

HERITAGE INSTITUTE OF TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

PRESENTS

KONSTRUCTZ

DEPARTMENTAL E-MAGAZINE

INNOVATE . DESIGN . BUILD

2022

BONTONTV



VISION

Developing motivated, skilled and highly competent Civil Engineers to excel in Education, Research, Entrepreneurship and Technological services, so that the department as well as the Institute will be recognized high in a global scenario.

MISSION

To empower the students with broad and in-depth knowledge in Civil Engineering fundamentals and their applications in practical as well as professional fields to meet socio-economic challenges.

To educate the students in the latest technologies in Civil Engineering, imbibe in them human values, self-confidence, team work and independent thinking in solving diverse problems in the related field so that they can serve the society.

To achieve international recognition by developing professional Civil Engineers, offering continuing education and interacting with industries by emphasizing research and development.

From the HOD's Desk :-



I am glad that a departmental magazine "K-onstructz has been published for all. I must appreciate all the students and the faculty members who worked tirelessly and within a tight time frame to achieve this.

This magazine will serve as a platform for all the students of CE department to hone their skills in literacy, poetry, innovation and research ideas. The staff will contribute to make it more interesting in terms of emerging technologies and lateral developments.

I am sure it will be everyone's delight.

Prof. (Dr.) Tapas Sadhu
Head, Department of Civil Engineering

Special Message from Esteemed Faculty:

- **Prof. (Dr.) Subha Sankar Chowdhury**
(Departmental Coordinator)



“In your life, never stop dreaming, but with the open eyes; what comes in your sleep is not your dream; instead, for which, you cannot sleep is your dream. Don’t go after the scores and marks, rather try to be a good human being. Civil engineering is the branch of engineering which teaches you the most about managing people, which is a skill which is very, very useful and applies almost regardless of what you do.”

- **Prof. (Dr.) Sarmila Sahoo**



“I highly appreciate this initiative by our students for the first time. Our E-magazine K-onstructz publishes the research, development and ideas of technological advancement and encourages the creative side of our students. I do hope that they will continue with this.”

- **Prof. Saurav Kar**



“Certainly, I would say this is one of the greatest initiatives taken by our department. I whole heartedly thank the total team of students and all the faculty members of our department.....”

- **Prof. Prithwish Saha**



“Wishing all the members and students directly or indirectly associated with K-ONSTRUCTZ a grand success. Hope K-onstructz will create a revolutionary footprint towards the upgradation of Civil Engineering department of HIT-K”

- **Prof. Puja Basu Chaudhuri**



“I would appreciate the initiative taken by our Civil Engineering Department and especially which cannot be fulfilled without help of our beloved students. Thank you, the team, for your enormous effort. Hope we can publish many more e-magazines in future with help of you all. Best wishes...”

- **Prof. Rudra Prasad Roychowdhury**



“Our students always try to maintain this attitude of excellence. This magazine is a team effort of the editors who have toiled hard”

- **Prof. Bedshruti Sen**



“A great initiative from the students. This magazine would certainly enhance our technical knowledge and cover the aspects of recent development in civil Engineering. All the best for your future endeavor.”

- **Prof. (Dr.) Chandrima Bhadra**



“I would highly acknowledge the students for this great initiative of publishing the departmental E magazine, K-ONSTRUCTZ. Also, I would like to appreciate the innovative write-ups, poems, paintings and photos contributed by the students. Best wishes to all of you”

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Special Message from Our Mentor



"Students are like diamonds and diamonds always continue to shine even in ultimate darkness. Being a guide to the students, I always try to show them the path of enlightenment."

- Prof. Saurav Kar



Editor's Message

Welcome to K-ONSTRUCT'Z 2022, HIT-K family!

Our Civil Department is full of folks whose talents might be obscure, but are far from mundane. Engineers we might as well be, but our skills are not restricted to any particular domain either. We are someone who can implement our innovation and use of modern technology to showcase our expertise anywhere whether it is the tech sector or the business world. We know to rule the world because we build the world. The coming pages are filled with the knowledge, imagination and craft of our friends discovering art, as well as engineering.

It also includes upgraded technology and innovation.

Civil Engineering is that technological field which is not itself in it it's going to be part of every single once for life.

For the time being, we would like to congratulate every one of you who has contributed to this magazine. You are the pride of our department, and you need to keep evolving. So, readers, buckle up. Enjoy the ride. Who knows what inspiration you might find within these pages!

Stay safe, Stay happy.;

-Editor's Team



Sayantan Dutta



Niharika Nidhi



Suvaranil Ray

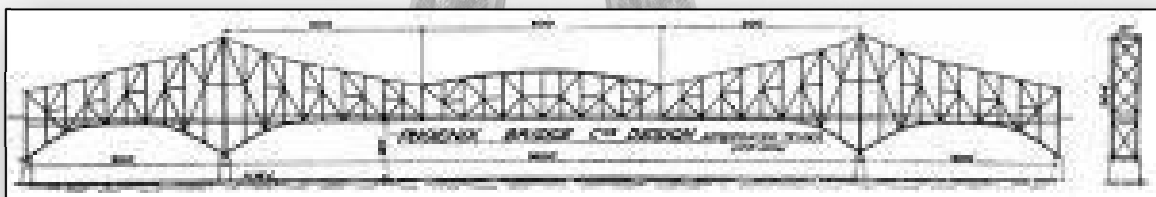
“This magazine carries the acquaintance of enormous talent that our mates, seniors and juniors got. We are not only made for working in this sector but also, we have that kind of ability and talent that we can use our innovation and skills for performing and rule any sectors. This asserts the facts that though we are engineers, our left brain is also as capable as of our right brain. We should just have a belief and faith in ourselves that we can do anything. Hope, this magazine will help us to know each other in a graceful way and make our bond of ∞ MPa.”

QUEBEC BRIDGE, THE FIRST FAILURE-1916

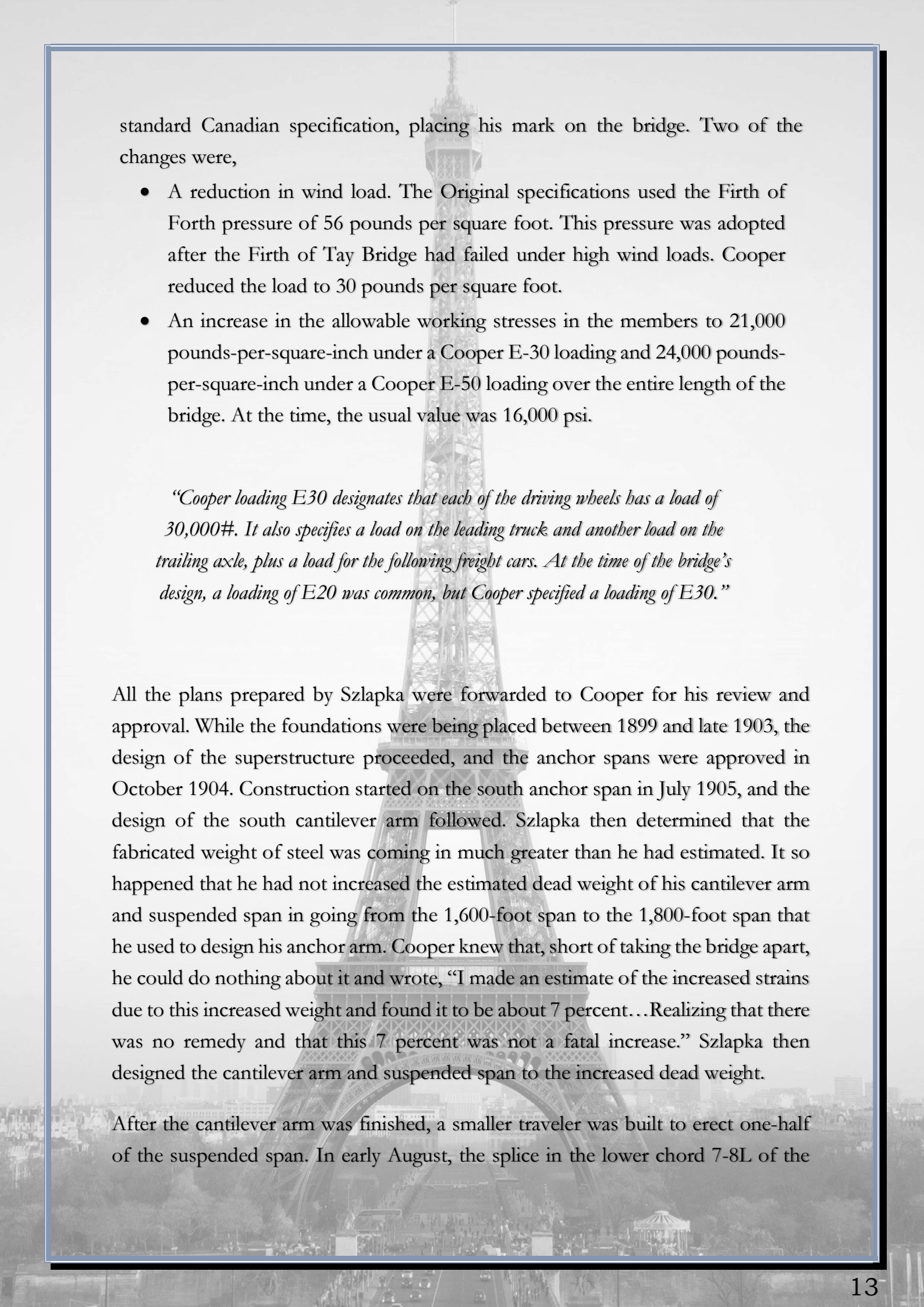
-- Abhishek Gupta (3rd year)

A bridge had been proposed across the St. Lawrence river for many years when the Phoenix Bridge Company and Theodore Cooper were selected to build an 1,800-foot-span cantilever bridge. The span would be the longest cantilever in the world, surpassing the Firth of Forth Bridge with its two spans of 1,710 feet. Cooper was initially selected as a consultant to the Quebec Bridge & Railway Co. to recommend a design from the many submitted in a design competition. He selected the Phoenix Bridge design as it was “an exceedingly creditable plan from the point of view of its general proportions, outlines, and its constructive features” and was the “best and cheapest plan and proposal of those submitted to me...”

At the time, Phoenix Bridge was one of the leading bridge companies in the world, and Cooper had an unblemished record as a bridge engineer. The original proposal was for a 1,600-foot cantilever, but Cooper recommended that the central span be increased to 1,800 feet to save the time to build and the cost of the piers.



On November 19, 1900, Cooper was retained as Consulting Engineer, and, shortly after, the Bridge Company received financial support from the Government. Peter Szlapka, working under J. Sterling Deans, started the actual design in accordance with specifications prepared by Cooper. Cooper had significantly modified the



standard Canadian specification, placing his mark on the bridge. Two of the changes were,

- A reduction in wind load. The Original specifications used the Firth of Forth pressure of 56 pounds per square foot. This pressure was adopted after the Firth of Tay Bridge had failed under high wind loads. Cooper reduced the load to 30 pounds per square foot.
- An increase in the allowable working stresses in the members to 21,000 pounds-per-square-inch under a Cooper E-30 loading and 24,000 pounds-per-square-inch under a Cooper E-50 loading over the entire length of the bridge. At the time, the usual value was 16,000 psi.

“Cooper loading E30 designates that each of the driving wheels has a load of 30,000#. It also specifies a load on the leading truck and another load on the trailing axle, plus a load for the following freight cars. At the time of the bridge’s design, a loading of E20 was common, but Cooper specified a loading of E30.”

All the plans prepared by Szlapka were forwarded to Cooper for his review and approval. While the foundations were being placed between 1899 and late 1903, the design of the superstructure proceeded, and the anchor spans were approved in October 1904. Construction started on the south anchor span in July 1905, and the design of the south cantilever arm followed. Szlapka then determined that the fabricated weight of steel was coming in much greater than he had estimated. It so happened that he had not increased the estimated dead weight of his cantilever arm and suspended span in going from the 1,600-foot span to the 1,800-foot span that he used to design his anchor arm. Cooper knew that, short of taking the bridge apart, he could do nothing about it and wrote, “I made an estimate of the increased strains due to this increased weight and found it to be about 7 percent...Realizing that there was no remedy and that this 7 percent was not a fatal increase.” Szlapka then designed the cantilever arm and suspended span to the increased dead weight.

After the cantilever arm was finished, a smaller traveler was built to erect one-half of the suspended span. In early August, the splice in the lower chord 7-8L of the

anchor span showed increased signs of distress. Cooper later stated that he began to get “uneasy” about the lower chord members on August 8 when he got a report from his man on the job, Norman McLure, on apparent bending of the web plates on the lower compression chord near the southerly pier.



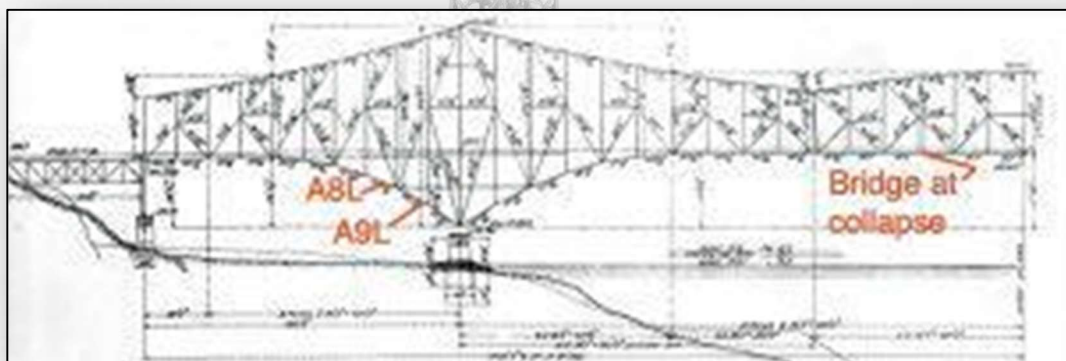
Bridge in the river

At the time of the collapse, the first three panels of the suspended span were in place.

The outside ribs on A9L were each built up of 3 plates – 54 inches $\times$ 15/16 inch and one 37 $\frac{3}{4}$ inches $\times$ 15/16 inch combined with stitch rivets. The interior ribs were built up with 2 plates – 54 inches $\times$ 15/16 inch and two 46 inches $\times$ 15/16 inch also connected with stitch rivets. The ribs were separated by latticing top and bottom and diaphragms near the top. The ends of the plates were milled, and the compressive load between the members of the lower chord was to be transferred from member to member by bearing. However, during erection, they encountered many problems bringing the members into full bearing over the entire joint.

Between August 7 and August 27, 1907, there were many letters, telegrams, and telephone calls between McLure, Cooper, Szlapka, and Deans regarding the increased bending of the web plates of the lower chord. At first, many of the players

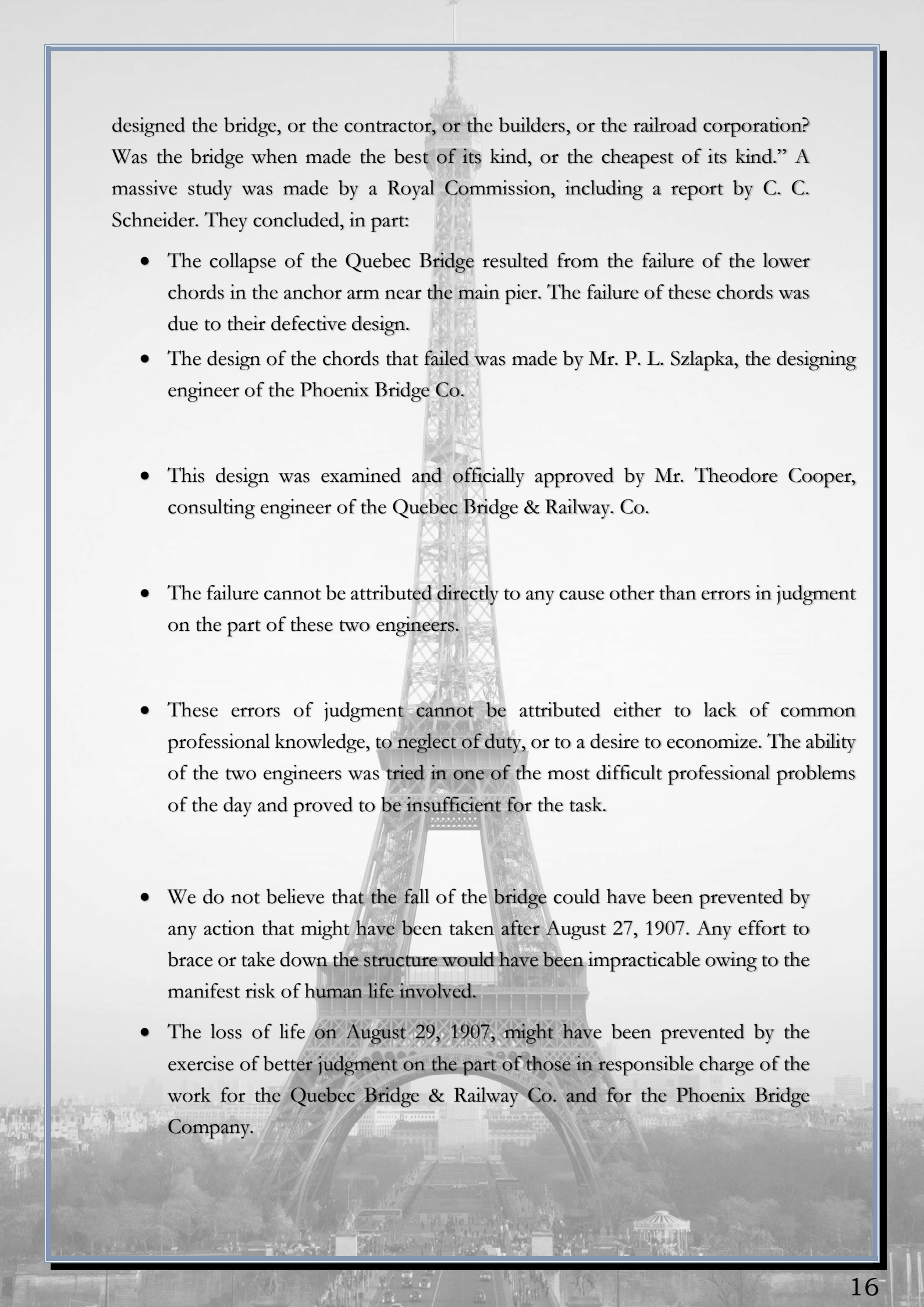
believed the bend had been in the plates from the beginning. McLure could not convince them that the bend was not there initially and was increasing over time as more load was added to the suspended span. Some of the Phoenix Bridge men on the job, including Yenser, the foreman, believed the situation was critical. Birks, the Superintendent, continued to believe the bend was in the member from the beginning. McLure wrote to Cooper, "...although a number of the chords originally had ribs more or less wavy, as I have reported to you from time to time, it is only very recently that these have been in this condition, and their present shape is undoubtedly due to the stress they are now receiving. Only a little over a week ago, I measured one rib of the 9-L chord of the anchor arm here shown, and it was only $\frac{3}{4}$ inch out of line. Now it is $2\frac{1}{4}$ inches."



Plan of bridge showing failed member A9L and planned suspended truss to mid-span.

McLure took the train to New York, arriving on the morning of August 29, and reported in person to Cooper on his concerns about the safety of the bridge. Finally recognizing the critical nature of the problem, Cooper told McLure to telegraph Phoenix Bridge, telling them to stop work immediately and sent him to Phoenixville to discuss the matter more fully with them. The telegram was sent at 12:16 PM and arrived at Phoenixville at 1:15 PM. McLure would not arrive at Phoenixville until 5:30 PM. At that time, the bridge collapsed into the St. Lawrence River, killing 75 men.

Harper's Weekly asked, "was it properly constructed? Was the iron of inferior quality? Is there no method of making iron bridges of assured safety? And who is responsible (so far as responsibility goes) for such an accident – the engineer who

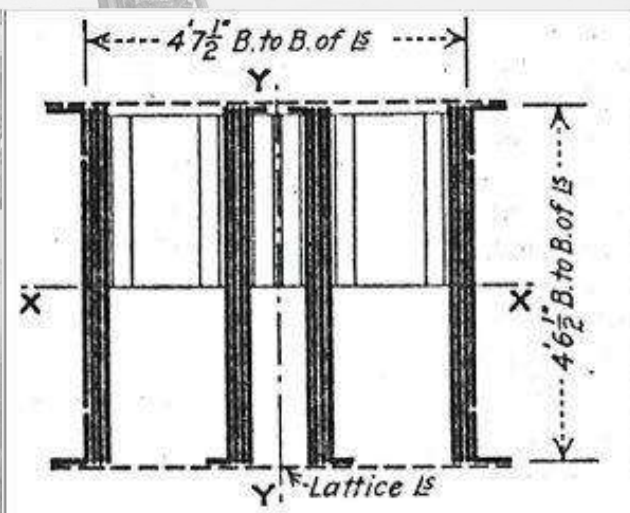


designed the bridge, or the contractor, or the builders, or the railroad corporation? Was the bridge when made the best of its kind, or the cheapest of its kind.” A massive study was made by a Royal Commission, including a report by C. C. Schneider. They concluded, in part:

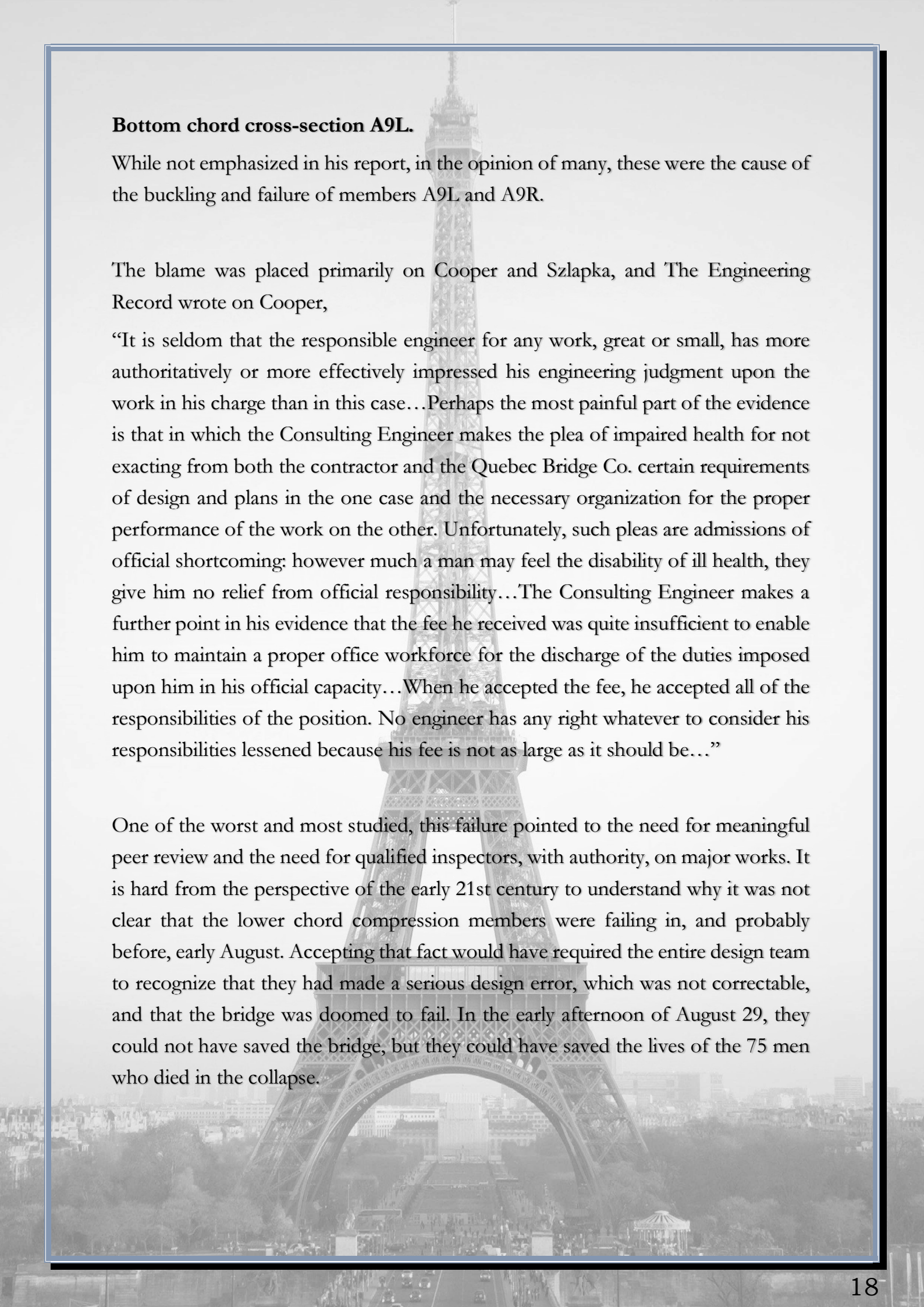
- The collapse of the Quebec Bridge resulted from the failure of the lower chords in the anchor arm near the main pier. The failure of these chords was due to their defective design.
- The design of the chords that failed was made by Mr. P. L. Szlapka, the designing engineer of the Phoenix Bridge Co.
- This design was examined and officially approved by Mr. Theodore Cooper, consulting engineer of the Quebec Bridge & Railway. Co.
- The failure cannot be attributed directly to any cause other than errors in judgment on the part of these two engineers.
- These errors of judgment cannot be attributed either to lack of common professional knowledge, to neglect of duty, or to a desire to economize. The ability of the two engineers was tried in one of the most difficult professional problems of the day and proved to be insufficient for the task.
- We do not believe that the fall of the bridge could have been prevented by any action that might have been taken after August 27, 1907. Any effort to brace or take down the structure would have been impracticable owing to the manifest risk of human life involved.
- The loss of life on August 29, 1907, might have been prevented by the exercise of better judgment on the part of those in responsible charge of the work for the Quebec Bridge & Railway Co. and for the Phoenix Bridge Company.

- No one connected with the general designing fully appreciated the magnitude of the work nor the insufficiency of the data upon which they were depending. The special experimental studies and investigations that were required to confirm the judgment of the designers were not made.
- The professional knowledge of the present-day concerning the action of steel columns under load is not sufficient to enable engineers to economically design such structures as the Quebec bridge. A bridge of the adopted span that will unquestionably be safe can be built, but, in the present state of professional knowledge, a considerably larger amount of material would have to be used than might be required if our knowledge were more exact.
- The professional record of Mr. Cooper was such that his selection for the authoritative position that he occupied was warranted, and the complete confidence that was placed in his judgment by the officials of the Dominion Government, the Quebec Bridge & Railway Company, and the Phoenix Bridge Company was deserved.

C. Schneider, in his report, wrote of A9L, A9R, and some other members, "Since, however, the lower chord members of the Quebec bridge are butt-jointed, they are neither continuous nor pin connected, and it is impossible to make the whole section bear uniformly under the various conditions of loading...However, there is a deficiency in many of the compression members, as their connections, such as the latticing, are not sufficient to make the parts composing them act as a unit. The most pronounced defect in this respect exists in the lower chord members of the cantilever and anchor."



Anchor - Arm
Chord A-9



Bottom chord cross-section A9L.

While not emphasized in his report, in the opinion of many, these were the cause of the buckling and failure of members A9L and A9R.

The blame was placed primarily on Cooper and Szlapka, and The Engineering Record wrote on Cooper,

“It is seldom that the responsible engineer for any work, great or small, has more authoritatively or more effectively impressed his engineering judgment upon the work in his charge than in this case...Perhaps the most painful part of the evidence is that in which the Consulting Engineer makes the plea of impaired health for not exacting from both the contractor and the Quebec Bridge Co. certain requirements of design and plans in the one case and the necessary organization for the proper performance of the work on the other. Unfortunately, such pleas are admissions of official shortcoming; however much a man may feel the disability of ill health, they give him no relief from official responsibility...The Consulting Engineer makes a further point in his evidence that the fee he received was quite insufficient to enable him to maintain a proper office workforce for the discharge of the duties imposed upon him in his official capacity...When he accepted the fee, he accepted all of the responsibilities of the position. No engineer has any right whatever to consider his responsibilities lessened because his fee is not as large as it should be...”

One of the worst and most studied, this failure pointed to the need for meaningful peer review and the need for qualified inspectors, with authority, on major works. It is hard from the perspective of the early 21st century to understand why it was not clear that the lower chord compression members were failing in, and probably before, early August. Accepting that fact would have required the entire design team to recognize that they had made a serious design error, which was not correctable, and that the bridge was doomed to fail. In the early afternoon of August 29, they could not have saved the bridge, but they could have saved the lives of the 75 men who died in the collapse.

MOTHER

-- Bikash Paul, 2nd Year

My mother is the light of my eyes

She is the forgiveness of my lies

Everyday asking me for food

For she is very good

My mother removes all my miseries

And she feels proud in my glories

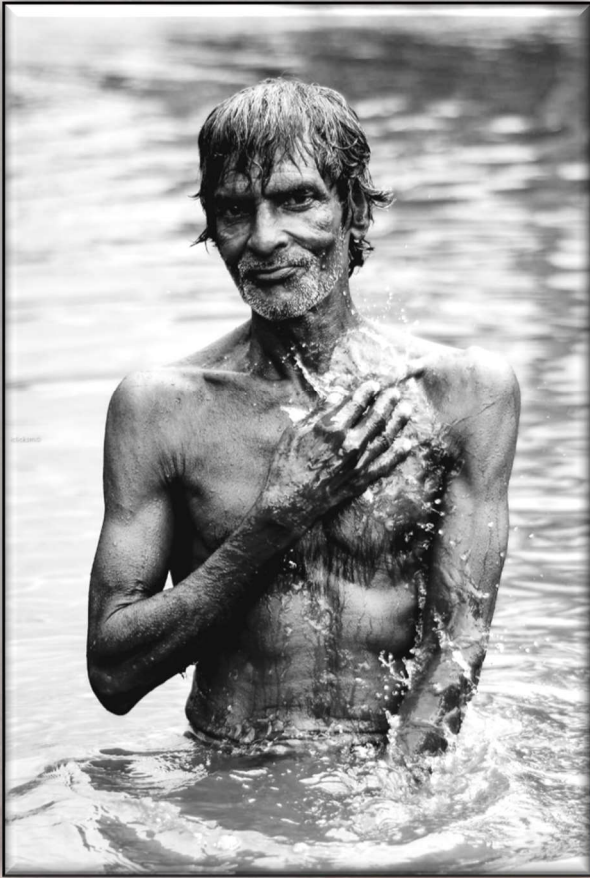
My mother is the right direction of my views

She is the completion of my life dues

My mother always loves me

And I love and see my mother in me.

Morning of the Earth



- By SOHAM DALAL, 3rd Year

Capturing the Nature

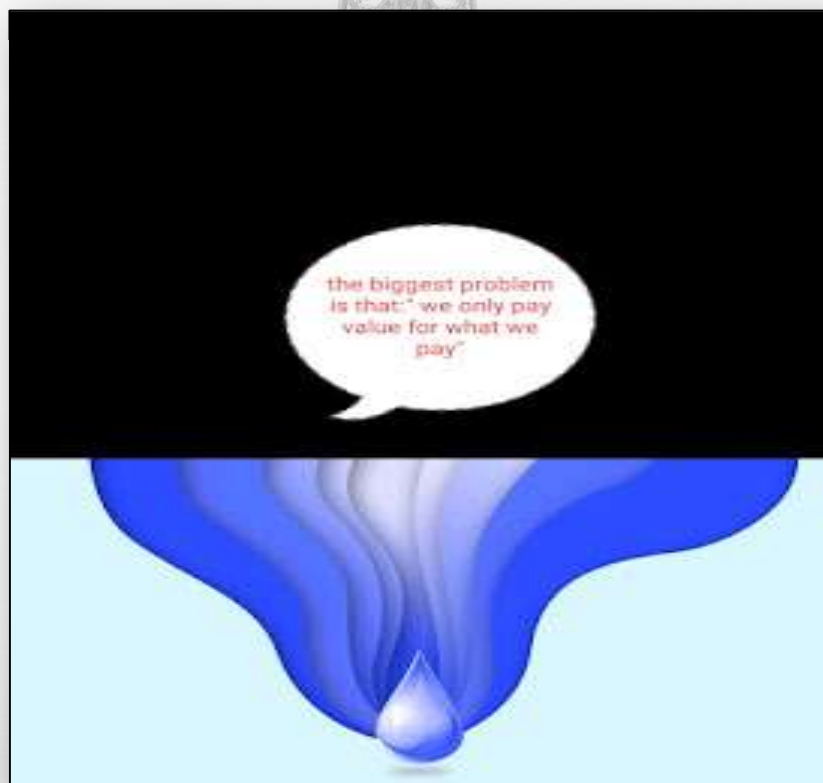


- By **SNEHA BHAKTA**, 2ND Year 

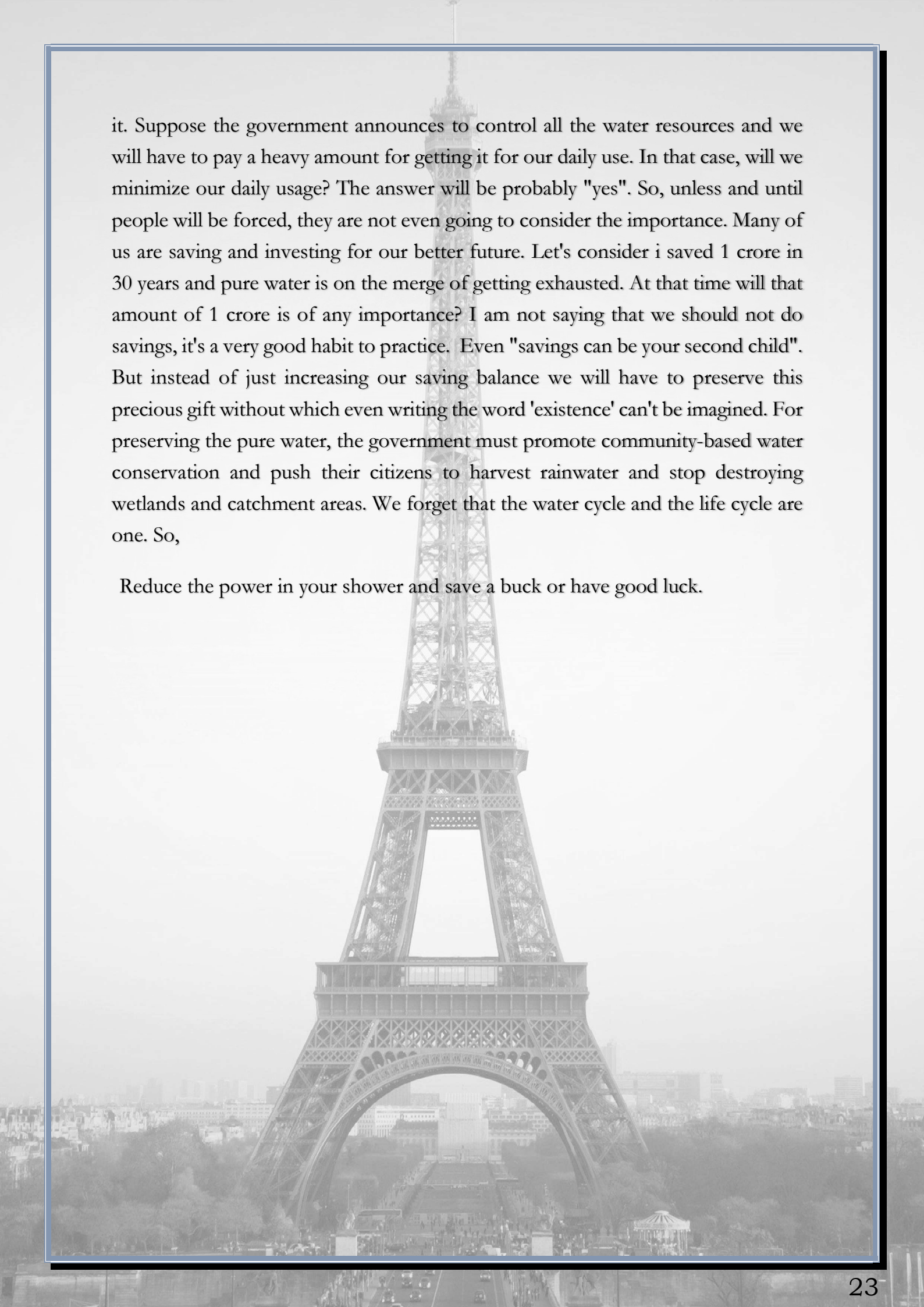
THE QUEST FOR WATER SECURITY FOR WHOLE WORLD!

--Chandan Kumar, 2nd year

A recent united nations report suggests that there is a global water crisis due to population growth, the nature of economic growth, the climate crisis, land use change, inefficient water use, and weak planning and enforcement. Everyone knows the importance of it but only few cares. It's too important, Isn't it? But why don't we care? Your smartphone is important, you care it! right? We give importance for what we pay. We are getting it at cheap or for free, this is the point where all importance is ignored easily.



Hardly you have seen someone just wasting or throwing the bottled mineral water. Why? Because we are not giving importance to the thing inside that bottle, we are just preserving it because we know the importance of that money, we gave to buy



it. Suppose the government announces to control all the water resources and we will have to pay a heavy amount for getting it for our daily use. In that case, will we minimize our daily usage? The answer will be probably "yes". So, unless and until people will be forced, they are not even going to consider the importance. Many of us are saving and investing for our better future. Let's consider i saved 1 crore in 30 years and pure water is on the verge of getting exhausted. At that time will that amount of 1 crore is of any importance? I am not saying that we should not do savings, it's a very good habit to practice. Even "savings can be your second child". But instead of just increasing our saving balance we will have to preserve this precious gift without which even writing the word 'existence' can't be imagined. For preserving the pure water, the government must promote community-based water conservation and push their citizens to harvest rainwater and stop destroying wetlands and catchment areas. We forget that the water cycle and the life cycle are one. So,

Reduce the power in your shower and save a buck or have good luck.

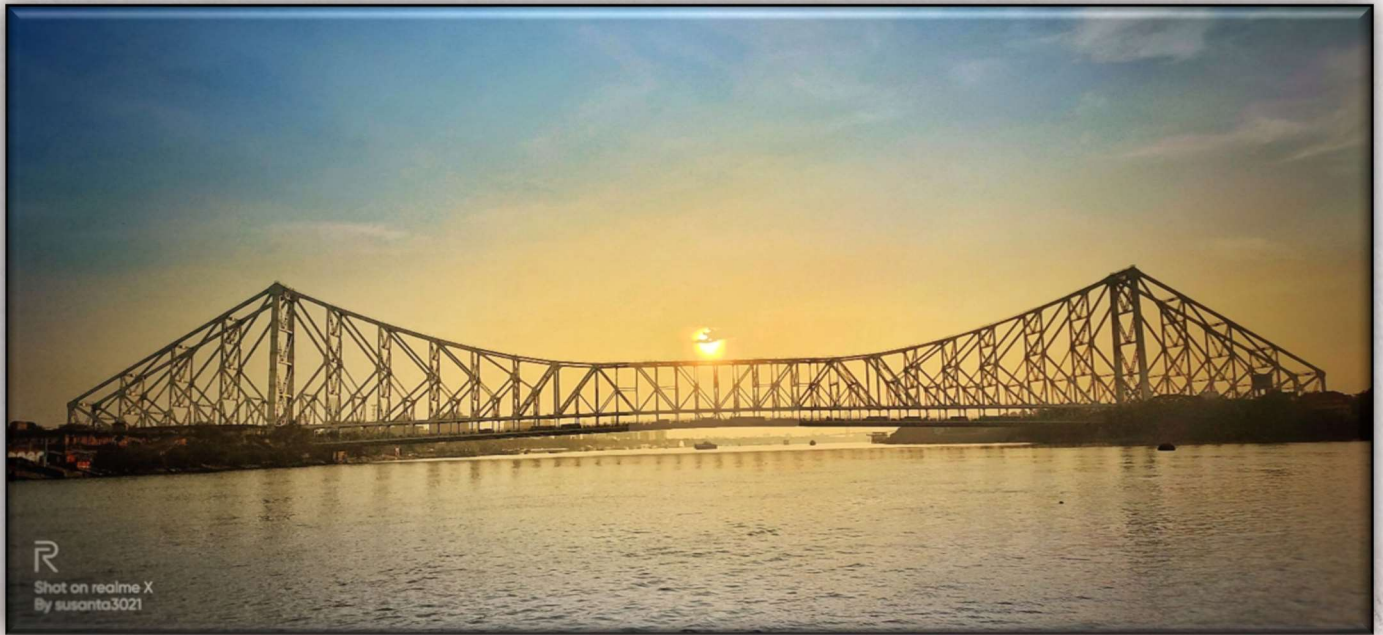
ଜନ୍ମଭୂମି

-- ଶାଶୁତ ଡଢ଼ାଚାଷ, ଦ୍ଵିତୀୟ ବର୍ଷ

ଆରୋ ଓଝୁଲ ହୋକ ସୂର୍ଯ୍ୟ
ମୋର ଜନ୍ମଭୂମିର ଆକାଶେ,
ଆରୋ ସ୍ନିହ, ମମତା ମିଶେ ଯାକ
ଆମାର ଦେଶର ବାତାସେ ।
ଆରୋ ମଧୁମତି ହୋକ ଗନ୍ତା,
ଆରୋ ଓଢ଼ଣ ହୋକ ହିମାଳୟ,
ଆରୋ ଯବୁଜ ହୋକ ନା ଶାସ୍ୟ
ଯେନ ମାଟିର ସ୍ନେହେର ଅଞ୍ଚାର,
ଆରୋ ରଞ୍ଜିନ ହୋକ ନା ଫାଲୁନ,
ବନେର ଅଶୋକ ଦଳାଶେର ।
ଆରୋ ନିର୍ମଳ ଆରୋ ଶୁଦ୍ଧ
ହୋକ ଆମାର ଡାହି-ଏର ଅନ୍ତର,
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ବିଶ୍ଵ ପିତାର ଆଶୀର୍ଵେ ।
ହୋକ ଆମାର ଦେଶର ଶିଶୁରା

ଆରୋ ହାସି ଧୁମି ଆରୋ ଓଝୁଲ,
ଯେନ କାରେନା ଗାଦେର ଚକ୍ଷେ
ଆରୋ ଏକଟି କୌଟା ଆଁଦି ଜଳ,
ଓରା ଆନନ୍ଦେ ଓ ସ୍ଵାସ୍ଥେ ଛୁଲେର ମତେ
ବିକାଶେ
ଆରୋ ଓଝୁଲ ହୋକ ସୂର୍ଯ୍ୟ
ମୋର ଜନ୍ମଭୂମିର ଆକାଶେ ।।

Morning of the Earth



- By SAYANDIP ROY, 2ND Year



- By SUBHAJIT PAL, 2ND Year

THE GOLDEN GATE BRIDGE

-- Abhishek Jha, 2nd year

The Golden Gate Bridge is an iconic structure connecting the city of San Francisco to Marin County, California. It spans almost two miles across the Golden Gate, the narrow strait where San Francisco Bay opens to meet the Pacific Ocean. The dream of connecting San Francisco to its northern neighbors became a reality when construction commenced in 1933. Given the chance for steady employment amid the Great Depression, construction crews braved treacherous conditions as the roadway and towers took shape over open water. The Golden Gate Bridge, opened to the public in 1937, has endured as a picture-perfect landmark and an engineering marvel. Before the bridge was built, the only practical short route between San Francisco and what is now Marin County was by boat across a section of San Francisco Bay. A ferry service began as early as 1820, with a regularly scheduled service beginning in the 1840s for the purpose of transporting water to San Francisco. The Sausalito Land and Ferry Company service, launched in 1867, eventually became the Golden Gate Ferry Company, a Southern Pacific Railroad subsidiary, the largest ferry operation in the world by the late 1920s.

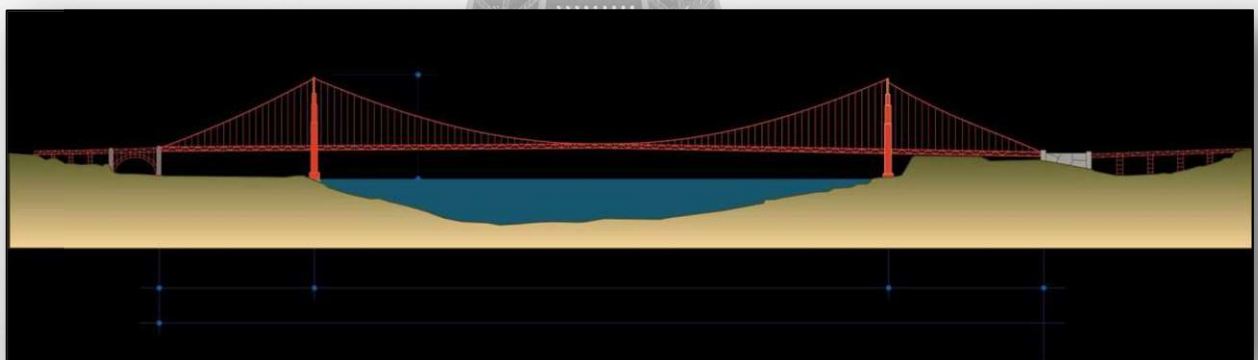


CONCEPTION

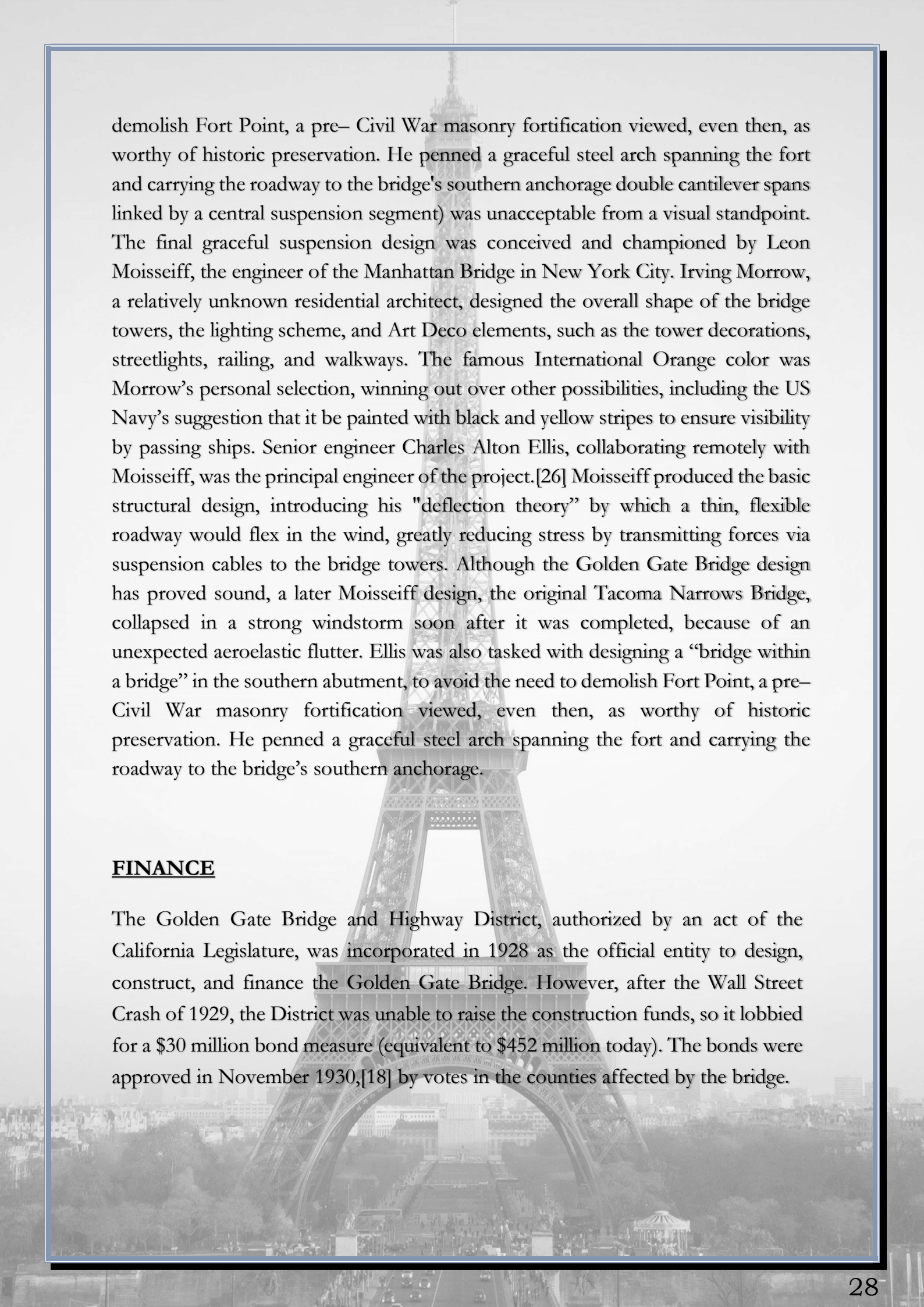
Although the idea of a bridge spanning the Golden Gate was not new, the proposal that eventually took hold was made in a 1916 San Francisco Bulletin article by former engineering student James Wilkins. San Francisco's City Engineer estimated the cost at \$100 million (equivalent to \$2.4 billion today), and impractical for the time. He asked bridge engineers whether it could be built for less. One who

responded, Joseph Strauss, was an ambitious engineer and poet who had, for his graduate thesis, designed a 55-mile-long (89 km) railroad bridge across the Bering Strait. At the time, Strauss had completed some 400 drawbridges—most of which were inland—and nothing on the scale of the new project. In May 1924, Colonel Herbert Deakyne held the second hearing on the Bridge on behalf of the Secretary of War in a request to use federal land for construction. Deakyne, on behalf of the Secretary of War, approved the transfer of land needed for the bridge structure and leading roads to the “Bridging the Golden Gate Association” and both San Francisco County and Marin County, pending further bridge plans by Strauss. Another ally was the fledgling automobile industry, which supported the development of roads and bridges to increase demand for automobiles. The bridge’s name was first used when the project was initially discussed in 1917 by M.M. O’Shaughnessy, city engineer of San Francisco, and Strauss. The name became official with the passage of the Golden Gate Bridge and Highway District Act by the state legislature in 1923, creating a special district to design, build and finance the bridge.

DESIGN



Strauss was the chief engineer in charge of the overall design and construction of the bridge project. Strauss’s initial design proposal (two Ellis was also tasked with designing a "bridge within a bridge" in the southern abutment, to avoid the need to



demolish Fort Point, a pre– Civil War masonry fortification viewed, even then, as worthy of historic preservation. He penned a graceful steel arch spanning the fort and carrying the roadway to the bridge's southern anchorage double cantilever spans linked by a central suspension segment) was unacceptable from a visual standpoint. The final graceful suspension design was conceived and championed by Leon Moisseiff, the engineer of the Manhattan Bridge in New York City. Irving Morrow, a relatively unknown residential architect, designed the overall shape of the bridge towers, the lighting scheme, and Art Deco elements, such as the tower decorations, streetlights, railing, and walkways. The famous International Orange color was Morrow's personal selection, winning out over other possibilities, including the US Navy's suggestion that it be painted with black and yellow stripes to ensure visibility by passing ships. Senior engineer Charles Alton Ellis, collaborating remotely with Moisseiff, was the principal engineer of the project.[26] Moisseiff produced the basic structural design, introducing his "deflection theory" by which a thin, flexible roadway would flex in the wind, greatly reducing stress by transmitting forces via suspension cables to the bridge towers. Although the Golden Gate Bridge design has proved sound, a later Moisseiff design, the original Tacoma Narrows Bridge, collapsed in a strong windstorm soon after it was completed, because of an unexpected aeroelastic flutter. Ellis was also tasked with designing a "bridge within a bridge" in the southern abutment, to avoid the need to demolish Fort Point, a pre– Civil War masonry fortification viewed, even then, as worthy of historic preservation. He penned a graceful steel arch spanning the fort and carrying the roadway to the bridge's southern anchorage.

FINANCE

The Golden Gate Bridge and Highway District, authorized by an act of the California Legislature, was incorporated in 1928 as the official entity to design, construct, and finance the Golden Gate Bridge. However, after the Wall Street Crash of 1929, the District was unable to raise the construction funds, so it lobbied for a \$30 million bond measure (equivalent to \$452 million today). The bonds were approved in November 1930,[18] by votes in the counties affected by the bridge.

CONSTRUCTION

Construction began on January 5, 1933, project cost more than \$35 million (\$523 million in 2019 dollars[32]), and was completed ahead of schedule and \$1.3 million under budget (equivalent to \$24.5 million today). Strauss remained head of the project, overseeing day-to-day construction and making some ground breaking contributions. A graduate of the University of Cincinnati, he placed a brick from his alma mater's demolished McMicken Hall in the south anchorage before the concrete was poured. He innovated the use of movable safety netting beneath the construction site, which saved the lives of many otherwise unprotected ironworkers. Of eleven men killed from falls during construction, ten were killed on February 17, 1937, when the bridge was near completion and the net failed under the stress of a scaffold that had fallen.



पिता

- आशु तोष कु मार

एक बाप को अपने बच्चे से शिकायत नहीं है

फूल खिल रहे हैं । पर जड़े सलामत नहीं हैं

बिन मांगे खुशियाँ कदमों में डाल देगा वो पिता ।

तुम्हें किसी के आगे हाथ फैलाने का ज़रूरत नहीं है ।

बस हमारी खुशियों के लिए ही केवल वो दिन रात पशिना बहाता है जनाब
वरना उसे पैसों का लालच नहीं है ।

फिर एक बच्चा रूठ जाता है फिर किसी माँ का दिल तक जाता है ।

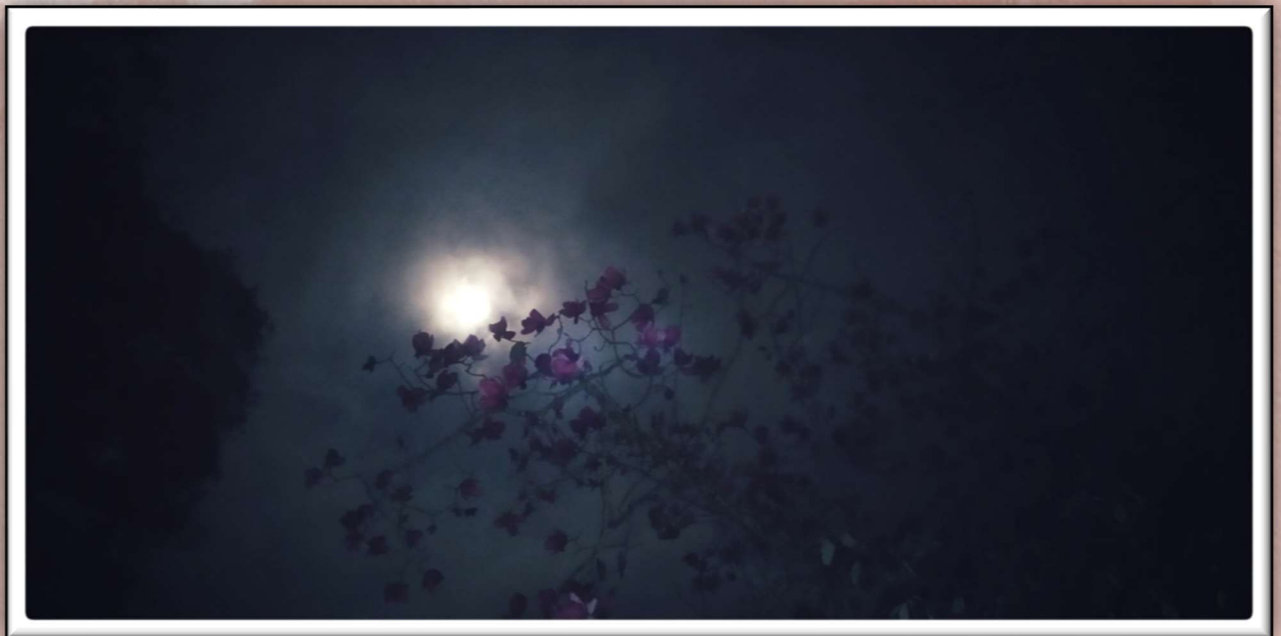
प्यार मोहबत अपनी जगह है और माँ - बाप की इज्जत अपनी जगह है ।

ये आज के बच्चों को कंहा समझ आता है ।

अगर किसी से रिस्ता बनाया है तो उसे निभाओ पर उससे पहले माँ - बाप
को रिश्ते के बारे में बताओ ।

तुम बताओगे नहीं तो वो कैसे जानेंगे

Wake up, Daydreamer



- By **BISWAJIT SARKER**, 3rd Year

ENTREPRENEURSHIP REVOLUTION IN INDIA

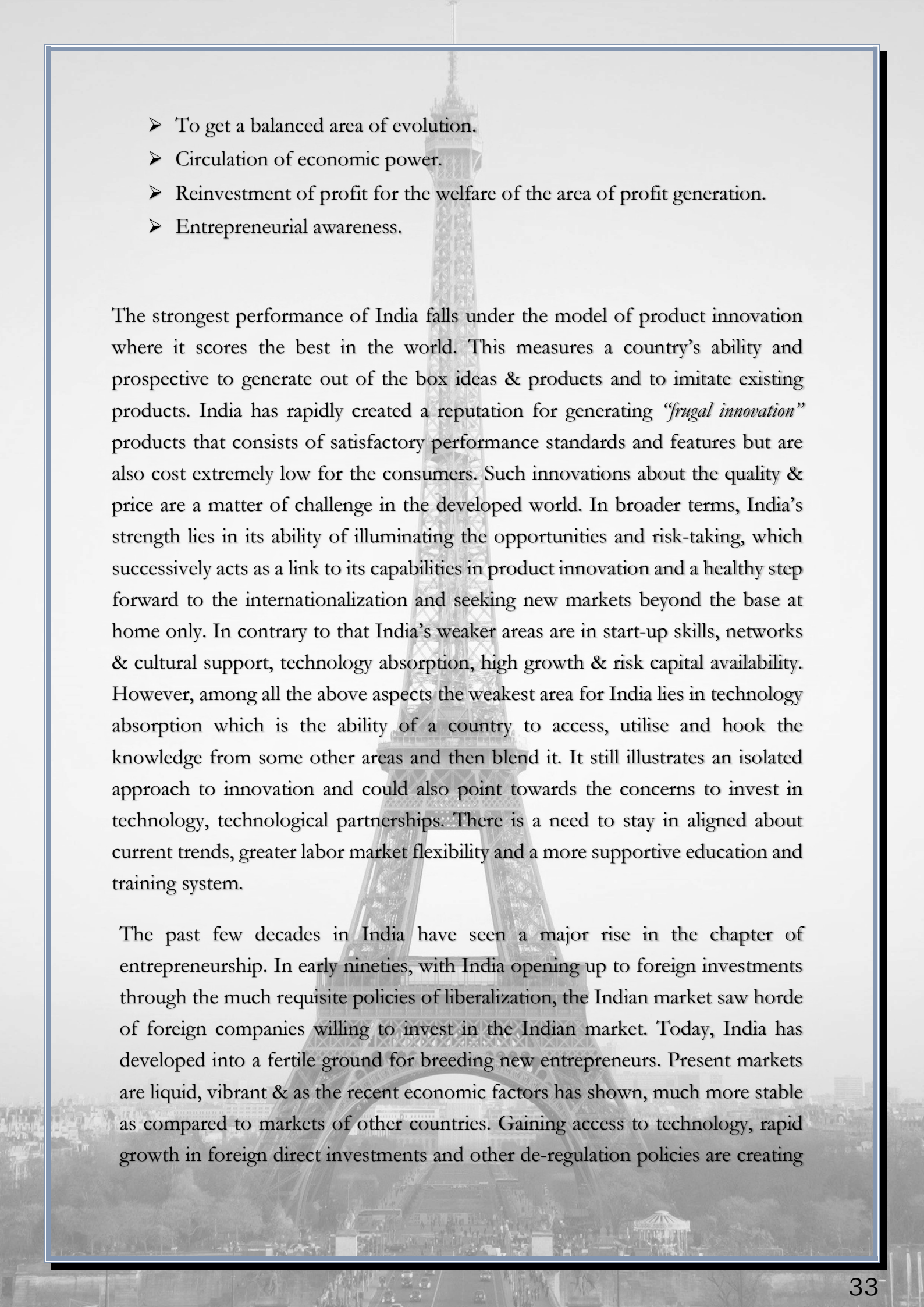
--Sandeep Bhattacharya, 3rd year

*Entrepreneurship is the fundamental action for creating job, economic growth and problem-solving. It is the most dynamic aspect of production which not only helps in actuating investment and output dimensions of an economy but also moulds the formal contours, shape and structure of an economic system. That's why it is highly akin with recognizable thinking and dreaming followed by actions to realize the dreams. The word 'entrepreneur' is derived from a thirteenth century French verb, *entreprendre*, which means 'to do something' or 'to undertake'*

India today has outstretched that stage of the demographic changeover in which more than 60 percent of our population is in the economically active age group of 15-19 years, commonly quoted as the DEMOGRAPHIC DIVIDEND. For India to spigot this dividend it is necessary that the economy is able to bring about enough job opportunities to productively absorb this economically active population. As reported by the GEDI India ranks 68th out of 138 countries. Entrepreneurship is not new to India. Earlier the mind-set of the community was that business was a 'dhanda', requiring existential revelation which can be more functional than Higher Education, that 'jugaad', swapped over for thrifty origination, affirmed by the opinion or rather belief that no matter what business it is profits can only be obtained by the sleight-of-hand expertise of the chartered accounted.

The need for entrepreneurship is:

- To increase national production.

- 
- To get a balanced area of evolution.
 - Circulation of economic power.
 - Reinvestment of profit for the welfare of the area of profit generation.
 - Entrepreneurial awareness.

The strongest performance of India falls under the model of product innovation where it scores the best in the world. This measures a country's ability and prospective to generate out of the box ideas & products and to imitate existing products. India has rapidly created a reputation for generating "*frugal innovation*" products that consists of satisfactory performance standards and features but are also cost extremely low for the consumers. Such innovations about the quality & price are a matter of challenge in the developed world. In broader terms, India's strength lies in its ability of illuminating the opportunities and risk-taking, which successively acts as a link to its capabilities in product innovation and a healthy step forward to the internationalization and seeking new markets beyond the base at home only. In contrary to that India's weaker areas are in start-up skills, networks & cultural support, technology absorption, high growth & risk capital availability. However, among all the above aspects the weakest area for India lies in technology absorption which is the ability of a country to access, utilise and hook the knowledge from some other areas and then blend it. It still illustrates an isolated approach to innovation and could also point towards the concerns to invest in technology, technological partnerships. There is a need to stay in aligned about current trends, greater labor market flexibility and a more supportive education and training system.

The past few decades in India have seen a major rise in the chapter of entrepreneurship. In early nineties, with India opening up to foreign investments through the much requisite policies of liberalization, the Indian market saw horde of foreign companies willing to invest in the Indian market. Today, India has developed into a fertile ground for breeding new entrepreneurs. Present markets are liquid, vibrant & as the recent economic factors has shown, much more stable as compared to markets of other countries. Gaining access to technology, rapid growth in foreign direct investments and other de-regulation policies are creating

a path to new opportunities every day. An important field of entrepreneurship in India is social entrepreneurship. In India where there is still existence of high levels of poverty and unemployment, many people & organizations have decided to take matters into their own hands with or without the help of Government, to work for a brighter tomorrow. Concepts like Tech for India, Tata Jagriti Yatra etc. are not only helping entrepreneurship among the youth but at the same time are providing hands-on experience to them.

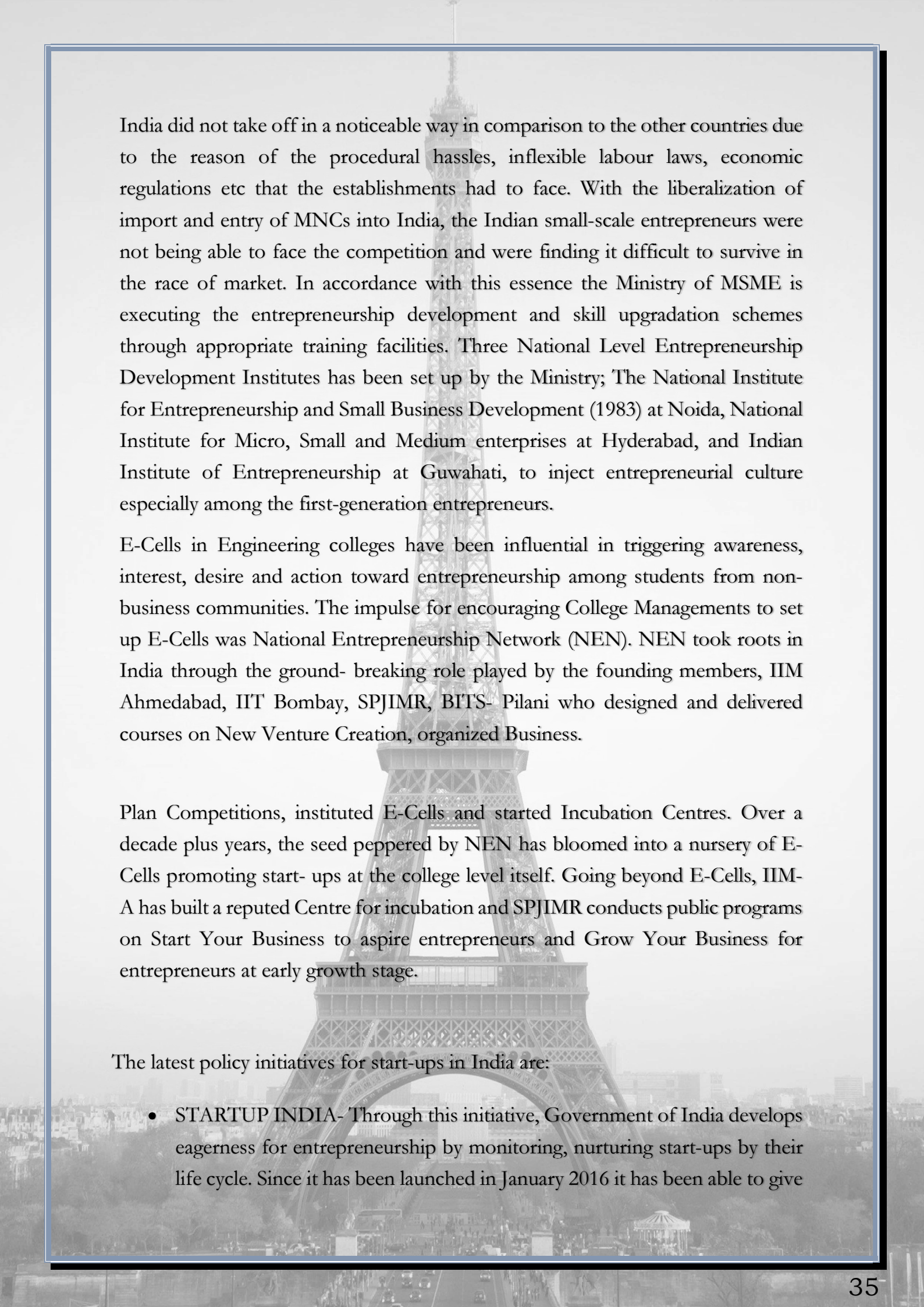
Challenges faced by Indian Entrepreneurs before commencement of start-ups:

- Courage to start your own business.
- Is your idea big enough to sustain the competitive market.
- Raising Capital.
- Hiring right talent.
- Effective marketing on limited budget.

A prior form of the current Make in India policy was the Swadeshi Movement launched in 1905 during the pre-Independence era in order to boycott British made goods and use goods made in India. The movement brought development of the Indian Textile Industry, the Iron and Steel industry by the Tatas, publishing of vernacular newspapers. In order to boost self-employment as a means of job creation and to promote entrepreneurship for further creation of jobs, the Micro, Small and Medium Enterprises Act, 2006 was authorized to aid the transformation, evolution and enhancing the competitiveness of Micro, Small & Medium enterprises.



Government has over the time accoutered policies to promote small industries which covered, granting concessional credit, training in entrepreneurship development, marketing assistance etc. Then also, the entrepreneurial growth in



India did not take off in a noticeable way in comparison to the other countries due to the reason of the procedural hassles, inflexible labour laws, economic regulations etc that the establishments had to face. With the liberalization of import and entry of MNCs into India, the Indian small-scale entrepreneurs were not being able to face the competition and were finding it difficult to survive in the race of market. In accordance with this essence the Ministry of MSME is executing the entrepreneurship development and skill upgradation schemes through appropriate training facilities. Three National Level Entrepreneurship Development Institutes has been set up by the Ministry; The National Institute for Entrepreneurship and Small Business Development (1983) at Noida, National Institute for Micro, Small and Medium enterprises at Hyderabad, and Indian Institute of Entrepreneurship at Guwahati, to inject entrepreneurial culture especially among the first-generation entrepreneurs.

E-Cells in Engineering colleges have been influential in triggering awareness, interest, desire and action toward entrepreneurship among students from non-business communities. The impulse for encouraging College Managements to set up E-Cells was National Entrepreneurship Network (NEN). NEN took roots in India through the ground- breaking role played by the founding members, IIM Ahmedabad, IIT Bombay, SPJIMR, BITS- Pilani who designed and delivered courses on New Venture Creation, organized Business.

Plan Competitions, instituted E-Cells and started Incubation Centres. Over a decade plus years, the seed peppered by NEN has bloomed into a nursery of E-Cells promoting start- ups at the college level itself. Going beyond E-Cells, IIM-A has built a reputed Centre for incubation and SPJIMR conducts public programs on Start Your Business to aspire entrepreneurs and Grow Your Business for entrepreneurs at early growth stage.

The latest policy initiatives for start-ups in India are:

- **STARTUP INDIA-** Through this initiative, Government of India develops eagerness for entrepreneurship by monitoring, nurturing start-ups by their life cycle. Since it has been launched in January 2016 it has been able to give

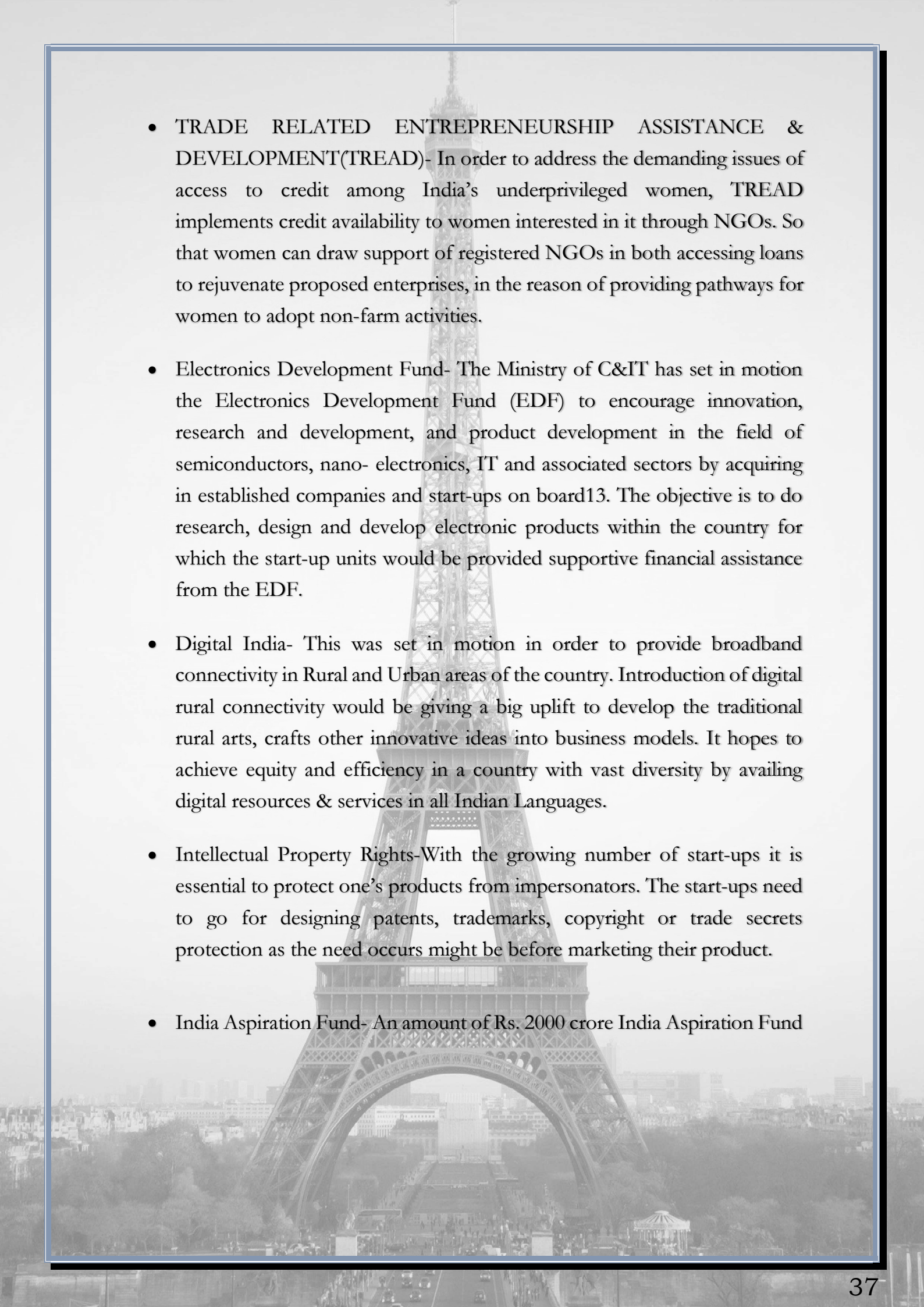
a head start to various aspiring entrepreneurs. It provides a comprehensive four-week free online learning, research parks have been made, incubators & start-up centres across the country by accomplishing a strong network of academia & industry bodies. “Fund of Funds” a concept has been brought to practice in order to help start-ups accessing funds.

- In order to give a boost to the Make in India programme, the MSME Ministry has launched the ASPIRE scheme in March 2015, a Scheme for Promotion of Innovation, Rural Industry and Entrepreneurship. The objective of this scheme is to set up a network of technology and incubation centres to accelerate entrepreneurship and also to promote start-ups for



innovation and entrepreneurship in agriculture industry.

- MUDRA Scheme- To satisfy the credit availability requirements of start-ups the Government had issued this scheme. Micro Units Development & Refinancing Agency operated by SIDBI for providing refinance to micro units. This would improve the liquidity of the micro units who at this moment have to borrow from NBFCs and moneylenders at a comparatively high rates of interest.
- ATAL INNOVATION MISSION (AIM)- AIM is Government of India's strive to boost a culture of innovation and entrepreneurship & it delivers as a platform for promotion of world-class Innovation Hubs, Grand Challenges, start-up businesses. In order to foment curiosity, creativity & imagination right at the school, AIM recently launched Atal Tinkering Labs across India. ATLs are workspaces where students can perform their jobs with tools & equipment to gain explicit training in the concepts of STEM.

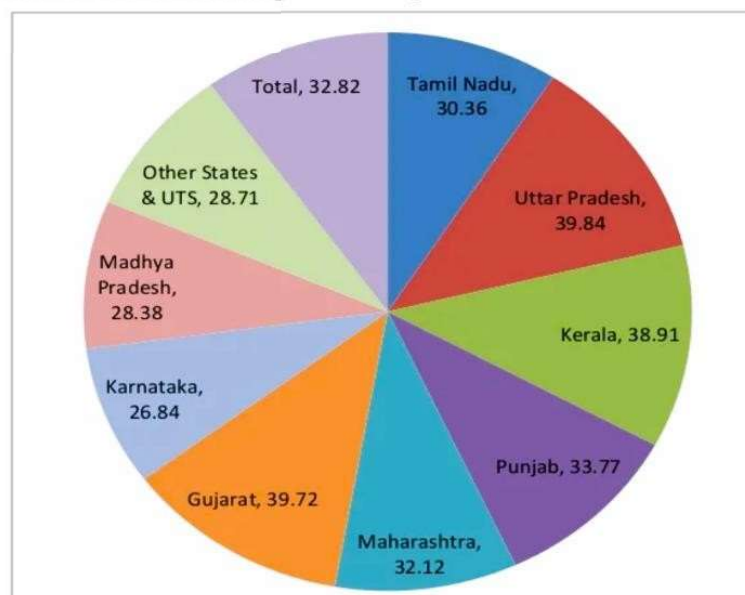
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- **TRADE RELATED ENTREPRENEURSHIP ASSISTANCE & DEVELOPMENT(TREAD)**- In order to address the demanding issues of access to credit among India's underprivileged women, TREAD implements credit availability to women interested in it through NGOs. So that women can draw support of registered NGOs in both accessing loans to rejuvenate proposed enterprises, in the reason of providing pathways for women to adopt non-farm activities.
 - **Electronics Development Fund**- The Ministry of C&IT has set in motion the Electronics Development Fund (EDF) to encourage innovation, research and development, and product development in the field of semiconductors, nano- electronics, IT and associated sectors by acquiring in established companies and start-ups on board¹³. The objective is to do research, design and develop electronic products within the country for which the start-up units would be provided supportive financial assistance from the EDF.
 - **Digital India**- This was set in motion in order to provide broadband connectivity in Rural and Urban areas of the country. Introduction of digital rural connectivity would be giving a big uplift to develop the traditional rural arts, crafts other innovative ideas into business models. It hopes to achieve equity and efficiency in a country with vast diversity by availing digital resources & services in all Indian Languages.
 - **Intellectual Property Rights**-With the growing number of start-ups it is essential to protect one's products from impersonators. The start-ups need to go for designing patents, trademarks, copyright or trade secrets protection as the need occurs might be before marketing their product.
 - **India Aspiration Fund**- An amount of Rs. 2000 crore India Aspiration Fund

(IAF) was initiated by SIDBI in August 2015 to boost the start-ups, fund of-funds ecosystem in the country. This fund would be invested in various venture capital funds to meet the equity obligation of MSME start-ups. A SIDBI Make in India Loan for Small Enterprises (SMILE) Scheme of Rs.10,000 crore has also been set in motion to ferment tens of thousands of crores of equity investment in start-ups and MSMEs, so that employment can be created for considerable amount of people, mostly for the educated youths over the coming next 4-5 years.

Performance of women entrepreneurs in India are also remarkable. People are changing their conservative mindset and encouraging women to pursue in this field. Government is also formulating various training programme & employment generation programs. Organisations like National Resource Centre for Women (NRCW), Women's India Trust (WIT), Women

Development Cells (WDC) are promoting Women Entrepreneurship in India. The literacy rate & employment opportunities are being increased by leaps & bounds. Over the years women entrepreneurship is a powerful response to end the 'Internalized subordination' of women.

Performance of Women Entrepreneurship In India



To conclude, a start-ups ecosystem has been created through the new policy initiatives which would not only try to promote start-ups particularly in the manufacturing sector but also the micro units would also be able to grow up faster as small and medium units. It is to be realized that establishing a business in India is not an easy task as freely walking in the park. It's true that at this time Indian entrepreneurs do not have to depart from the country to chase their interests, nevertheless, building empires as an entrepreneur will require much more than mere fortuity, what it requires is a vision & individual impulse. It's not the straight path that will always lead you the destination of success it can be the curved undiscovered path which might be the more effective one to gain success. "The success of the young entrepreneur will be the key to India's transformation in the new millennium" as stated by Dhirubhai Ambani.

HUMAN

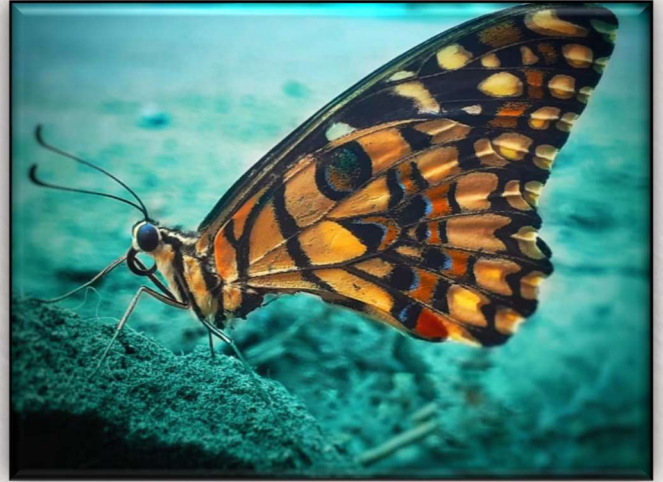
-- Bikash Paul, 2nd Year

Humans are the gifts of nature,
That God has created the great creature;
The human qualities are great,
But now, it has gone all fade.
The Earth depends on the activities of human,
For the utilization is up to every man.
Those who are kind in this world,
Are the winners of true gold;
Kindness, selflessness and humbleness are also
the gifts of nature,
Please spread these to every creature.

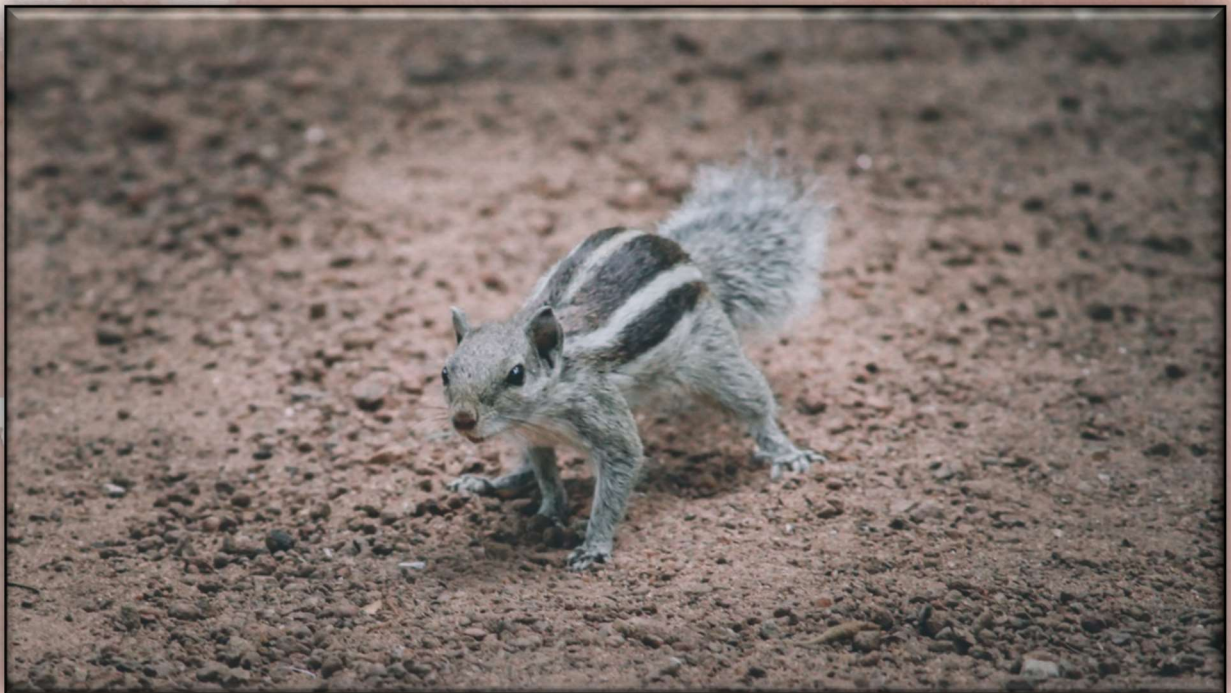
Best zoo



- By **BISWAJIT SARKER**, 3rd Year



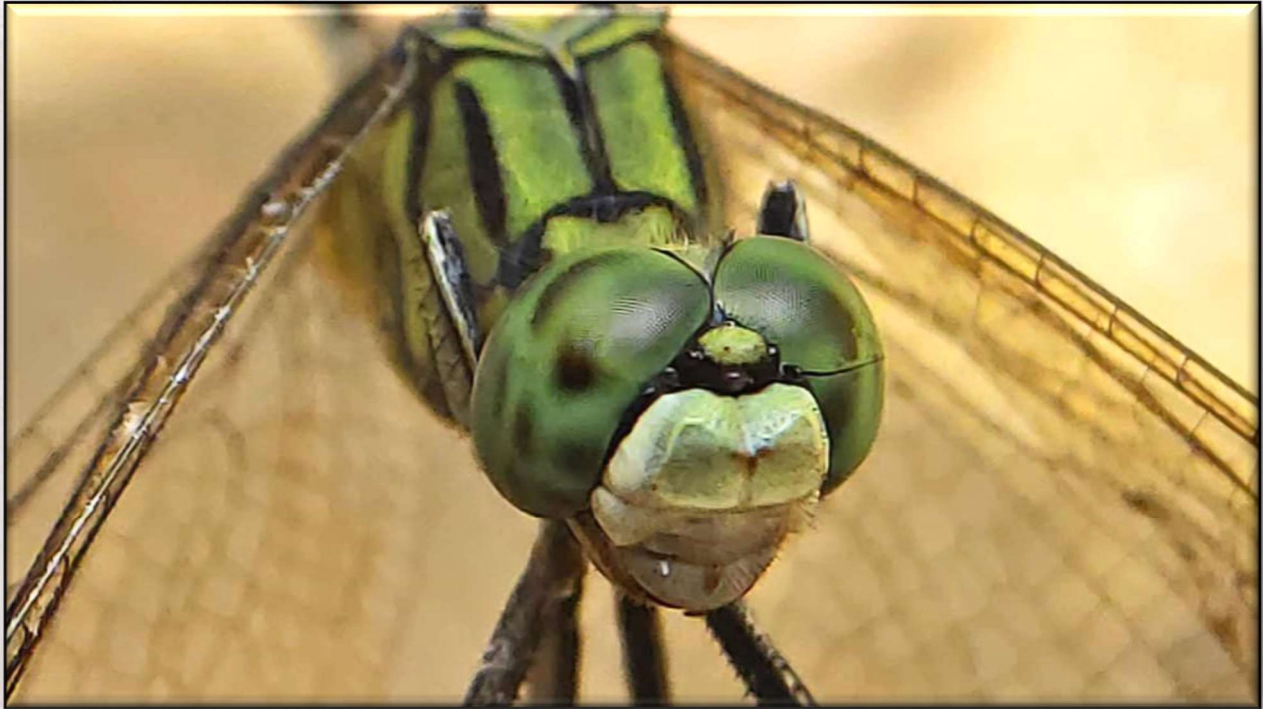
- By **MD. SIBGHATULLAH**, 3rd Year



- By **SATYAPRIYA MAHATO**, 2ND Year



Best Zoo



- By ARGHYA PRATIHAR, 3rd Year



- By ANIT KUMAR DAS, 2ND Year

PROJECT NAME – FIBER-REINFORCED CONCRETE – ADVANTAGES, TYPES AND APPLICATIONS

--Fardeen Hossain Khan, 2nd year

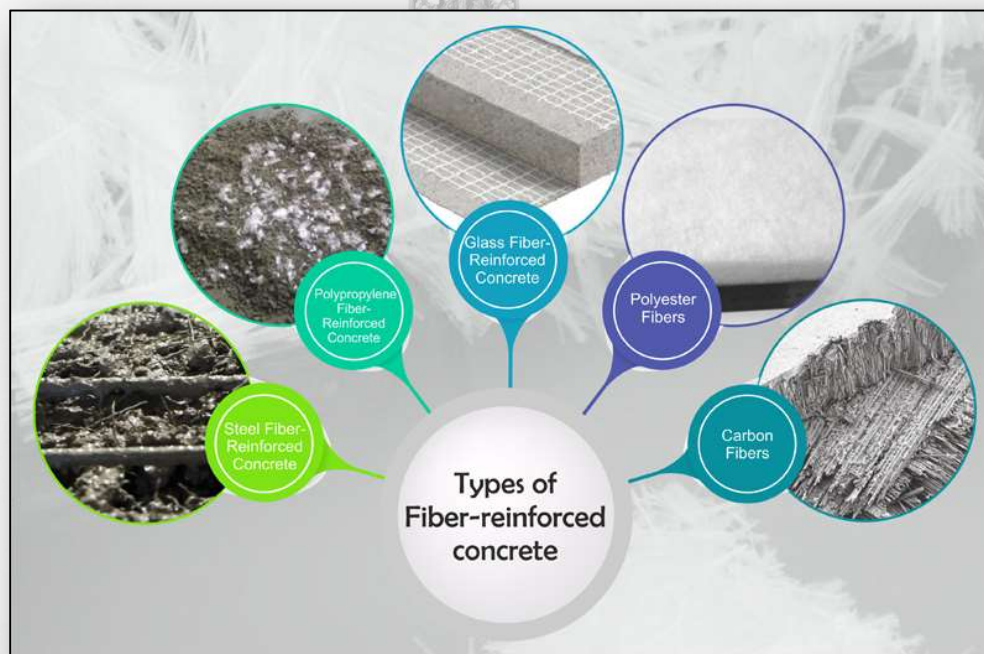
Fiber Reinforced Concrete is a composite material consisting of fibrous material which increases its structural integrity. It includes mixtures of cement, mortar or concrete and discontinuous, discrete, uniformly dispersed suitable fibers. Fibers are usually used in concrete to control cracking due to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



Advantages of Fiber-reinforced concrete

- Fibers reinforced concrete may be useful where high tensile strength and reduced cracking are desirable or when conventional reinforcement cannot be placed
- It improves the impact strength of concrete, limits the crack growth and leads to a greater strain capacity of the composite material
- For industrial projects, macro-synthetic fibers are used to improve concrete's durability. Made from synthetic materials, these fibers are long and thick in size and may be used as a replacement for bar or fabric reinforcement

- Adding fibers to the concrete will improve its freeze-thaw resistance and help keep the concrete strong and attractive for extended periods.
- Improve mix cohesion, improving pumpability over long distances
- Increase resistance to plastic shrinkage during curing
- Minimizes steel reinforcement requirements
- Controls the crack widths tightly, thus improving durability
- Reduces segregation and bleed-water
- FRC, toughness is about 10 to 40 times that of plain concrete
- The addition of fibers increases fatigue strength
- Fibers increase the shear capacity of reinforced concrete beams



Different types of Fiber-reinforced concrete

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

Steel Fiber Reinforced Concrete

Steel fiber is a metal reinforcement. A certain amount of steel fiber in concrete can cause qualitative changes in concrete's physical property. It can greatly increase resistance to cracking, impact, fatigue, and bending, tenacity, durability, and others. For improving long-term behavior, enhancing strength, toughness, and stress resistance, SFRC is being used in structures such as flooring, housing, precast,

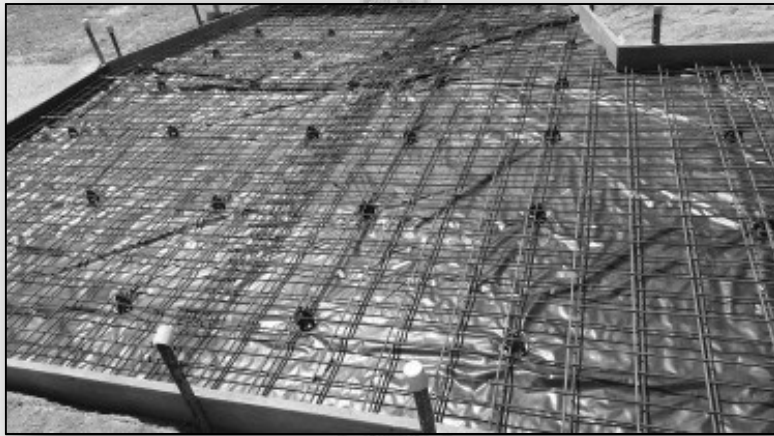


bridges, tunneling, heavy-duty pavement, and mining. The types of steel fibers are defined by ASTM A820 are, Type I: cold-drawn wire, Type II; cut sheet, Type III: melt-extracted, Type IV: mill cut and Type V: modified cold-drawn wire

Polypropylene Fiber Reinforced (PFR) Concrete

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

resistance. Polypropylene is manufactured from propylene gas in the presence of a catalyst such as titanium chloride. Polypropylene fiber displays good heat-insulating properties and is highly resistant to acids, alkalies, and organic solvents.



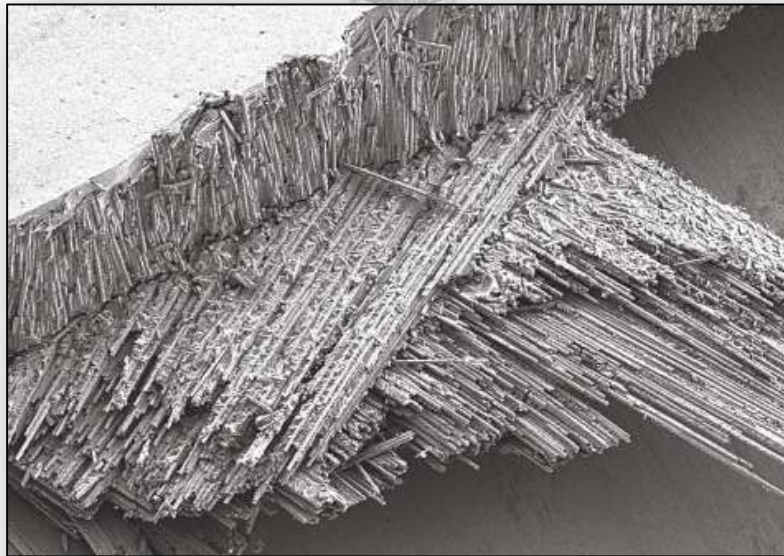
Polyester fibers

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



Carbon fibers

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



Application of Fiber-reinforced concrete



The applications of fiber reinforced concrete depend on the applicator and builder in taking advantage of the static and dynamic characteristics of the material. Some of its area of application is-

- Runway
- Aircraft Parking
- Pavements
- Tunnel Lining
- Slope Stabilization
- Thin Shell
- Walls
- Pipes
- Manholes
- Dams
- Hydraulic Structure
- Elevated decks
- Roads
- Bridges
- Warehouse floors

Remarkable fibre-reinforced concrete structures around the world



**Museum of Civilisations
from Europe and the
Mediterranean, France**



The Heydar Aliyev Center, Azerbaijan

Conclusion

Fiber-reinforced concrete has been rapidly growing throughout the building industry since contractors and homeowners started to recognize its many benefits. Fibre Reinforced Concrete is gaining an increasing interest among the concrete community for the reduced construction time and labor costs. Besides cost issues, quality matters are of paramount importance for construction and fiber-reinforced concrete also fulfills these requirements.

তুমি

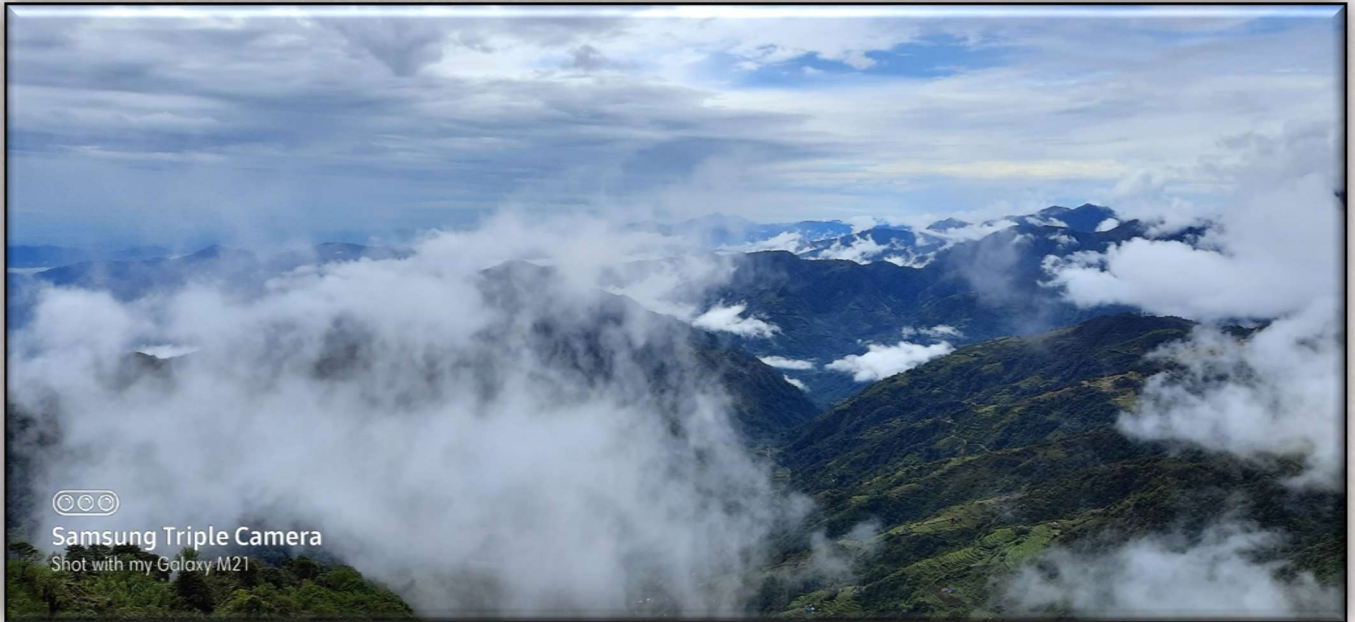
-- অর্ঘ্য প্রতিহার, তৃতীয় বর্ষ

রাতের আকাশে তোমাকে দেখি
অকালের কুয়াশায় বিলীন হয়ে যাও
ক্লান্ত পথিক এর মতো তোমায় খুঁজি
চেনা রাস্তায় আমি পথ হারিয়ে যাই ॥

সীতের মেঘলা দুপুরে আমি রোডের আশায়
আমার ডাকবাংলো তোমার চিঠি খুঁজে যাই
সীতের হৃদয়তো আমি তোমার চিত্রায়
আমার অক্ষ দ্বারা তোমার জানলায় ॥

মেঘাচ্ছন্ন মন যে তো তোমার চিত্রায়
ভালোবাসা ছিল যেমন কাল ও থাকবে
আমার স্বপ্নে তুমি চিরকাল থাকবে ॥

Capturing the Nature



Samsung Triple Camera
Shot with my Galaxy M21

- By URMI PANDIT, 2ND Year



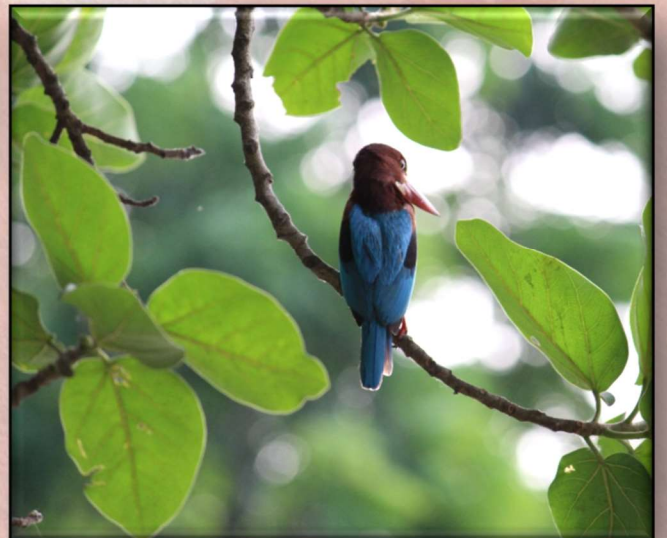
@ \$Δ

- By SOUBARNA ADAK,
3rd Year



- By SAYANTAN DUTTA,
3rd Year

Best Zoo



- By **INDRANIL HALDER**, 3rd Year

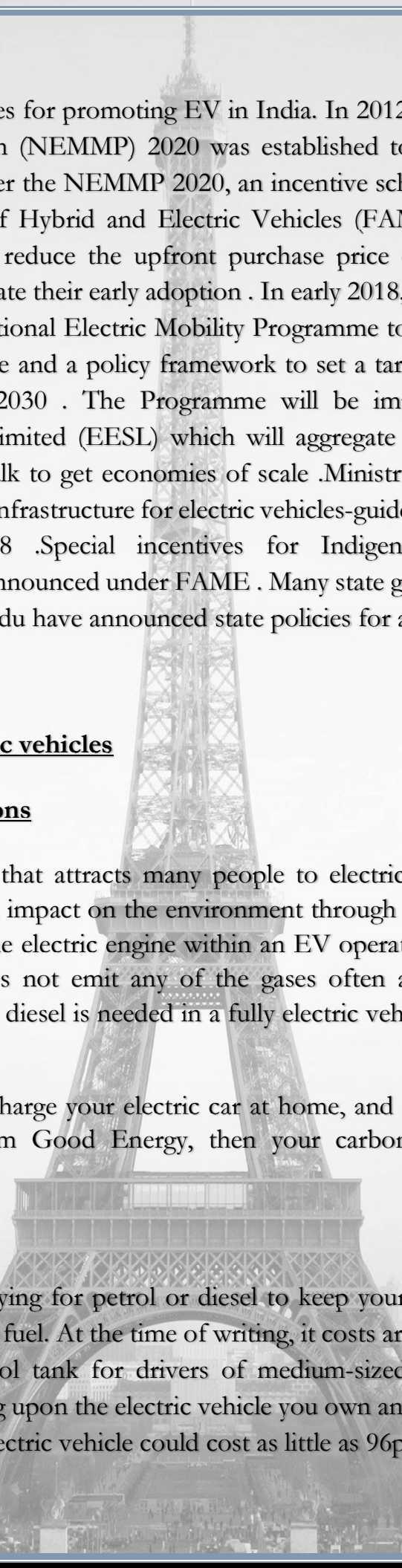
- By **SNEHA DAS**, 3rd Year

WHY INDIA SHOULD GO FOR EV?

--Pawan Kumar, 2nd year

India need to reduce dependency on a fossil-fuel based economy. India's crude oil imports for 2014-15 was 112 billion dollars (approximately 7,00,000 crore rupees) Aspects related to global warming needs a shift to automobile solutions that reduces/ do not produce greenhouse gas emissions. Air Quality Indices related to India indicate that the air in many cities of India is no longer healthy. Automobile related pollution has been one of the causes for this India can become a global provider for clean mobility solutions and processes that are affordable and scalable. People living in some of the Indian cities are being affected by noise pollution. Some of the Indian cities have the worst noise pollution levels in the world. Electric vehicles may contribute to a reduction in noise pollution levels in the cities. Energy efficiency and emission reduction has improved in automobiles but energy efficiency measures and pollution control measures did not keep pace with the sales growth in vehicles.

Current Status of EV in India 4. The Indian electric vehicles (EV) market is at a very nascent stage comprising of only 1% of the total automobile sales .95% of the Indian EV market is dominated by 2 and 3-wheelers The EV market in India was about 25,000 units at the end of 2016-17 and 56,000 units at the end of 2017-2018 .4,330 EVs were sold in Gujarat, 2,846 in West Bengal, 2,467 in Uttar Pradesh and 2,388 in Rajasthan during the fiscal year 2016-17 .The EV market in India is set to see the entry of a flurry of new players of foreign and domestic origin in the 2 and 3-wheeler segments Chinese firms such as BYD Auto Co. Ltd will supply electric buses to some state transport firms. Mahindra has a first to the market advantage in 4-wheeler segment. The company plans to make 60,000 electric vehicles annually from 2020. The Indian unit of South Korea's Hyundai Motor Co. Ltd is expected to launch its electric vehicle in 2019. Maruti Suzuki will enter the market by 2020. Tata Motors has launched its electric vehicle Tata Tigor in 2018.



Government Initiatives for promoting EV in India. In 2012, the National Electric Mobility Mission Plan (NEMMP) 2020 was established to promote hybrid and electric vehicles. Under the NEMMP 2020, an incentive scheme, Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME Phase 1 & 2), was launched in 2015 to reduce the upfront purchase price of hybrid and electric vehicles and to stimulate their early adoption. In early 2018, the Ministry of Power launched the new National Electric Mobility Programme to focus on creating the charging infrastructure and a policy framework to set a target of more than 30% electric vehicles by 2030. The Programme will be implemented by Energy Efficiency Services Limited (EESL) which will aggregate demand by procuring electric vehicles in bulk to get economies of scale. Ministry of Power (MoP) has notified the charging infrastructure for electric vehicles-guidelines and standards on 14th December 2018. Special incentives for Indigenous OEM and EV manufacturers were announced under FAME. Many state governments like Delhi, Maharashtra, Tamilnadu have announced state policies for adoption of EV.

Advantages of electric vehicles

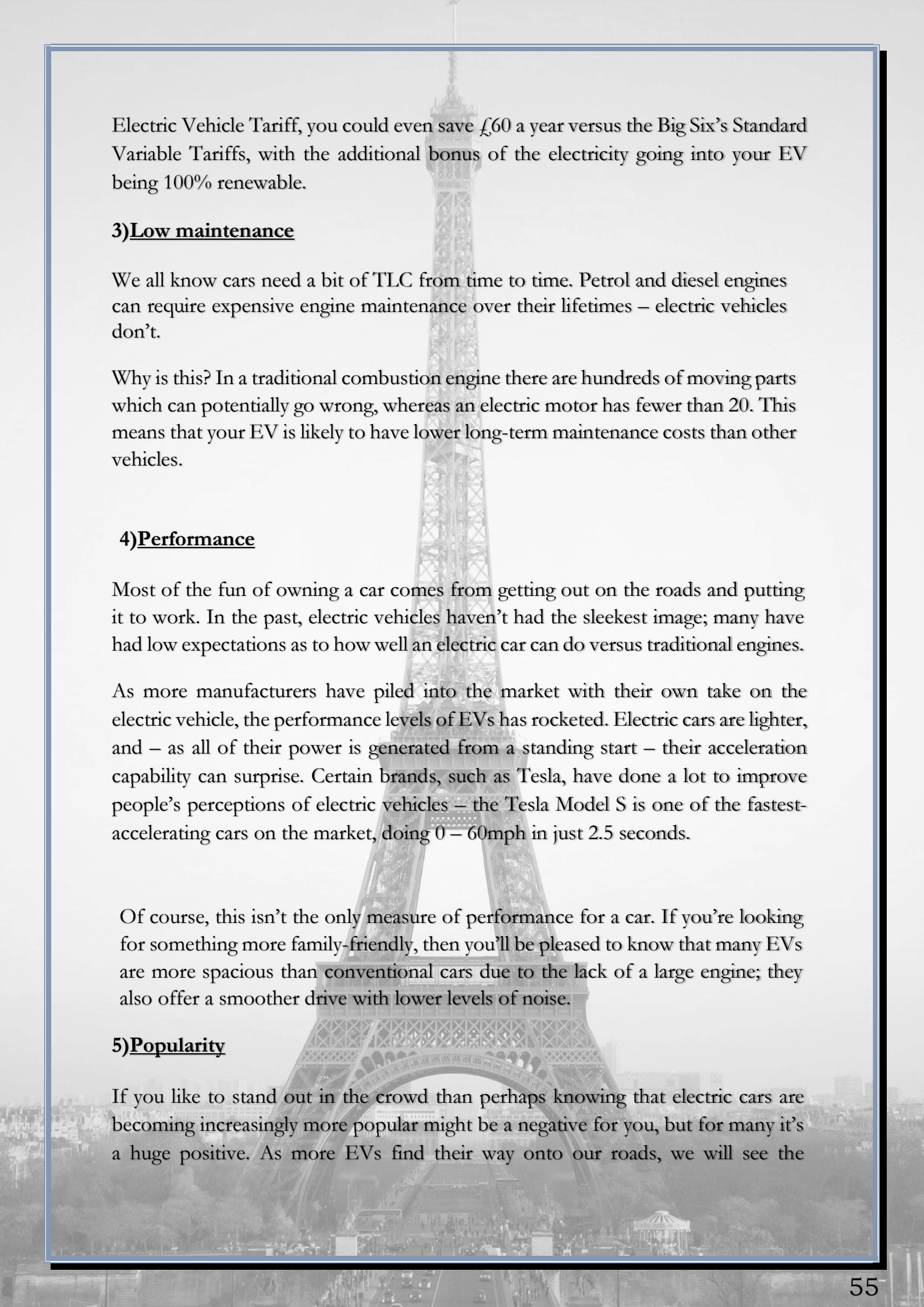
1) No fuel, no emissions

This is the key point that attracts many people to electric cars. If you want to decrease your personal impact on the environment through transport, then an EV is the way forward. The electric engine within an EV operates on a closed circuit, so an electric car does not emit any of the gases often associated with global warming. No petrol or diesel is needed in a fully electric vehicle, which is great for your carbon footprint.

Even better – if you charge your electric car at home, and your home runs on renewable energy from Good Energy, then your carbon footprint shrinks dramatically!

2) Running costs

Because you're not paying for petrol or diesel to keep your car running, you can save a lot of money on fuel. At the time of writing, it costs around £63.80 to fill the average unleaded petrol tank for drivers of medium-sized cars in the UK. By comparison, depending upon the electric vehicle you own and the tariff you are on, a full charge of your electric vehicle could cost as little as 96p. With Good Energy's



Electric Vehicle Tariff, you could even save £60 a year versus the Big Six's Standard Variable Tariffs, with the additional bonus of the electricity going into your EV being 100% renewable.

3)Low maintenance

We all know cars need a bit of TLC from time to time. Petrol and diesel engines can require expensive engine maintenance over their lifetimes – electric vehicles don't.

Why is this? In a traditional combustion engine there are hundreds of moving parts which can potentially go wrong, whereas an electric motor has fewer than 20. This means that your EV is likely to have lower long-term maintenance costs than other vehicles.

4)Performance

Most of the fun of owning a car comes from getting out on the roads and putting it to work. In the past, electric vehicles haven't had the sleekest image; many have had low expectations as to how well an electric car can do versus traditional engines.

As more manufacturers have piled into the market with their own take on the electric vehicle, the performance levels of EVs has rocketed. Electric cars are lighter, and – as all of their power is generated from a standing start – their acceleration capability can surprise. Certain brands, such as Tesla, have done a lot to improve people's perceptions of electric vehicles – the Tesla Model S is one of the fastest-accelerating cars on the market, doing 0 – 60mph in just 2.5 seconds.

Of course, this isn't the only measure of performance for a car. If you're looking for something more family-friendly, then you'll be pleased to know that many EVs are more spacious than conventional cars due to the lack of a large engine; they also offer a smoother drive with lower levels of noise.

5)Popularity

If you like to stand out in the crowd than perhaps knowing that electric cars are becoming increasingly more popular might be a negative for you, but for many it's a huge positive. As more EVs find their way onto our roads, we will see the



supporting infrastructure expand. There are already over 4800 charging locations in the UK, offering nearly 7500 individual charging points – and these numbers are growing at an ever-increasing rate.

To compare, in 2016, there were 8,459 petrol stations and this number has been declining since 2000. With the increase in electric vehicles on the road, we are likely to see this number continue to fall while the number of charging locations will increase further.

In addition to more charging points, the increased popularity of EVs also means more options to choose from for the car itself. There are more affordable electric car options available now than ever before, like the Nissan Leaf and the Renault Zoe, with some of the most popular petrol and diesel models also available in an electric version, such as the Volkswagen eGolf.

THE PERFECT LOCKDOWN

-- Bikash Paul, 2nd Year

We are the people of 21st century and not the prisoner of home,
This is the phase of exploration and not the chaos of chrome.

In the knowledge of ocean and technology everywhere
We are limited with thoughts in the boredom of home,

What an embarrassed phase has brought to us,
The pandemic has met the beginners with the worst blast

Who said there can be spark in this call?

For those who are trying their beginning ball

Everyone knows this will ceased one day

But what for the opportunity in the beginning day

Will it knock for the second day?

The complain is to the creators,

Not God but the virus spreaders,

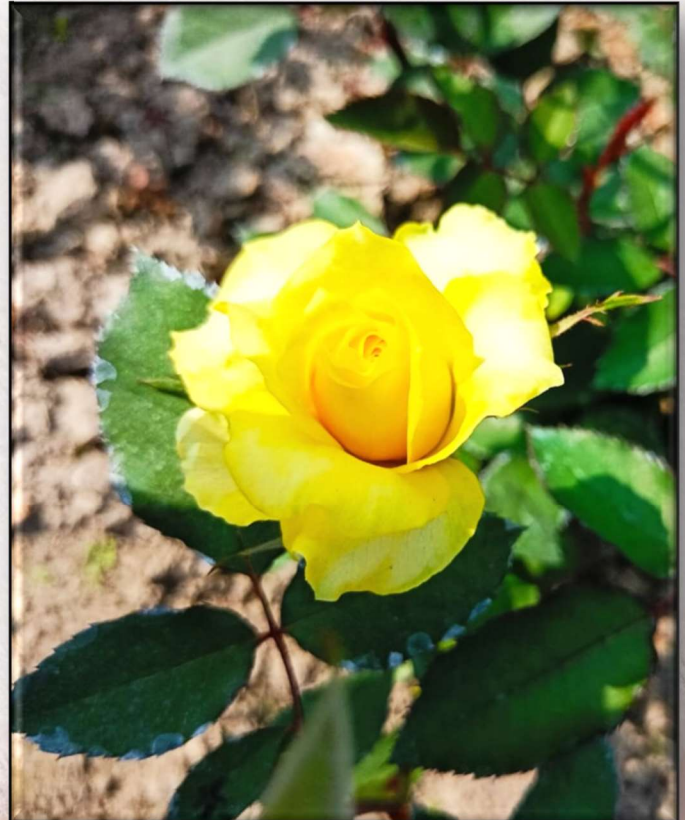
May be this is comfort for some,

But we know happiness is not in everyone's home.

Having good thymes in the garden



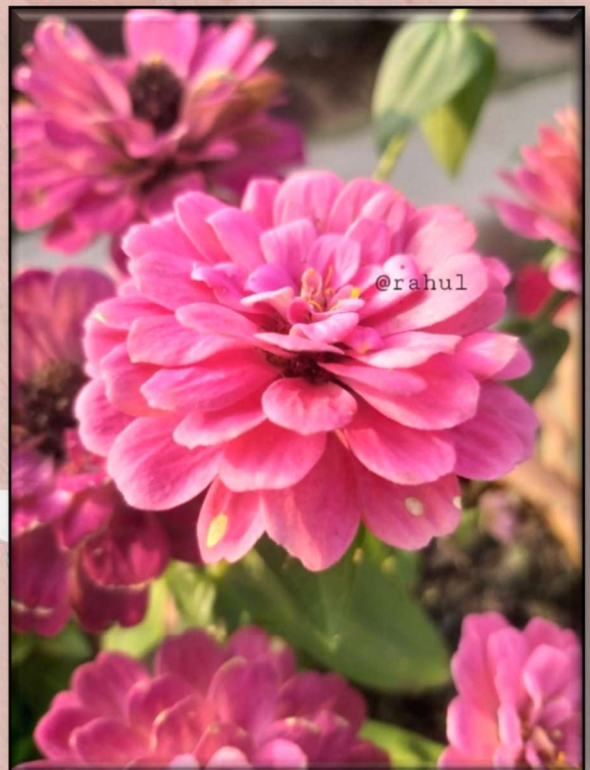
- By AYUSH ANAND, 1ST Year



- By RAHUL MONDAL, 3rd Year



- By ACHINTYA ADHIKARY, 2ND Year



- By RAHUL SINGHA ROY, 3rd Year

INDUSTRIAL VISIT

WATER TREATMENT PLANT

PADMAPUKUR WATER TREATMENT PLANT

--Shaswata Bhattacharya, 2nd year



The water treatment plant which is located in HOWRAH & it's under H.M.C.

According to officials, about 10 lakh people under Howrah Municipal Corporation area will benefit from the project. A 112Km long pipeline from the treatment plant will supply purified water



across Howrah and two 4.5Km pipelines will bring in the untreated water. The

plant treats 40MGD water from river Ganges. The 1st unit of treatment process is sedimentation & it is done on Clariflocculator. Raw water collect from Ganges at B.garden through 1200mm dia pipe & transfered to this plant by Ø750 mm pipe for increasing pressure. This plant has 4units of clariflocculator it's a dia of 145 ft & depth of the outer periphery 10ft in centre 15.75ft. Additional alum was done in fluid mixture and the flocculator works as sedimentation tank.



As sedimentation is going on clear water from top floor & mud from below is suction to sewage sump.

After flocculation tank clear water reaches to sand filter tank. There are total 16 liter of tanks allotted for 4 units of clariflocculator each (28ft x 39 ft).The filter bed consists of 6 layer of fine sand, coarse sand & gravel.

In every 4-5 hrs back washing is done for 30 minutes after filtration process done. Normally 500gm chlorine per hour in terms of liquid gas is injected.

After the chlorination process the water is store in UNDER GROUND RESERVOIR of 4 MGD capacity there are 9 pumps in pump house for supplying water to different part of the city by 1500 mm diameter pipe. There was also a quality control lab for different test to satisfy the quantity of water by checking pH value, Turbidity etc in the administrative building.

The maintenance work of the treatment plant is done yearly before monsoon for a period of 3-4 days and it is remain close at that time.



SOME IMPORTANT TERMS

Clarification is an essential step in a water or wastewater treatment process to remove suspended solids through gravity settling, providing a clarified liquid effluent. First, understanding primary and secondary clarification is needed to determine the appropriate technology to meet treatment requirements.

The clarifier works by permitting the heavier and larger particles to settle to the bottom of the clarifier. The particles then form a bottom layer of sludge requiring regular removal and disposal. Clarified water then proceeds through several more steps before being sent for storage and use.

Underground reservoir, also known as sumps serve as suction sources for pumps .The reservoir at the water treatment plant or well source can be either completely buried, partially buried or completely above grade. The onsite reservoir at each well site can help to solve potential water quality problems.

Reservoirs are the basic elements of water-management systems. In a system, all basic functions of a reservoir can be made use of: storage, water conservation, flood

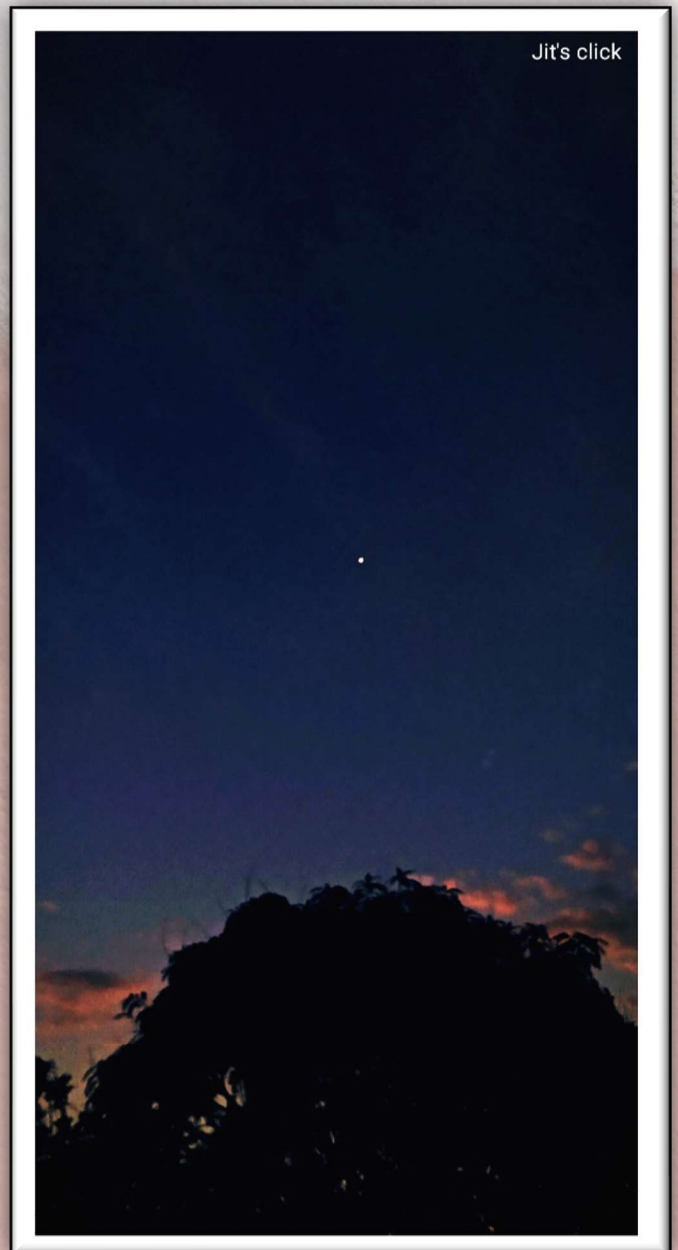
control, water treatment, and aquatic environment. Reservoir systems can be either single- or multi-purpose systems.

A **Sump** is a low space that collects often undesirable liquids such as water or chemicals. A sump can also be an infiltration basin used to manage surface runoff water and recharge underground aquifers. Sump can also refer to an area in a cave where an underground flow of water exits the cave into the earth.

We get important information about water treatment. A daily life needed fresh & clean water processing.



Beauty of night



- By **BISWAJIT SARKER**, 3rd Year

METaverse

--Rituraj Rana, 1st year

The newly evolving technology Metaverse is observed as the next step of the development of the Internet. The investors are showing greater interest in this developing technology.

The metaverse that is also stated as the virtual world is a combination of different 3-D virtual spaces. All that we have in our real physical world will also be available in the metaverse.

An Account On Metaverse

The word metaverse came into existence in the year 1992. It was first formulated by Neal Stephenson in his science fiction novel named Snow Crash. In this novel, the humans were shown in the form of avatars. These avatars developed interaction with each other and computer programs in a 3-D virtual environment. The term was mainly focused by Stephenson to illustrate that virtual reality is the newer version of the Internet.

Technology Not Only Limited To Devices

The metaverse technology creates a digital realm. This digital realm is not only limited upto technological devices like finding different things by using the internet. In this, you can not only look at things but can feel and mark your presence in augmented reality. The presence of human beings will be marked by the presence of avatars that will be free to interact with each other in the 3-D virtual spaces. The devices like VR headsets and wired gloves will help in providing access to the amazing virtual world.

A WOMAN OF LEISURE

-- Megha Sarkar, 2nd Year

I am not a woman with a thousand crowns

I am just buying my own fortunes.

A worker in the morning and a lover at night

Tough woman, but with you I will set tight.

I'm not a woman of leisure, but got a golden heart

It's unsaleable, but I'll give you a half part.

Would you like to decorate my simple Lodge?

My bookcase wants to share some knowledge.

I am just a woman of culture with some words

Singing you some of my thoughts.

I can't bring you the world

But I will cover you when it's cold.

I am just a woman drinking tea with clove

I want my wrinkles to see your love.

I am a woman of leisure with a million crowns

My heart will die and bequeath you smiles.

APPLICATION OF REMOTE SENSING IN CIVIL ENGINEERING

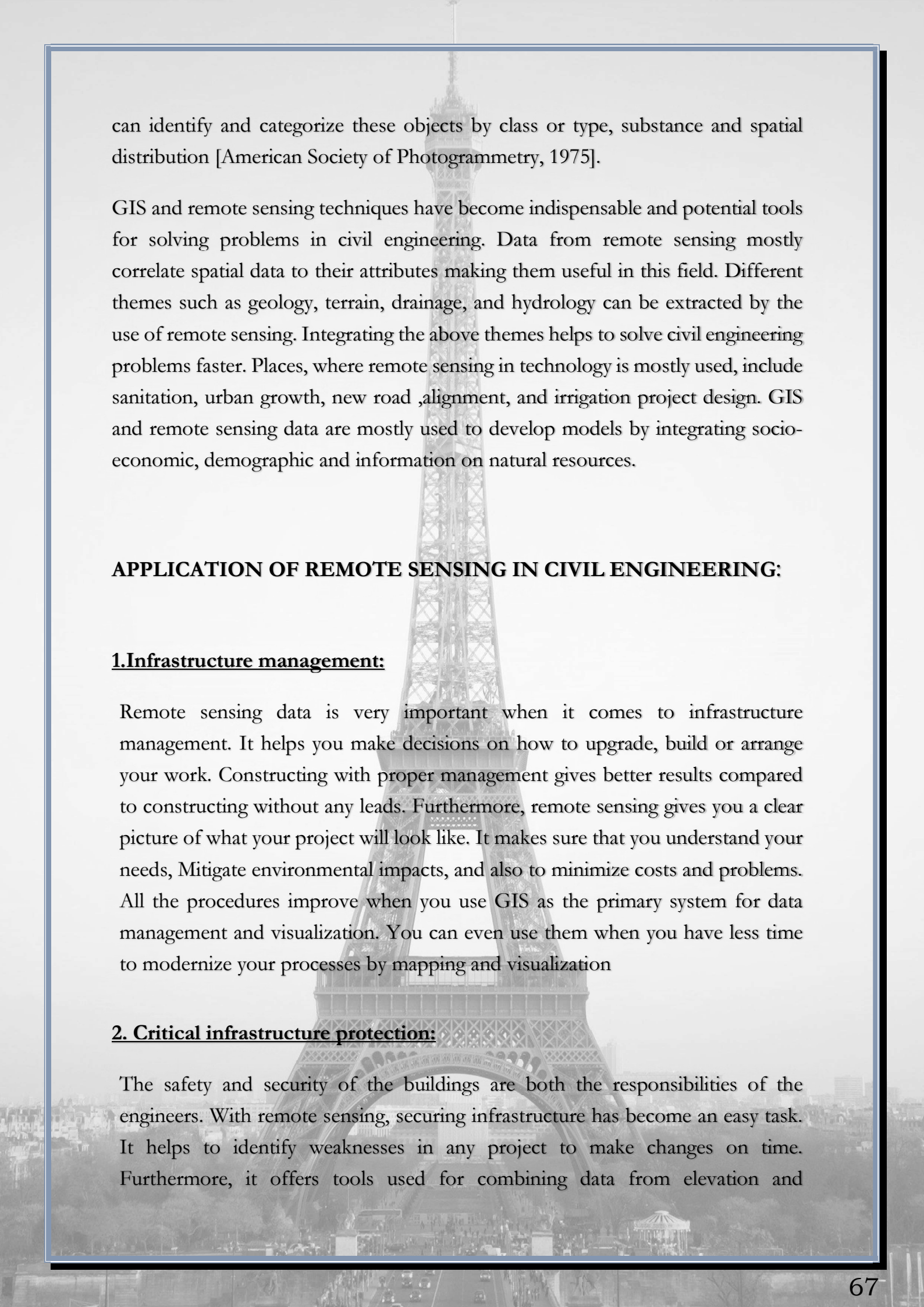
-- Pratibha Dutta Chowdhury, 2nd Year

INTRODUCTION:

Remote sensing is an art and science of obtaining information about an object or feature without physically coming in contact with that object or feature. Humans apply remote sensing in their day-to-day business, through vision, hearing and sense of smell. The data collected can be of many forms: variations in acoustic wave distributions (e.g., sonar), variations in force distributions (e.g., gravity meter), variations in electromagnetic energy distributions (e.g., eye) etc. These remotely collected data through various sensors may be analyzed to obtain information about the objects or features under investigation. Remote sensing is the process of inferring surface parameters from measurements of the electromagnetic radiation (EMR) from the Earth's surface.

This EMR can either be reflected or emitted from the Earth's surface. In other words, remote sensing is detecting and measuring electromagnetic (EM) energy emanating or reflected from distant objects made of various materials, so that we





can identify and categorize these objects by class or type, substance and spatial distribution [American Society of Photogrammetry, 1975].

GIS and remote sensing techniques have become indispensable and potential tools for solving problems in civil engineering. Data from remote sensing mostly correlate spatial data to their attributes making them useful in this field. Different themes such as geology, terrain, drainage, and hydrology can be extracted by the use of remote sensing. Integrating the above themes helps to solve civil engineering problems faster. Places, where remote sensing in technology is mostly used, include sanitation, urban growth, new road alignment, and irrigation project design. GIS and remote sensing data are mostly used to develop models by integrating socio-economic, demographic and information on natural resources.

APPLICATION OF REMOTE SENSING IN CIVIL ENGINEERING:

1. Infrastructure management:

Remote sensing data is very important when it comes to infrastructure management. It helps you make decisions on how to upgrade, build or arrange your work. Constructing with proper management gives better results compared to constructing without any leads. Furthermore, remote sensing gives you a clear picture of what your project will look like. It makes sure that you understand your needs, Mitigate environmental impacts, and also to minimize costs and problems. All the procedures improve when you use GIS as the primary system for data management and visualization. You can even use them when you have less time to modernize your processes by mapping and visualization

2. Critical infrastructure protection:

The safety and security of the buildings are both the responsibilities of the engineers. With remote sensing, securing infrastructure has become an easy task. It helps to identify weaknesses in any project to make changes on time. Furthermore, it offers tools used for combining data from elevation and

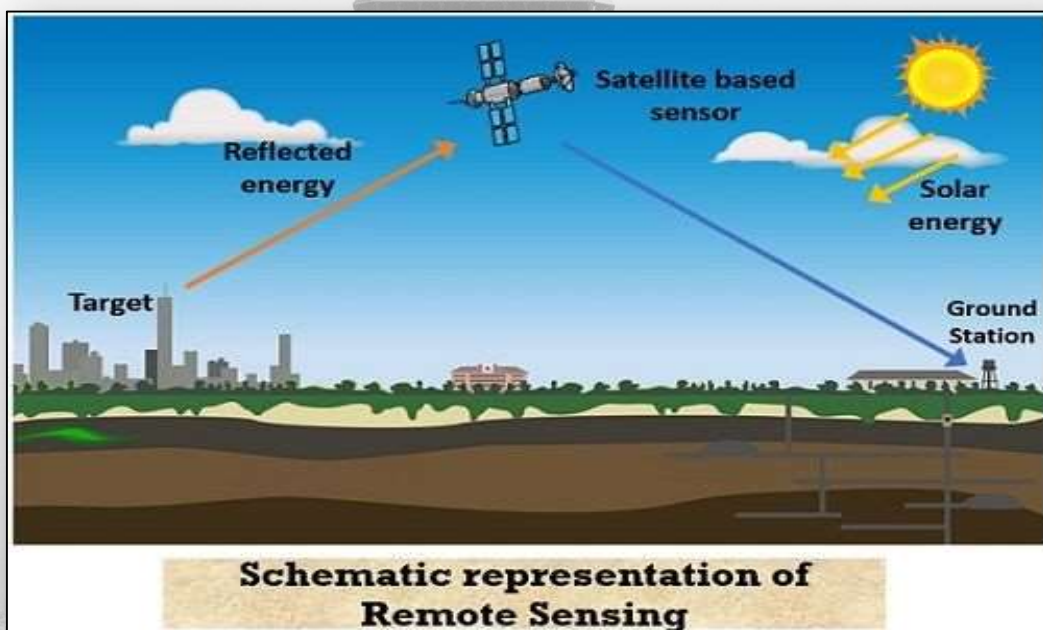
evacuation routes to inspect structural specifications and results. The information is mostly saved in a geodatabase that easily displays information on a web-based map in real-time

3. Site analysis:

GIS quickly incorporates and analyzes various types of information and images for site analysis. It presents accurate results that civil engineers use to interact and



connect with clients easily via a simple map. The base map includes environmental protection areas, aerial photos, and topographic maps. Besides civil engineers use remote sensing techniques to predict future essentials.



4.Reduces cost of management:

GIS and remote sensing technology help in reducing the cost of management. Engineers that make use of remote sensing and GIS no longer need expensive devices such as printers. Besides, they don't even need to spend a lot of time using technical pens and papers. Before a lot of time and resources were consumed by doing such activities. However, today they only need to point a location and all the material that they need is listed. That means that there are improved communications which makes management easy and less costly.

5. Provides detailed geographic information:

The firm that developed GIS, ESRI assures you that you can get information about any location. Besides, it provides other important information such as the date and access logs. Furthermore, GIS helps in examining and analyzing information hence making construction easier for civil engineers.

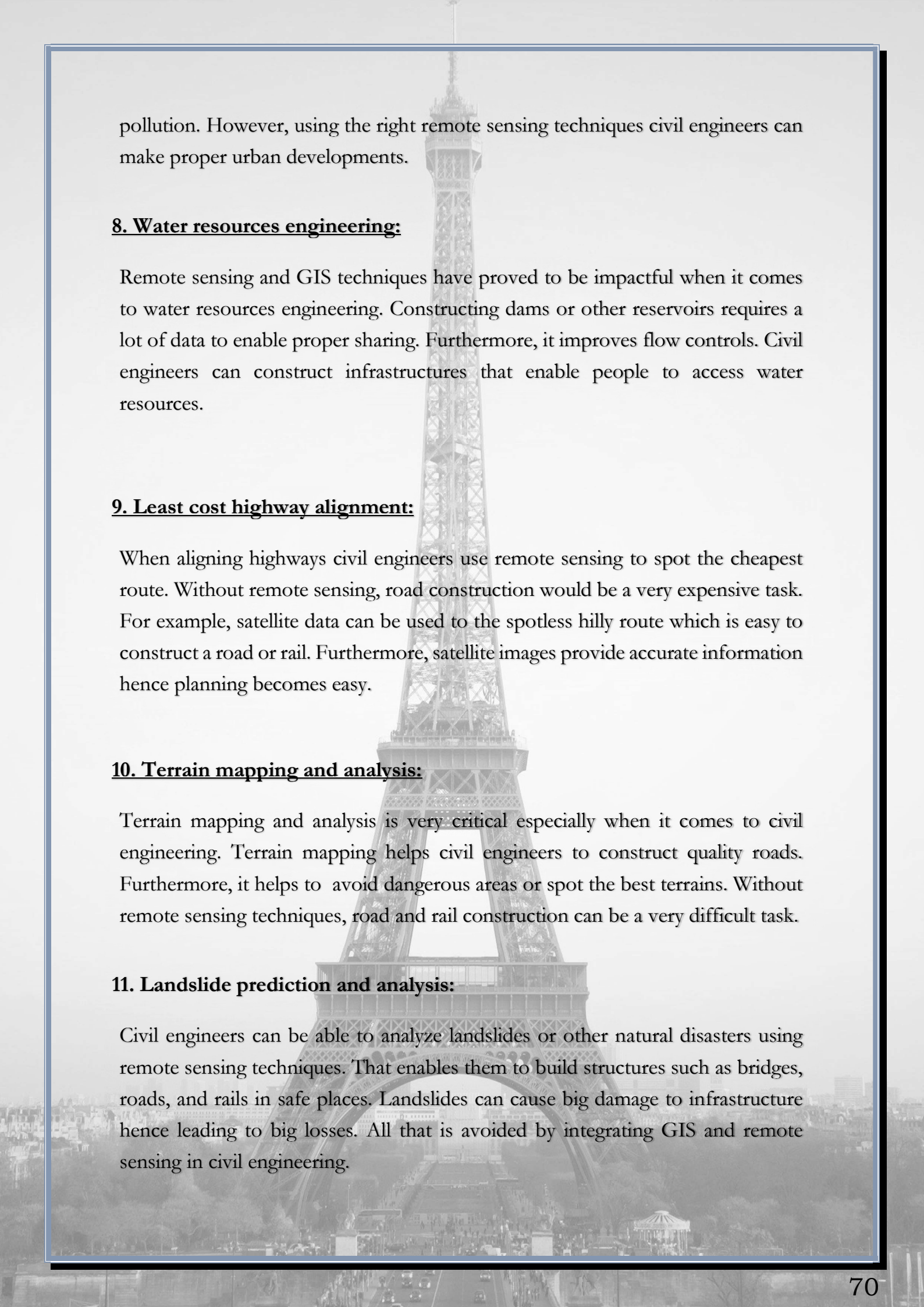
6. Town planning:

Towns are emerging in almost every corner of the world. Proper planning helps in having a clean and accessible town. Remote sensing and GIS plays a very important role in ensuring that it is achieved. GIS is responsible for positioning resources in proper locations. Remote sensing, on the other hand, helps to track things such as power lines and drainage

7.Urban development:

Almost every country is facing rampant urbanization causing problems such as sanitation and housing. Other problems caused by urbanization include disposal of effluents, water supervironmental





pollution. However, using the right remote sensing techniques civil engineers can make proper urban developments.

8. Water resources engineering:

Remote sensing and GIS techniques have proved to be impactful when it comes to water resources engineering. Constructing dams or other reservoirs requires a lot of data to enable proper sharing. Furthermore, it improves flow controls. Civil engineers can construct infrastructures that enable people to access water resources.

9. Least cost highway alignment:

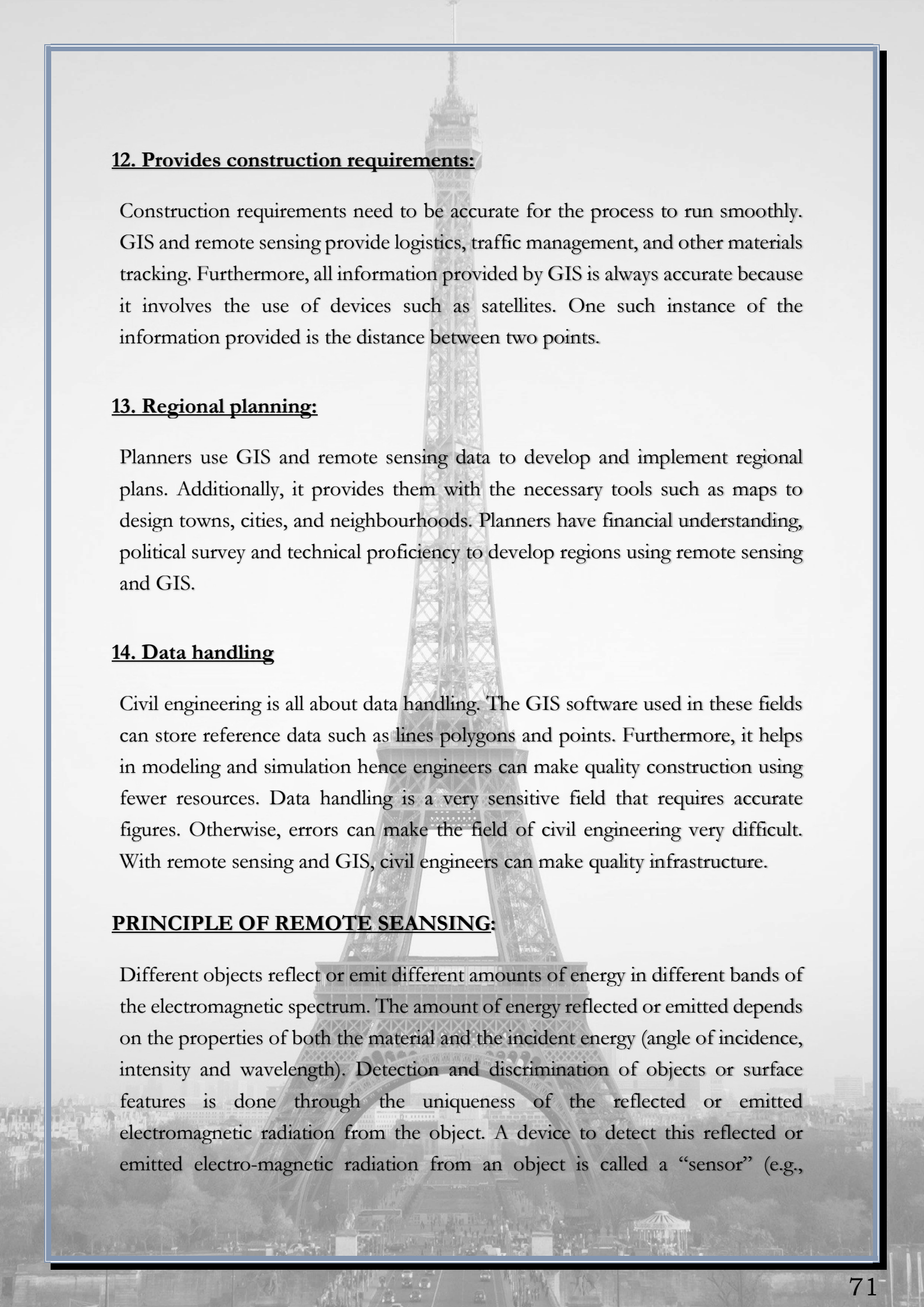
When aligning highways civil engineers use remote sensing to spot the cheapest route. Without remote sensing, road construction would be a very expensive task. For example, satellite data can be used to the spotless hilly route which is easy to construct a road or rail. Furthermore, satellite images provide accurate information hence planning becomes easy.

10. Terrain mapping and analysis:

Terrain mapping and analysis is very critical especially when it comes to civil engineering. Terrain mapping helps civil engineers to construct quality roads. Furthermore, it helps to avoid dangerous areas or spot the best terrains. Without remote sensing techniques, road and rail construction can be a very difficult task.

11. Landslide prediction and analysis:

Civil engineers can be able to analyze landslides or other natural disasters using remote sensing techniques. That enables them to build structures such as bridges, roads, and rails in safe places. Landslides can cause big damage to infrastructure hence leading to big losses. All that is avoided by integrating GIS and remote sensing in civil engineering.



12. Provides construction requirements:

Construction requirements need to be accurate for the process to run smoothly. GIS and remote sensing provide logistics, traffic management, and other materials tracking. Furthermore, all information provided by GIS is always accurate because it involves the use of devices such as satellites. One such instance of the information provided is the distance between two points.

13. Regional planning:

Planners use GIS and remote sensing data to develop and implement regional plans. Additionally, it provides them with the necessary tools such as maps to design towns, cities, and neighbourhoods. Planners have financial understanding, political survey and technical proficiency to develop regions using remote sensing and GIS.

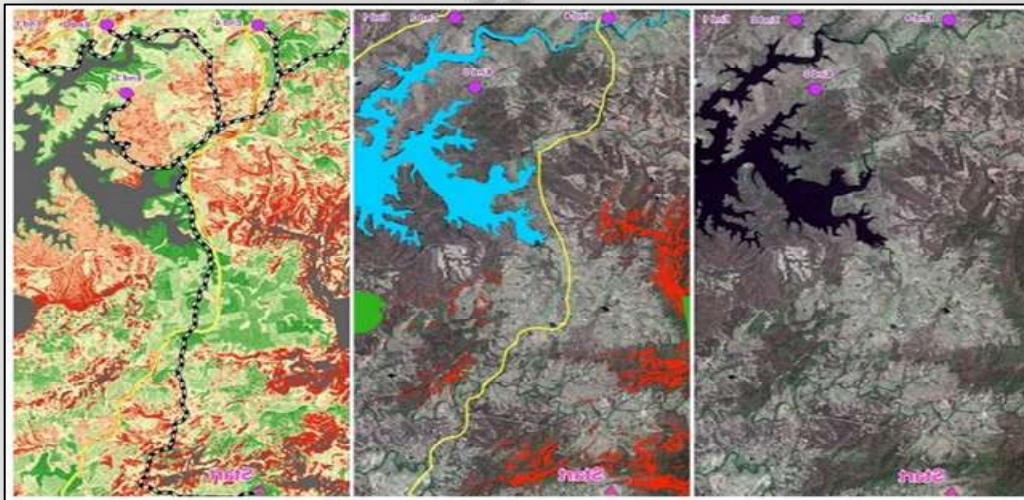
14. Data handling

Civil engineering is all about data handling. The GIS software used in these fields can store reference data such as lines polygons and points. Furthermore, it helps in modeling and simulation hence engineers can make quality construction using fewer resources. Data handling is a very sensitive field that requires accurate figures. Otherwise, errors can make the field of civil engineering very difficult. With remote sensing and GIS, civil engineers can make quality infrastructure.

PRINCIPLE OF REMOTE SEANSING:

Different objects reflect or emit different amounts of energy in different bands of the electromagnetic spectrum. The amount of energy reflected or emitted depends on the properties of both the material and the incident energy (angle of incidence, intensity and wavelength). Detection and discrimination of objects or surface features is done through the uniqueness of the reflected or emitted electromagnetic radiation from the object. A device to detect this reflected or emitted electro-magnetic radiation from an object is called a “sensor” (e.g.,

cameras and scanners). A vehicle used to carry the sensor is called a “platform” (e.g., aircrafts and satellites).



Satellite picture

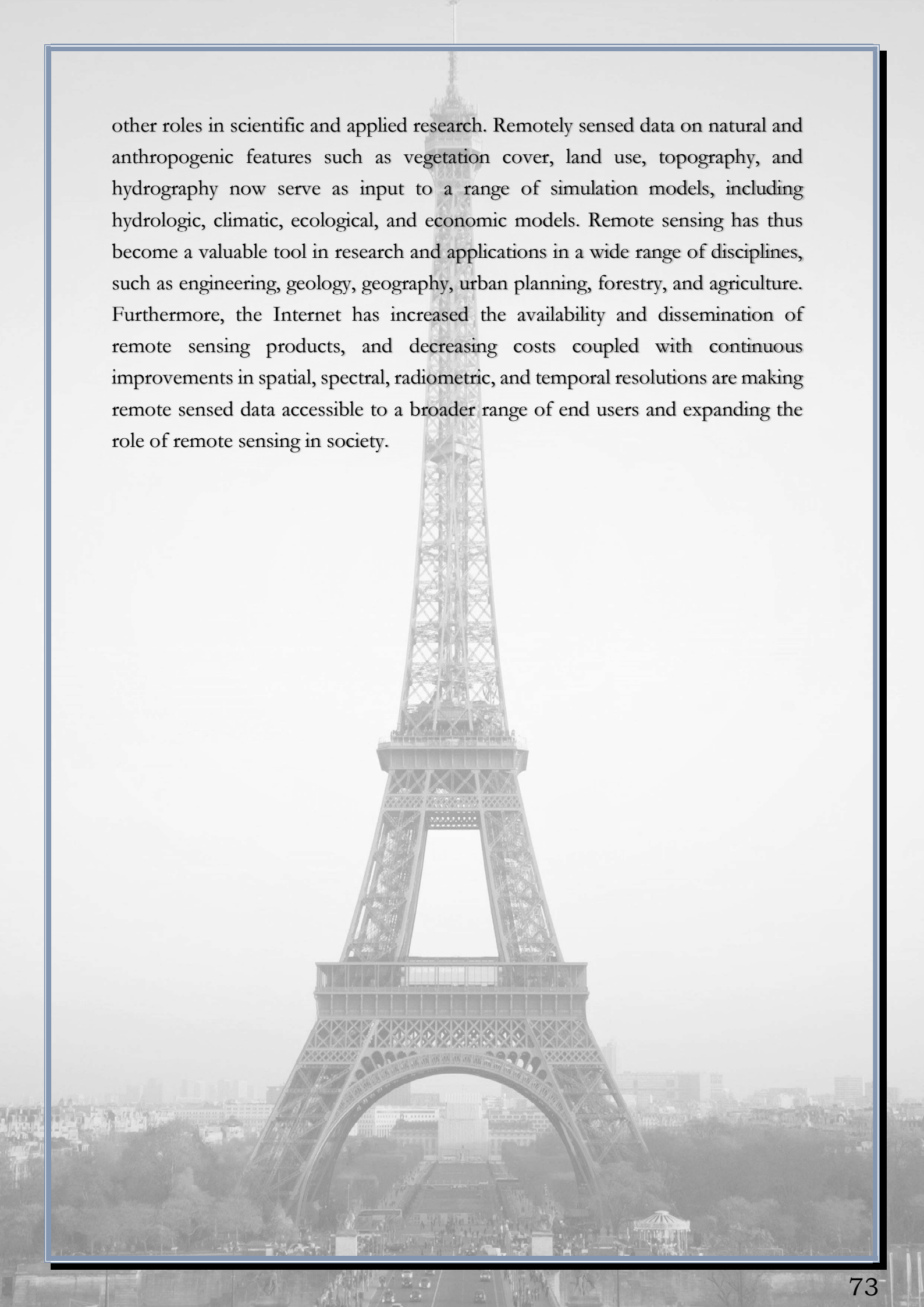
GIS Software Used in Civil Engineering:

GIS and remote sensing applications in civil engineering are central to modern industries. The GIS software used in civil engineering creates layers of detail that can be visualized independently or in conjunction with other layers. For example, data can display a base map with other important information superimposed on the same area. These layers can be switched on and off as needed in order to create a complex picture that can also be analyzed in segments. Examples of layers include subterranean water sources, surface traffic patterns and population density at particular times of the day. These layers are observable in a 3D overlay, which enables clear and accurate planning. This software is a critical GIS application in civil engineering.

Conclusion:

Although remote sensing techniques have primarily been viewed as a means for gathering data that are then interpreted by the user, they are increasingly serving

other roles in scientific and applied research. Remotely sensed data on natural and anthropogenic features such as vegetation cover, land use, topography, and hydrography now serve as input to a range of simulation models, including hydrologic, climatic, ecological, and economic models. Remote sensing has thus become a valuable tool in research and applications in a wide range of disciplines, such as engineering, geology, geography, urban planning, forestry, and agriculture. Furthermore, the Internet has increased the availability and dissemination of remote sensing products, and decreasing costs coupled with continuous improvements in spatial, spectral, radiometric, and temporal resolutions are making remote sensed data accessible to a broader range of end users and expanding the role of remote sensing in society.



पिता

हर्ष कुमार
प्रथम वर्ष

तू आया इस दुनिया में,
तुझे सिखाया उन्होंने चलना।
अब बस तू ज़िंदगी में आगे चल,
साथ वो तेरे तू किसी से न डरना।

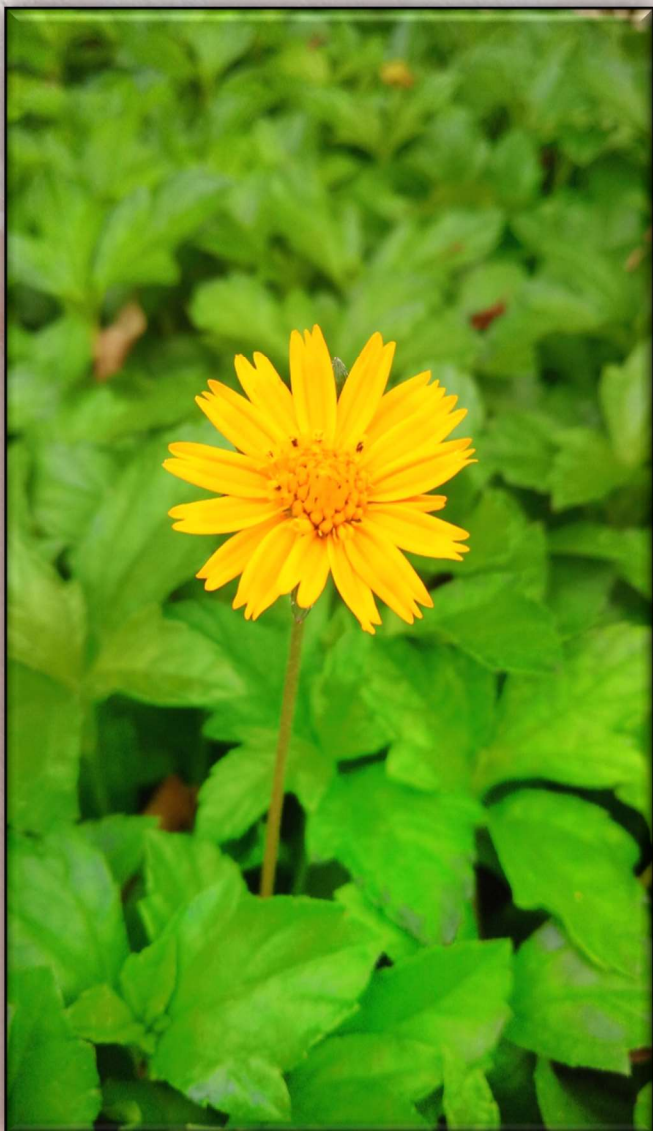
जुबां से हैं कठोर,
दिल से हैं वो नरम।
सबसे प्यारा तू है उनका,
इसलिए मन से हटा ले भरम।

ये चाहिए वो चाहिए तू बस कर,
कर देंगे वो तेरे ख्वाब पूरे।
रहेगी उनके चेहरे पर मुस्कान,
चाहे उनकी खुद की रह जाए जरूरते अधूरे।

तू कर ज़िंदगी में कामयाबी,
यही है उनका सपना।
सब कुछ करदेते तेरा,
कुछ भी नहीं रखते हैं वो अपना।

तुम्हें देंगे वो कभी डांट,
फिर भी दिल से देंगे तुम्हें आशीर्वाद।
कहते हैं पिता उन्हें,
फिर भी ये काम है उनके लिए अल्फाज अल्फाज अल्फाज।

Capturing the Nature



- By PALLAVI DEY, 3rd Year

Dawn at the mountain



- By BISWAJIT SARKER, 3rd Year



- By AYON MAITY, 4TH Year

POVERTY IN INDIA

--By Amit Yadav, 2nd year

India is a developing nation. Although its economy is growing, poverty is still a major challenge. However, poverty is on the decline in India. It has around 84 million people living in extreme poverty which makes up ~6% of its total population as of May 2021. However, the COVID-19 pandemic is expected to drive an additional people into extreme poverty, Depending on the severity of the economic contraction. Poverty, defined as living on less than \$1.90 a day, affected between 9.1% and 9.4% of the world's population in 2020, according to the biennial Poverty and

Shared Prosperity Report. This would represent a regression to the rate of 9.2% in 2017. Had the pandemic not disrupted the global economy, this rate was expected to



drop to 7.9% in 2020.[1] In May 2012, the World Bank reviewed and proposed revisions to their poverty calculation methodology and purchasing power parity basis for measuring poverty worldwide.[1] It was a minimal 3.6% in terms of percentage. As of 2020, the incidence of multidimensional poverty has significantly reduced from 54.7% in 2005 to 27.9% in 2015–2016.[2] According to United Nations Development Programme administrator Achim Steiner, India lifted 271 million people out of extreme poverty in

a 10-year time period from 2005–2006 to 2015–2016. A 2020 study from the World Economic Forum found “Some 220 million Indians sustained on an expenditure



level of less than Rs 32 / day—the poverty line for rural India—by the last headcount of the poor in India in

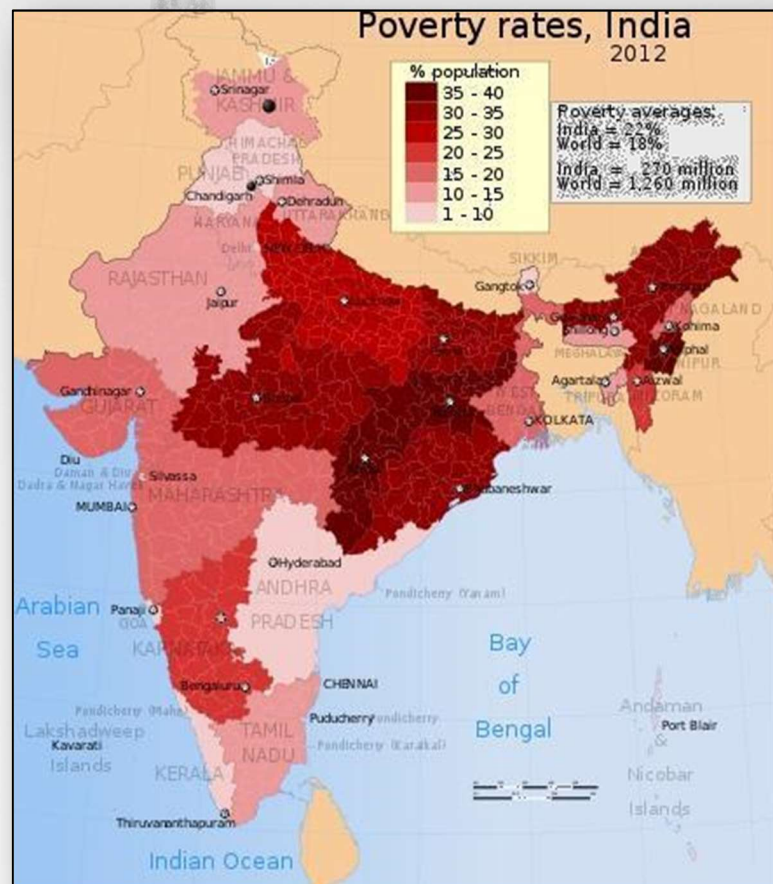
2013. The World Bank has been revising its definition and benchmarks to measure poverty since 1990–1991, with a \$0.2 per day income on purchasing power parity basis as the

definition in use from 2005 to 2013.[4] Some semi-economic and non-economic indices have also been proposed to measure poverty in India. For example, in order to determine whether a person is poor, the Multi-dimensional Poverty Index places a 13% weight on the number of years that person spent in school or engaged in education and a 6.25% weight on the financial condition of that person.

Economic measures

There are several definitions of poverty, and scholars disagree as to which definition is appropriate for India.[27][28] Inside India, both income-based poverty definition and consumption-based poverty statistics are in use.[29] Outside India, the World Bank and institutions of the United Nations use a broader definition to compare poverty among nations, including India, based on purchasing power parity (PPP), as well as nominal relative basis.[30][31] Each state in India has its own poverty threshold to determine how many people are below its poverty line and to reflect regional economic conditions. These differences in definitions yield a complex and conflicting picture about poverty in India, both internally and when compared to other developing countries of the world.

India determines its household poverty line by summing up the individual per capita poverty lines of the household members. This practice is similar to many developing countries, but different from developed countries such as the United States who adjusts their poverty line on an incremental basis per additional household member. For example, in the United States, the poverty line for a household with just one member was set at \$11,670 per year for 2014, while it was set at \$23,850 per year for a 4-member household (or \$5963 per person for the larger household).[50]



The rationale for the differences arise from the economic realities of each country. In India, households may include surviving grandparents, parents, and children. They typically do not incur any or significant rent expenses every month particularly in rural India, unlike housing in mostly urban developed economies. The cost of food and other essentials are shared within the household by its members in both cases. However, a larger portion of a monthly expenditure goes to food in poor households in developing countries,[51] while housing, conveyance, and other essentials cost significantly more in developed economies.

Light



- By **SUSHMITA CHAKRABORTY**, 3rd Year



- By **ACHINTYA ADHIKARY**, 2ND Year

What Do Civil Engineers Do?

--Ritish Ranjan, 3rd year

Civil engineering is Everywhere, it is in every road we drive, it is in clean water we drink, it is everywhere we live, work , and play . Thus, it is really all around us.

So, In broadest of terms what is a civil engineer ?

A civil Engineer is someone who applies scientific knowledge to improve infrastructure and common utilities that meets basic human needs. Thus, civil engineers help in improving of life of millions of people every day.

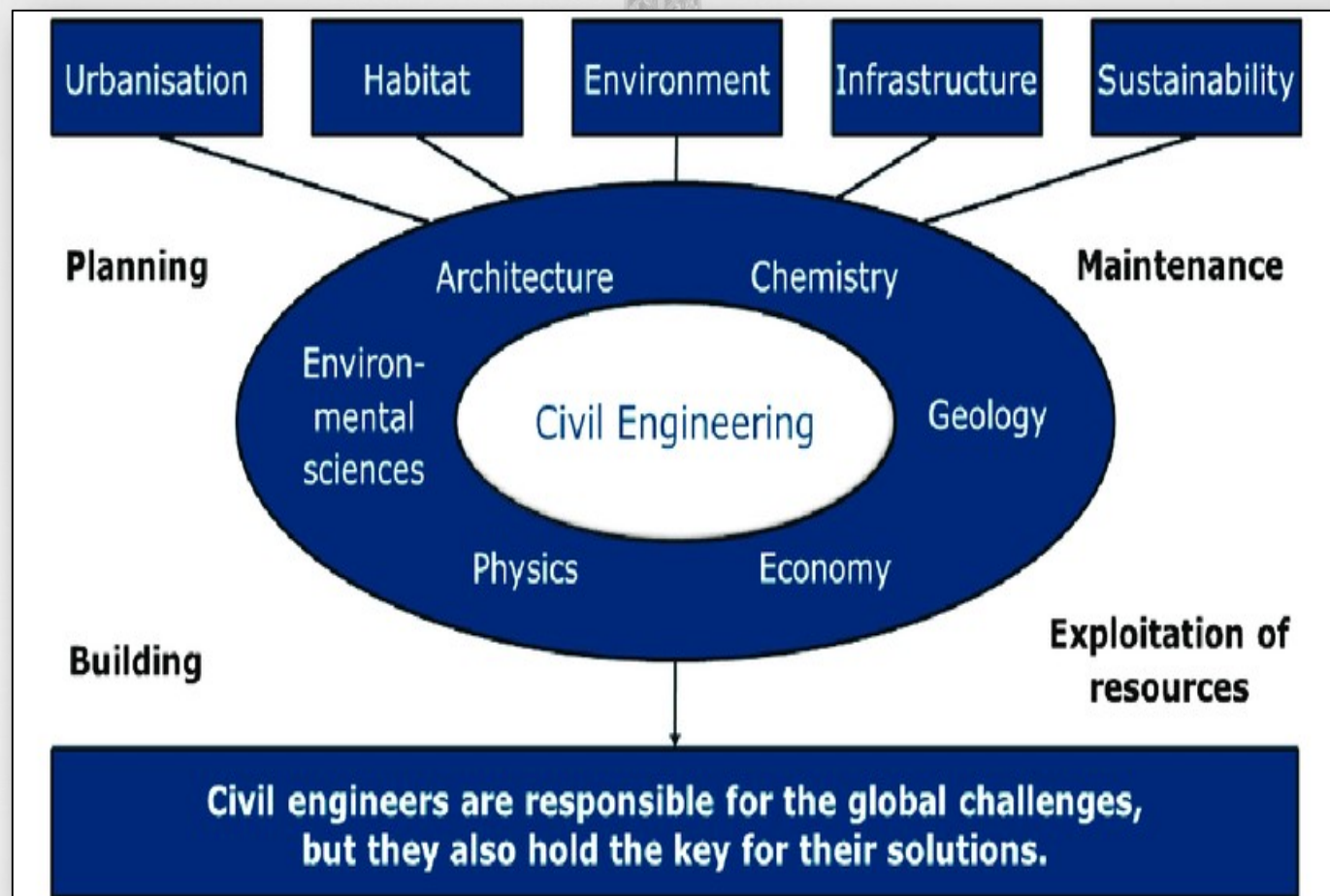
Civil Engineers design major transportation projects, they conceive, design, build, supervise, operate, construct, maintain infrastructure projects and system in public and private sectors including roads, building airports , tunnels , dams , bridges , and system for water supply and sewage system .

Many civil Engineers works in planning, design, construction, research and education. they consider construction costs, government regulations, environmental hazards and other factors during planning and risk analysis stages of project.

They oversee and analyze the test of soil also prepares cost estimates for materials, equipments or labor to determine projects economic feasibility. They use design software to plan and design transportation, hydraulic system etc.

Thus, these Engineers are typically responsible for design and safety of temporary structure used during construction and it is well said -

“God has created the earth and civil Engineers civilized it “.



"এবং জীবন"

-- অমৃতিকা মাজী, দ্বিতীয় বর্ষ

১। কইতে গেলে ফুলোয় না
হইলে শুক ফুলোয় না
না কইলেও ফুলোয় না
ডেবেনা পাই করবো কি
অবুঝ জ্বালা জুড়োয় না।

২। না কইতে মইতে হয়
না কইলেও মইতে হয়
মইবো না কইবো না তো কি হয়,
হাওয়ায় এ বুক ভরবো কি
শরীর ছাড়া প্রাণ বিনা।

৩। হাজার হলো যা শোনা
প্রমত্তে ধরো আলতো না
আবার ডীর্ঘ আঁকড়ে না
এই দোটানায় ভুলবো কি
নিজের প্রাণে ঘর গোনা।

৪। কইলে মই শুনে ডালো
(আহা) শরীর জুড়ে মিঠাম আলো
কাটেছে আঁটার মাছ জোরালো
বক হবো না করবো কি!
তুমি হৃদয় কি হলো।

৫। দূর আজানের বাজলো ঢেঁড়
মোরগটাকে ডাকনা কেঁড়
ঘর ভর্তি রোদ নাকি
এখন কোথায় মুখ ঢাকি
বিড়াল বলে হালুম আমি
খিল খুলতে কাল ঘামই
স্বপ্ন ধোঁয়া চোখ দুটো
টাটকা জলের ছল ছুতো
দিনের অনেক কাজ বাকি

৬। আমি যে কই বেশ আছি
বুকের ডেপ্তর শুক পাখি
ঢাক পেটায় যে খুঁত তা কি
তুই কি, তা তুই মানিস না
আমনা হোলির রং মাখি।

৭। নকশা ছাপা যে অংলাপ
মাজলি বটে দারুন পাটে
অমনাকি তাও এ জীবন
কয় কথায় আপন মন
নিজের কাছে দিম ফাঁকি।

৮। আচমকা যে কাল বেলা
মিছেই হলি হরবোলা
বুড়ো চোখে অবুঝ ঢং
স্মৃতির পায়রা বক বকম
শুকনো ঠোঁটে ঢেঁক গেলা।

৯। মঙরা কঙার ঘর টা পার
দেদার ডঠোন আকাশটার
মমর্পনের শখ নাকি।
স্বর্গটাকেও মইতে কয়
বিমর্জনের বাজনা কি।।

Antique



- By ACHINTYA SHIB, 3rd Year

STRANGERS PAIN

--Md Mustufa Faisal, 2nd Year

I'm working in a corporate sector and everything in my life goes well like my job, financial conditions and health since last two years. I'm very excited that my dream bike has arriving tomorrow and this weekend I'll go on a solo trip so finally that day is coming I have been waiting for so many years. Today I'm going to office on my bike when I reached in office every friends and colleagues cheer up and asking me for party may be my destiny does not like these things, in last hour of office news came that company has gone in drastically loss so company decided that they fire 50 employees and unfortunately I'm one of those, for me it's all over I cancel my plan don't talk to anyone just like two days passed I didn't even come out from my room then my father talk to me and explain me this is wrong what I'm doing to my self he told me that your trip is full planned, for so many years you are excited to go on this trip convince me to go and enjoy, whatever happen happens for good so I decided to go.

I'm driving from 3-4 hours but did not show any restaurants or dhaba, after driving half an hour continuously a dhaba came but no one is here at that time except 4-5 staff members, I came got freshen up and have very good dinner with all the staff members, all the staff were very good with me they just treated me like family as we talked together for a long time I'm asking with them how they manage all the things, stay away from family and no one is far away they told me their very sad story if anyone listen, he or she will cry. Their life was full of problems but they have no complaints with life, happily accepts the problems and enjoy their lives. I would like to say one thing if any problem or worst situation came into your life just never give up and wisely face the problem if you tackle the situation and solve the problem this'll be the great achievement of your life.

Thank you ☺

Some Extra...

-- Ayush Anand, 1st year

It takes some extra concentration to hit the goals.

It takes some extra hard work to get success.

It takes some extra effort to make unique.

It takes some extra time to make decision.

It takes some extra love to impress someone.

BUT exam is all about

Some extra hard work

Some extra effort

Some extra time

And some extra love with books..

TRICKS OF MATHEMATICS

--Debarghya Sarkar, 2nd Year

DIVIDATION BY 5:

If we want to divide any number with 5. Let's think we want to divide the number 135 by 5.

Basically,

$$135/5 = 27 \text{ because } 27 \times 5 = 135$$

But here we will use another method to determine the answer. The number which we need to divide by 5 we will multiply that number with 2.

So, we will multiply 135 with 2. So $135 \times 2 = 270$

Now we can write 270 as 270.00 because 270 and 270.00 is same.

So now as we are dividing the number 135 with 5 and 5 is a single digit number so we will shift that point one hand left side from it's initial position. So, after shifting that point

270.00 will be written as 27

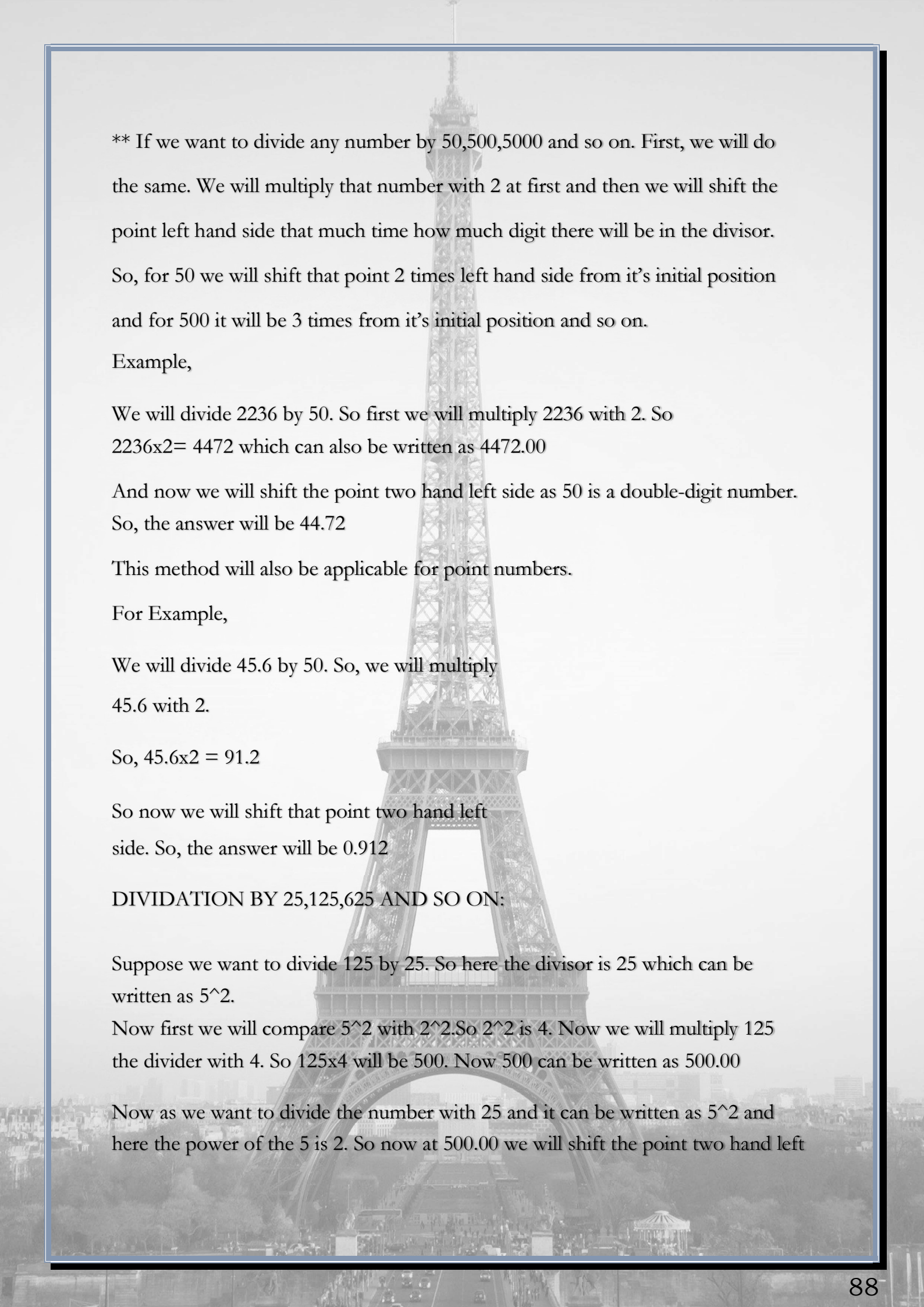
So, the answer of $135/5$ will be 27.

The same method will also be applicable for point numbers also.

As Example,

We want to divide 32.2 by 5.

So first we will multiply the number 32.2 with 2. So, $32.2 \times 2 = 64.4$ and now we will shift that point one hand left side from it's initial position as 5 is a single digit number. So, the answer will be 6.44



** If we want to divide any number by 50,500,5000 and so on. First, we will do the same. We will multiply that number with 2 at first and then we will shift the point left hand side that much time how much digit there will be in the divisor. So, for 50 we will shift that point 2 times left hand side from it's initial position and for 500 it will be 3 times from it's initial position and so on.

Example,

We will divide 2236 by 50. So first we will multiply 2236 with 2. So $2236 \times 2 = 4472$ which can also be written as 4472.00

And now we will shift the point two hand left side as 50 is a double-digit number. So, the answer will be 44.72

This method will also be applicable for point numbers.

For Example,

We will divide 45.6 by 50. So, we will multiply 45.6 with 2.

So, $45.6 \times 2 = 91.2$

So now we will shift that point two hand left side. So, the answer will be 0.912

DIVIDATION BY 25,125,625 AND SO ON:

Suppose we want to divide 125 by 25. So here the divisor is 25 which can be written as 5^2 .

Now first we will compare 5^2 with 2^2 . So 2^2 is 4. Now we will multiply 125 the divider with 4. So 125×4 will be 500. Now 500 can be written as 500.00

Now as we want to divide the number with 25 and it can be written as 5^2 and here the power of the 5 is 2. So now at 500.00 we will shift the point two hand left



side from its initial position because the power of 5 is 2 and then the answer will come. So, the answer will be 5.

Another Example,

Now we will divide 111 by 625. So here the divisor 625 can be written as 5^4 .

Now we will compare 5^4 with 2^4 which will be 16

and now we will multiply 111 with 16. So, $111 \times 16 = 1776$

Here the power of the 5 is 4 and 1776 can be written as 1776.00. So now we will shift the point four hand left side from its initial position. So, the answer will be 0.1776

This method will also be applicable for point numbers.

For example, we want to divide 254.4 by 3125. So here 3125 can be written as 5^5 and we will compare it with 2^5 which is 32 and now we will multiply 254.4 with 32.

So, $254.4 \times 32 = 8140.8$

So, as the power of 5 is 5 so we will shift the point five hand left side from its initial position. So, the answer will be 0.081408.

अनुभूति

- पुलक राज, प्रथम वर्ष

आवास पर तू शे र था,
अं जान में तू कु छ नहीं ।

कमजोर था, मगर तू था सही,
बाहर निकल तू कु छ नहीं ॥

कु छ, रहने का था गम तुझे,
अब तो बचा है कु छ नहीं ॥

जो था शायद पर्याप्त था,
तुझको लगा जो कु छ नहीं ॥

उनकी राय लिए बिना ही कहते हो माँ पापा नहीं मानें गे ।

उसकी डाँट मे उसके जज्बात दे खना।

फिर उसके काँपते हाथ दे खना।

अगर फिर भी समझ ना आये तो छतों से वो शर्द रात दे खना।

और अगर कभी भटक जो अपनी मंजिल से मेरे दोस्त अपने बाप का वो
अधूरा ख्वाब दे खना।

Life is short, by the plants

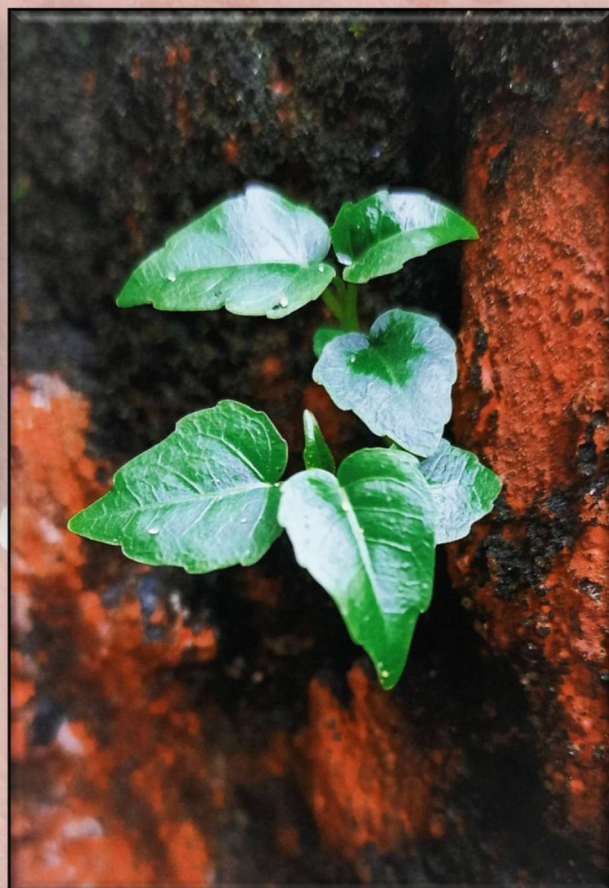


CAPTURED BY ACHINTYA SHIB

- **By ACHINTYA SHIB, 3rd Year**



- **By ADITYA SAHU, 2ND Year**



- **By ADITYA SAHU, 2ND Year**

EAST-WEST METRO PROJECT

(1st Under Water Metro Project In Our Country)

-- Ayon Maity , 4th year

Transportation

It is the movement of goods and persons from place to place and the various means by which such movement is accomplished. The growth of the ability—and the need—to transport large quantities of goods or numbers of people over long distances at high speeds in comfort and safety has been an index of civilization and in particular of technological progress.

Modes Of transportation

There are mainly 4 types of transportation. They are –

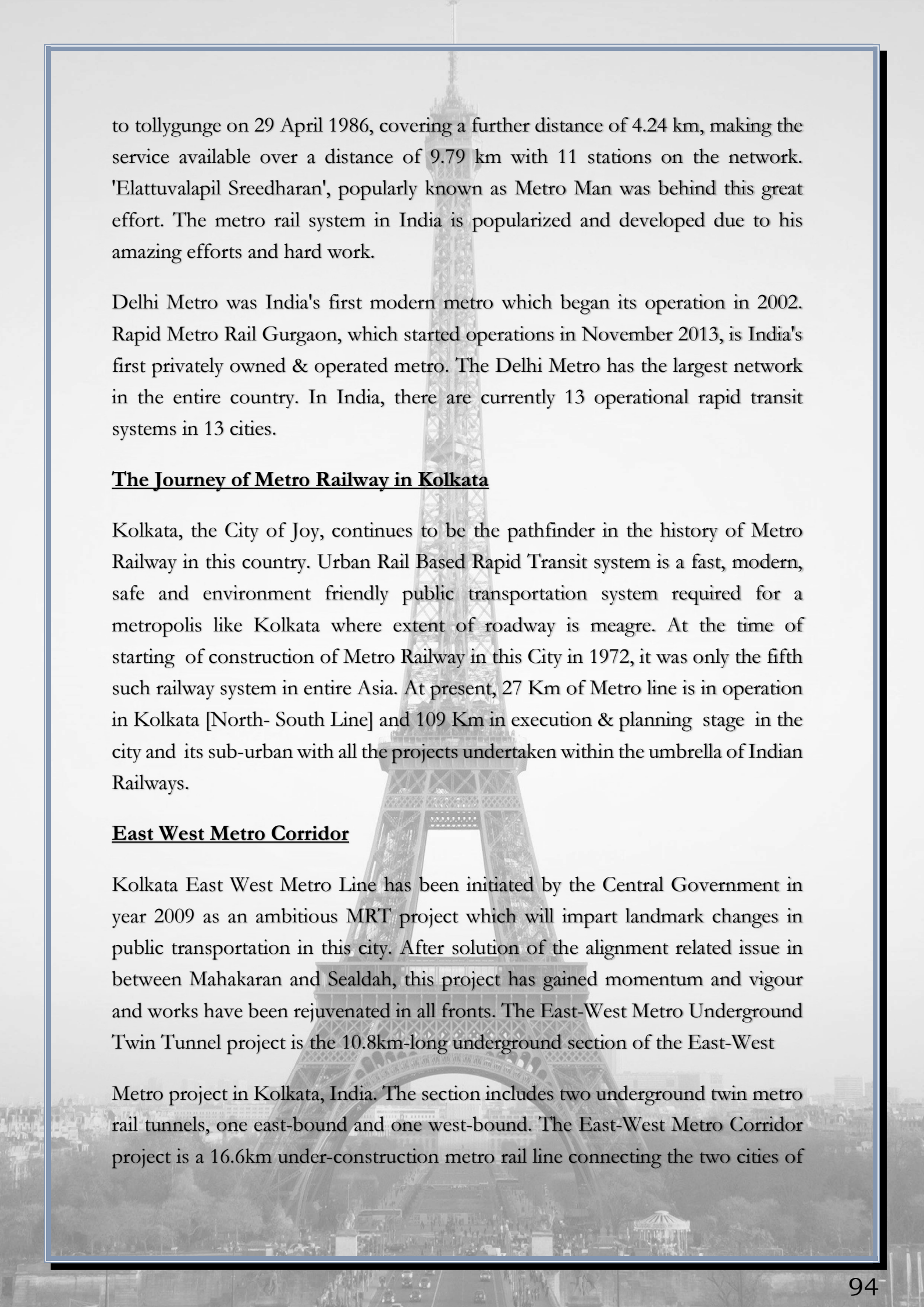
- Roadway Transportation.
- Railway Transportation.
- Waterway Transportation.
- Airway Transportation.

Mass rapid transit (MRT), also known as heavy rail or metro is a type of high-capacity public transport generally found in urban areas.



Indian Metro Railway History

The first rapid transits system in India was Kolkata Metro, which started operations in 1984. The metro services began for the first time on the first stretch of Kolkata metro on 24 October 1984 with an operational line of 3.40 km with five stations served between Esplanade and Bhowanipur. The commuter service was extended



to tollygunge on 29 April 1986, covering a further distance of 4.24 km, making the service available over a distance of 9.79 km with 11 stations on the network. 'Elattuvalapil Sreedharan', popularly known as Metro Man was behind this great effort. The metro rail system in India is popularized and developed due to his amazing efforts and hard work.

Delhi Metro was India's first modern metro which began its operation in 2002. Rapid Metro Rail Gurgaon, which started operations in November 2013, is India's first privately owned & operated metro. The Delhi Metro has the largest network in the entire country. In India, there are currently 13 operational rapid transit systems in 13 cities.

The Journey of Metro Railway in Kolkata

Kolkata, the City of Joy, continues to be the pathfinder in the history of Metro Railway in this country. Urban Rail Based Rapid Transit system is a fast, modern, safe and environment friendly public transportation system required for a metropolis like Kolkata where extent of roadway is meagre. At the time of starting of construction of Metro Railway in this City in 1972, it was only the fifth such railway system in entire Asia. At present, 27 Km of Metro line is in operation in Kolkata [North- South Line] and 109 Km in execution & planning stage in the city and its sub-urban with all the projects undertaken within the umbrella of Indian Railways.

East West Metro Corridor

Kolkata East West Metro Line has been initiated by the Central Government in year 2009 as an ambitious MRT project which will impart landmark changes in public transportation in this city. After solution of the alignment related issue in between Mahakaran and Sealdah, this project has gained momentum and vigour and works have been rejuvenated in all fronts. The East-West Metro Underground Twin Tunnel project is the 10.8km-long underground section of the East-West

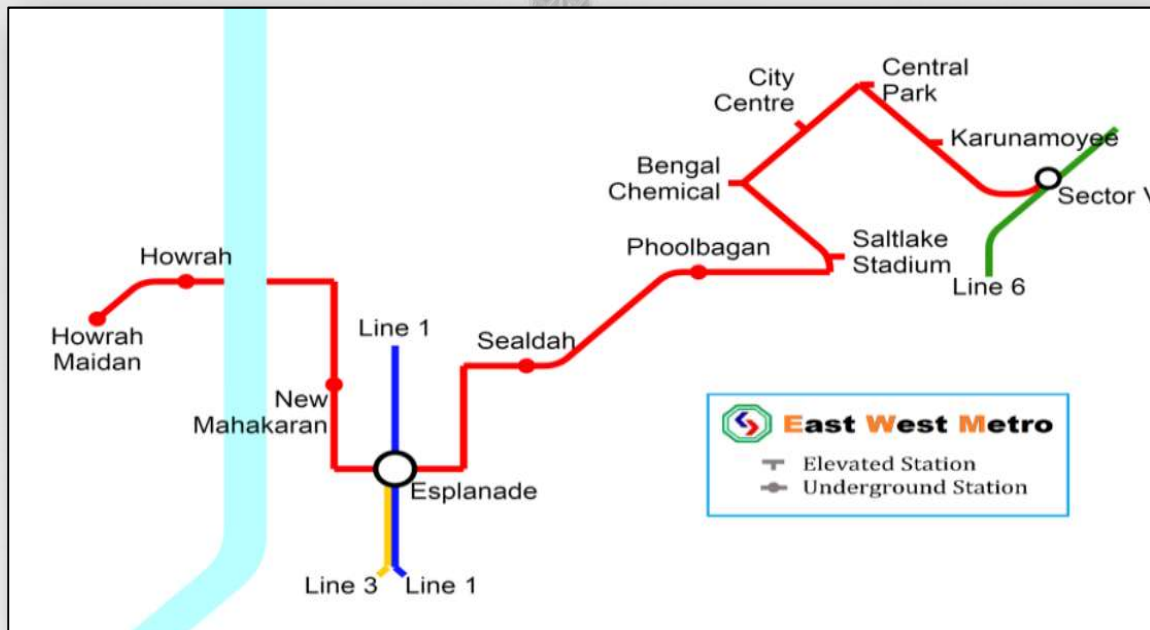
Metro project in Kolkata, India. The section includes two underground twin metro rail tunnels, one east-bound and one west-bound. The East-West Metro Corridor project is a 16.6km under-construction metro rail line connecting the two cities of

Kolkata and Howrah. The elevated section of the corridor will cover a length of 5.8km. Kolkata Metro Rail Corporation (KMRCL) is executing the project with partial financial support from Japan Bank for International Cooperation (JICA). In October 2020, the Government of India approved a revised estimated cost of Rs 8575Cr (\$1.17bn). The underground tunnel will cross the Hooghly River for approximately half a kilometer necessitating a 520m underwater section of the tunnel making the East-West Metro tunnel the first underwater tunnel in India. The underwater tunnel will be at a depth of 13m below the water while the depth of the tunnel crown extra-dose will be 13m below the riverbed. It is the 1st underwater metro project in India. The most advanced techniques are used for this project. According to the tariff structure approved by Railway Board, a commuter will have to pay Rs 5 for travelling up to 2km. For the next 3km till 5km, the fare will be Rs 10; for 5km-10km Rs 20 and for 10km-16.5km, it will be Rs 30.so, This project will be bringing the revolution in Kolkata transportation system as well as Indian transportation system. The project execution is divided in two phases as below [Total Length- 16.6 Km]

The project execution is divided in two phases as below [Total Length- 16.6 Km]

	Phase- 1	Phase-2
Scope	Salt Lake Sector-V to Sealdah	Sealdah to Howrah Maidan
Length	9.4 km (Elevated – 5.8 km, Underground – 3.6 km)	7.2 Km [Elevated –Nil, Underground- 7.2 Km]
Stations	8 no [Elevated – 6, Underground -2]	4 nos [Underground-4]
Opened	13 Feb, 2020 [Upto Phoolbagan]	March, 2022 [Target]

Route Map:



Design and Construction of India's First Underwater Tunnel

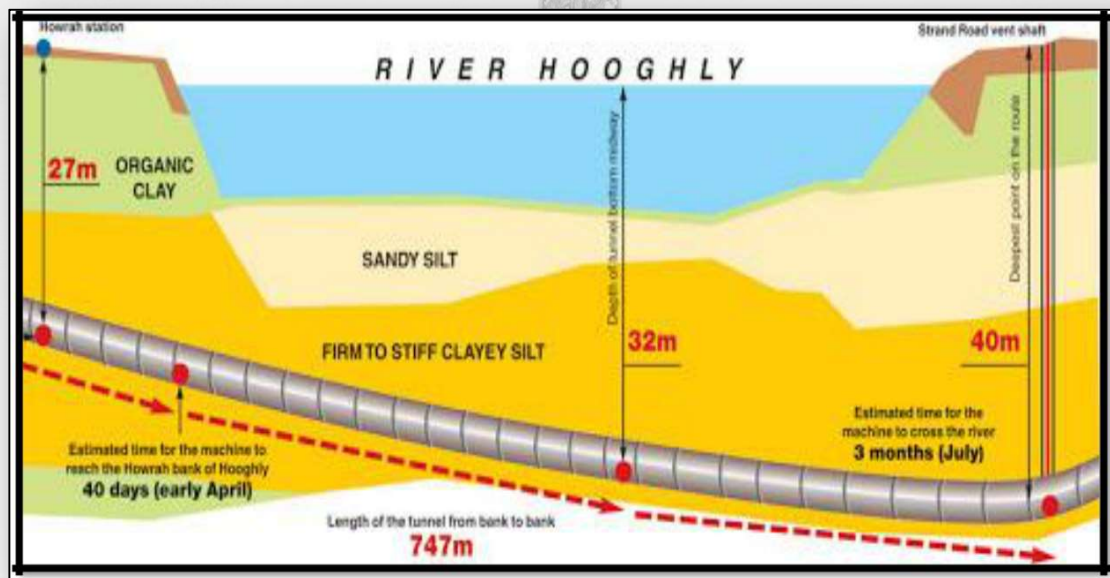
The tunnel will have an internal diameter of 5.55m and an external diameter of 6.1m. The spacing between the tunnels will be 16.1m center-to-center. The inner walls of the tunnel are being made with M50 grade, reinforced concrete segments with a thickness of 275mm each. Six of these segments will complete a circular lining of the tunnel's diameter. The segments are being pre-cast in specialised moulds imported from Korea. Several protective measures have been taken to prevent water inflow and

leakages in the tunnel. Concrete mixes composed of fly ash and micro silica have been used for the segments to minimize water permeability. The segments are being sealed using a complex grouting process that will fill the space between the segments and the shield of the tunnel boring machine (TBM). A two-component grout mix, including slurry made of water, cement and bentonite and sodium silicate, is being used to fill the gaps. The liner segments are fitted with German-made neoprene and hydrophilic auxiliary gaskets, which expand when in contact with water to prevent inflow through segmental joints.



Boring the underwater tunnels, which are predominantly composed of soft and stiff clay, has been one of the complex challenges of the project. Two German-made tunnel boring machines (TBMs), named Prerna and Rachna, were deployed for the process. Equipped with earth pressure balancing (EPB) capabilities, the machines are suitable for projects on unstable terrain or under structures that are sensitive to ground disturbances. They can withstand three times more atmospheric pressure during the boring process. Each TBM is 8.5m-long, as tall as a two-storey building and has backup gantries extending to 100m. Six generator sets of 1,010 kVA will supply power to the boring machines, which are equipped with five motors exceeding 650HP and more than 35 other auxiliary motors. The TBMs will bore up to 15m a day, excavating up to 500m³ of the earth to complete 2.9m of the tunnel. The two TBMs bored the east and west-bound tunnels in a record span of 66 days, from April 2017 to June 2017. While the first tunnel crossed the river in May 2017, the second one crossed it in June. The underwater tunnel construction is technologically comparable to the Eurostar high-speed railway service that traverses the Channel Tunnel between the UK and France. The TBM S-616 Urvi was deployed in March 2021 to construct the final stretch of the East-West Metro, 17m below Sealdah station.

The underground section of the East-West Metro project stretches from Phoolbagan and Howrah Maidan. The stretch will have a total of six underground stations at Phoolbagan, Sealdah, Esplanade, Mahakaran, Howrah and Howrah Maidan. The tunnel will cross the Hooghly River between Mahakaran and Howrah stations.



CONCLUSION

It is the 1st underwater metro project in India. This has motivated the Team KMRCL to face the challenges ahead – crossing below the Bankim Setu, Howrah Yard & Platforms more than 100 years old masonry building. This corridor connects three most important parts of the Kolkata Metropolitan area like - Howrah, Sealdah and Salt Lake Sector v. Due to soil settlement in Bowbazar, All the shifted residents have been brought back after repairing the minor cracks. A minimum fare of east-west metro project is Rs 5 for 2 km and a maximum fare of Rs 30. So it is cheap, time efficient and safe and millions of poor to rich any class of people can afford this and take advantage of this project. So, we can say this project will be the bringing the revolution in Kolkata transportation system as well as Indian transportation system.

मानव-जीवन ऐसा अनमोल तोहफा है, जो हर किसी को नहीं मिलता।
इसकी महत्ता, इसकी अहमियत बहुत खास होती है,
कुछ ऐसे भी लोग होते हैं, जिन्हें बस चंद साँसों की आस होती है।

तुमने नहीं सोचा कि,
किसी का तुम्हारी ज़िन्दगी पर तुमसे ज़्यादा अधिकार था,
उन्हें खुद से ज़्यादा, तुमसे प्यार था।
उनके आसमान के सूरज, चाँद, सितारे तुम थे,
उनकी जवानी की कमाई, बुढ़ापे के सहारे तुम थे।

तुमने नहीं सोचा कि,
ये अन्याय होगा उन मुसाफिरों के साथ जिनका सफर तुमसे बड़ा था,
जिनकी राहों में भी मुसीबतों का ऐसा ही एक पहाड़ खड़ा था,
हो सकता है अब उनके सपने भी सो जाएंगे,
उनकी हिम्मतों को ठेस पहुँचेगी, हौंसले कमजोर हो जाएंगे।

तुम अपनी कमजोरियों को नया आधार बना सकते थे,
अपनी हार के कारणों को जीत का हथियार बना सकते थे,
जहाँ कठिनाईयाँ भी नतमस्तक हो जाए,
ऐसी सूरत, ऐसा हाल बना सकते थे,
अपनी कामयाबी को हमसफरों के लिए मिसाल बना सकते थे।

मगर तुमने तो आँख मूंदकर,
अपने दिल की उस निर्बल आवाज़ को सुन लिया,
मुसीबतों से निजात पाने का सबसे कायर रास्ता चुन लिया।

ऐसे रास्तों का चुनाव करने वाला,
हमारा कोई दोस्त, भाई या रिश्तेदार हो सकता है,
जिसकी खुदकुशी का कारण भी कोई डरपोक विचार हो सकता है।
क्योंकि, लोग अक्सर लम्बे सफ़र में ऊब जाते हैं,
जहाँ से उभरना नामुमकिन हो, ऐसी गहराईओं में डूब जाते हैं।

इसलिए जब लगे कि कोई मुसाफिर, थक गया हो या उदास हो,
जिसे आत्मविश्वास की भूख हो या हौंसलों की प्यास हो,
तो एक हाथ उसकी ओर बढ़ा देना,
हो सकता है, उसे तुम्हारे सहारे की ही तलाश हो।

-सतीश अग्रहरी
-तीसरा वर्ष

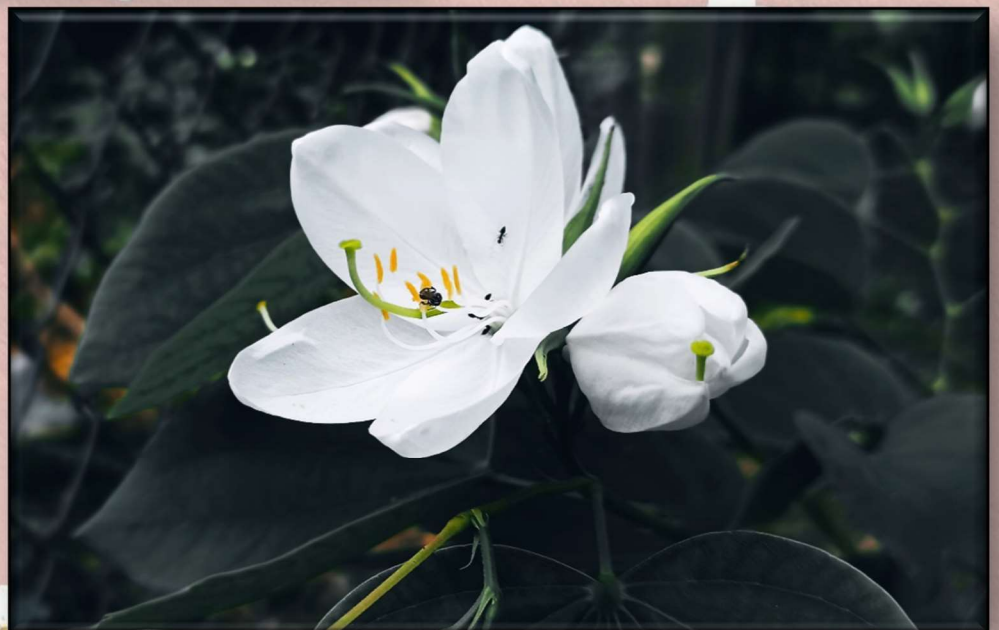
©Satish agraphari
Nojoto



Bloom in grace



- By AKASH SARKAR, 3rd Year



- By ANIT KUMAR DAS, 2ND Year

ESSAY ON SOURCES OF RENEWABLE ENERGY

-Samriddha Dhali, 2nd Year

Over the last few decades, energy demand has increased globally due to the rising average population of the world, modern technological developments and rising rate of electrification. Environmental experts believe that this demand can be met through various renewable energy options.

Importance of renewable energy

With the expansion of wind, water power and solar power in the world, the generation of electricity from geothermal energy can meet the world's maximum power needs. By adopting renewable energy, air pollution can be reduced by improving the quality of the world environment. Renewable energy sources are safe, self-sufficient and reliable, with huge quantities available throughout the year.

Most of the world's energy is derived from petroleum, natural gas, wood, sunlight and uranium. Our traditional energy sources will be exhausted in the coming few thousand years. We have finished it in a few minutes, which nature has taken millions of years to make. Environmental pollution, social and economic pressures and political crises make the problem more serious. Therefore, the development and use of renewable energy sources and having strong will power for it is the need of the day.

This requires large-scale use of renewable energy as well as strengthening its storage capacity. To voluntarily adopt renewable energy, one has to be emotionally and socially connected. To increase their reliability,



more control over renewable energy resources and better performance will have to be ensured.

210 billion (US \$ 3.1 billion) of government assistance is planned for the solar panel manufacturing industry to increase India's photovoltaic capacity. Under this scheme, India is committed to generate 40 percent of the total energy with green energy by 2030.

In view of limited energy resources and high cost of imports, the Prime Minister wants to focus on innovation and research in renewable energy sectors such as solar and wind energy. This will provide electricity to every family at a reasonable price.

" হারজিত "

-- রিম্মা চেল, দ্বিতীয় বর্ষ

যে যে পথিক
চলিছে দূর হতে দূরাশ্বে,
তুমি কাকে ডাবো !
যে ছিল তোমার স্বপ্নাশ্বে ?
ডাবিও না তারে
যার বক্ষে রাখিতে হাত ,
একলা মফরে এগিয়ে তুমিও
করিবেই বাজিমাণ ।

তুমি যাহার পানে চক্ষু ডেজাও
যে যে এখন বহুদূর ,
রাঙিয়ে তোলা দোলের নেশায়
ঘুচুক বিষাদ - সুর ।
রবির ছটায় রাত্রি হটে
দিনের অপেক্ষায় ,
দিন যদিও রাত ডাবে না
তাহলে কে রইলো প্রতীক্ষায় ?
এগিয়ে চলো সেই বিলেতে

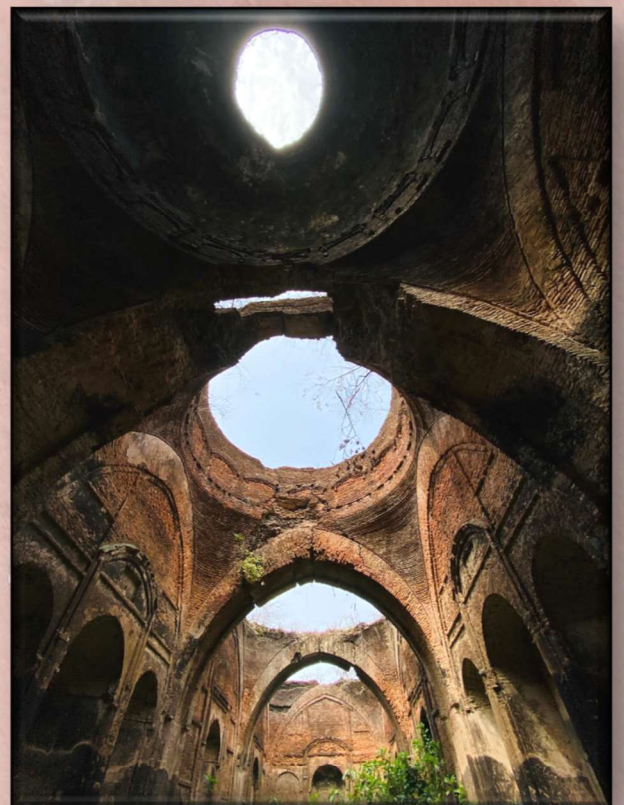
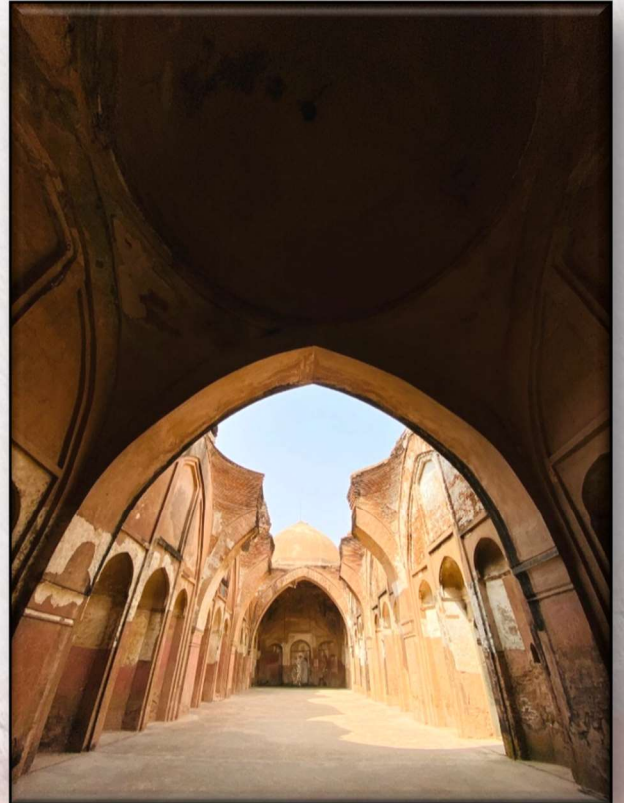
হইবে জীবন অমর ,
তোমার পানে কিছু থাকায়
হিংসা যদিও অমর ।
অশীত ঘিরে কাঠকয়লা
হোক না মেঘব যার ,
জয়ের পথে এগিয়ে গেলে
ফিরতে নেই আর ।

Standing through centuries

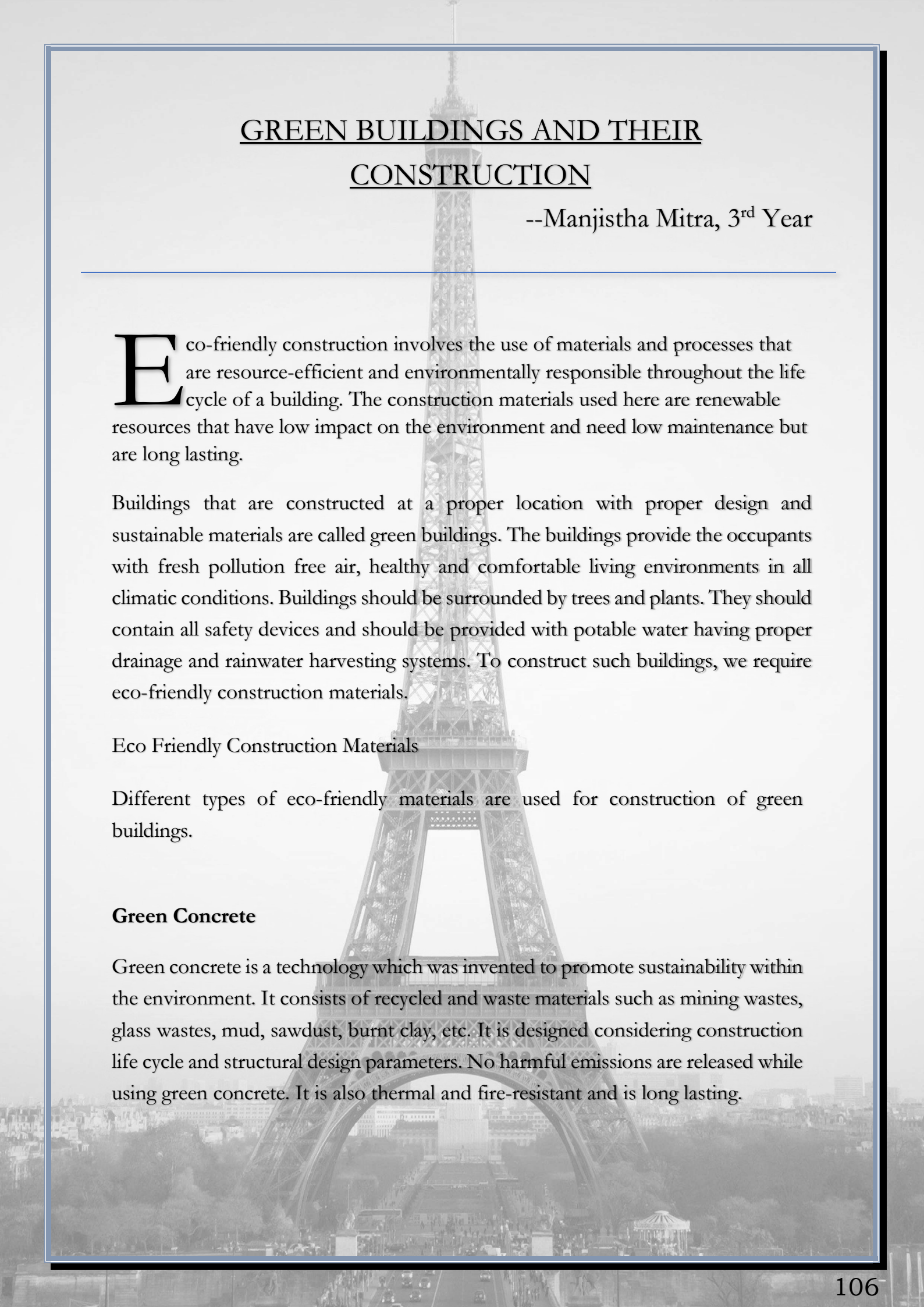


- By AKASH SARKAR, 3rd Year

Standing through centuries



- By AKASH SARKAR, 3rd Year



GREEN BUILDINGS AND THEIR CONSTRUCTION

--Manjitha Mitra, 3rd Year

Eco-friendly construction involves the use of materials and processes that are resource-efficient and environmentally responsible throughout the life cycle of a building. The construction materials used here are renewable resources that have low impact on the environment and need low maintenance but are long lasting.

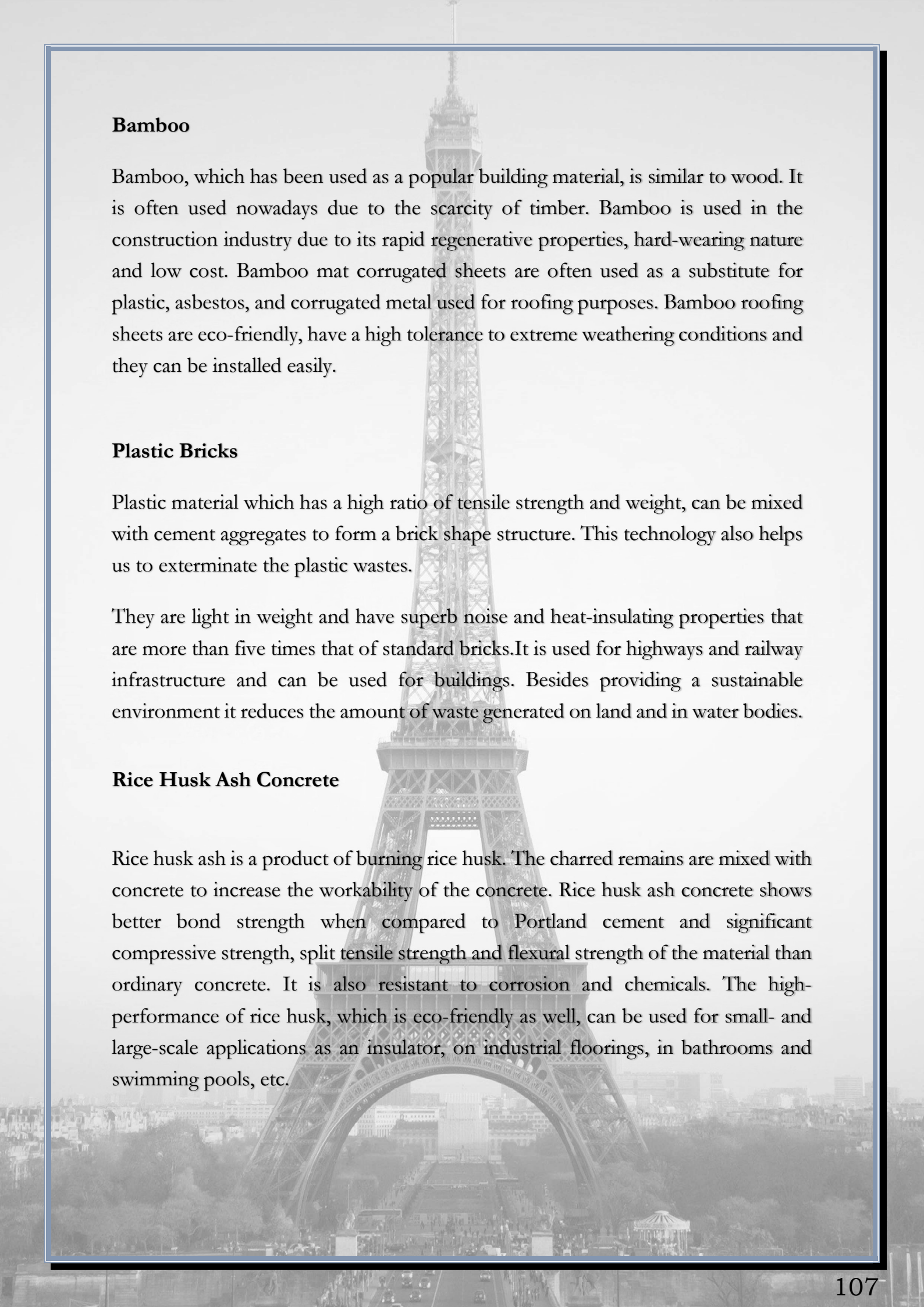
Buildings that are constructed at a proper location with proper design and sustainable materials are called green buildings. The buildings provide the occupants with fresh pollution free air, healthy and comfortable living environments in all climatic conditions. Buildings should be surrounded by trees and plants. They should contain all safety devices and should be provided with potable water having proper drainage and rainwater harvesting systems. To construct such buildings, we require eco-friendly construction materials.

Eco Friendly Construction Materials

Different types of eco-friendly materials are used for construction of green buildings.

Green Concrete

Green concrete is a technology which was invented to promote sustainability within the environment. It consists of recycled and waste materials such as mining wastes, glass wastes, mud, sawdust, burnt clay, etc. It is designed considering construction life cycle and structural design parameters. No harmful emissions are released while using green concrete. It is also thermal and fire-resistant and is long lasting.



Bamboo

Bamboo, which has been used as a popular building material, is similar to wood. It is often used nowadays due to the scarcity of timber. Bamboo is used in the construction industry due to its rapid regenerative properties, hard-wearing nature and low cost. Bamboo mat corrugated sheets are often used as a substitute for plastic, asbestos, and corrugated metal used for roofing purposes. Bamboo roofing sheets are eco-friendly, have a high tolerance to extreme weathering conditions and they can be installed easily.

Plastic Bricks

Plastic material which has a high ratio of tensile strength and weight, can be mixed with cement aggregates to form a brick shape structure. This technology also helps us to exterminate the plastic wastes.

They are light in weight and have superb noise and heat-insulating properties that are more than five times that of standard bricks. It is used for highways and railway infrastructure and can be used for buildings. Besides providing a sustainable environment it reduces the amount of waste generated on land and in water bodies.

Rice Husk Ash Concrete

Rice husk ash is a product of burning rice husk. The charred remains are mixed with concrete to increase the workability of the concrete. Rice husk ash concrete shows better bond strength when compared to Portland cement and significant compressive strength, split tensile strength and flexural strength of the material than ordinary concrete. It is also resistant to corrosion and chemicals. The high-performance of rice husk, which is eco-friendly as well, can be used for small- and large-scale applications as an insulator, on industrial floorings, in bathrooms and swimming pools, etc.

Advantages of Green Buildings

- **Low Maintenance and low operation cost**

In green buildings, different technical strategies are used that ensure efficient use of water and energy. A lot of daylight is allowed to enter the buildings, which vastly reduces the amount of power used in lighting systems. This helps the user to reduce their electricity cost.

- **Energy Efficiency**

Renewable energy sources such as solar panels are installed which reduces use of fossil fuels

- **Water Efficiency**

Green buildings allow the use of alternative sources of water such as rainwater, reducing water waste through the installation of plumbing fixtures that are efficient and reducing the strain on shared water resources by installing systems that purify water and enable recycling.

- **Reduces Strain on Local Resources**

As population increases, local shared resources such as water and energy come under considerable pressure. Through the use of technologies and processes that increase water and energy efficiency, green buildings can reduce this strain.

- **Material Efficiency**

To achieve material efficiency, green building companies use materials that are long lasting, recycle and reuse some products, design buildings in a manner that allow for the use of fewer materials and employ processes that use less water, raw materials, and energy.

- **Better Environment And Good Health**

By reducing usage of energy sources that pollute the environment such as coal, green buildings contribute to keeping the environment clean. In addition, by reducing the levels of carbon dioxide emitted to the atmosphere, they help to lessen the pace of climate change. Toxic substances like carcinogens released from plastic by products causing several health issues can be avoided in green buildings which provides residents a healthy life.

To The SKY

Harsh Kumar
1st Year

At the beginning you take birth,
And then you cry.
Everyone teaches you what's right or wrong,
But they lie.

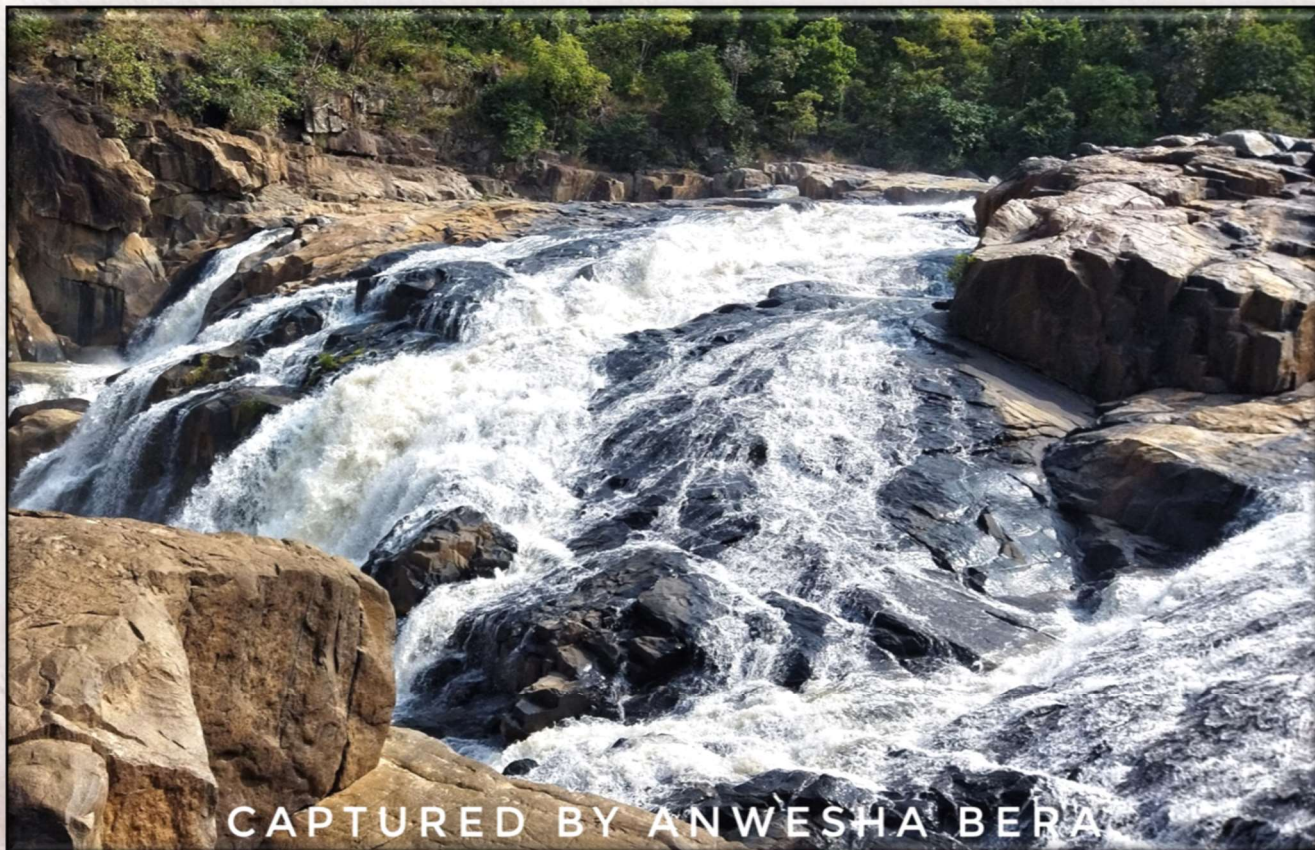
Everyone sets goal for you,
And they wanted you to fly.
But they never thought,
For them you have make your own dreams die.

You win you lose, you become successful,
So everyone wanted you to become tough guy.
But very time your mental torture,
Make you to say the world GOODBYE!

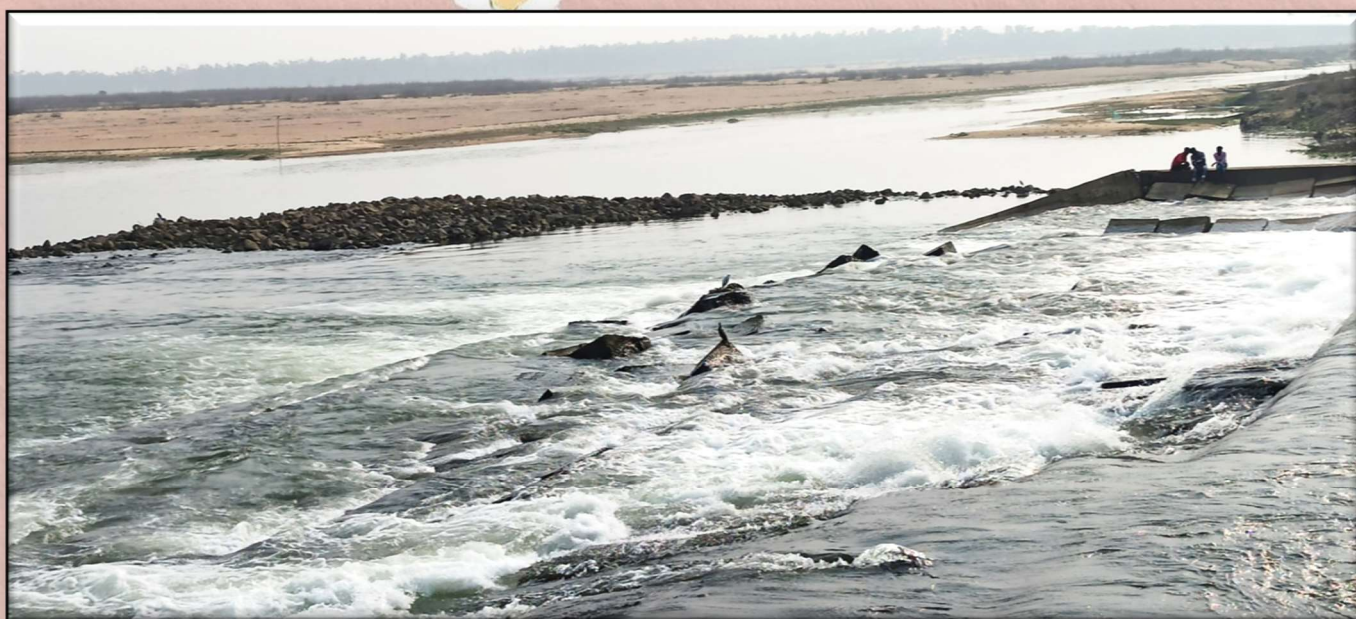
You can't speak about this to anyone,
Because you are too shy.
So you can't find the solution,
And then you think the best is to die.

At last when you fade away,
And go to sky.
You get all the love, attention and support,
For which you used to cry.

Flow of life



- By ANWESHA BERA, 3rd Year



- By ANIT KUMAR DAS, 2ND Year

EFFECT OF STOCK MARKET TO YOUNGSTER AFTER IT GOT ONLINE AND EASY

--Niharika Nidhi, 3rd year

For many young adult it seems easier to put off any investing decisions until their financial situations becomes at least theoretically more stable. An investor age influences the amount of risk they can withstand young people with years of earning ahead of them can afford to take more risk in the investment activities. While individual reaching retirement year may gravitate towards low risk- or risk-free investment.

Young Investor also have the flexibility and time to study investing and learn from their success and failure. Since investing has a fairly lengthy learning curve, young adult are at



an advantage because they have years to study the market and refine their investing strategies as with the increase risk that can be absorbed by young investor so too they can overcome investing mistake because they have the time needed to recover. After the stock market got online it became more easier for the young generation they can able to study, research, apply online investing tools and techniques. Online trading platform provides countless opportunity for both fundamental and technical analysis. Technology including online opportunities, social media, apps

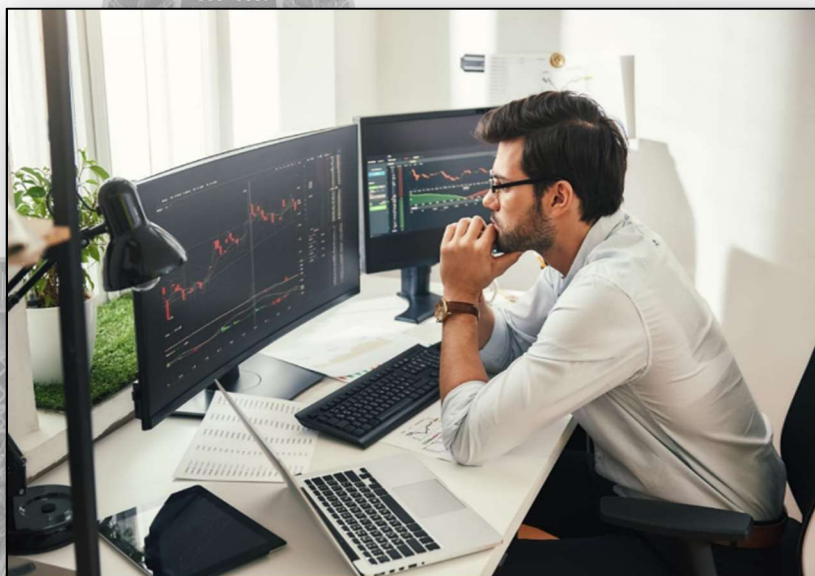
and all contributes to young investor knowledge base experience confidence and expertise.

The other primary benefit that the internet had on investing is the effect it has on lowering fees for the investors. In particular the young investor has seen a drastic decline in the commission rates they have to pay to trade securities. These days it's very common to an online broker to offer at vary rate to make a common stock trade. Prior to the wide availability discount broker, full service broker was able to extract their control over the market and charge what now seems like exorbitant commission rates.



The Young Investors participation in Indian Stock Market is Rising says a SBI Report, pointing out that 44.7 lacs Young Investor

account has been added during the 2 months of this fiscal year. The number of Individual Investor has increased by whooping 142lacs in the financial year 2021, with 122.5lacs new account CDSL and 19.5lacs in NSDL, the report





says also the shares of individual investors in total turnover on stock exchange has risen to 45% from 39% in march 2020 as shown by NSE Data.

With the onset of pandemic and subsequent lockdown household financial showed a significant jump in Q1 FY21 and a sharp modulation in Q2 says in SBI Report. However, the data shows that currency in circulation again increased in Q3 and Q4 FY21 with incremental amount of 80,501 crore and 95,181 crore respectively compared to 17,225 crore in Q1.

Overall for the Youngster after the stock market got online had a profound effect on how the investor obtain financial information equally important, it has lowered cost significant for most of the financial market participant.

There has been the significant increase in the market capitalization in the stock market across the world in the last one year. However, in India it has been higher then the other major countries. The market capitalization of the BSE Sensex has increased by 1.8 times its value in one year ago. Russia had 1.6times increased followed by Brazil, China, France and South Africa.

रंग की दुनियाँ

समीर जमशेद, तृतीय वर्ष

1 रंग है हुस्न तेरा

7 रंगों के रंग से वाक़िफ़ है ये दुनियाँ

तेरा चेहरा सीसे गुलाब जैसी

और उसपर फीकी परी ये दुनियाँ

तेरे गालों की सुर्ख लाली पर

सिलवट परी ये दिनियाँ

गुलाल, अबीर, सब तेरे पेहलु पर

तेरे दामन के रंग की ये दुनियाँ

राधा बनी श्याम की

मुरली के धुन पर नाचे ये दुनियाँ

Vibrant Gloss



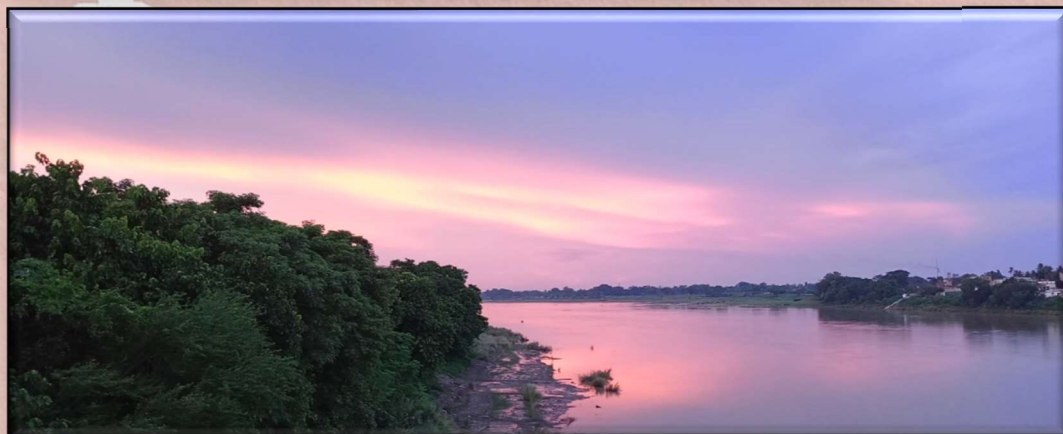
- By **SAYANTAN DAS**, 3rd Year



- By **RITISH RANJAN**,
3rd Year



- By **PALLAVI DEY**, 3RD Year



- By **PRITHVIRAJ ROY**, 2ND Year

NEW POST BOX DESIGN FOR INDIAN POSTAL SERVICE

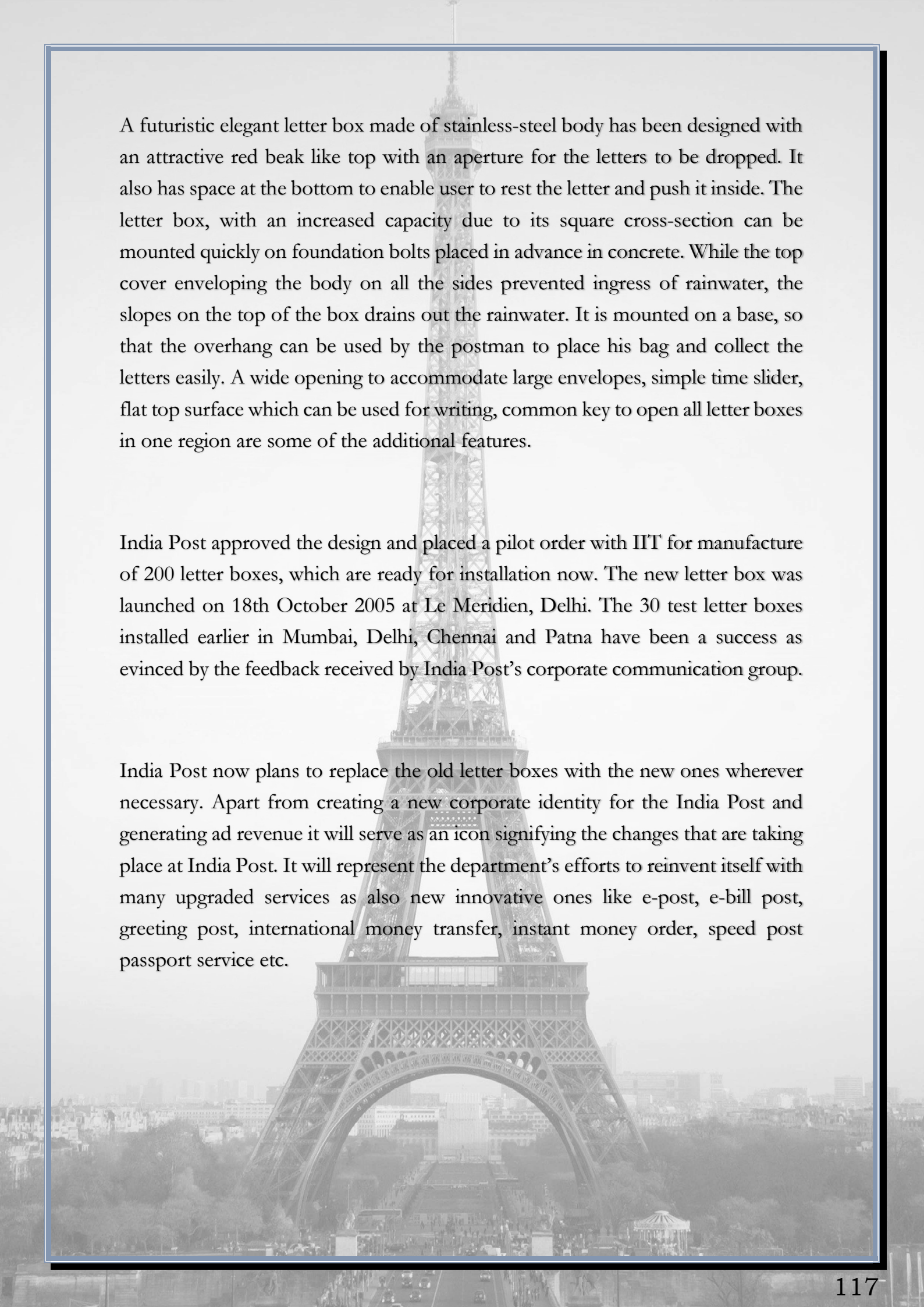
--Angshuman Kar ,4th year



A study conducted prior to designing the letter box among postal staff and public to obtain feedback on the difficulties they faced while using the box as also the additional features they would like to have to make it more user-friendly.

- The existing post boxes made of mild steel rusted
- rapidly and were easily damaged and users would
- often hesitate to post letters in such boxes
- Letters would get wet during rains.
- Postmen found it inconvenient to collect letters.
- There was overflow of letters during festivals and
- New Year.

The user insights were converted into idea sketches wherein the core issues regarding seepage of rainwater, rusting of letterboxes and ease of collection of letters were addressed. The ideas were clustered into groups and in line with the requirement of maintenance free letterbox, the idea clusters were based on the materials used for manufacture.



A futuristic elegant letter box made of stainless-steel body has been designed with an attractive red beak like top with an aperture for the letters to be dropped. It also has space at the bottom to enable user to rest the letter and push it inside. The letter box, with an increased capacity due to its square cross-section can be mounted quickly on foundation bolts placed in advance in concrete. While the top cover enveloping the body on all the sides prevented ingress of rainwater, the slopes on the top of the box drains out the rainwater. It is mounted on a base, so that the overhang can be used by the postman to place his bag and collect the letters easily. A wide opening to accommodate large envelopes, simple time slider, flat top surface which can be used for writing, common key to open all letter boxes in one region are some of the additional features.

India Post approved the design and placed a pilot order with IIT for manufacture of 200 letter boxes, which are ready for installation now. The new letter box was launched on 18th October 2005 at Le Meridien, Delhi. The 30 test letter boxes installed earlier in Mumbai, Delhi, Chennai and Patna have been a success as evinced by the feedback received by India Post's corporate communication group.

India Post now plans to replace the old letter boxes with the new ones wherever necessary. Apart from creating a new corporate identity for the India Post and generating ad revenue it will serve as an icon signifying the changes that are taking place at India Post. It will represent the department's efforts to reinvent itself with many upgraded services as also new innovative ones like e-post, e-bill post, greeting post, international money transfer, instant money order, speed post passport service etc.

দোষ

- সাত্ত্বিক মন্ডল, দ্বিতীয় বর্ষ

হাতের উপর হাত রাখা যে অমী,
জানি না, কি বলে মেই রিষ্টাকে ?
আত্মা থেকে যারা মোটেই ছিন্ন নয়,
অময় তাদের বন্ধু বলে আজ ডাকে ।
শিরার ভিতর চলছে বয়ে ধুলোখোলা,
শরীর মনের মধ্যে কত দুরিয়া?
বান্ধবতা নীরব সুরে বাতাস হয়,
যেমন পালায় স্বরচিত পদ্যরা ।
কখন ছিল সব স্পর্শকাতর, খুব ভারী,
ব্যস্ত পলক মিলনেরই আয়োজনে ।
খবর রাখুক মেঘদূতেরাই আড্ডাদের,
বাড়ছে শুধুই স্মৃতির পাহাড়, গুজনে ।
মহামারীর শেষ বেলাতে করি স্বীকার
হাটছি সাথে, বলাছি তোদের, করিম রাগ !
যেতে হলে আমিই যাবো নিরুদ্দেশ,
আদর-বাঁধন অক্ষত থাক, মারবিহাণ ॥

Shearing the darkness



- By **SATYAPRIYA MAHATO**,
2ND Year



- By **SONALI**,



- By **SUSHMITA CHAKRABORTY**, **3rd Year**

THE IMPACT OF COVID -19 ON STUDENT EQUALITY AND INCLUSION IN INDIA

--Ritu raj, 2nd year

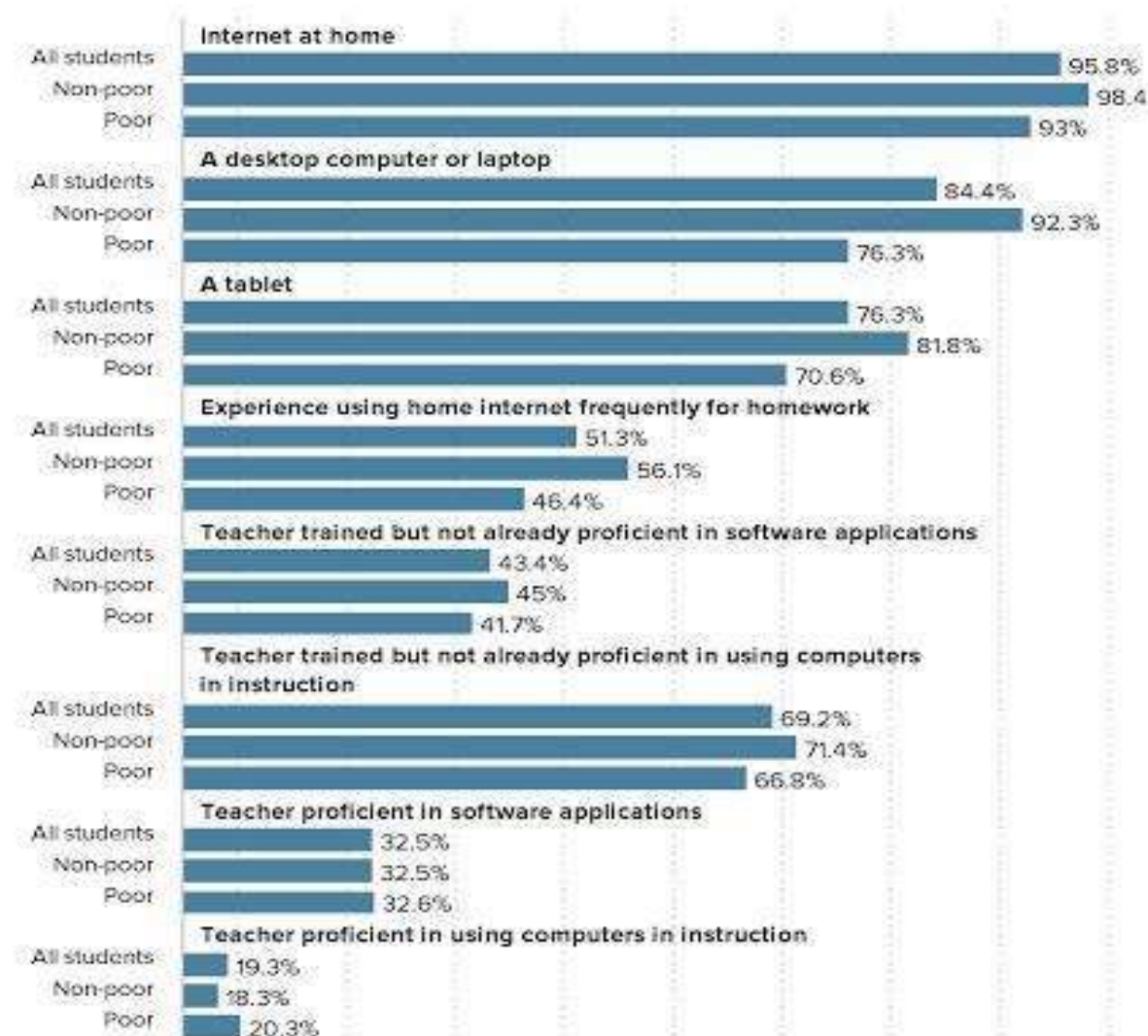
A study from the world economic forum found “some 220 million Indians sustained on an expenditure level of less than Rs 32/day -the poverty line for the rular India – by the last headcount of the poor in India in 2013.covid-19 pandemic create very critical situation not only to the health of people but also impact very badly on daily life of people. Education is one of the big challenges among us. Pandemic education became Fully digital, mode of study drastically changed .As we know only 21 percent of India population use internet in 2017 and it’s increases to 61 percent in year 2021 after pandemic . while



rest of population might not access to digital learning resources. Those students whose economic condition is good they easily adopted the digital mode but million of students even can't afford data charges. How vulnerable students afford mobile , laptop & tab even they can't afford proper nutrition .Due to this millions of students have to discontinue their classes due to lack of resources. This pandemic hit very hardly to students equality and inclusion in our country.

Not all students are set up for online learning, and students who are poor have less access to key tools

Share of eighth-graders with access to online learning, by income level and tool, 2017



Notes: Poor students are students eligible for the federal free or reduced-price lunch programs. Non-poor students are students who are ineligible for those programs. Frequent use of internet at home for homework means every day or almost every day. Students' teachers were either "already proficient" in, "have not" received training in, or "had received training" in "software applications" and "integrating computers into instruction" in the last two years.

Source: 2017 National Assessment of Educational Progress (NAEP), eighth-grade reading sample microdata from the U.S. Department of Education's National Center for Education Statistics. Chart adapted from Figure D in García, Weiss, and Engdahl 2020.

Economic Policy Institute

বৃষ্টি আমার আগে

-- সাত্ত্বিক মন্ডল, দ্বিতীয় বর্ষ

নৈঃশব্দেও আছে অনিবার্য হাহাকার

আধো ঘুমের আচ্ছন্নতার মতোই ।

ফিরে আসে জীবনের লালসা,

দুঃখী হয়ে যায় মৃতদের মুখ ।

মেথানেও জীবন আছে । জীবনের স্বাদ রহিয়াছে ।

কালের প্রশ্নের উত্তরে একই দিকে কাঁটা ঘোরে

আরাটা দিন

শুকনো ঝকাল ভিজিয়ে দেয় দমকা বৃষ্টি

শুকনো জীবন ভিজিয়ে দেয় অবিশ্বাস

ভিজে মন ঝলমে দেয় হতাশা,

জীবনের খারে দাঁড়ালে মৃত্যুও টের পেত তার উচ্চাস ।

রক্তে ভিজে যায় রোজকার বিছানায় পাশা স্বপ্ন ।

তোমার মধ্যস্থে বেঁচে আছে

আলি আকবর আর রবিশঙ্করের যুগলবন্দী

তোমার ঘুমন্ত রাতে জেগে থাকে রাখা,

বৃষ্টির অপেক্ষায় ।

প্রহর পেরিয়ে পরে থাকে প্রেমিকের স্বপ্ন;-

নীল মৃত্যু জুড়ে লাল রক্ত ।

অমন্ত দিন ধরে বৃষ্টি হৃদয় বানায়,

চোখ জলপূর্ণ হয়ে যায় ।

ছুপিমাঝে শহরে নেমে আসে অশ্রু,

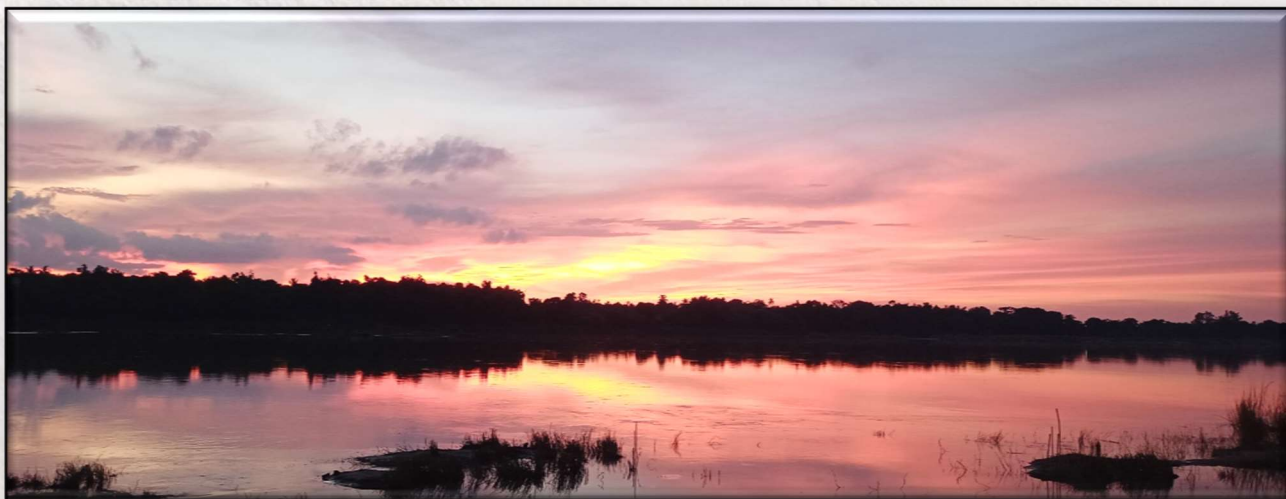
আঁধার রাতের প্রেমের মতো এসে পরে মেঘ,

অচকিত আলিঙ্গনের মতো জাপটে ধরে ঝোড়ো হাওয়া-

তারপর, নেমে আসে বৃষ্টি,

এক অনিবার্য গভীর ছুসনের মতন ॥

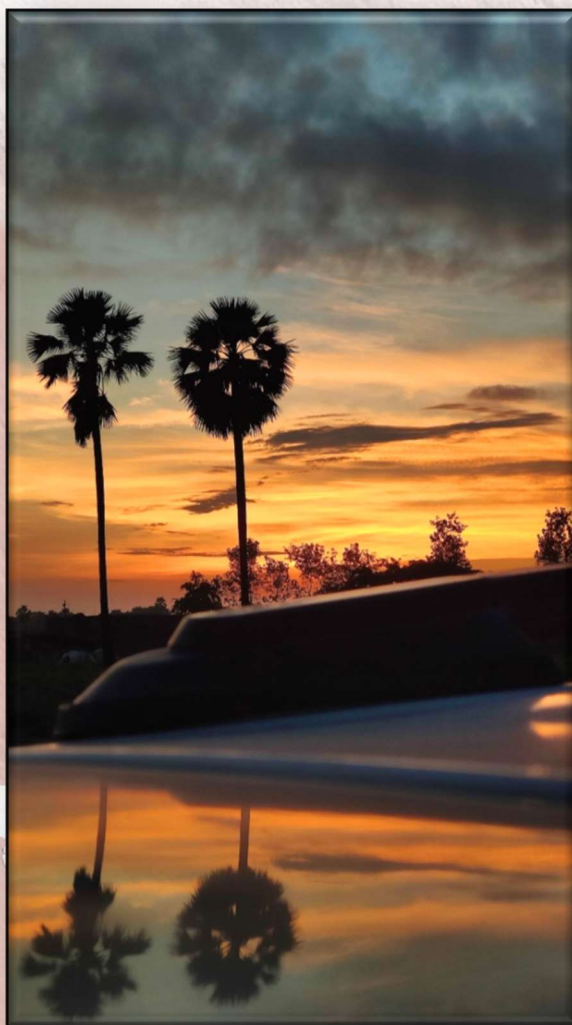
Gloomy Evening



- By **PRITHVIRAJ ROY**, 2ND Year



- By **AKASH CHAKRABORTY**, 2ND Year



- By **MD. SIBGHATULLAH**, 3rd Year

PLASTIC ROAD

--Prasun Banerjee, 2nd Year

Introduction

Plastic pollution has become one of the most pressing environmental issues, as rapidly increasing production of disposable plastic products overwhelms the world's ability to deal with them. Plastic pollution is most visible in developing Asian and African nations, where garbage collection systems are often inefficient or non-existent. Researchers estimate that more than 8.3 billion tonnes of plastic have been produced since the early 1950s. About 60% of that plastic has ended up in either a landfill or the natural environment. Therefore, it is very important to decrease the plastic use and recycle of it.



Prof. Rajagopalan Vasudevan is an Indian scientist who is well known as plastic man of India. He is currently a chemistry professor in Thiagarajar College of Engineering, Madurai. He

developed an innovative method to reuse plastic waste to construct better, more durable and very cost-effective roads. He thought up the idea of shredding plastic waste, mixing it with bitumen and using the polymerized mix in road construction. This method will help in making roads much faster and also will save environment from dangerous plastic waste.

What is Plastic Road?

Plastic roads are roads made either entirely of plastic or of composites of plastic with other materials. Plastic roads are different from standard roads in the respect

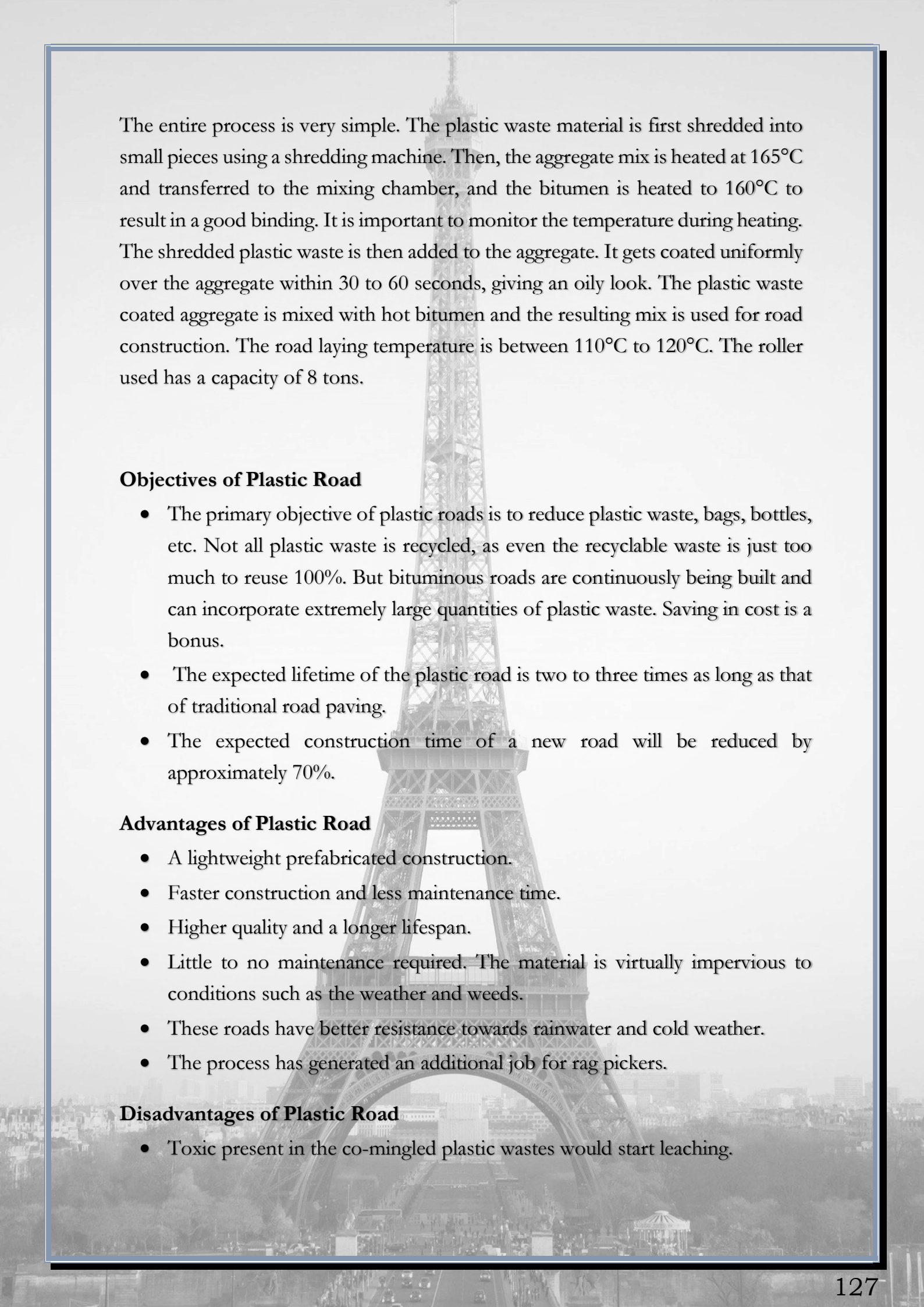
that standard roads are made from asphalt concrete, which consists of mineral aggregates and asphalt. Currently, there are no records of regular roads made purely of plastic. Plastic composite roads, however, have existed and demonstrate characteristics superior to regular asphalt concrete roads; specifically, they show better wear resistance. The implementation of plastics in roads also opens a new option for recycling post-consumer plastics. This technology is getting replicated very fast in Jharkhand, after the plastic road laid at Jamshedpur city on 30 November 2011.

Plastic Road Construction Process

The various steps of plastic road construction are listed below.

- Collecting waste plastics, including plastic carry bags, cups, soft and hard foams, and laminated plastics.
- Cleaning it by washing.
- Shredding it to a uniform size.
- Melting the waste plastics at 165°C, and blending them with hot aggregates and bitumen, and using this mixture to lay the road.





The entire process is very simple. The plastic waste material is first shredded into small pieces using a shredding machine. Then, the aggregate mix is heated at 165°C and transferred to the mixing chamber, and the bitumen is heated to 160°C to result in a good binding. It is important to monitor the temperature during heating. The shredded plastic waste is then added to the aggregate. It gets coated uniformly over the aggregate within 30 to 60 seconds, giving an oily look. The plastic waste coated aggregate is mixed with hot bitumen and the resulting mix is used for road construction. The road laying temperature is between 110°C to 120°C. The roller used has a capacity of 8 tons.

Objectives of Plastic Road

- The primary objective of plastic roads is to reduce plastic waste, bags, bottles, etc. Not all plastic waste is recycled, as even the recyclable waste is just too much to reuse 100%. But bituminous roads are continuously being built and can incorporate extremely large quantities of plastic waste. Saving in cost is a bonus.
- The expected lifetime of the plastic road is two to three times as long as that of traditional road paving.
- The expected construction time of a new road will be reduced by approximately 70%.

Advantages of Plastic Road

- A lightweight prefabricated construction.
- Faster construction and less maintenance time.
- Higher quality and a longer lifespan.
- Little to no maintenance required. The material is virtually impervious to conditions such as the weather and weeds.
- These roads have better resistance towards rainwater and cold weather.
- The process has generated an additional job for rag pickers.

Disadvantages of Plastic Road

- Toxic present in the co-mingled plastic wastes would start leaching.

- But the presence of chlorine will definitely release HCL gas.

Plastic Roads in India

Chennai was among the first cities globally to adapt the technology in a big way



when the municipality commissioned 1000 km of plastic roads in 2004. The first plastic road in Tamil Nadu was laid down in Kambainallur, a Panchayat Town of the Dharmapuri district as per the

guidelines of then Chief Minister. Since then, all major municipalities in India have experimented with the technology including Pune, Mumbai, Surat, Indore, Delhi, Lucknow, etc. So far 703 km of National Highways have been constructed with use of waste plastic in “wearing coat of flexible pavement”.

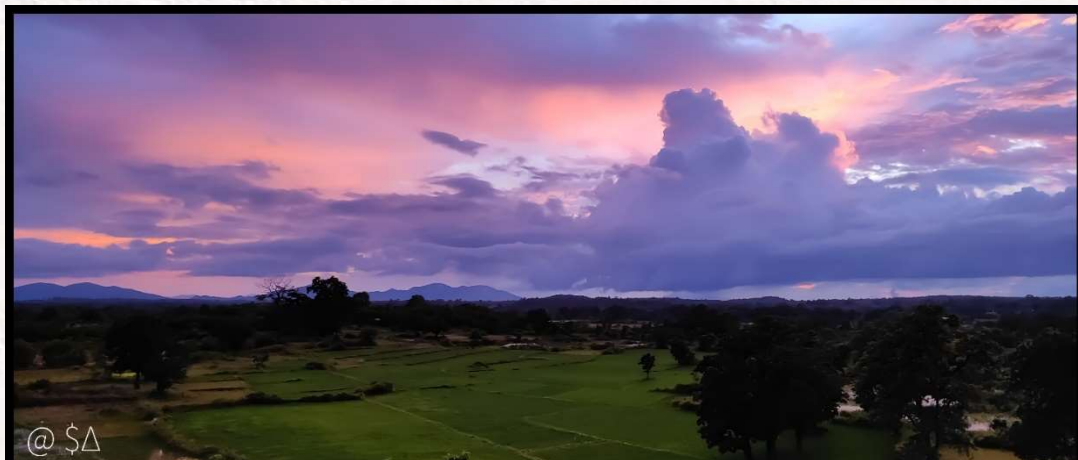
Conclusion

Plastics increase the melting point of the bitumen. The use of this plastics in road construction is an innovative technology which not only strengthens the road but also increases the road life. The analysis in this paper reveals that durability, strength and cost. It is hoped that in near future we will have strong, durable and eco-friendly roads which will relieve the earth from all type of plastic waste.

Future Scope

As the population increases, the solid waste also increases proportionally. The best alternative is the usage of waste as construction material assuring a good disposal. As this method is economic the practice would be on satisfactory extent aiding the future generations for a good solid waste management.

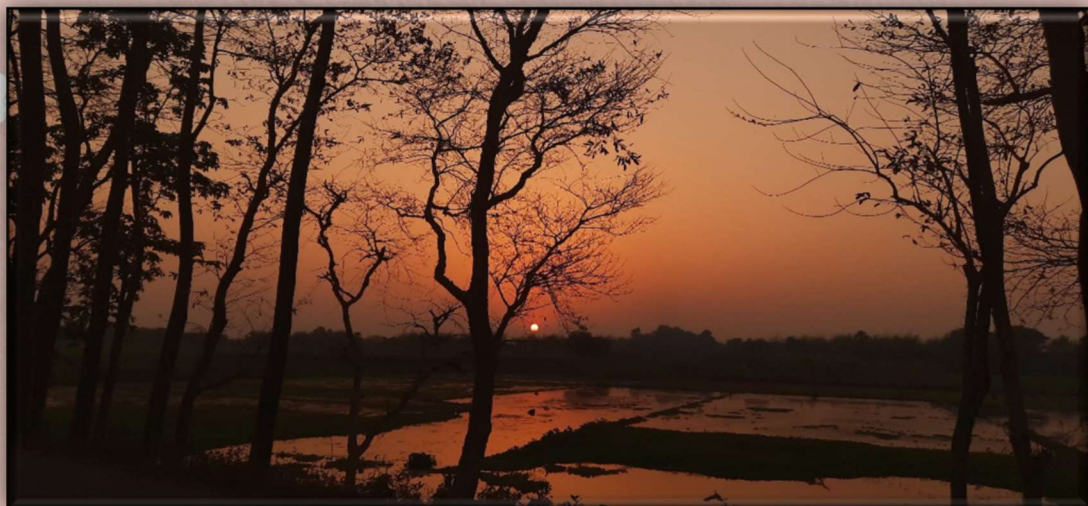
Gloomy Evening



- By SOUBARNA ADAK, 3rd Year



- By SATYAPRIYA MAHATO, 2ND Year



- By SAYANTAN DUTTA, 3rd Year

SOLAR DOME KOLKATA

--Swagatam Ghosh, 2nd Year

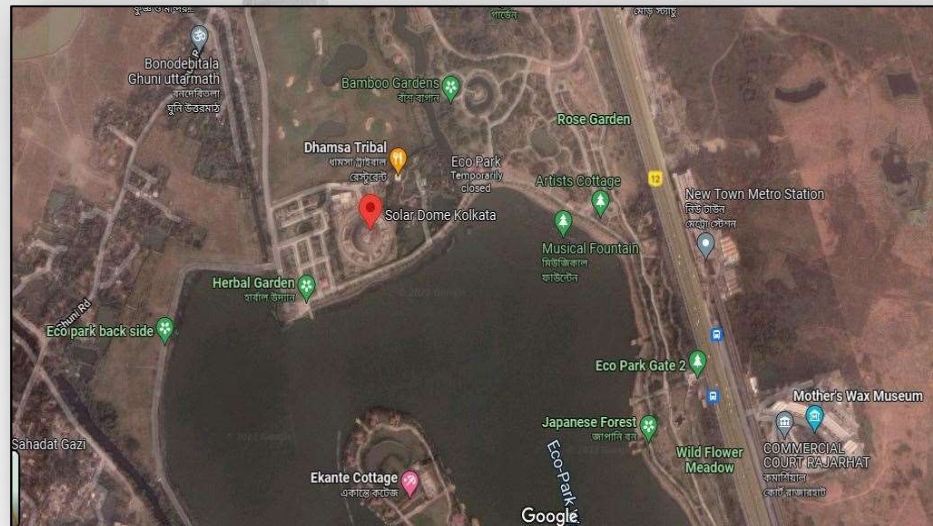


Solar Dome (সৌর গোলক), is India's first largest dome shaped museum-cum-hall and auditorium, which has been under construction since 2016, is likely to be completed by the year-end. The project is a joint effort by West Bengal State Electricity Distribution Company Limited (WBSEDCL) and Housing Infrastructure Development Corporation (HIDCO). This mega-project is situated in Eco Park, Newtown, West Bengal Pin-700156, adjacent to the herbal garden.

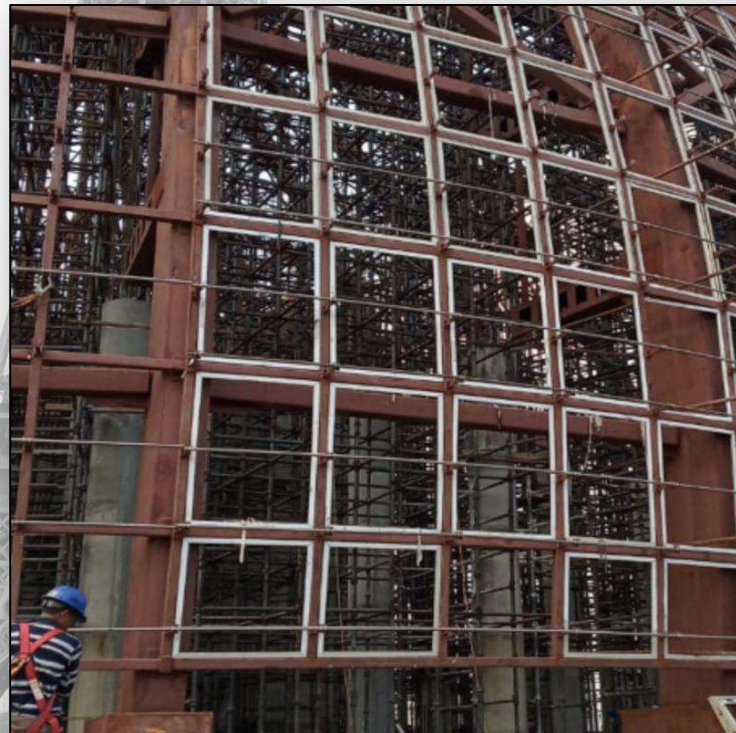
Solar energy is the energy received by the Earth from the Sun. This energy is in the form of solar radiation, which makes the production of solar electricity possible. It is a non-conventional energy and zero carbon energy. The solar dome

is a truncated geodetic spherical dome with more than 2000 active solar panels on its outer side for continuous generation of solar power throughout the day. The solar

dome is designed to accept both direct and indirect rays of the Sun to convert it to electrical energy. It is capable of generating 180KW per hour on a sunny day and around 100-120 KW per hour on a cloudy day. The solar energy generated will be used for inside lighting as well as illuminating the nearby streetlights, according to officials.

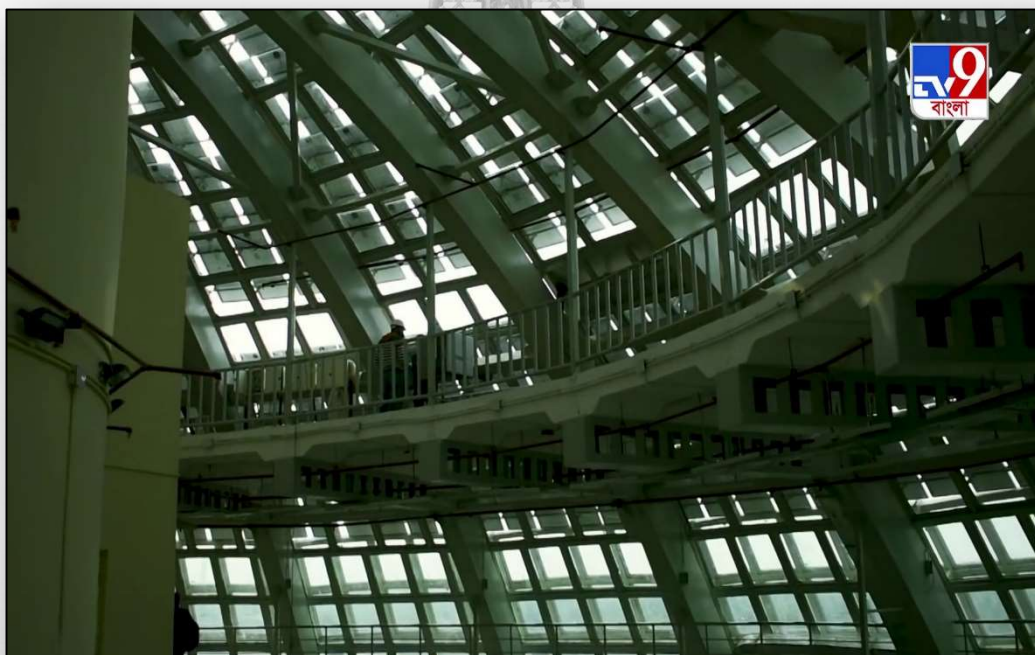


The solar dome is constructed over 3.3 acres of land near gate 6, next to the herbal garden. The solar dome is a 27-meter high and 45-meter diameter mega structure, having 4 floors connected with a spiral ramp for visitors to go upstairs and 2 central lifts with 15-person capacity each, for visitors to go downstairs. The total project cost is ₹30 crore. It

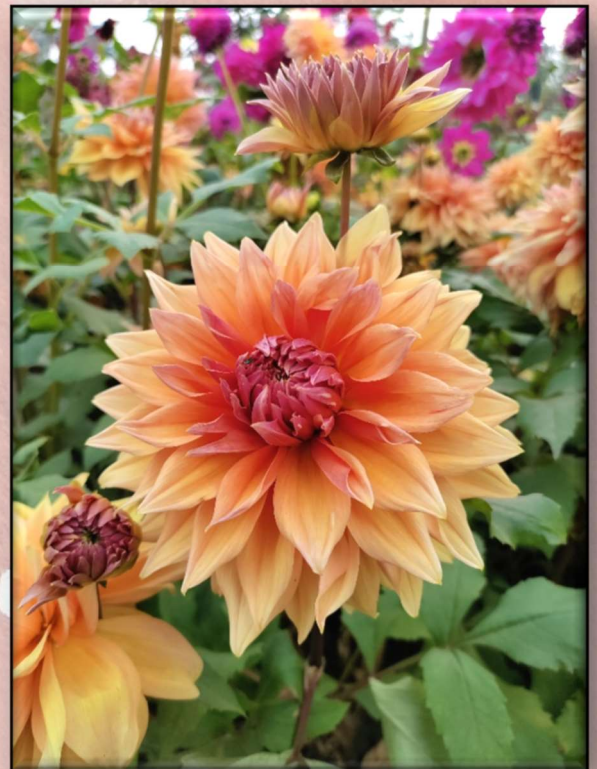
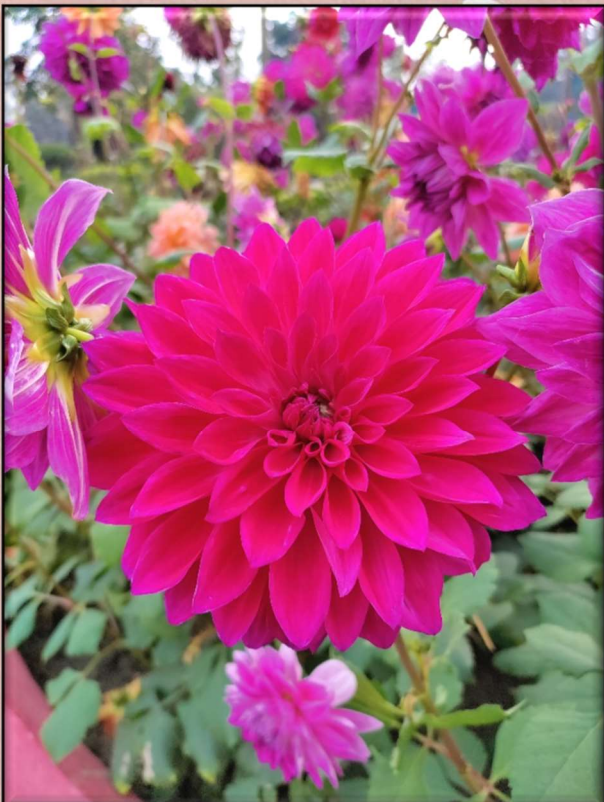


will house a planetarium, marine aquarium, gallery and a view point from which the visitors will have a panoramic view of Rajarhat-Newtown. The dome will act as a museum displaying various uses of unconventional energy and it will also have games in which visitors can score points which they can later redeem for various facilities during their visit. Officials have confirmed that they will introduce more attractions like Laser-show, overhead aquarium, food court, hi-tech displays of international standard and so on. On opening, visitors will have access on the lower 3 floors but the top most floor will not be accessible by common people.

This mega project is targeted to be complete within 2022 but officials hope to launch at least the first floor of the solar dome globe in the coming months. To enter the dome, visitors need to buy a ticket pricing of which will be announced later. This dome is expected to attract visitors from all over the world to visit city of joy Kolkata. Also, it is targeted to attract scientists and students for their research purposes and to make a step toward pollution free energy.



Floral Don't tell, They show



- By SURAJ KUMAR, 3rd Year



GLOBAL WARMING

-- Sumangal Sarkar, 2nd year

Global warming has become a global warning for all of us. Due to large scale burning of fossil fuel and other human activities has increased the level of greenhouse gases in the atmosphere. As a result, the temperature of the earth is increasing. This is what we call global warming. Due to global warming, the sea levels are rising faster, threatening to flood in coastal areas, wetlands and many low-lying areas. Rainfall, snowfall & weather pattern have changes across the globe. If it is not checked, life on earth will be buried into the sea one day.

Making no further delay, we should take protective measures against global warming. We should save drinking water & electricity, use ecofriendly things, minimize the use of motor vehicles, reduce consumption of red meat and plant trees & more trees as much as one can.

By adopting sustainable lifestyle and afforestation, we can save our plant, our lovely planet Earth.

CITY OF JOY

- অন্নভিষা মাজী, দ্বিতীয় বর্ষ

এই শহরেই জীবন শুরু ব্যস্ততার হাত ধরে
এখন যে বড়েই দুর্বল, চাইনা তোমায় যেতে ছেড়ে ।
শৈশবের সেই দিনগুলো খুব মনে পড়ে আজ
পূজোর দিন রঙীন আলোয় তিলোত্তমার মাজ ।
ডিক্টোরিয়া মাঠের সেই ফুচকা আর ডাজা কড়াই
ডোরের আলোয় নাচ দেখাতো ফিঙে আর চড়াই ।
শীতের ডোরে কুম্বাশা মাখা কোমল স্নিগ্ধ রূপ
ছিল যেন মায়াডরা অন্ধকূপ ।
তারই মধ্যে বেড়ে ওঠা নিজের কৈশোর কে পাওয়া
মনের দোলায় দোলা দিতো বসন্তের হাওয়া ।
হঠাৎ করেই পেয়েছিলাম প্রথম ভালোবাসা
তাকে নিয়েই স্বপ্ন দেখি, মনে রাখি আশা ।
পড়ন্ত দুপুরে ছাদে উঠে চুরি করা আচার
সেই সব স্মৃতি হলো বঙ্গজীবন সন্মচার ।
হঠাৎ করে বদলে গেলো চেনা পরিবেশ
সেইসবই অতীত হয়ে মাখায় স্মৃতির আবেশ
বদলে গেছি আমরা, কোমরে বেলে মাঁটি
ধর্মতলার ছুটেপাথে মুখ, এই আছে শহরটা
ব্যস্ততা আর আধুনিকতার নিত্য সঙ্গী জ্যাম
ঘন্টা বাজিয়ে আজও চলে নৃতিস্থের ড্রাম ।

বইমেলায় ডিড় আর Coffee house এর স্মৃতি

এক দেয়াল চা আর সাথে টেক স্নান রাজনীতি

যতই থাকুক বর্ষাতি

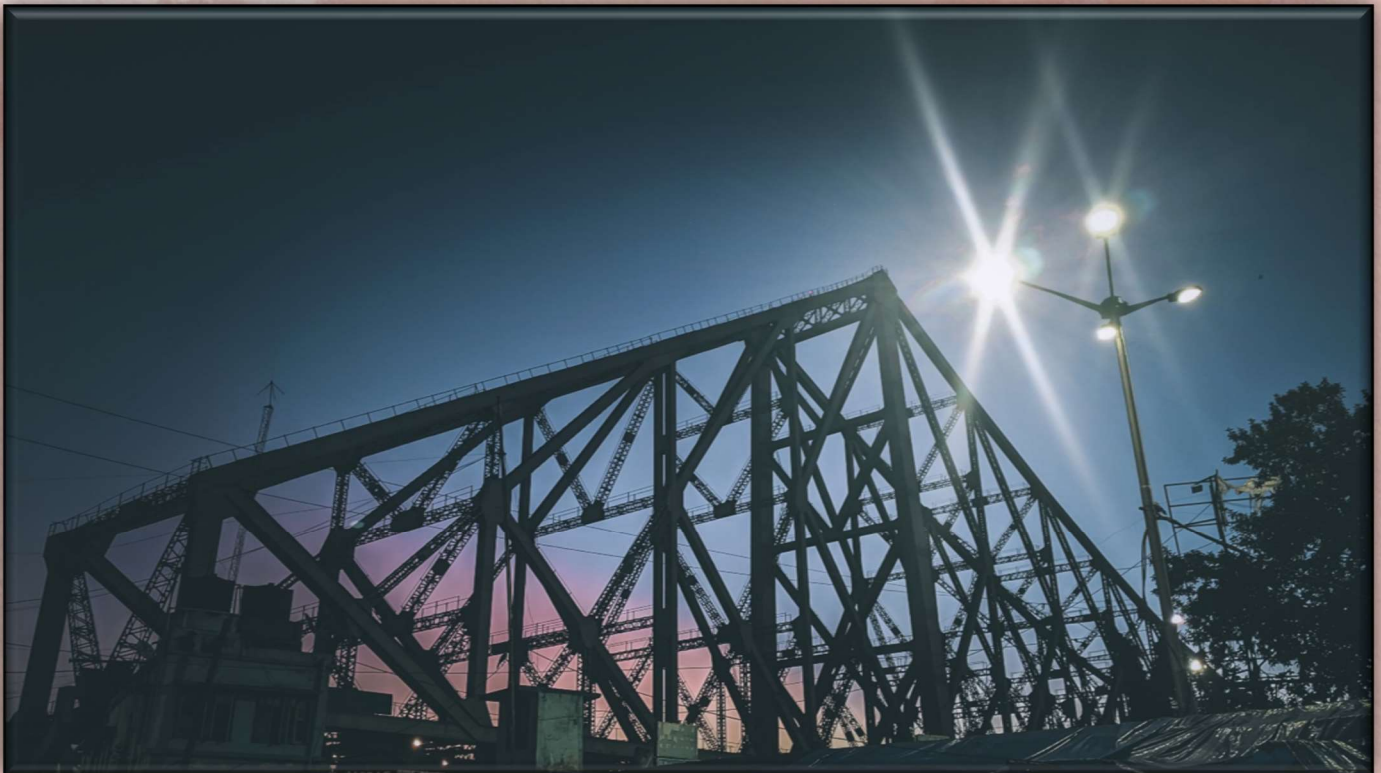
বর্ষার প্রেমের আখ্য K.C.Pal এর ছাড়া

তুমিই আমার প্রথম প্রেম

City of Joy 'কলকাতা' ।।



City of Joy



- By SATYAPRIYA MAHATO, 2ND Year

To travel is to live



- By ABHAY SAHA, 2nd Year

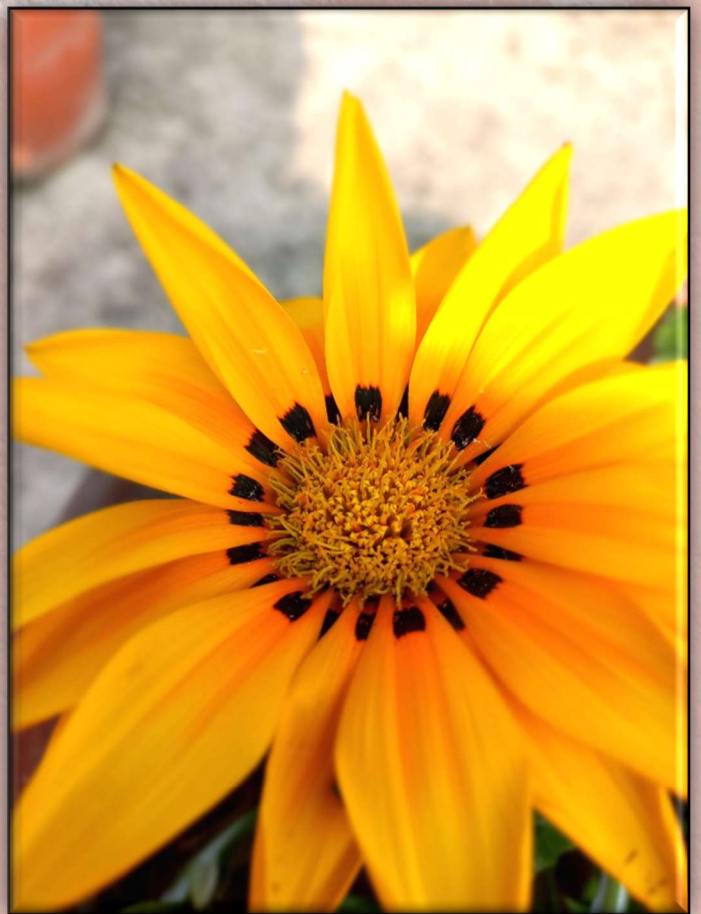
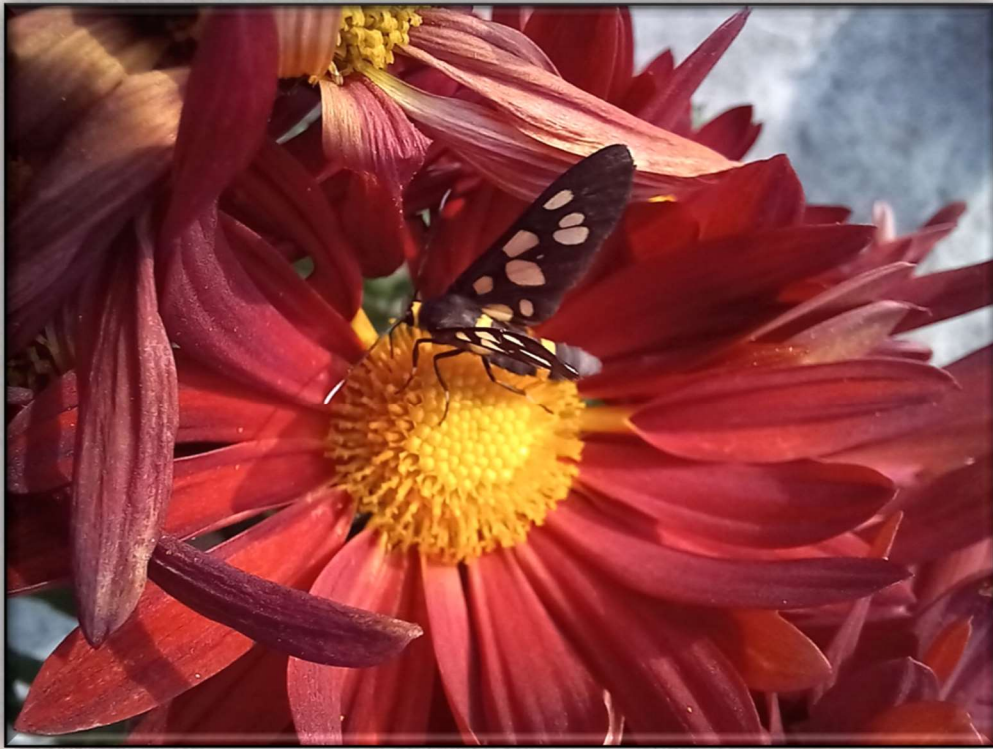


- By ABHAY SAHA, 2nd Year



- By RITISH RANJAN, 3rd Year

Floral Don't tell, They show



- By PRAUSN BANERJEE, 2ND Year

UNCHARTED SPIES OF COLD WAR

-- Suvranil Roy, 3rd Year

Dread of Communism to WEST

The second world war was over and the communists and the allies had won but the differences and suspicions that were there at the start of the war, now been looming up. Stalin's communists wanted to rule to world and the western democracies feared that godless communism would destroy all their civilization. Stalinist Russia was expanding at the rate of several kilometers per day. Italy and France, already vulnerable, had to be saved from succumbing to leftist. The US also have to secure Latin America, it's neighbor and the middle east but NATO or any other military alliances were not enough to protect its interest and also it was impracticable to indulge again into a war. So, there could be no hot war, no more soldiers dying or cities being bombed. Yet the war had to be fought clandestinely to weaken and destroy communism in all fronts – political, military, economic, and above all cultural and ideological.

The US's post war priority was to retain global supremacy – in all the possible fronts. Until communism could be defeated, it would be an unrestrained Cold War. In essence, and unscrupulous and devious spy war, that started even before the second world war, continues until today. It will continue into the future as long as the nations will fight for global supremacy. The difference being that instead of only USA and Russia, the world will see a new player China playing a central role in this war of Spies.

The Child who tries to run even before walk, CIA

Freshly minted by Harry S. Truman in 1947, CIA was determined to bring down Soviet Union by taking on Stalin. All the ani-communists were encouraged covertly and influenced to join CIA including the head of Hitler's main intelligence officer.

Covert action soon became the main priority of the organization. Instead of patient work of intelligence, the CIA was like warm blooded young of early 20s. The agency was trying to run before it could walk. So, the result was obvious. From showing restraint in future wars to para dropping



JAMES ANGLETON

agents in Soviet Union, all proved disastrous. The CIA sent hundreds of agents into USSR, Poland, Romania, Bulgaria and Ukraine. Hundreds of them perished, mainly by local agencies and others by KGB. For instance, the Albanian operation seemed to be most ridiculous. James Angleton was the in charge of all secret operation who ensured no penetration by double agents, would share all co-ordinates of air drops with great friend Kim Philby who as mentioned earlier, was a double agent of Soviets. The pair would meet for regular lunches braced with endless glasses of whisky and Angleton happily part all the information with Philby who would forward this to his Soviet masters. Nearly 200 of agents perished as the operation lasted for 4 years. At the end of this, Angleton was promoted to chief of CIA counter intelligence and Philby went back to London.

On their first mission in September 1949, flying out agents for Ukraine, US Air Force officers detected radioactive emission over Alaska. However, CIA analysts confidently declared that the USSR was still three to four years away from making a bomb. On that year 23 September that year, President Truman informed the world that is the USSR has successfully tested the bomb. One could attribute this misreading of all the signs on the ground to an inexperienced organization who became over confident after a huge victory on 1945. What was not known to CIA was the deep roots the Soviet intelligence apparatus has made into vital US defence and scientific establishments as early as 1935. Added to this were the Cambridge Five that included Kim Philby, and other deep moles in the West. The Cambridge

Five was a KGB group of British spies who passed information to the Soviet Union during World War II and the early stages of the Cold War. The group comprised Donald Maclean (1913-83), Guy Burgess (1911-63), Harold 'Kim' Philby (1912-88) and Anthony Blunt (1907-83). Yuri Modeen was their handler from KGB.

The Luminaire “KIM PHILBY”

After graduating from Trinity college in 1933, Kim Philby dabbled in activities of communist organizations in Europe. He fell in love with Litzi Friedmann, an Austro-Hungarian and married to her next year. It was Litzi who lured Philby in the world of intelligence and the process began.



KIM PHILBY

Over a lifetime of two decades in the The Secret Intelligence Service, commonly known as the MI6, the prior intelligence agency of Britain, Kim Philby had become a highly placed soviet mole in the British and US intelligence systems with access to the soviet intelligence apparatus. He had repeatedly given details of western intelligence operatives or assets working behind the curtain of KGB and KGB was able to liquidate nearly all of them. The time he was in British embassy in Washington and became associated with Angleton were the most productive years of KGB.

The Atomic Secrets and the American Scientist

One of the early and perhaps the biggest success of KGB was that they were able to get America's atomic success. Undoubtedly, Soviet Union would have got their

bomb eventually but this happened so quickly that it altered perceptions in the US and made them feel sudden vulnerable. CIA failed to detect the deep roots in Manhattan project and FBI failed to detect the espionage ring.

Morris and Lana Cohen were an American couple that had been spying for the Soviet Union from the late 1930s. They had regularly relayed atomic bomb secrets to the kremlin in the 1940s. The Cohens had been able to recruit an American scientist and could tell Moscow 12 days in advance that the US was about to test the bomb. Morris died in Moscow in 1995 without revealing his recruits name, and nothing else is known about his agent except that the FBI referred to him as PERCY.



MORRIS AND LANA COHEN

The PERFECT SPY

George Abramovich Koval was born on Christmas Day, 1913, in Sioux City, Iowa and passed away quietly in Moscow on 31 January 2006 at an age of 92. On November 2, 2007 President Putin startled the Americans when the posthumously awarded a “HERO OF RUSSIA’ medal to Koval. The citation, as reported in Russian press, mentioned Koval as the only Soviet intelligence officer to infiltrate the secret plants of the US’s



GEORGE ABRAMOVICH KOVAL

Manhattan project, which he used to help the Soviet Union to speed up the manufacturing of its atom bomb.

Though there were others who were part of a spy ring to access the project, they were mostly walk-ins. Koval was trained by the GRU (Glavnoye Razvedyvatelnoye Upravlenie, principal military intelligence agency of Russia) and sent back to US in 1940. There he enlisted as an army sergeant. As a health inspector for radiation, Koval had unhindered access to the entire polonium manufacturing facility as Oak Ridge, Tennessee.

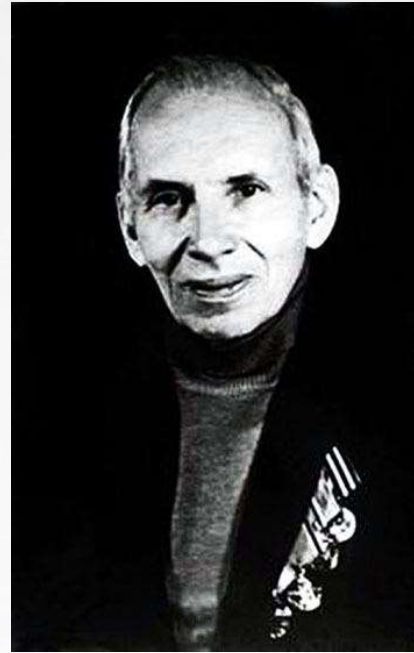


KLAUS FUCHS,
The greatest nuclear spy

Klaus Fuchs, a representative scientist from the Britishers, was a Soviet spy, working at nuclear project in Los Alamos, New Mexico. Between them the different agents had access to the facility where scientists were building the atomic bomb. Koval had another lucky break when in 1945, he moved to Dayton, Ohio, where the polonium-based initiator, essential for the plutonium bomb, was going into production. Security clearances were easy and it was apparently not difficult to send reports to the soviet embassy in Washington, BY July 1945, the bomb was ready. IN August, it was dropped on the Japanese city of Hiroshima and Nagasaki.

Discharged Honourable from the US Army in 1946, Koval returned to the Bronx, received an electrical engineering degree and few months later, announced to his friends that he was thinking to go abroad. He obtained a US passport and in October sailed to Le Havre in France, never to return. It was an unhurried exit when FBI was on a hot trail of several Soviet spies. In the mid-1940s it was able to intercept communication traffic between the Soviet Consulate in New York and Moscow. Operation VENONA decrypts began to unravel many of the KGB spy rings in the US. Kim Philby at that time was in Washington, the linkman between

the British and US intelligence services, became aware of VENONA. The KGB decided to sacrifice the less important for the more important and keep FBI happy with their discoveries. The Cohens were warned earlier, they flew to Mexico and then to New Zealand. The KGB has warned Donald Maclean but the Rosenberg couple was compromised, perhaps deliberately to save the Cohens. Elsewhere in Europe, several star spies were exposed – Kim Philby, Guy Burgess, Donald Maclean, George Blake, Gordon Lonsdale among the luminaries of the espionage world that fell but not George Koval. Was he the mysterious man that the Cohens met on an afternoon in a restaurant in Manhattan before he went off to be GRU's star spy in Ohio? The GRU code name for Koval was DELMAR. Was he the PERCY, the only man to penetrate the MANHATTAN project by whom Stalin was able to know the atomic tests of US 12 days before? NO one knows the complete truth, and perhaps will never be in light.



GEORGE ABRAMOVICH KOVAL
some days before death

It was only 2007, at the time the Russian award to Koval was announced, that the citation mentioned that the crucial intelligence given by agent DELMAR regarding the nuclear bomb's initiator had been vital to its manufacture. There are Spies and there are spies. The one, who performs invaluable work assigned to him, at great risk to himself, in a hostile country and then retires peacefully to live a quiet, normal life is a perfect SPY.



KLAUS FUCHS, the spy who shaped the
COLD WAR

Eternal Mountains



- By **SHALINI BANERJEE**, 2ND Year

Eternal Mountains



- By **SUSHMITA CHAKRABORTY**, 3rd Year

Cityscapes

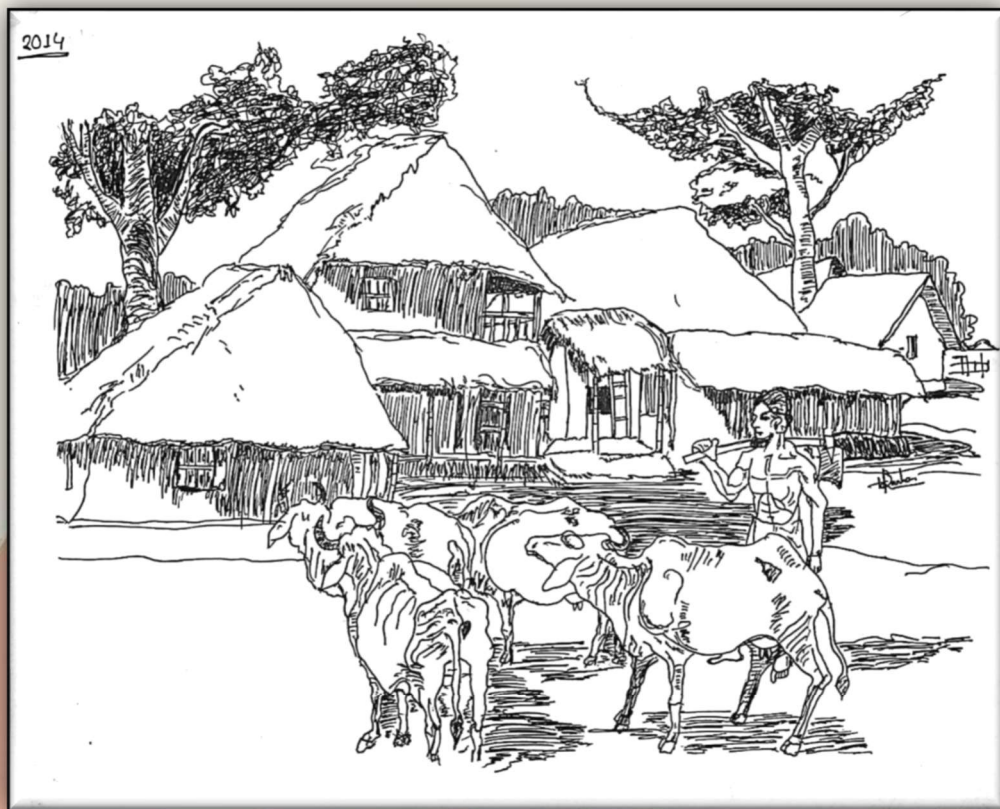


- By **AYON MAITY**, 3rd Year



- By **SATYAPRIYA MAHATO**,
2ND Year

Art Gallery

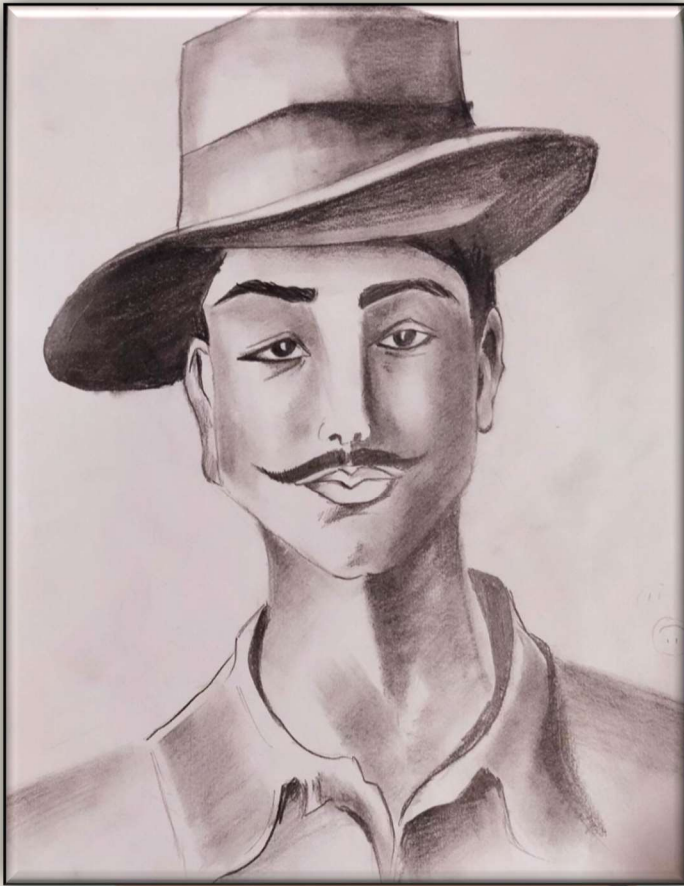


- By HRISAV SARKAR, 2nd Year



- By Debarshi Roychowdhury, 2nd Year

Art Gallary

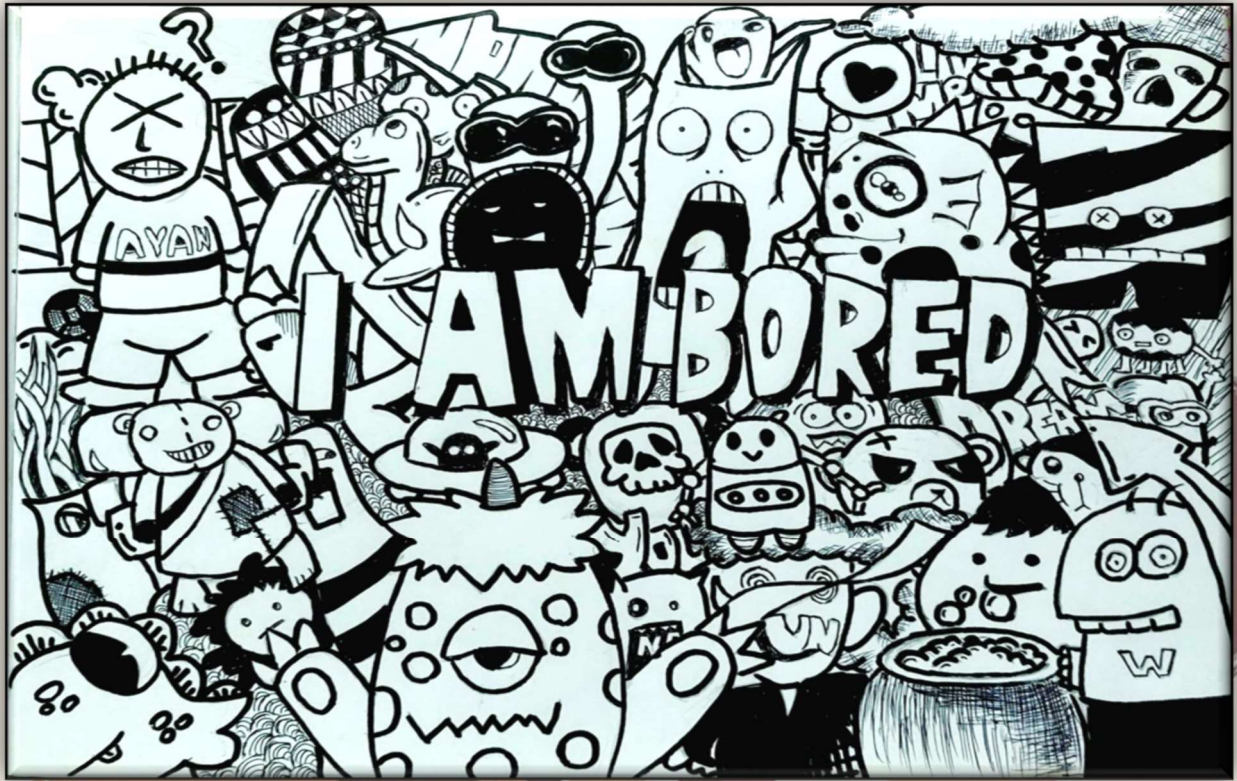


- By UJJWAL SINGH, 1ST Year



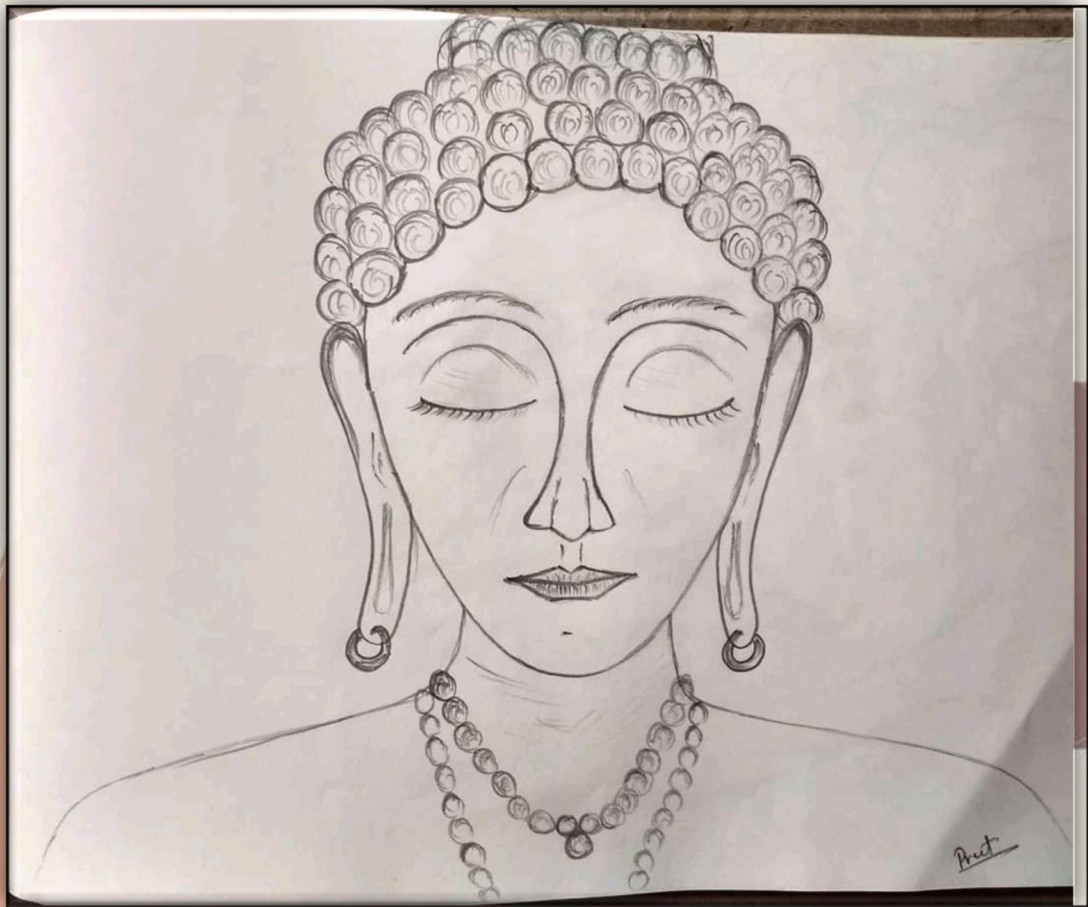
- By SHASWATA
BHATTACHARYAYA, 2nd Year

Art Gallery



- By **AYAN MAJUMDAR**, 3rd Year

Art Gallery



- **By PREET ANAND, 1ST Year**



- **By ANKIT KRISHNAUT**

Solve of the Sudoku
by Ritish Ranjan, 3rd year

		8	2			9		3
3	4	2		9	5			7
1	9	7						4
		5	3	1	2	4	7	9
2				7	4	5		
	2				1			5
	7				6	8	9	1
8			4	3		7		6

9	2	7	6	8	4	1	5	8
1	6	8	9	2	5	5	7	4
5	4	3	1	8	7	9	2	6
8	3	5	4	7	9	6	1	2
2	9	1	8	5	6	4	3	7
6	7	4	2	1	3	5	8	9
4	5	2	3	9	8	7	6	1
7	8	9	5	6	1	2	4	3
3	1	6	7	4	2	8	9	5

Solution