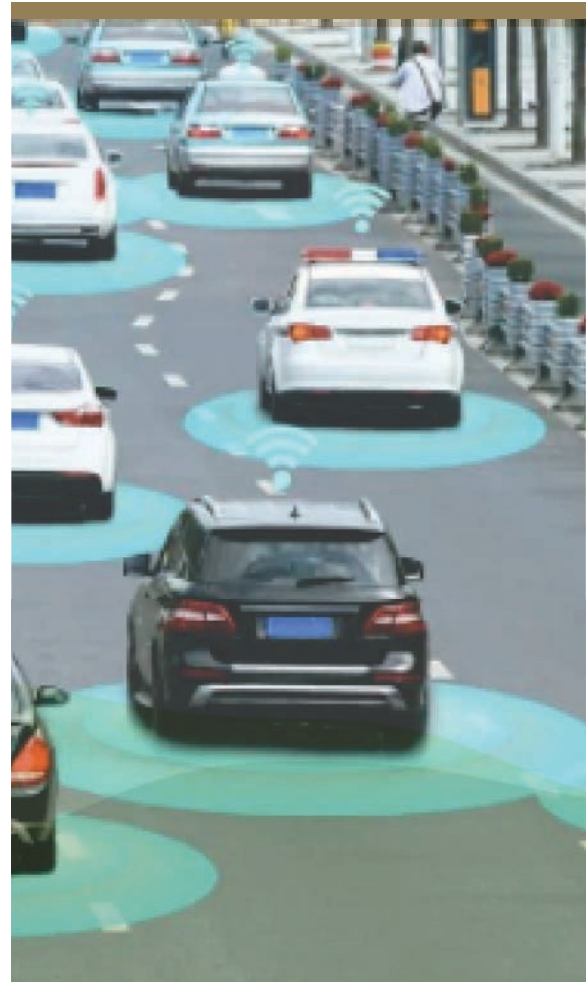
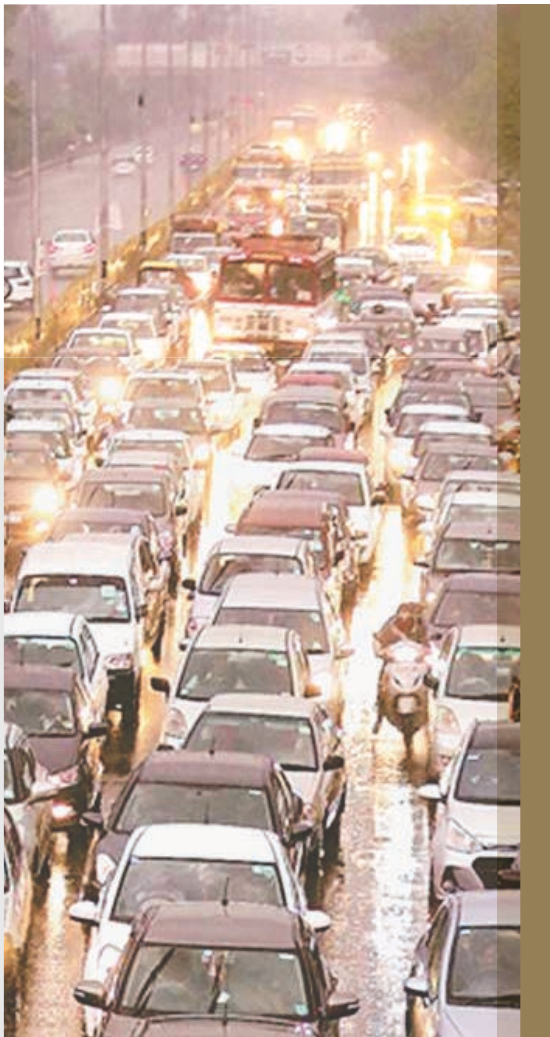
Machu Picchu sits at 2,430 metres above sea level.

In the Quechua language, Machu Picchu translates to 'Old Mountain' or 'Old Peak'.

Machu Picchu was used as an astronomical observatory.

Traffic Management

*KRUTIKA SHINDE
DWITESH PAWAR
PRATHAMESH GAIKWAD
ROHIT LASSI
OM DHONNAR*



Their unit of measurement varied causes of traffic jams. Generally, on restricted-access highways, it isn't traffic volume alone that contributes to traffic jams, but a combination of that and different factors. On a city street, traffic volume can contribute to traffic problems, as **motorists** mire behind lights, and one light-weight cycle is additionally lean to allow all the motorists behind a light-weight to **expertise**. There is a unit some ways you'll place restrictions on traffic jams, whereas managing a secure road will embody new technology implementation, more roads, additional transit choices, and lots of extras.

Motorists: The driver of a car.



Once one thing should be in deep trouble, the commuters' pain is the time. It's not just for the govt bodies; however, we tend to all even have to come back forward. To overcome the traffic issues, there square measure some ways to manage it Carpooling. Carpooling or sharing your vehicle with others United Nations agency square measure travelling within the same direction may be an excellent way to scale back the number of cars on the road. In this manner, you save your cash and fuel by sharing the price with your partners. Odd-even initiative conducted by the govt in Delhi NCR was an excellent step taken by the govt in the context to prevent congestion

adjustive traffic signals have you ever been stuck in the state of affairs once a traffic light goes red to inexperienced to yellow to red, but you couldn't move? Such traffic signals don't seem to be the sole nuisance; however, the square measure creates the traffic worse and a lot of symptoms. Adaptive Traffic Signals would become a boon for such a state of affairs. It truly will sense the approaching cars at the intersection and may modify their phasing in response. It doesn't mean that the adjustive signal creates any additional time or capability; actually, it allocates time **expeditiously**, making longer or capability.

Expeditiously: With speed and efficiency



Center Island on road it's conjointly known as mid-block medians, created on the middle Island of the road. Aside from beautifying the place, it cuts the dimension of the road and narrows down how, and forces the drivers to prevent their vehicles' speed. Arranging the workplace hours Since the overall timing of the workplace hours is 9:00-5:00 PM, that makes the traffic jam and conjointly disturbs the mental peace of the folks, so the workplace timings ought to be rearranged, alternate days operating and also the best choice is to try and create a lot of use of labour from a home pattern that eventually makes folks manoeuvre according to their time with none traffic.



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

*UTKARSH BHOIR
SANIKA GURAV
GAVRAV BAVDHANE
VAISHNAVI BHAT
AYUSH KASLIWAL*



The consumption of concrete as a construction material is now second only to water by volume and the statistics for concrete use worldwide are huge, accounting for about 2 ½ tonnes per person of the global population per annum, with cement consumption reaching close to 5 billion tonnes and with associated aggregate consumption in the region of 30 billion tonnes per annum. These are huge numbers for natural resources usage, given the associated consumption of energy and pollution of the environment.



Thus, it is not surprising that the concrete industry world over has been a major target for lowering CO₂ emissions and promoting sustainable construction, to comply with global sustainability agendas, such as the recently agreed Paris Climate Accord 2015, signed by 195 member states of the United Nations Framework Convention on Climate Change which aims to keep the global temperature rise this century below 2.0°C, and possibly 1.5°C.

For a better world, there are new processes and sustainable and green building material alternatives that can be used in construction today. Coconut shells were used as waste and eco-friendly material in Construction Materials for Sustaining the Strength of Strength Concrete here.



The behaviour of Green Concrete (Blended Concrete) using Agro-Industrial Waste AS Partial Replacement of Cement: The flexural strength of 10% replaced concrete samples showed the highest strength values of all other mixes. The compressive strength values of 15% and 20% replaced combinations showed very less strength values than all other concrete mixes. Impacts of adding jute fibres to concrete: By adding jute fibres the compressive strength and split tensile strength increase to 33% and 10% respectively.

Also, the reduction in weight due to sulfate attack is within permissible limits. An increase in fiber aspect ratio also leads to a decrease in the strength characteristics. Impacts of nonconventional construction materials on concrete strength development: Glass fiber incorporation in concrete increased the compressive strength by a minimum of 2%, for 10% replacement. The addition of Carbon fiber Reinforced Concrete decreased the compressive strength of the concrete; hence it is not recommended.

Rice husk ash can be replaced by cement due to its pozzolanic property and a notable increase in strength was observed. GGPS is replaced even up to 40% and a notable increase in the strength of about 30% when compared to the control mix as achieved.

Sustainable Construction Materials & Technology in Context with Sustainable Development: The use of sustainable materials & technology not only reduces transport & production costs, and carbon emissions but also provide avenues for employment & skill development for community members.

- 1. Obtaining Material:** Collecting coconut shells required for the project work. Crushing of coconut shell to be used as coarse aggregate.
- 2. Preparation of Concrete Samples:** Concrete samples are prepared by mixing crushed coconut shells with concrete, further placing and curing concrete cubes
- 3. Laboratory Testing:** Tests such as Compressive Strength can be performed on the prepared sample cube.



We can use different sustainable materials in concrete. Using sustainable materials, we can increase the strength of concrete according to the material used. By using eco-friendly materials, we can reduce the cost of construction and also achieve the required strength, and by using eco-friendly materials, we can save naturally available materials such as sand, etc which are about to get depleted. Thus using such material can conserve the resource, become cost-effective, and also be beneficial to humans.

Agro-industrial wastes consist of variable composition that supports the growth of microorganisms as a result of fermentation produced different valuable enzymes.



Explore

**MORE THAN 2 MILLION STONE BLOCKS
WERE USED.**

**THE STONES REFLECTED THE SUN'S
LIGHT SO WELL THAT THE EGYPTIANS
CALLED THE PYRAMID 'IKHET', MEANING
THE 'GLORIOUS LIGHT'.**

IT HAS SHRUNK BY 25 FEET.

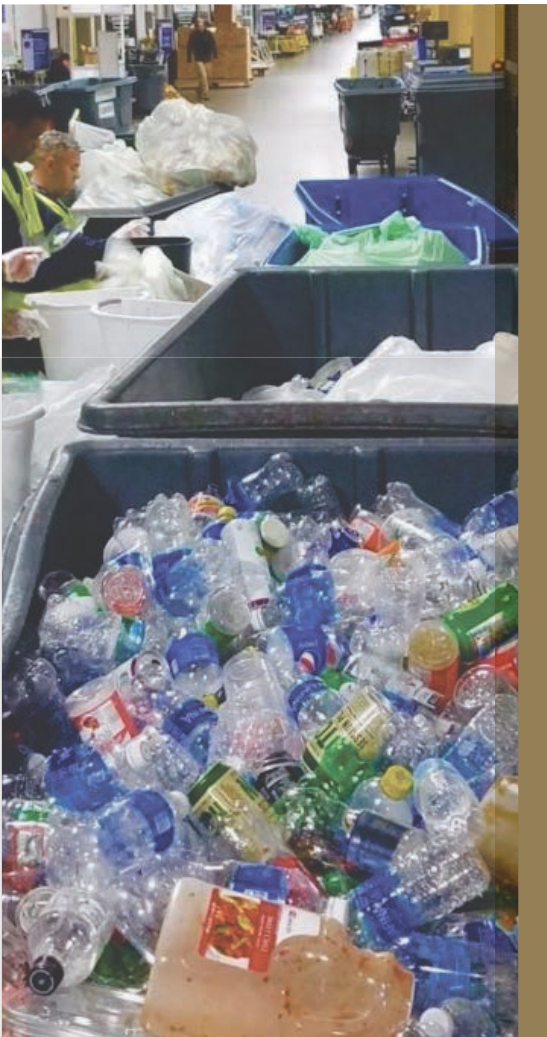
**IT IS THOUGHT THAT A MASSIVE
EARTHQUAKE LOOSENING MANY OF THE
STONES AND THEY WERE TAKEN AWAY
TO BUILD MOSQUES IN NEARBY CAIRO.**

**THE GREAT PYRAMID WAS BUILT FOR THE
PHARAOH KHUFU.**

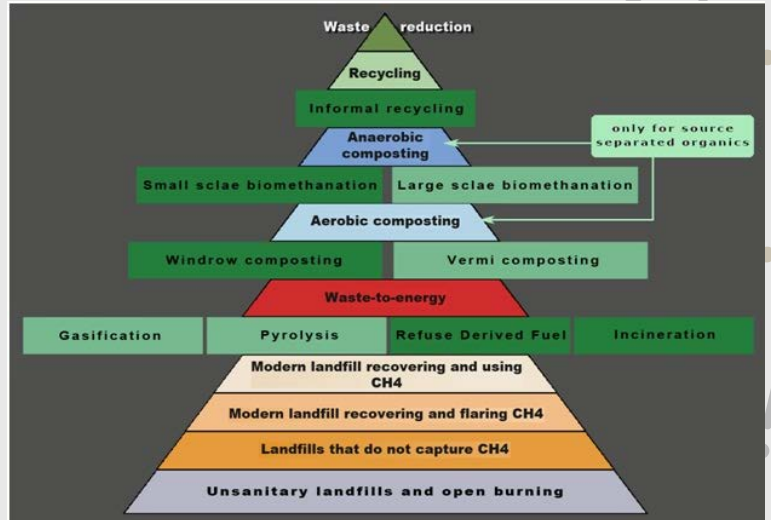
Pyramid of Giza

SOLUTION FOR EFFECTIVE SOLID WASTE DISPOSAL

*PRATYUSH CHOUDHARY
SHUBHAM MADKAIKAR
KAVITA SINGH
VISHAL PARMAR*



Solid wastes are those organic and inorganic waste materials produced by various activities of the society, which have lost their value to the first user. Improper disposal of solid wastes pollutes all the vital components of the living environment (i.e., air, land, and water) at local and global levels. The problem is more acute in developing nations than in developed nations, as their economic growth as well as urbanization is more rapid. There has been a significant increase in MSW (municipal solid waste) generation in India in the last few decades.



Effects of Waste on Environment:

1. **Water Contamination:** Water is an excellent solvent; it can contain numerous dissolved chemicals. As a result, while moving through, water picks up pollution along the way. It often has dissolved substances like various chemicals and gases. Rainfall easily mixes with toxic liquid substances and seeps into the water streams to end up in nearby water bodies. Thus, the neighborhood fountain, pond, lake, or even drinking water taps are susceptible to the dangers of contamination. The victims? All living organisms including us, humans.





2. Soil Contamination:

Ideally, we would like our plastic, glass, metal, and paper waste to end up at a recycling facility. It then returns to us as a renewable product. But the reality is entirely different.

3. Air Contamination:

Let's talk about the ozone layer first. A lot of it leaves us feeling hopeless for we feel unable to make necessary changes. We think we cannot consume any less. Even so, we can, at least, follow strict protocol over how it's recycled. On the occasions paper and plastic are burned at the landfill, causing landfill gas, the chemicals released accumulate and contribute to the ozone layer and hurt the surrounding human population. **Methane** gas adds to it as well. Besides, with chemicals such as dioxin out there, the air has been proven to have harmful effects on us. All of it, and especially when improper waste management is concerned, play a significant role in causing global warming.

4. Human Damage:

Consider the majority of the human population where we do not see any scientific waste management system. Such places may possess a system, but there is no disposal area to be found. Those who are at significant risk are Children and those who live near such facilities, Waste disposal workers, and Employees whose workplaces manufacture or encounter waste materials. Think about the fires at landfills and their effects on us. Whether coming from the air or its accumulation in our cellars, those landfill gases have been exposed to causing cancer, creating respiratory and visibility problems, and the explosion of cans put people nearby at constant risk. Solid wastes are those organic and inorganic waste materials produced by various activities of the society, which have lost their value to the first user. Improper disposal of solid wastes pollute all the vital components of the living environment (i.e., air, land, and water) at local and global levels..



The problem is more acute in developing nations than in developed nations, as their economic growth as well as urbanization is more rapid. There has been a significant increase in MSW (municipal solid waste) generation in India in the last few decades. This is largely because of rapid population growth and economic development in the country. Due to the rapid growth of the urban population, as well as constraint on resources, the management of solid waste poses a difficult and complex problem for society and its improper management gravely affects public health and degrades the environment.

Methane: A colourless, odourless flammable gas which is the main constituent of natural gas.



VERTICAL FARMING

SANIKA SAWANT
RICHA NAIK
MOKSHI RANAVARE
VAISHNAVI RAYKAR



The vertical farm is a world-changing innovation whose time has come. Imagine a world where every town has its local food source, grown in the safest way possible, where no drop of water or particle of light is wasted. Smart farming makes a tremendous contribution to food sustainability in 21st century. The reason is that environmental and water management affects plant growth directly. Vertical farming is considered a modern tool for feeding a large world population by the year 2050. Vertical farming is the practice of growing crops in vertically stacked layers. It usually includes controlled environment agriculture, aimed at crop development growth, as well as small-scale farming techniques such as hydroponics, aquaponics, and aeroponics.



Other common building blocks are direct farming systems that include buildings, ship containers, tunnels, and disposable shafts. As of 2020, there is the equivalent of about 30 ha (74 acres) of operational vertical farmland in the world. The modern concept of direct farming was introduced in 1999 by Dickson Despommier, a professor of sociology and ecology Health at Columbia University. Despommier and his students came up with a plan for a long-distance farm that could feed 50,000 people. Although the design has not yet been developed, it has successfully developed the concept of direct farming. The main objectives of vertical farming are to produce more crops in less area, save drinking water by using the grey or black waste water by processing it, and reduce the use of harmful pesticides and fertilizers on crops.



Vertical Farming is mainly adopted in three types of processes:

1. Hydroponic
2. Aeroponics
3. Aquaponics

1. Hydroponics: Hydroponics is a method of growing plants without soil. The plant is supported in an inert growing area like a **cockpit** and they are fed with nutritious water solution and uses about 70% less water than traditional farming. Hydroponic systems can be simple as a full glass of water with stones and water containing fertilizer or complex as a large heat-retaining structure consisting of beds of pellets/full clay pots and occasional cockpit provided with a solution of elements. . The nutrient film technique (NFT) is also a kind of hydroponic farming that is adopted by many commercial farmers these days. Plants grown in grow tray is filled with a nutrient solution a few times a day using a reservoir below the tray, a water pump, and a timer. The timer is set based on the parameters such as the size of the plants and water and nutrient requirement of the plants the growth cycle of the plants as well as the air temperature.

The essential nutrients used in the hydroponics system are calcium nitrate, potassium sulfate, magnesium sulfate, etc.

2. Aeroponics: Aeroponics is the process of growing plants in an air or mist environment without the use of soil or an aggregate medium. The basic goal of growing a viable plant is to plant plants hanging in an enclosed or enclosed area by spraying the hanging roots of the plant and the lower stem with a solution of atomic or sprayed, nutritious water.

3. Aquaponics: Aquaponics is a recirculating system that combines hydroponics (growing plants in water without soil) and aquaculture (fish farming) to create an efficient closed-loop system. Aquaponics uses these two in a symbiotic combination in which plants are fed the aquatic animals' discharge or waste. In return, the vegetables clean the water that goes back to the fish. Along with the fish and their waste, microbes play an important role in the nutrition of the plants. These beneficial bacteria gather in the spaces between the roots of the plant and convert the fish waste and the solids into substances the plants can use to grow.



The result is a perfect collaboration between aquaculture and gardening. Vertical Farming has many advantages when compared with traditional farming methods. In the upcoming future, it is expected that 80% of the population will live in urban areas. This will increase the demand for crops. Vertical farming can be a useful method of farming in urban areas where the area is very low. Vertical farming allows us to produce more crops from the same square footage of the growing area. The water required is also very less compared to the traditional farming method. Indoor vertical farms are less likely to feel the brunt of the unfavourable weather, providing greater certainty of harvest output throughout the year. There are some disadvantages to vertical farming. The financial feasibility of this new farming method remains uncertain. The cost of building skyscrapers for farming, combined with other costs such as lighting,

heating, and labour, can be more than the benefits we can get from the output of vertical farming. Vertical farming takes place in a controlled environment without the presence of insects. The pollination process needs to be done **manually**, which will be labour-intensive and costly. Losing power for just a single day can prove very costly for a vertical farm. Vertical farming technologies are still relatively new. Companies are yet to successfully produce crops at scale and make it economically feasible to meet the growing food demand. A lot of research is being done toward a networked agricultural system that looks to the open-source software movement for inspiration. In the future cooperating image processing and mobile applications, we can control this module remotely by using mobile application software. Although there are a lot of challenges in vertical farming, "Vertical farming needs to be heard, learned and done".

Manually: Using the hands

Explore

Pisa got its name in 600 BC from a Greek word meaning “marshy land.”

Galileo was baptized in the baptistery in 1565.

Mussolini tried to fix the tower but he only made it worse.

The tower was a military base during World War II.

Leaning Tower of Pisa



CREDITS

Magazine wouldn't have
been possible without the
help of ...

TEAM PUBLICATION

SHRESHTA BHARGAVA

DHEERAV NAHAR

PRATHAMESH GAIKWAD

DWITESH PAWAR

KRUTIKA SHINDE

CHAITNYA PARMAR

VEEREN PAWAR

YASH YADAV

RUGVED TELANG

PRATYUSH CHOUDHARY

SNEHAL KAMBLE

SIDDHESH MALVADE

TEAM CREATIVES

HARSHAD VHATKAR

AAYUSH JAIN

SUDHA PAUDEL

SUHENA GHOSH

Creative team, you took the
“im” out of impossible!



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THANK YOU !



Colosseum
ITALY



Leaning tower
of Pisa
ITALY



Machu Picchu
PERU



Christ Redeemer
BRAZIL

Bid adieu until next volume...