VIIA

THE INDIAN INSTITUTE OF ARCHITECTS

EMOTION

CONTENTS

EDITOR'S NOTE

Architecture is an art when one consciously or unconsciously creates aesthetic emotion in the atmosphere and when this environment produces well-being.
Luis Barragan.

Emotion is a strong feeling derived from one's circumstances, mood or relationship with others.

Architecture can trigger a variety of emotions. We have experienced how designed memorials can elicit emotions like pride, sadness or gratitude. Similarly, other buildings of various types can yield surprise or mellow one's mood. Many research studies show that the design of the built environment affects the health and well-being of people and can have long term implications on the quality of life.

As Ar. Zaha Hadid said, "I don't think that architecture is only about shelter, . . . it should be able to excite you, to calm you, to make you think".

We have published six issues of the revamped Journal. The journey by the new team was not easy but very exciting. The last six months have generated many emotions in the team as well. The Editorial Team, the JIIA Correspondents and the reviewers worked in tandem to bring out a publication of quality in content and layout.

We thank all those who supported us by contributing research papers, articles, photographs, sketches and other material. We gratefully acknowledge the valuable contributions of all those who have published advertisements in the Journal.

We are initiating a new section, OPINIONS, to discuss on some relevant current issues in the field of architectural practice and education. The current issues showcases points of view on the recommendations made by COA on architectural education, based on the new National Education Policy (NEP) by the Government of India.

Ar. B. Sudhir is in Dialogue with Senior Architect N. Mahesh.
A tribute to Master Architect Charles Correa by Ar. Ashish Acharjee is carried in this issue.
We continue with our regular columns as in the past issues.

As Barragan continues, "Any work of architecture that does not express serenity is a mistake."

Be emotional.

Ar. Lalichan Zacharias
Editor

EDITORIAL TEAM

Ar. Lalichan Zacharias

Ar. Gita Balakrishnan

Ar. Manguesh R. Prabhugaonker

Ar. Mukul Goyal

Ar. Brijesh Saijal

Dr. Shilpa Sharma

Dr. Pratheek Sudhakaran

Ar. Tushar Sogani

8

PRESIDENT'S MESSAGE

Dear Members,

Greetings!

We cherish being members of our Institute and it is incumbent on each one of us to contribute to its functioning and growth. All of us have been gifted in life in whatever measure- be it our family, our education and profession- an opportunity to be part of a constructive profession that yields immense satisfaction proportional to our efforts. It is also our responsibility to give back to society in equal measure, not only through our work, but with a genuine concern that will benefit the society at large.

Recently, I had the opportunity to visit our AP Chapter and Rajasthan Chapter. After a long break and easing of restrictions, the synergy and enthusiasm of the members is upbeat with Rajasthan announcing a competition for its Chapter premises.

I urge all the Chapters and Centres to give youngsters an increasing role in the affairs of our Institute to channelise their skills and energies for the sustained growth of our profession. Now that the online application for new memberships is open, I request members to invite their friends to be part of our Institute. This is the simplest task each one of us can do with ease.

There is a constant flow in new technologies, material, services, etc. related to our profession. It is imperative that all of us keep abreast of these by organising workshops for our members at every Chapter and Centre level.

To identify and recognize the talent of young architects, a Chapter-wise Young Architect of the Year Award has been initiated. This year's award will be presented at the Young Architect's Festival at Ranchi in the month of October.

The final Jury for the IIA and the Awards Presentation Ceremony are proposed to be held in November, hosted by Goa Chapter. Let us all look forward to the presentations and an exciting event.

The path for professional progress is laid with both exciting opportunities and critical challenges. Many new young practices have emerged very successfully with an interesting array of projects. We should dedicate one issue of the Journal for young practices.

Looking forward to a vibrant YAF 2021 at Ranchi and for the pleasure of seeing you all.

Best wishes

Ar. C. R. Raju
President, IIA

Ar. C.R. Raju
President, IIA

Ar. Vilas Avachat
Vice-President, IIA

Ar. Jitendra Mehta,
Jr. Vice President, IIA

Ar. Gyanendra Singh Shekhawat
Hon. Treasurer, IIA

Ar. Ashutosh Kr. Agarwal
Jt. Hon. Secretary, IIA

Ar. Leena Kumar
Jt. Hon. Secretary, IIA

Ar. Satish Mane
Jt. Hon. Secretary, IIA

IIA OFFICE BEARERS

Ar. Divya Kush,
Immediate Past President

COMMENTS

Dear Ar. C.R. Raju,

I must congratulate you and your team for the enormous improvement in the recent issues of the Journal of the Indian Institute of Architects. Please extend my congratulations and good wishes to your entire Editorial Team. It is good to see that the Journal now has limited advertisements, is well put together, with interesting projects, well-illustrated, and a range of articles covering different issues. including students' works. I would also like to state that I am honoured with the latest issue having featured my dialogue with Pratheek Sudhakaran.

It is good to see that the Institute is now giving some importance to young architects. With all due respect, may I suggest that this is an area that needs further personal promotion on your part. The Institute now has several Chapters in different parts of the country which should encourage students and young architects in their respective states to take an active interest in professional development through their local Chapters. Student competitions relating to local development issues organised in association with schools of architecture by local Chapters, would help develop concepts based on the large variety of environmental conditions that exist in our different states. The presence of this variation in the architectural character of projects from different areas is already manifest in some of the projects featured in recent issues of the Journal. It is good to see for a change an architectural journal, the contents of which are not driven by the advertising of products that they feature, as is the case with most of the architecture and interior design magazines available today.

I hope you will understand that I do not wish to impose my personal approach but merely put across observations developed over a long period of practice, and a desire to bring about meaningful change. I look forward with interest to your reaction and response.

With regards,
Sincerely,
Ranjit Sabikhi
New Delhi

I must congratulate JIIA's wonderful team for doing a great professional job which has raised the bar of the Journal publication of IIA, brought a new regime of publication along with richness of intent and contents. Every aspect of professional journalism is reflected in the publication, touching on variety of issues impacting the academics and practice of architecture. Every issue remains different and adds value to the profession and professionals. The Journal is becoming a brand in itself. We hope it will make a great difference to the perception of the community and for the larger recognition of the profession.
Good Luck and all the best.

Ar Jit Kumar Gupta

Excellent !! The JIIA team outdoes itself every time!!

Ar Azmi Wadia

A sparkling improvement in JIIA.
This is one big step towards long awaited improvement for IIA in general. Since long, the ratio of architects graduating and new members joining IIA has been low. This fresh look and content of JIIA will definitely help to encourage fresh graduates to join IIA, and so the strength of the whole fraternity will improve. Congratulations to whole team.

Best wishes.
Ar. Prakash Mandavia
Rajkot

We welcome your comments and suggestions.

Please write to us at **jiiaeditorial@gmail.com**

THEME

CIRCUMAMBULATIONS AROUND
THE EMOTIONS OF ARCHITECTURE

by Dr. Shilpa Sharma

Ideas in the mind are produced either by sensation- the interaction between the body and the objects in its surrounding environment- or by reflection- the mind's contemplation of its own operations.
JOHN LOCKE
AN ESSAY CONCERNING HUMAN UNDERSTANDING, 1690

Let us establish the two ends of the spectrum: on the one hand, we can place hell, represented by Dante's *Inferno,* as a place where all feelings are frozen. On the other hand, we have the concept of Upanishadic *ananda* or heavenly bliss, as encompassing and surpassing all human emotion. Somewhere in between these two, perhaps, could be said to lie Goethe's idea of architecture as frozen music: just as good music is soulful and emotes, similarly, can we see that buildings too, can evoke feelings- both ugly, beautiful or worse still, non-committal.

In the eighteenth century, Quatremere's *Encylopedie Methodique* differentiated between the visible physical character of an object and its intangible attributes. The same is true of the theory of *rasa* propounded by Bharat in his *Natya Shastra* written nearly sixteen centuries earlier, prescribing guidelines of performances and space creation, which, when combined in various ways, produced cues which led to instinctive responses from the audience. Both draw upon the common premise that there is a close and definite relationship between one's physical surroundings and mental responses, and the unfortunate example of Pruitt-Igoe seems to bear this theory out tragically.

Today, our feelings are played upon equally by visuals and music on our ever-evolving cell-phone screens, produced by human beings we may never meet or know. Art needs to create and sustain a certain empathy between the artist or creator and the beholder by the work of art, which has to communicate the intended emotion between the two.

As all art creates different states of the mind in us, so does all of our built or unbuilt environments assail us with various elements as 'tools' for evoking emotions. Bharat extrapolated various physical stimuli or "codes" in the form of *hastas, mudras* and rituals employed by the actors' to arouse the *navarasas* or emotions. Similarly, architecture uses form, light, proportions, materials, structure and ornamentation to create spaces with various metaphors. For instance: of 'authority' as with loftiness, immensity or ornateness; or of 'security' as with solidity or symmetry; or the humble simplicity of a hut or even induce depravity as did the inadequacies of Pruitt Igoe.

Contemporary architects continually adapt to the trends and spirit of their era, popularly called *zeitgeist,* to bring drama to their design and strategize it specifically for its users. Just as with a monotonous soap opera, buildings without any individuality fail to create any deep or lasting impression. Untold to the users, the design manipulates them through the carefully choreographed experience of elements and spaces which use all the senses combined with the imagination to create an unforgettable experience.

Bearing in mind that emotional experiences are responses to external physical cues, designers may prefer to implement specific kinds of design decisions and control the design process effectively. And we, as architects and designers of the built environment, need to understand how we can consciously use this factor to create just the kind of spaces we intend, without the use of words.

Navarasas as described in Bharat's Natya Shastra, (2 BCE – 2 CE)
(Source: https://openart.in/general-topics/indian-aesthetics/)

Hell with "frozen feelings" in Dante's Inferno. Engraving by Gustave Doré (14th cent.)
(Source: https://www.geocaching.com/geocache/GC6TCQ6_17-die-karte-zur-holle-gefrorene-fluss-kokytus)
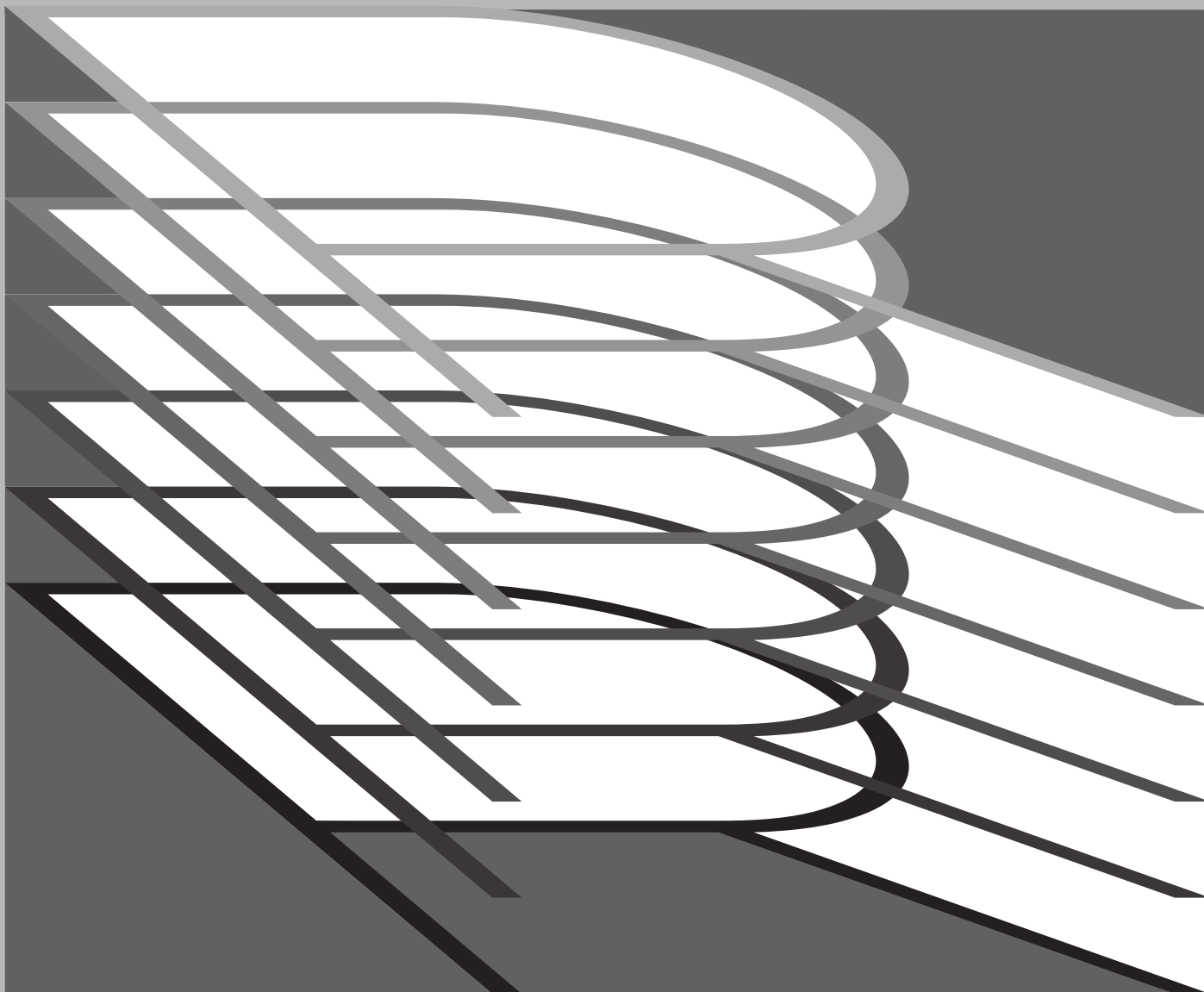
RESEARCH

FLOOD-RESILIENT ARCHITECTURE, ITS FEASIBILITY AND IMPLEMENTATION IN THE FLOOD-PRONE AREAS OF BIHAR

Ar. Aisha Shabeeh Shaheen
Final year, M.Arch., Dept. of Architecture,
Zakir Hussain College of Engineering & Technology,
Aligarh Muslim University, (AMU)
Aligarh, Uttar Pradesh, India
shaheen22aug@gmail.com, gl7691@myamu.ac.in

Ar. Sanjeev Maheshwari
Associate Professor
Dept. of Architecture,
Zakir Hussain College of Engineering & Technology,
Aligarh Muslim University, (AMU)
Aligarh, Uttar Pradesh, India
sanjeev_maheshwari2004@yahoo.com

ABSTRACT

Every year millions of people throughout the world become homeless due to the destruction of houses by floods. Floods are synonyms of chaos in public life, causing loss of public order and putting safety of the public at great risk. In India, Bihar has to face severity of flood every year and till date there is no proper way out formulated for ensuring the safety of human lives and valuables.

Flood-resilient architecture has become an exigent character of the affined approach towards the management of flood threats. This will educate us to stay along with water and nature, giving it proper space to flourish, with minimal impairment to the residents and their valuables. Sadly, there is a lack of implementation with proper analysis of the flood-affected area in Indian states. The topic of this paper addresses an old and widespread concern, but there has been no active, concrete or futuristic work regarding this in the Kosi region of Bihar. This study deals with the worldwide problem of every low-lying area, specifically concentrating upon the flood plain of the Kosi river. A sudden surge of water from the Shivalik range through Nepal causes heavy destruction in this area and life becomes very miserable for its residents. The government cuts a sorry figure, though it spends crores and crores annually in the form of relief funds, repairs and reconstructions.

This paper deals with the introduction about Climate Adaptive Neighbourhoods (CAN) projects and the background of the flood severity in Bihar, literature review, methodology, case studies to achieve a workable solution, and by these results, recommendations and conclusions are achieved.

Keywords: Flood, safety of the life of personage and valuables, Flood Resilient architecture, live with water, Kosi region of Bihar, heavy destruction, relief funds, repairs, and reconstructions.

INTRODUCTION

In flood-prone regions, projects adopt climate-adaptive neighborhoods or flood resilient design and architecture as a new initiative to protect lives and goods from floods. The location of the buildings should have been planned in such a way as to resist and curtail the flood risk and the areas where the threat of flood still persists. These projects will help evaluate the ever-changing climate and its future effects in the fields of architectural development and to understand the action to be taken to minimize the hazards of flooding. They can also be linked with various actions to understand a broader area of climate-related problems that might arise due to negligence (ARCC, 2013). Flood-resilient architecture is the conclusive result of the frequent floods which occur in many states of India and which, till now, the Government has been unable to find a proper solution to.

Figure 1 : Existing buildings in the flood-prone area of Bihar
(Source: https://indianexpress.com/article/india/bihar-flood-toll-rises-to-67-48-lakh-affected-5834986/. Accessed on 4 Nov. 2020)

Recent reports given by the Intergovernmental Panel on Climate Change (IPCC) Designate indicate that by the end of about a hundred years, 12 coastal cities of India can go 3 feet underwater. As stated by the United Nations report around 40 million people will face risk from rising sea levels by the end of 2050 (Chatterjee, 2021). For the region of Bihar, floods have become a major threat due to heavy rainfall and overflow in the perennial and non-perennial rivers. Every year people of Bihar have to encounter harshness and losses because of floods. This has induced a sense of insecurity, lack of trust in government and lost dreams for prosperity or happiness (Sethi, 2017).

In these conditions it is imperative to study and analyse various strategies to be adopted. The topology and economic situation of Bihar are considered for developing an economical flood-resilient structure capable of withstanding floods, storms, earthquakes and a conjunction of both, which is the need of time: a workable and low-priced solution, that is not temporary, and which can be easily adopted by the dwellers of Bihar state. It is only this which will help erase these insecurities in the residents of Bihar and alleviate the existing situation in the forthcoming years (Figure 1).

Aim

The aim of this study is to explore the feasibility and implementation of the flood resilient architecture in the most flood-prone areas of Bihar.

Objectives

In order to understand the situation better, following are the objectives :

1. To study flood-resilient architecture and design, its structural aspects, composite materials and implementation strategies.

2. To analyze various techniques implemented on existing buildings to render them flood-resilient.

3. To suggest flood-resilient building designs and mitigation strategies which can allay devastation and loss of life and goods in the flood-prone areas of Bihar.

REVIEW OF LITERATURE

The literature regarding flood resilience is vast and is still developing. Water flowing at 10 miles/hour has a very high intensity equivalent to that of a storm having a speed of 270 miles/hour (Shell, 2005). This shows how hazardous floods can be. Besides this, flood water incorporates two kinds of pressure, one is hydrodynamic and the second one is hydrostatic. There are several

Figure 2 : Underground discharge and its floodwater cathedral
(Source: https://www.tourist-destinations.com/2014/11/g-can-flood-surge-tunnels-in-tokyo.html. Accessed on 4 Jan. 2020)

factors of floodwater which affect buildings : the forces exerted by flood water at different times and place according to their nature, the time duration of standing water and quantity of flood water, among others, which cause different types of damage to the building in its foundation, superstructure and roof.

According to Protecting Against Flood Damage, (Roberts, n.d.) materials are considered to be 'flood-resistant' are those which can withstand the impact of flood water for about 72 hours after coming directly into contact with it. Such materials should be used for floors, walls and various segments of a house which are below 100 years flood level line. All hardware used in these areas must be created out of galvanised or stainless steel. Flood-resilient materials are: closed-cell and foam insulation, concrete, ceramic tile, marine-grade and pressure-treated plywood, waterproof veneer on doors, flood-resilient doors (which automatically work against the entry of water), on interior wall partitions of concrete blocks, magnesium oxide board or lime plaster as finishing are to be used as flood-resilient building materials. Flood walls, levee, water-gate, dry flood proofing and wet flood proofing are various methods of construction which can be implemented on site to protect it from the invasion of flood water.

METHODOLOGY

The methodology adopted includes the review of literature which incorporates the study of research papers, other sources such as the internet and other material. Five case studies of flood resilient architecture adopted by different architects in different parts of the world are undertaken, which would help in building the knowledge and understanding for further analysis regarding Bihar regions with high flood risk, design proposal, implementation guidelines and conclusion.

Case Studies

The case studies are as follows:

Case study 1: The first case study is about the design and construction of a complex web of tunnels in Tokyo, Japan, 22 metres below the earth's surface. Extending over 6.3 km, it ends at large towering cylindrical chambers to overcome the flood condition occurring due to spillage of excess water in five different rivers in the city (Figure 2). Tokyo's defence system was designed to withstand up to 50 mm rain per hour, particularly for areas that are densely populated. After all these efforts, Tokyo still suffers. As Cecilia Tortajada remarks, "If a country as prepared as Japan is suffering, and a city like Tokyo suffers, we should all be paying attention." *(Ortiz, 2018).*

Case study 2: The second case study is about the design and construction of amphibious houses in the Netherlands and Britain. These houses have the tendency to float on the surface of water in the event of floods but are firmly anchored in a manner that they never move horizontally from their place; they only move upward if the water is all around and settles back to its original position when the water recedes, or in times of no floods (Figure 3).

There are primarily four components of an amphibious house:
a) To curb the inflow of debris, mud, rocks, etc.
b) A buoyant foundation which helps the house to float on the surface of water
c) Guidance posts which guide the house to move up and down.
d) Flexible utility connections, i.e., long and flexible pipes to bring in water, electricity and take out waste water, etc. and to retain their ground connections even during flood times (Williams, 2016).
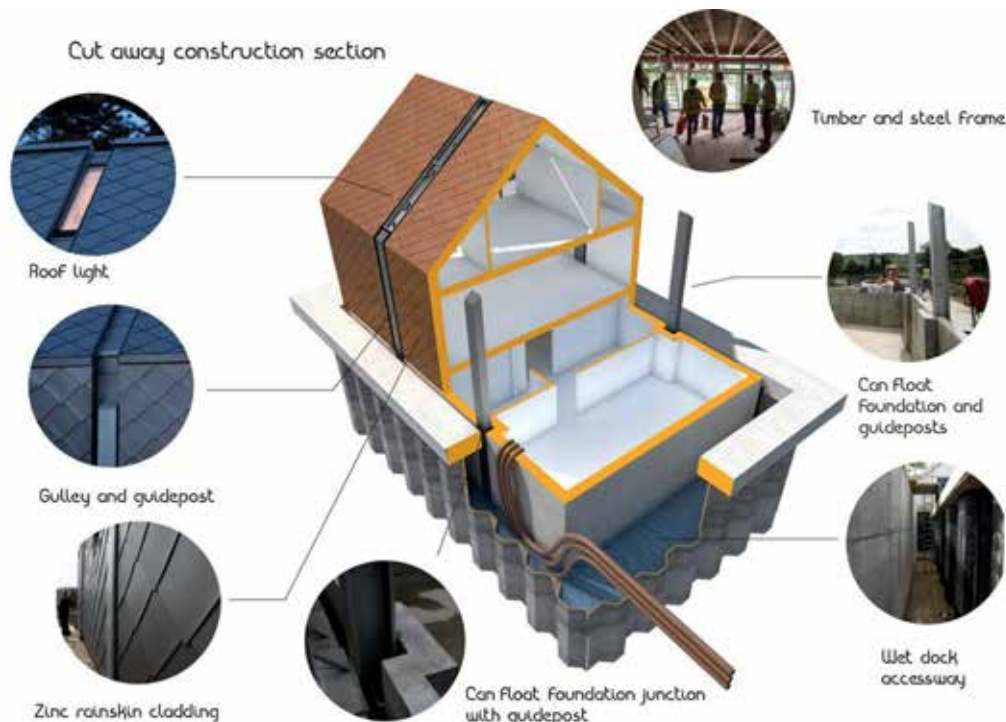
Figure 3 : Illustration of an amphibious house and its working. This house is constructed in Britain to avert the hazards produced by floods.
(Source: https://www.construction21.org/case-studies/h/the-thames-amphibious-house.html. Accessed in Jan. 2021)

14

Figure 4 : View of the storage tanks and a cross section under the green roof and the museum
(Source: https://time.com/collection-post/5718871/kotchakorn-voraakhom/ Accessed on 11 Dec. 2020)

Case study 3: The third case study is Bangkok's first public park.

As Bangkok City started being inundated with water, in order to protect it, a public park was created for the first time in three decades. Before this, the focus was largely on the construction of concrete beds all over the city by filling the canals to facilitate development. This public park was designed by a landscape architect Kotchakorn Voraakhom from Thailand which gives a view about returning to a new normal. According to the report given by the World Bank, before 2030 it is anticipated that about 40% of the Bangkok city would get submerged in the river situated beside it. To tackle this situation, she created a permanent resolution for the floods and towards nature : an 11-acre 'thirsty' plot with the capacity to absorb 1 million gallons of water across an amalgamation of sloping gardens, a retention pond and wetlands. Around 2,50,000 gallons of run-off water overflowing from the green roof can be collected in a museum and three massive storage tanks situated below the green roof. In the summer season, for about twenty days, these tanks have the tendency to keep the park watered (Voraakhom, 2019). (see Figure 4).

Case study 4: The fourth case study is concerned with flood control in the Netherlands, it can be given the title of the world's best country, for the flood continence. They are so serious about floods and the safety of the citizens from floods that their constitution has given the right to the Dutch people to be saved from flood. Very high standards are followed there regarding flood safety. In case if a new flood control measure is adopted, this is done in consideration of the colossal and huge flood that occurs only one time in the period of 10,000 years. Some extremely good projects have been initiated a few years before. The "room for river project" is one amongst them. Rivers are provided a larger area to flow by building embankments farther away from rivers. The focus lies on not disturbing the river's natural flow and natural environment and then build their infrastructure and technology around that. This way of construction is much cheaper and better instead of spending money on projects including huge machinery and other structures.

Case study 5: The fifth case study is the Kosi region of Bihar. The natural drainage flow in Bihar intrinsically

Figure 5 : Rivers of Bihar with R. Kosi Bihar highlighted.
(Source: Adapted by Author from https://www.mapsofindia.com/maps/bihar/rivers/. Accessed on 10 Feb. 2021)

Figure 6 : Seismic zones of Bihar
(Source: Adapted from Bihar State Disaster Management Authority)

Figure 7 : Wind map of Bihar
(Source: Adapted from Vulnerability Atlas of India)

allows water to accumulate easily, resulting in a 'flood'. The river map of Bihar (Figure 5) shows the expanse of the river after being released from Nepal. Because of the natural topography of Bihar and the river which changes its path rapidly, it creates hazardous situations. The districts which are flood-affected are Sheohar, Sitamarhi, Supaul, Darbhanga, Kishanganj, Muzaffarpur, West Champaran, Gopalganj, East Champaran, Saran, Khagaria, and Samastipur (Sethi, 2017). In addition, high intensity earthquakes in the northern region of Bihar coincide with the beginning of River Kosi (Figure 6). High-Intensity wind (Figure 7) in about 86% of

the total expanse of Bihar is inclined to cyclone of 47 metres/second, which is the same intensity as a storm. The remaining 14% of the area is inclined to cyclones of lesser intensity (BMTPC, 2019).

RESULTS AND DISCUSSION

Following are the main damages that happen to the buildings due to flooding in the Kosi region of Bihar:

i. Foundation settlement and scouring because of the hydro-dynamic masses.
ii. Wall- and eventually, roof collapse occurs either because of the amalgamated impact of buoyancy, saturation and mortar turning into mud or because of inadequate bearing capability and saturation underneath due to heavy serious rain.
iii. Flotation of roof because of inundation, resulting in additional wall damage.
iv. Other comparatively less severe damages are bulging and cracks, wall erosion, floor settlement and plaster delamination, destruction to services like, sanitation, water supply, and electrical systems.

RECOMMENDATIONS AND CONCLUSION

Several areas encounter annual flooding and danger of rising water levels, especially in the coastal areas. Use of amphibious and floating houses may lessen the expenditure that is required to tackle damage and hazards to the property. Investing the money only once in the construction of these houses is more expedient than investing the money on the houses for the repair purposes every year when constructed traditionally. These houses can be built of any available material: the superstructure can be made from bamboo, although there are certain limitations regarding this material, which has widespread availability in India. Such houses can be constructed and promoted by building an awareness program in the flood region of north Bihar. Green roofs planted with vegetation, like the Thirsty Park, can absorb rainwater throughout the monsoon season and also help heavily populated areas to conform to the changing climate.

A common by-product of disasters is homelessness. This can be resolved by using emergency or temporary shelters, which are lightweight, non-permanent structures, supported by fibreglass, wooden, plastic or light metal frame with a cover of nylon, canvas or some strong fabric. The frame plus cover in combination can be made a temporary roof.

During floods another serious health risk to people is overflowing sanitary latrines. Improved designs and planning for sanitation for the time of floods can help minimize health risk. In flooding, crowd gathering is a very common practice and thus providing hygienic sanitation advantage is a colossal challenge when the sewage system has failed. At such times dry toilets serve the purpose.

Various kinds of structures and construction procedures could be utilized to overcome the flood risks. They are mentioned below with the cost analysis :

i) Disaster shelter : Disaster shelter common for all residents, should be built on the most elevated area at regular intervals which may be previously utilized as primary school or resort (Figure 8).
ii) Continuous row housing : The beams and columns are connected to the system which provides more strength to the whole set of housing. Here, if any one beam weakens, another one along with the columns support the block and doesn't let it fall even in the worst flooding conditions also (Figure 9).
iii) Cost analysis : Cost assessment of different building materials with their properties and longevity are shown in Table 1.

The cost analysis in Table 1 reveals that the installation and transportation cost of traditional buildings make them costlier in comparison with other innovative ways of building construction methods. The minimum installation cost of brick work is ₹ 25,500 for laying of 1000 bricks and the total price of a 1000 sft house is between ₹ 10 to 12 lakhs based on the material used. In contrast, the cost of 1000 sft shipping container houses costs just ₹ 3 to 4 lakhs.

To make the construction process less costly, more durable and sustainable in the flood plain of Kosi river inhabited by villagers in the low-income group, construction can be with the usage of composite fibreglass piling for constructing stilts. Above this, on a concrete base houses of either shipping containers or of bamboo can be constructed. The use of shipping containers provides more strength and can withstand

Figure 8 : View of a disaster shelter
(Source: https://in.pinterest.com/davebaker35110/homes-by-the-sea/. Accessed on 26 Feb. 2021)
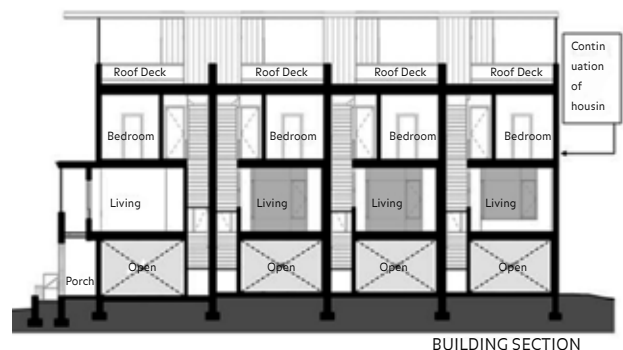

BUILDING SECTION

Figure 9: Section showing continuous row housing on stilt, minimum 8 to 10 feet high *(Source: Author)*

various disastrous situations to a greater extent as north Bihar lies in the disaster-prone zone. Besides this, upon a foundation of composite glass fibre pile, anchored to the trees, a bamboo tree house works as a better alternative. The positive is also that it will encourage afforestation, allowing nature to heal itself gradually. Besides these, amphibious houses too may be constructed in these regions with the use of light and cheap bamboo and composite glass fibre piles to cut cost with a better result in terms of durability and sustainability.

Table 1: **Assessment of different construction materials**

Building Material	Approximate cost of various material	Transportation Cost	Property of the material	Longevity
1. Concrete	₹ 74,000 per 1000 sft (Mahajan, n.d.)	₹ 200 per quintal within 1 km distance when minimum load is 5 quintals. When the load is less than 5 quintals, the cost is ₹ 500 per quintal.s	Mechanical strength, in particular compressive strength. The resistance of concrete differs between 25 and 40 MPa. Tenability, porosity, density, fire resistance, thermal and acoustic insulation, impact resistance.	Life of buildings is often 30 years, although most buildings last 50 to 100 years or even more.
2. Brick	₹ 38,000 per 1000 sft (Mehta, 2020)	₹ 5300 per 1000 bricks, including transportation	Good bricks should have sharp edges, good shape, well burnt, good compressive strength, etc.	
3. Sand	₹ 1,23,000 per 1000 sft (Indiamart (a), n.d.)	Transportation is included with the cost, i.e., ₹ 75 per sft	Should be completely inert. Grains should be sharp, strong and angular; should not contain any hygroscopic salts (CaCl2, MgCl2, etc.); should not contain clay & silt; usually 3-4 % clay and silt is ordinarily permitted for practical reasons. No organic matter should be used.	
4. Cement	₹ 1,64,000 per 1000 sft (Indiamart (b), n.d.)	₹ 3 per sack per 10 km when there are 50 sacks. When there are less than 50 sacks then it costs ₹ 5 per sack per 10 km	Compressive strength, fineness, soundness, setting time, and specific gravity	
5. Steel	₹ 2,46,000 per 1000 sft (Indiamart (c), n.d.)	Can be ordered online and according to the distance between the procurement point and the site	Provides strength to the RCC structure and an integrated part of RCC construction.	General life expectancy is 100 years but if constructed and preserved properly can last many more years.
6. Finishers	₹ 1,65,000 per 1000 sft (Indiamart (c), n.d.)		Essential for buildings	If implemented material is of good quality, can last long after a one-time investment.
Fittings	₹ 2,28,000 per 1000 sft (Indiamart (c), n.d.)			
7. Shipping container (Figure 10)	₹ 80,000 (for 8x40 ft) (Indiamart (c), n.d.)		More cost-effective than traditional housing, quick to construct, modular homes, durable, and mobile.	It may easily last up to 20 to 25 years if painted regularly every few years.
8. Light Gauge Steel (LGSF), Construction	₹ 800 per sft (Indiamart (d), n.d.)		It is a superior construction material, has cutting edge technology, creates less pressure on foundations, speed of construction, and has lesser chances of human error	Light weight, more durable, can last 100 years beyond without any replacement or repair.
9. Bamboo	₹ 100 - 120 per kg (raw bamboo). (Shaurya, 2019)	Varies according to the distance between the procurement point and the site, but mostly available on the site	It is developed in various forms like bamboo tiles, bamboo sheets for roof covering, bamboo insulated doors, etc.	Minimum age of a bamboo house is 25 years. When treated properly and regularly it may extend beyond 100 years. Some bamboo houses in Asia and South America are older than 200 years.
10. Composite Fiberglass piling	It depends upon the size and area, but is more cost effective than RCC piling.	Can be ordered online and varies according to the distance between the procurement point and the site	It bears high restrained strength, long lasting, high ductility, less maintenance cost, and long-time usability.	It can last generations to generations and doesn't require replacement.
11. Water	₹ 29,13,414 per year	Varies according to the distance between the procurement point and the site	Essential requirement for traditional building construction methods.	In context to global rainfall India receives about 4 % and ranks at 133 in the world in the matter of water share each person annually. It is estimated that India has 1,897 sq. km per year in respect of total resources of renewable water.
12. Damp proofing material	₹ 345 per kg (Amazon, n.d.)	Nil	Impervious, strong and durable, dimensionally stable, free from deliquescent salts like sulphates, chlorides, and nitrates	It enhances the longevity of the structure and protects it from the adverse effect of water surges during floods.

The following are workable solutions and recommendations for building in flood-affected areas of Bihar :

i)   Raised groundwater levels or sub-soil water flowing across the location are often attenuated by the supply of sufficient drainage of sub-soil.

ii)   Flooding of sewers because of surcharging or backflow of drains or sewers may be addressed by use of anti-flooding devices and non-return valves.

iii) Groundwater intrusion through the floors may be self-addressed by the use of construction which is water-resistant.

iv)   Wherever there's a risk of water intrusion through the floor voids, provisions to examine and clear out sub-floor voids will be attended to.

v)   5% of the area at urban level must be left for the storage of additional flood-water in each, city, town, and village as water retention space. The additional collected water may be channelized to those areas of the country or state which are suffering from drought conditions.

vi)   In a severe flood-affected zone, no house should be built without stilts.

vii) All buildings should have a plinth level of a minimum of 0.6 metres exceeding the flood submersion/drainage levels underneath the mean annual flood.

viii) Preferably every building should have two or more floors

ix)   The roof level in the first-floor level in two-floor buildings and the single floor buildings preferably kept more than a 1000-year of flood levels.

x)   The building of amphibious houses should also be practiced to provide a more hygienic environment and livelihood.

xi)   Every new construction must be constructed on at least 8 to 10 feet stilt with friction pile foundation having a minimum of two floors.

Future flood prevention

Following are the measures which should be considered for flood prevention in years to come:

i) The catchment measures should be adopted copiously on a wider scale.

ii) Communications about flood risk should be simplified.

iii) Resilience should be ameliorated.

iv) Building rules should be stricter.

v) Malfunctioning of developers in obeying and working with planning requirements should be held accountable for the expenditure incurred by associated flooding.

vi) Water corporations ought to be created statutory consultees on planning applications.

vii) The right to attach surface water to a sewerage system ought to be abolished.

viii) Some grant schemes for small or medium businesses should be granted, which are previously unable to secure reasonable insurance for the construction of resilience measures.

ix) Clearer strategies for creating awareness of flood hazards.

x) Regular excavation of silt with the usage of dozer ships must be done to maintain sizable depth to the rivers to provide "room for rivers".

Figure 10: Shipping container house with stilts
(Source: https://www.decoist.com/best-shipping-container-homes/?chrome=1. Accessed on 26 July 2021)

xi)   Campaign and awareness programmes regarding changing climate and flood risks are necessary in the coming future.

xii) Residents are needed to be involved in the rejuvenation of nature so that they automatically feel connected with nature.

xiii) Laws regarding protection of residents from flood hazards should be added up in the Constitution to give them priority.

xiv) National Disaster Management Authority (NDMA) offices should be situated in the regions most prone to floods to control the severity and should work beforehand on mitigation strategies.

xv)   A booth for life jackets and other emergency equipment, which are required during floods, should be made accessible simultaneously with the flood warnings.

Conclusion

Water is a resource and not an obstacle. We have studied about the earliest civilizations which developed besides water bodies such as rivers. But, currently in some places of the world we discover this water has become problematic. In reality, structural design provides the means to curb the natural progression of rain, air gusts, cold waves, etc. However, no flood-resilient architecture has ever been introduced in the Bihar region of the Kosi river. The only solution here is to live in compatibility with nature and deal with the floods in a friendly manner without disturbing it very much. Only then will human beings be able to flourish.

A simple future scenario of the Kosi region is delineated here, which starts from the status of the rivers and its surroundings. The embankments should be built far from the river floodplains. The silt at the bottom of the river should be removed regularly with the use of the dozer ships, which can be used for making bricks. On the flood plain, afforestation is to be done at a wider range and plantation of vetiver grass, especially at steep slopes of the Nepal mountains, to hold the soil firmly and help in minimizing soil erosion. This will also lessen the quantity of silt taken to the rivers. When river water flows from Nepal to India, the river has an extreme hydrodynamic pressure which further minimizes after

hitting the trees on the flood plain, the inertia then transfers and the acceleration of the river changes into drag velocity which has very less destruction impact.

There is a demand for amphibious houses for single family units in the areas near the hydrodynamic loads and for row housing on stilts in other areas which are safe from the water. Amphibious houses can be constructed out of various materials depending on their local availability in one's locality. Mobile house technology is required to be enhanced in India. These houses have the capability to withstand during the flood

Incinolet toilets which incinerate human waste further help in reducing contagious situations. Along with this, the houses also require purification of rain water into potable drinking water. At the areas far from the river, the building of houses on stilts are essential to avoid flood hazards to the dwellers.

The urban areas of this floodplain are to be made as a sponge city which doesn't allow its waste water to go to the rivers and to escalate the water level. Instead, it collects the waste water into the reservoirs outside the city or town, which is then cleaned and used for irrigation and other purposes. The roads of these cities should be made out of pervious concrete, water permeable brick and permeable asphalt mixture, to soak rain water and feed it into designated ponds or reservoirs through the drainage system constructed below it.

In this way we would have a far less hazardous situation in the event of flooding. We may not be able to curb the flood but we can prevent this flood from becoming a 'calamity'.

REFERENCES

1
Amazon. (n.d.). *Dr. Fixit Dampguard Classic Damp-Proof Coating For Internal Walls and RCC Water Tanks.* Retrieved Aug. 2021, from https://www.amazon.in/: amazon.in/Dr-Fixit-Damp-Guard-Internal-Walls/dp/B07PHPHL6F

2
ARCC. (2013). *Climate Adaptive Neighbourhoods (CAN) Project.* Retrieved Aug. 4, 2020, from Adaptation and Resilience in the Context of Change (ARCC): https://www.arcc-network.org.uk/climate-adaptive-neighbourhoods-can-project/

3
BMTPC. (2019). *Vulnerability Atlas of India.* Building Materials and Technology Promotion Council, Ministry of Housing and Urban Affairs, Govt. of India. Retrieved 2021, from bmtpc.org/DataFiles/CMS/file/VAI2019/WIND-bihar.html

4
Chatterjee, A. (2021, Aug. 11). *These 12 Indian Cities Are Likely To Go 3 Feet Underwater By 2050, Warns IPCC.* Retrieved Aug 12, 2021, from idiva.com: https://www.idiva.com/lifestyle/hot-takes/these-indian-cities-likely-to-go-underwater-by-2050-warns-ipcc/18023081

5
Indiamart (a). (n.d.). *River Sand.* Retrieved Jan. 5, 2021, from https://dir.indiamart.com/: https://dir.indiamart.com/impcat/river-sand.html

6
Indiamart (b). (n.d.). *Cement.* Retrieved august 2021, from https://dir.indiamart.com/: https://dir.indiamart.com/impcat/construction-cement.html

7
Indiamart (c). (n.d.). *TMT Steel Bars.* Retrieved August 2021, from https://dir.indiamart.com/: https://dir.indiamart.com/impcat/tmt-steel-bars.html

8
Indiamart (d). (n.d.). *INTERARCH Light Gauge Steel (LGSF), Construction.* Retrieved july 26, 2021, from https://www.indiamart.com/proddetail/interarch-light-gauge-steel-lgsf-15688037555.html

9
Mahajan, B. (n.d.). *Civiconcepts.* Retrieved June 6, 2021, from https://civiconcepts.com/: https://civiconcepts.com/blog/cost-of-concrete-per-cubic-meter#:~:text=The%20Labour%20cost%20for%20concrete,per%20cubic%20meter%20(m3)

10
Mehta, M. (2020, Aug 09). Construction Material Quantity Estimation for 1000 sq.ft of House Construction. *Brick & Bolt Home Construction.* Retrieved July 6, 2021, from https://www.bricknbolt.com/blogs-and-articles/construction-material-quantity-estimation-for-1000-sqft-of-house-construction

11
Ortiz, D. A. (2018, Nov. 29). *The underground cathedral protecting Tokyo from floods.* Retrieved Dec. 9, 2020, from bbc.com: https://www.bbc.com/future/article/20181129-the-underground-cathedral-protecting-tokyo-from-floods

12
Roberts, G. (n.d.). *Protecting Against Flood Damage.* Retrieved Jan. 8, 2021, from https://www.hgtv.com/: https://www.hgtv.com/design/remodel/mechanical-systems/protecting-against-flood-damage

13
Sethi, A. (2017, Sep. 18). Bihar's Scary New Flood. *Hindustan Times.* Retrieved Aug. 2020

14
Shaurya, S. (2019, Dec. 10). *Modi govt wants more bamboo trade but it must end control of China, Vietnam first.* Retrieved July 2021, from https://theprint.in/: https://theprint.in/opinion/%E2%80%8Bmodi-govt-wants-more-bamboo-trade-but-it-must-end-%E2%80%8Bcontrol-of-china-vietnam-first/332887/#:~:text=India%20prod

15
Shell, A. (2005, Sep. 9). *Floods Can Cause Damage to Structure.* Retrieved from usatoday.com: www.usatoday.com/money/perfi/housing/2005-09-08-wet-homes-usat-x.htm

16
Voraakhom, K. (2019). Kotchakorn Voraakhom Time 100 Next. *TIME.* Retrieved July 7, 2021, from https://time.com/collection/time-100-next-2019/5718871/kotchakorn-voraakhom/

17
Williams, J. (2016). *Five Ways to Build a Flood-proof Home.* Retrieved August 5, 2020, from https://earthbound.report/2016/01/08/five-ways-to-build-a-flood-proof-home/

Ar. Aisha Shabeeh Shaheen
Aisha is a graduate from National Institute of Technology (NIT) Patna, Bihar. She was a member of Anveshta group at NIT and documented the historical architecture of Bihar. Sha has also worked on the documentation of Wilayat Manzil, is a heritage building in Aligarh Muslim University.

Ar. Sanjeev Maheshwari
Ar. Sanjeev Maheshwari, a product of Govt. College of Architecture, Lucknow is a first batch graduate of Lucknow University. He served his alma mater as a Lecturer and as an Assistant Architect. He has worked with Swedish theatre expert, Per Edstrom, on variable theatre following an international workshop on Theatre Design.

SCI-FI FILMS & ARCHITECTURE

UNDERSTANDING ARCHITECTURAL RESPONSE TO THE NARRATIVE OF SCIENCE FICTION FILMS
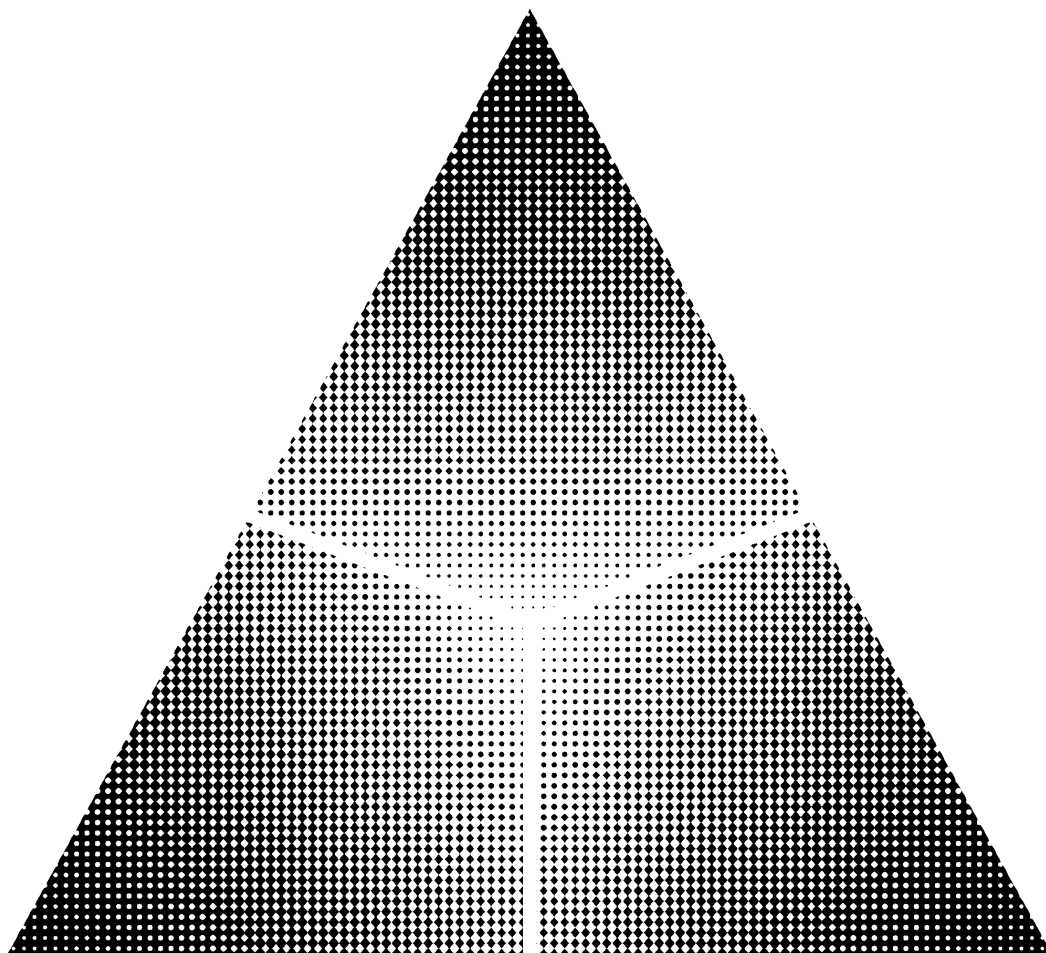
Saumil Upadhyay
Final Year, B.Arch.
Institute of Architecture and Planning, Nirma University
Ahmedabad, India
saumil17upadhyay@gmail.com

Ar. Supriya Pal
Faculty of Architecture,
Institute of Architecture and Planning, Nirma University
Ahmedabad, India
supriya.pal@nirmauni.ac.in

ABSTRACT

Architecture and film share a lot of commonalities, they both allow people to travel through space and experience it through either physical or imaginary movement within the space. Human activity within these imaginary or fictional spaces is guided by the narrative. Narrative is necessary to create a place and give it a meaning or a purpose. The thesis attempts to analyze architectural representation in films developed as a response to the narrative of futuristic science fiction films. In science fiction films, the architectural representation is meant to be interpreted through the idea of city and architectural elements. The relationship between film, narrative and Architecture will be established by analyzing three science fiction films of a similar genre: Blade Runner (1982), The Fifth Element (1997) and Equilibrium (2002). The research hopes to utilize this analysis to establish the narrative relationship between film and Architecture, to decipher architectural response to the speculative narration of science fiction films, and draw the reader's attention towards futuristic concepts of architecture represented in the films. The thesis can act as a reference for architects, as well as art directors. With this research, we are looking at a method of imaginative exploration.

Keywords: *architecture, future, narrative, science fiction films*

1. INTRODUCTION

1.1 Background

During the 20th century cinema was becoming increasingly popular, which allowed the spread of stories at a broader scale and faster rate. Its ability to reach global audience in a very less duration allowed the spread of new architectural styles and ideas at a much faster rate. Science fiction has been widely popularized through films since the broad commercialization of cinema in the 1930s. This wide-scale popularity of the science fiction genre creates a broader impact on people and society. It allows architects to express their work without any bounds and experiment with it.

"Science fiction (sometimes shortened to sci-fi or SF) is a genre of speculative fiction that typically deals with imaginative and futuristic concepts such as advanced science and technology, space exploration, time travel, parallel universes, and extraterrestrial life. It has been called the 'literature of ideas', and often explores the potential consequences of scientific, social, and technological innovations." (Gilks, Fleming, & Allen, 2003).

Science fiction films are perfect examples of fictional architecture. Implementation of speculative architecture and process of world building are involved in the making of a fictional world for any futuristic science fiction film. Thus it felt logical to study the architecture of science fiction films in order to explore speculative architecture. (Border, 2017)

1.2 Aim, Objectives, Research Questions, Scope, Limitations

Aim:

The aim of this research is to analyze architectural representation in films, developed as a response to the narrative of futuristic science fiction films.

Objectives:

1) To look into the architectural representation used as a tool to convey the narrative to the viewers of science fiction films.

2) To understand the architectural representation in science fiction films as interpreted through the concept of city and architectural elements.

3) To investigate the architectural elements used to convey ideas and futuristic concepts of the narrative within science fiction films.

Research Questions:

1) Through the narration in science fiction films, what is the primary concept of the film, around which the whole story revolves?

2) What is the architectural response to the narration and context along with the concept of the film, in terms of built environment and spatial connotation?

3) How are the narrative and architecture interrelated and form a complete environment for the film?
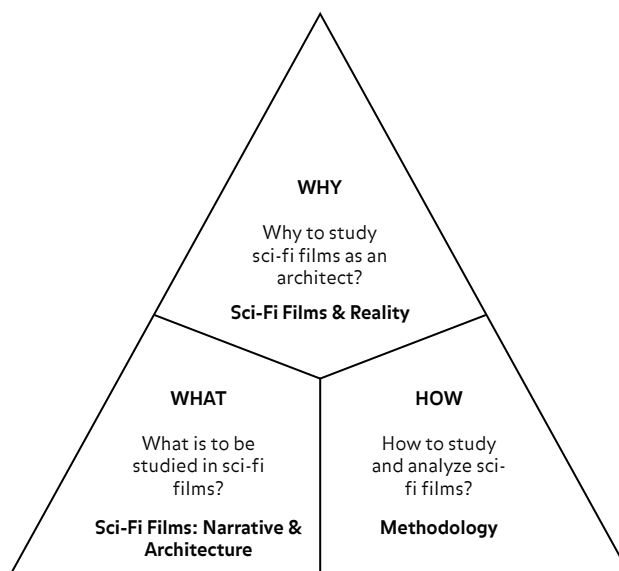
Figure 1: Why? What? & How *(Source : Author)*

Scope:

Scope of the research consists of three main themes.

a) Narration in the film

b) Architectural representation in the film

c) Interrelation of narration and architecture forming a complete film

The research revolves around these three themes. By understanding the narration of the film, one can analyze the architectural response to the narration and explain the inter-dependency of narration and architecture in the film. The thesis looks at prominence of frames that depict narration in the film through built environment, so that further discussion can be done on the relation of architecture and narrative in science fiction films.

Limitations:

a) Analysis of the film is limited to specific buildings shown in the film and those buildings are studied through selected frames. It is not possible to analyze the whole film, as some of its aspects will be irrelevant and increase the length of the research unnecessarily.

b) As the research explores three movies of a specific genre, the data collected is applicable to only such films and is not universal.

c) Only 2D representation of the frames is possible. 3D representation or motion pictures cannot be included in this medium of representation.

d) The temporal aspect of the frames is not considered for this research, as it requires a different methodology which doesn't fall under the scope of this research.

e) The research is subjective, due to the methodology of qualitative analysis and criteria chosen for analysis.

f) Due to time and word count restrictions, a limited amount of references were feasible. Potential references could not be utilized due to accessibility whether it be located distantly or be of great expense.

2. LITERATURE REVIEW

2.1 Science Fiction Films & Reality
How science fiction films help architects in reality?

"These science fiction-based films tend to be the 'favorites' in courses that relate architecture and film, as they generate the most provocative, compelling, and even disturbing, images of the future." (Boake, 2001). Films have an incredible ability to realistically represent possible architectural and environmental visions of the future; an ability to convincingly ask 'what if?' Science fiction films can have significant influence on the design of current and future environments. Fictional architecture is a valid exercise in architectural design. Physical environments in films can be compared with exercises in architectural design. One of the reasons behind digital transformation in architectural profession is films. Due to films, the act of designing has shifted from paper to screen. Fiction is rooted in reality, and imagination is influenced by the empirical world we inhabit. An imaginary, exaggerated, or altered version of reality can inspire innovations in the real world (Kanpillewar, 2019). Historian Yuval Harari in his book Sapiens: A Brief History of Humankind (2015) highlights that "the human ability to imagine things and then collectively treat them as a part of reality", appears to be the main distinction between humans and other animals. Many developments in technological fields like space travel, communication, transport, entertainment have been inspired by fictional imaginations and futuristic depictions; a major source being the science fiction genre.

How science fiction turns into reality?

Science fiction films have influenced real-life architecture in various ways. Sometimes it is just aesthetic influence, like Freddy Silvestre's homes that looks like a spaceship and futuristic hotels in the Middle East, while sometimes it influences much larger scale buildings and concepts such as modular architecture in Japan. Science fiction films allow architects to design with materials and technologies that are not presently available, and this process allows more creative architectural explorations and encourages innovations (Border, 2017). As described, influence of science fiction films can be seen in many buildings. However, sometimes it has not just influenced, but directly led to development. A direct translation of the concept in real life can be seen in terms of technology, product design and architecture. When real-world technology catches up with the one shown in fiction, life imitates art. From flip-phones to waste plastic bricks as building material are examples of how science fiction concepts have directly turned into reality in its imagined form and function.

2.2 Science Fiction Films: Narrative & Architecture
Architecture: a tool for story-telling in science fiction cinema

As discussed in the previous chapter, science fiction films have a great influence on real-life innovations, be it architectural or technological. Thus it becomes important to study how architecture tells stories through science fiction films that inspire real-life architecture. Architecture has been a tool for storytelling in cinema since the era of early silent films, in return, the film has served as an inspiration to architects and designers (Căplescu, 2015).

Narrative relationship between film and architecture

Architecture within a science fiction film is used to passively inform narrative of the film to viewers. Directors use architecture to aid plot's concept and narrative of the film. Annette Kuhn in her book Alien Zone II: The Spaces of Science-fiction Cinema (1999) mentioned that "Architecture is fundamentally used within the film to assist in the grounding of a narrative, symbolizing a time and a place, though sometimes it is used by directors to function as a vision in itself.". Creative producer, Chris Roe mentioned in his blog that a complete narrative consists of six elements: setting, characters, plot, conflict, theme, and narrative arc. (Roe, 2020). For this research, we can narrow this list down to two elements : plot and context. As we are looking at the architectural response to the narrative, we can choose to focus on only those elements which play a crucial role in the making of architecture. Narrative of the selected films can be explained under the headings of plot and context, and further its influence on the development of architecture can be studied.

Representative relationship between film and architecture

Architectural spaces in science fiction films invite people to travel through and experience the space the way director wants, as the frame we view is controlled and narrated as per the storyline. It allows the viewer to relate to the story through the architectural representation. The viewer becomes an active participant of the world created by the director (Manasseh, 2000). Film-architecture is architecture of meaning, everything in a frame has something to tell and carries certain importance. It becomes very important to understand every bit of the frame to decipher the real meaning behind it (Schaal, 2000). Most of the futuristic science fiction films show cityscape of the future cities and further narrow it down to buildings within the cities. Thus the audience can get a glance at the larger picture of the city followed by the smaller details that complete the whole environment. We can categorize architecture of science fiction films into two parts: cityscape and built spaces.

3. METHODOLOGY

Qualitative analysis will be beneficial for this research, over quantitative analysis. Aim of the research and research questions consist of topics that are only observationally descriptive and opinion pieces will avail. Thus, quantitative data will not be relevant to this thesis.
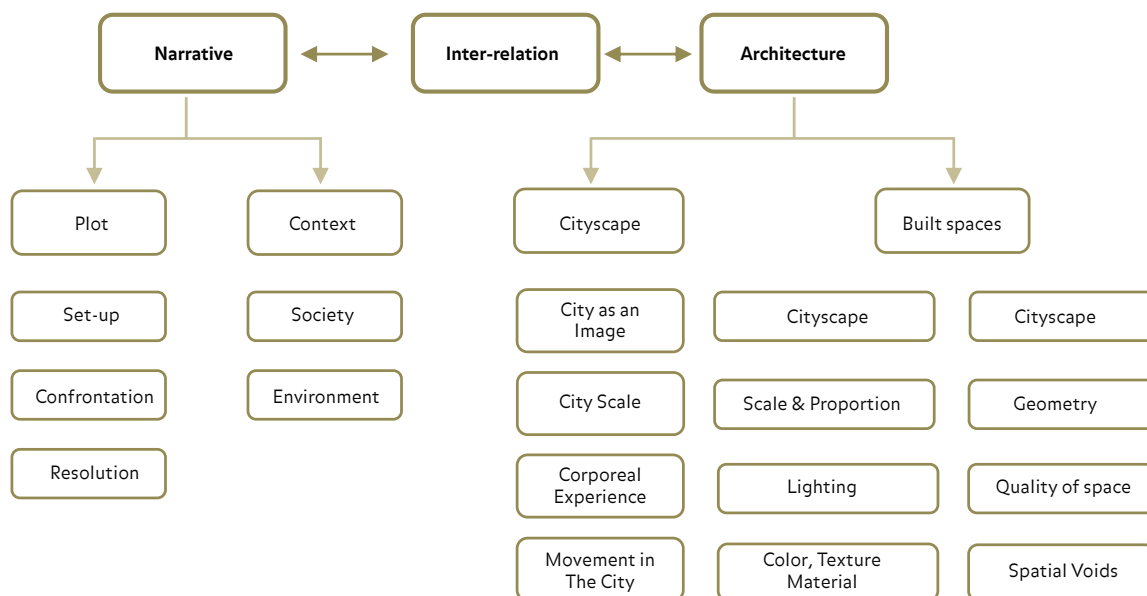
Figure 2: Analytical Framework *(Source : Author)*

3.1 Framework of the research

The research is structured upon three main themes:

  i. Narrative: Plot & Context
  ii. Architecture: Cityscape & Built Spaces
  iii. Inter-relation between Narrative & Architecture

3.2 Framework for detailed Analysis

Detailed analysis of the films will be done through the following criteria (Refer Fig. 2):

• Plot: Set-up, Confrontation, Resolution (Field, 1979)
• Context: Society, Environment (Film Education, 2010)
• Cityscape: City as an image, City scale, Corporeal experience, Movement in the city (Hacıömeroğlu, 2008)
• Built Spaces: Focus and Subject, Scale and Proportion, Lighting, Color-Texture-Material, Depth, Geometry, Quality of space, Spatial voids (Tokas, 2018)

3.3 Criteria for selection of films

The following have been the criteria for selection of the films as case studies for this research :

  i. Science fiction films with futuristic approach to be selected for the research. Genre is specific to futuristic science fiction films and not any other kind of science fiction films.
  ii. Hollywood films with duration of at least one and a half hour to be selected, not any short films or series to be studied.
  iii. Films with color and audio to be selected. Animated films are not considered for this research.
  iv. Film should be set on earth and not any other planet.
  v. Films should be of different time periods, can be between 1920-2020.
  vi. Films representing future societies and settlements should be selected, with technological advancement and futuristic approach.

Selected Films:

  1) Blade Runner (1982), Directed by Ridley Scott; Set in 2019 in Los Angeles
  2) The Fifth Element (1997), Directed by Luc Besson; Set in the 23rd century in New York
  3) Equilibrium (2002), Directed by Kurt Wimmer; Set in 2072 in Libria

3.4 Criteria for selection of frames

The following have been the criteria for selection of the frames from the chosen films for analysis :

  i. Frames with the focus on architecture should be selected.
  ii. Multiple frames with same built environment should not be analyzed. One frame per building should be analyzed.
  iii. Frames showing built spaces of specific class and hierarchy should be selected.
  iv. Frames showing built spaces of specific functions should be selected.

4. CASE STUDY

4.1 Blade Runner

Blade Runner presents the futuristic world that echoes the industrialism of advancing technology and society.

▶ Narrative (Plot & Context) :"Rick Deckard, an ex-policeman, becomes a special agent with a mission to exterminate a group of violent androids. As he starts getting deeper into his mission, he questions his own identity." (Blade Runner, 2021). These four frames (See Fig.4) depict the social structure and environment of the film. Drones hovering over the city to advertise an off-world utopian settlement, crowded streets, retrofitted buildings and dominance of cops represents a dystopian environment. Signs of foreign language in Los Angeles shows existence of multicultural population living under the same hood.

▶ Architecture : The use of this dramatic long shot as the first visual seen by the viewer conveys a sense of dystopia, helplessness, and industrialism to the audience. It sets the tone for the rest of the film and provides insight into the city's environment.

Drone Advertising about off-world living

Crowded streets of Los Angeles

Neon signs of foreign language

Retrofitted Bradbury Building
Figure 4: Narrative
(Source: Snapshot from the Film Blade Runner, adapted by Author)
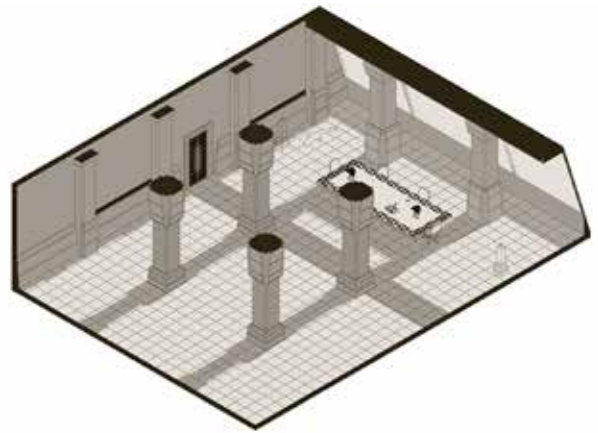
Figure 7a: Tyrell Headquarter Isometric View
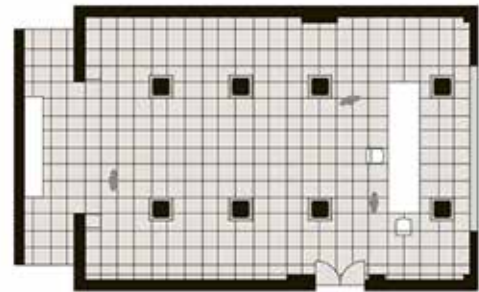
Figure 7b: Tyrell Headquarter Plan

Figure 7c: Tyrell Headquarter Section

▶ Cityscape: Cityscape is analyzed through illustrations (See Fig. 5) under these four titles: City as an image, City Scale, Corporeal Experience, and Movement in the city

▶ Built Space: Tyrell Corporation Headquarters: A sequence of shots (See Fig. 6) representing the Tyrell Corporation through the lens of Deckard who is traveling towards the Tyrell building in a flying car gives a 360 view of the pyramidal structure of Tyrell building. Gradually zooming in towards the interior of Tyrell's headquarter. There is only one scene in Blade Runner where the sun is visible, and that is from the interior of the Tyrell's building, indicating that he is the most powerful character in the film. Tyrell tints the windows after enduring sufficient sunshine, thereby manipulating the sun and symbolizing himself as a god-like character. Visualizing the 3D volume of the space with the help of multiple 2D frames that can aid in the creation of the full image of the space. This volumetric 3D interpretation of the space (Fig 7a) gives a clear idea of the enclosure, proportions and scale of the building, and also helps in visualizing 3d aspect of the space along with the complete picture of the space. The entrance corridor is not visible in any frame, but with the help of depth and lighting condition, we can assume it and represent it through plan and section (Fig. 7b &

7c). These drawings allow us to understand hidden parts of the building by logically assuming and connecting it with the visible parts.

▶ Focus and Subject: This scene is focused towards the huge window through which the sun is visible and the subject is facing towards it. Focus and subject are placed in the centre.

▶ Lighting: The whole movie is shot in a darker lighting condition and artificial lights, except for this scene, where the only light source is the Sun showing importance of the space.

▶ Scale and Proportion: This illustration helps to understand scale of the space. Monumentality of the structure can be understood through this illustration.

▶ Color, Texture, Material: This scene has a monochrome color palette. The materials seen in the image are highlighted by yellow tone of the sunlight.

▶ Depth: Delayering of the image shown here is further done to understand the depth of the image and the geometry of the space. It simplifies the 3d environment.

▶ Geometry: The whole space in the scene is symmetrical and being visualized from the central axis. Geometry balances the ratio of enclosure and openness.

▶ Spatial Voids: The only void in this frame is the length of the space. This scene gives very limited information about the context of the space. Information provided in the scene is enough to visualize the space in isolation.

▶ Quality of space: Side by side illustration of the original image and edited image tries to simplify the scene by removing unnecessary information.

▶ Inter-relation between Narrative and Architecture: Blade Runner is one of the most discussed and influential films of our time due to the thoughtfulness of the main premise and the layering of visuals and associations. A post-modern vision of a globalized world is formed by visual layering of architectural typologies from diverse cultural pasts. Blade Runner presents a future of overpopulation, immigration, poverty, pollution and deterioration through the presentation of basic surroundings to manipulate the perception of the future. It presents a variety of dominant related scenes driven by the darkness, helplessness, and industrial sensation the film encompasses. Overpopulation, technical delinquency, poverty, control, and vertical class division are all topics in this bleak future. The film employs darkness to convey uncanny, inhospitable environments. It uses a collection of familiar buildings and materials that have been retrofitted to create futuristic visions. The street-level future is chaotic, filthy, and teeming with a jumbled sense that any new technical advancement we invent will coexist with all that has come before it. This crucial concept distinguishes the film from other speculative urban fantasies that build science fiction cities from the ground up. Instead, Blade Runner's universe is a thick industrial jumble, which makes it all the more practical. Influence of the film Metropolis (1927) is clearly seen in this film, as it uses similar techniques to convey certain philosophies. A sense of urban gigantism and geometrical structure can be seen in both Metropolis (1927) and Blade Runner. Metropolis' skyline is dominated by the Tower of Babel, whereas the Tyrell Corporation's headquarters pyramid serves as the city's centre in Blade Runner. Like Metropolis (1927), Ridley Scott's Blade Runner (1982) shows class hierarchy by its vertical architecture. For architects and city planners, Blade Runner has become a source of inspiration and appreciation, as it combines architectural and narrative techniques to build a near future city. Ridley Scott has represented not too-distant future of Los Angeles through Blade Runner. Due to the architectural representation and believable narrative manipulation, the futuristic representation of the film has acted as an inspiration for architects and town planners. Despite the film's grim horror sequences, the cinematography and narration portray Los Angeles as a futuristic metropolis.

5. CONCLUSION & SCOPE FOR FURTHER RESEARCH
4.2 Summary of all three films
Conclusion

The aim of the research was to analyse architectural representation in science fiction films, developed as a response to the narrative of the film. Then to arrive to a conclusion of how an imaginary/ fictional narrative can be translated into a believable environment with the help of architectural imagery. Various literatures about films, narrative and architecture provided insight into basic concepts of narrative and architectural representation in science fiction films, which was further explored through case studies of three science fiction films: Blade Runner (1982), The Fifth Element (1997), Equilibrium (2002).

According to a general notion, architecture in science fiction films is used passively to convey the director's vision to the viewers by supporting the narrative of the film. At first glance, the use of architecture in science fiction films may seem to be a simple process, but what has derived is a more complex process in which architecture aids film and film aids architecture. Whether deliberately or unconsciously, the architecture of science fiction films often ends up in a criticism of the structures depicted, their architects, and even an architectural

Table 1: **Summary of the films (Blade Runner, The Fifth Element, and Equilibrium)** *(Source: Analysis by Author)*

Blade Runner (1982)	The Fifth Element (1997)	Equilibrium (2002)
Set in 2019 in Los Angeles, depicts a postmodern vision of a globalized world.	Set in 23rd century New York, a groundless city with extreme verticality.	Set in 2072 in Libria, a peaceful city of order and discipline.
Visual layering of architectural typologies from diverse cultural pasts.	Layering of different architectural styles, starting from Egyptian architecture to space architecture.	A Utopian city of order and discipline, but at the cost of human emotion.
Overpopulation, technical delinquency, poverty, control, and vertical class division, all combined create a bleak future.	An overpopulated city with compact houses and movement above the ground level. Extreme verticality.	Perfectly organized skyscrapers, huge gathering spaces, planned cityscape, but clad in black and de-saturated blue.
The film employs darkness to convey uncanny, inhospitable environments.	Dense construction and extremely tall buildings representing overpopulation.	The Father's dictatorship changes the whole setting from a utopian idea to dystopian aesthetic.
The film uses a collection of familiar buildings and materials that have been retrofitted to create futuristic visions.	Use of iconic elements of New York City, like fire-staircases on the façade to create a believable environment.	Colour is used as a primary element to differentiate places, to show life as well as the lack of emotions, dominance and order.
Blade Runners' universe is a thick industrial jumble, which makes it all the more practical.	A skyscraper-only city, with tiny houses, very close to a possible future.	The architecture of Libria is very rigid and specific, which represents the political power and its dominance in the city.
The film combines architectural and narrative techniques to build a near future city.	Architecture in the film conveys the narrative of different spaces through the components and setting.	The film uses architecture to manipulate the environment and set the mood for the scene.

trend as a whole. As a consequence, architecture in science fiction films is never passive; rather, it promotes dialogue. This cultivation of architectural discourse is extremely beneficial to contemporary architects and society in general, as it raises questions not only about the merits of different design styles and approaches, but also about the effect that these styles and approaches may have on society as a whole.

Most science fiction films depict and analyze contemporary social problems surrounding the cityscape and climate. Architecture is aided through narrative and narration can be manipulated with the help of architecture. In certain ways, architecture and film are dependent on each other. Film's ability to communicate with its viewers is aided by architecture. Film aids architecture by encouraging the audience to become more interested in their urban world and to see something they would never have had the opportunity to experience in real life through the medium of film. Film also establishes architecture as a mainstream forum in which both trained and untrained critics can participate; where architects can realize visions that are impossible to realize in practice. By understanding the relationship between film and architecture, we can better articulate our diverse ideas and visions for cities through architectural elements (signifiers). I hope that these experiences from my research contribute to a deeper understanding of architectural and cinematic relationships. Architectural decisions that can aid in the creation of environments that provoke specific feelings in the user's experiences.

Scope for further research

This research only analyzed three films of a specific genre. There are several different films that could be studied under this topic. Analysis of more films will provide a much better and comprehensive idea of narrative relationship of films and architecture. This research has developed a potential framework that can be used to analyze a wide range of sci-fi films. The research can further talk about the speculative architecture and its practicality; as this segment of the architecture is not yet explored enough, but seems to have a greater impact in terms of predicting the future and preparing the world for it.

REFERENCES

1. *Blade Runner.* (2021). Retrieved February 5, 2021, from Greatest Movies: https://greatestmovies.miraheze.org/wiki/Blade_Runner
2. Boake, T. (2001). *Architecture And Film: Experiential Realities And Dystopic Futures.* University of Waterloo. Retrieved January 26, 2021, from https://www.academia.edu/3437846/Architecture_And_Film_Experiential_Realities_And_Dystopic_Futures
3. Border, G. (2017). *Architecture of Science Fiction : Is architecture in science fiction films merely inspired by the present, or does it truly show us the future?* Scotland: University of Edinburgh. Retrieved January 26, 2021
4. Căplescu, O. A. (2015). *Architecture in Science Fiction Movies.* Romania: "Ion Mincu" University of Architecture and Urbanism. Retrieved March 4, 2021, from https://www.academia.edu/11672078/ARCHITECTURE_IN_SCIENCE_FICTION_MOVIES
5. Field, S. (1979). *Screenplay: The Foundations of Screenwriting.*
6. Film Education. (2010). *Metropolis: themes and context.* Film Education. Retrieved March 2, 2021, from http://www.filmeducation.org/metropolis/pdf/Metropolis_Themes_and_context.pdf
7. Gilks, M., Fleming, P., & Allen, M. (2003). *Science Fiction: The Literature of Ideas.* WritingWorld.com. Retrieved January 26, 2021, from https://www.writing-world.com/sf/sf.shtml
8. Hacıömero lu, N. (2008). *Reconstruction of Architectural image in Science Fiction Cinema: A Case Study on New York.* Retrieved February 5, 2021, from https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.633.5377 andrep=rep1andtype=pdf
9. Harari, Y. N. (2015). *Sapiens: A Brief History of Humankind.* New York: Harper Collins publishers.
10. Kanpillewar, R. (2019). *Architecture in Fiction : Estrangement, Naturalization and Social Commentary in the Architecture of Contemporary Speculative Fiction Films'.* London: University of Westminster. Retrieved February 1, 2021, from https://issuu.com/ruchitakanpillewar/docs/ma_thesis_ruchita_kanpillewar
11. Kuhn, A. (1999). *Alien Zone II: The Spaces of Science-fiction Cinema.* New York.
12. Manasseh, C. (2000). *Architectural Space and Form in Science Fiction Cinema. An Analysis of "Blade Runner" (1982), "The Fifth Element" (1997) and "Alien" (1979).* GRIN. Retrieved February 23, 2021, from https://www.grin.com/document/305130
13. Roe, C. (2020). *Storytelling 101: The 6 Elements of Every Complete Narrative.* Pond5 Blog. Retrieved March 7, 2021, from https://blog.pond5.com/6477-storytelling-101-the-6-elements-of-every-complete-narrative/
14. Schaal, H. D. (2000). *Spaces of the Psyche in German Expressionist Film.*
15. Tokas, Y. (2018). *Learning from Cinema: The Architecture Language of Spaces in Sci-Fi Thriller Genre.* Faculty of Architecture Cept University.

SOURCES FOR IMAGES

• **Figure 7a:** https://images.squarespace-cdn.com/content/v1/542227c8e4b01cc5399bd3df/1436849959968-8AWJJ8BU0BHV983X8Y0I/ke17ZwdGBToddI8pPm48kBpPelmut04RQl0FKZuGB597gQa3H78H3Y0txjaiv_0fDoOvxcdMmMKkDsyUqMSsMWxHk725yiiHCCLfrh8O1z4YTzHvnKhyp6Da-NYroOW3ZGjoBKy3azqku80C789l0jRb3i7UjwNNySrgFE_nWatvL4Rxvt9jpiVNIHbAFww2bDmpYixQDVkGaiLdZ7WIPQ/image-asset.jpeg?format=1500w (Retrieved February 25, 2021; adapted by Author)
• **Figure 7b:** https://www.researchgate.net/profile/Juan-Parra-33/publication/30867375/figure/fig2/AS:277215632740363@1443104765974/Scene-of-arrival-to-Tyrell-Corporation-in-Bladerunner-1982-frames-of-the-shots-and.png (Retrieved February 25, 2021, adapted by Author)
• **Figure 7c:** https://www.researchgate.net/profile/Juan-Parra-33/publication/30867375/figure/fig2/AS:277215632740363@1443104765974/Scene-of-arrival-to-Tyrell-Corporation-in-Bladerunner-1982-frames-of-the-shots-and.png (Retrieved February 25, 2021; adapted by Author)

Saumil Upadhyay
Saumil Upadhyay is an undergraduate Student of Nirma University in his final year of B.Arch. His interests lie in speculative architecture and science-fiction films. He has developed a passion for fictional architecture since the last couple of years and looking forward to learning more about it.

Ar. Supriya Pal
Ar. Supriya Pal is an architect-academician specializing in history, theory and design. Her work interests include global and Indian history, modernism, cultural ethnography and poetry. She completed her undergraduate education at CCA, Chandigarh and Masters at CEPT University and Politecnico di Milano. She is currently pursuing her doctoral studies titled Indian architecture in the Penultimate Decades before Independence.

GHAR
A WELLNESS CENTRE FOR MENTALLY ILL ADOLESCENTS

By Aratrika Sarkar
Final Year Student
Jadavpur University, Kolkata
aratrika0399@gmail.com

Dr. Jayita Guha Niyogi
Professor, Dept. of Architecture,
Jadavpur University, Kolkata
jayitaguha.niyogi@jadavpuruniversity.in

28

ABSTRACT

Amidst the worldwide crisis, due to the uproar of the pandemic, several pre-existent issues resurfaced, one of them being mental health. The consequent effect of the lockdown has led to this project to understand the contribution of architecture towards the psychology and mental health of inhabitants and its implementation in an urban metro city of India for the most adversely affected age group of 13 to 18. The report, therefore, throws light on the process of learning about existent mental health care systems, recognizing the scope of architecture in betterment of the current scenario and designing various spaces to fulfil both the functional and personal needs of teenagers. The dissertation discusses this project for a wellness centre for mentally ill adolescents at Noida, India.

INTRODUCTION

Health, as defined by the World Health Organisation, is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (WHO, 2003).

As defined by the Mental Health Care Act 2017 (Ministry of Law and Justice, 2017), mental illness means a substantial disorder of thinking, mood, perception, orientation or memory that grossly impairs judgment, behaviour, capacity to recognize reality or ability to meet the ordinary demands of life, mental conditions associated with the abuse of alcohol and drugs. However, this does not include mental retardation which is a condition of arrested or incomplete development of the mind of a person, especially characterized by sub-normality of intelligence.

METHODOLOGY

To thoroughly understand the various aspects of mental health disorders, the patients and a healing environment, the following methodology has been implemented:
• Step I – Study of basic terminologies established by certified and reliable sources. This helps in understanding the field of mental health care facilities.
• Step II- Referring to surveys on the prevalence of crisis according to region, gender, and age; identifying the type of organization through recognition of affected zones and selecting the site accordingly.
• Step III- Studying the relationship between architecture and emotions, building codes, conducting interviews and case studies. This was important to understand functional and personal needs of inhabitants.
• Step IV- Drawing design guidelines and applying them in concept, zoning, and the final design project.

MENTAL HEALTH AND MENTAL ILLNESS : DISCUSSION

Deinstitutionalisation

Deinstitutionalization is an essential part of the reform of mental health services. This means more than discharging people from long-stay hospitals. It requires significant changes involving the use of community-based alternatives rather than institutions for the delivery of services as depicted in Figure 1 (Vishwanath, 2020).

Psychiatric Rehabilitation

Psychiatric rehabilitation is a gradual process of helping persons with psychiatric disability (PwPD) to function optimally and achieve desired life goals. Rehabilitation helps PwPD in activity scheduling, gainful engagement, socialization and boost of self-confidence (Bhide & Chakraborty, 2020).

National Mental Health Survey

National Mental Health Survey 2015-16, includes a study of twelve states in India to understand the epidemiology of various disorders based on rural, urban non-metro, urban metro cities, age, gender and income. Following are the analytical aspects :
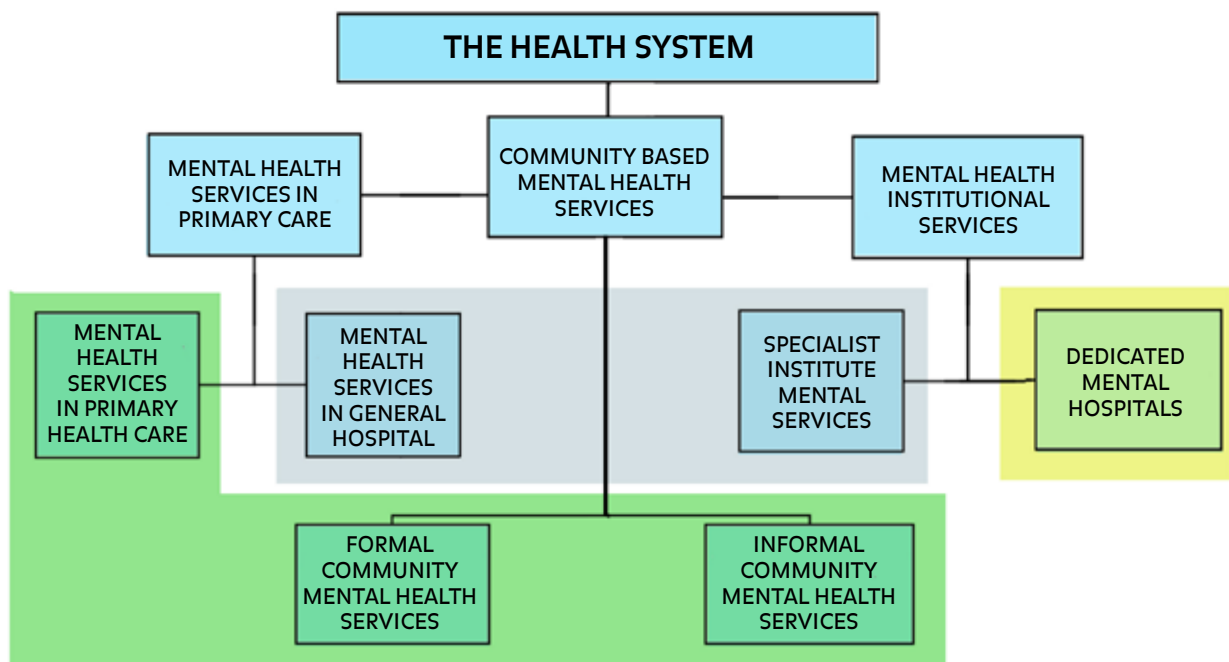

Figure 1: Organisation for services of mental health
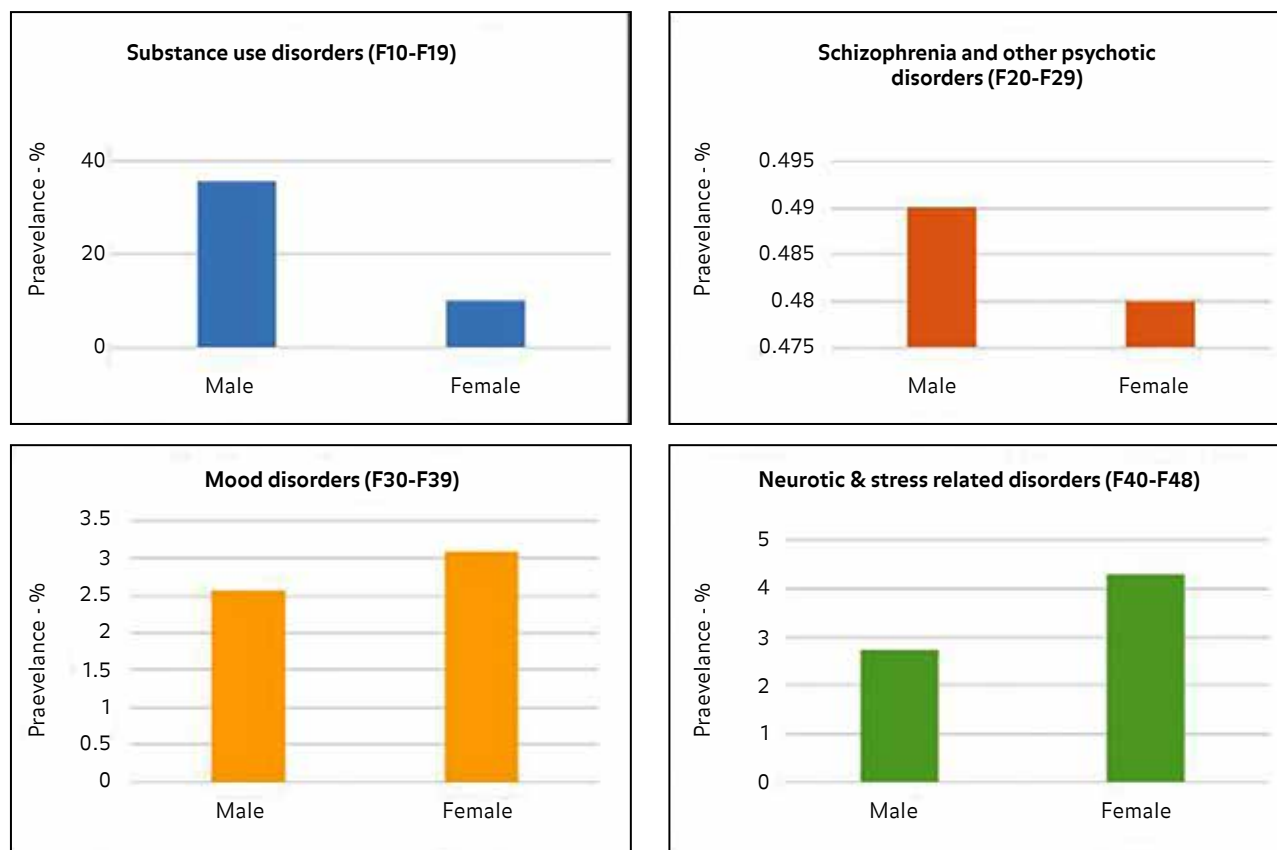*(Source: Mental health policy and service guidance package, WHO, 2003)*

Figure 2: Prevalence of mental morbidity across genders
(Source:, National Mental Health Survey of India, 2015-16, Prevalence, Pattern and Outcome, NIMHANS, 2016)

a) There is an equal prevalence of both genders in mental disorders observed (Figure 2). Therefore, a complex can be designed for a diverse community.

b) Figure 3 shows a peak in case of all the disorders in the age group of 40-49. This peak is also reported due to the delay in seeking care after certain symptoms. Therefore, the starting group of ages 13-18 can be considered to allow for early consultation and prevent adverse effects due to delay.

c) A majority of people suffering from disorders share urban metro background as depicted in Figure 4. Therefore, the location of the site for a complex should be easily accessible from the urban metro areas.

d) A site in a state that can be accessible from the highly affected areas can be considered shown in Figure 5, as the state of Uttar Pradesh or Delhi is in proximity with other affected states. (NIMHANS, 2016)

Impact of COVID-19 and measures
Data from various institutions indicate the need for psychiatric facilities on a local level to reserve the beds for severe patients and treat the illnesses at the preliminary stage (Scroll, 2020).

The consequent lockdown and isolation drove several people including adolescents either towards mental illnesses or relapse due to delay or lack of treatment.

Adolescents and their illnesses
Adolescence is the span that acts as a transitional zone for the growth of a child into an adult. It leads to a change in biological, cognitive and psychosocial aspects. India has the largest adolescent population as reported by UNICEF (2019). According to the National Mental Health Survey, 7.8 % of mentally ill patients are adolescents (NIMHANS, 2016). Therefore, early attention and treatment will not only prevent the aggravation of the illness but also empower the future generations of our country.

Psychotherapeutic Interventions
Various forms of psychotherapy that are used in the treatment of child and adolescent psychiatric disorders include acceptance and commitment therapy, cognitive-behavioural therapy (CBT), dialectical behaviour therapy, family therapy, group therapy, inter-personal therapy (IPT) and so on (Bhide & Chakraborty, 2020).

ARCHITECTURE AND MENTAL HEALTH
Environmental psychology is a sub-discipline of behavioural sciences and studies human behaviour in a physical environment with the impact over one another like values and needs along with perception, cognition and social behaviour (Mottalebi, 2002).

a) Salutogenic Theory
Salutogenic is a psychological study of what keeps people healthy, illness and health being the two extremes.

Lawton and Nahemow (1973) observed that an environment that lacks challenge can lead to deterioration but an environment with too many challenges can be stressful. Further, according to the study by Antonovsky (1987), when a person is subjected to stressful times, a supportive environment can be fortifying. Therefore, a "sense of coherence" is
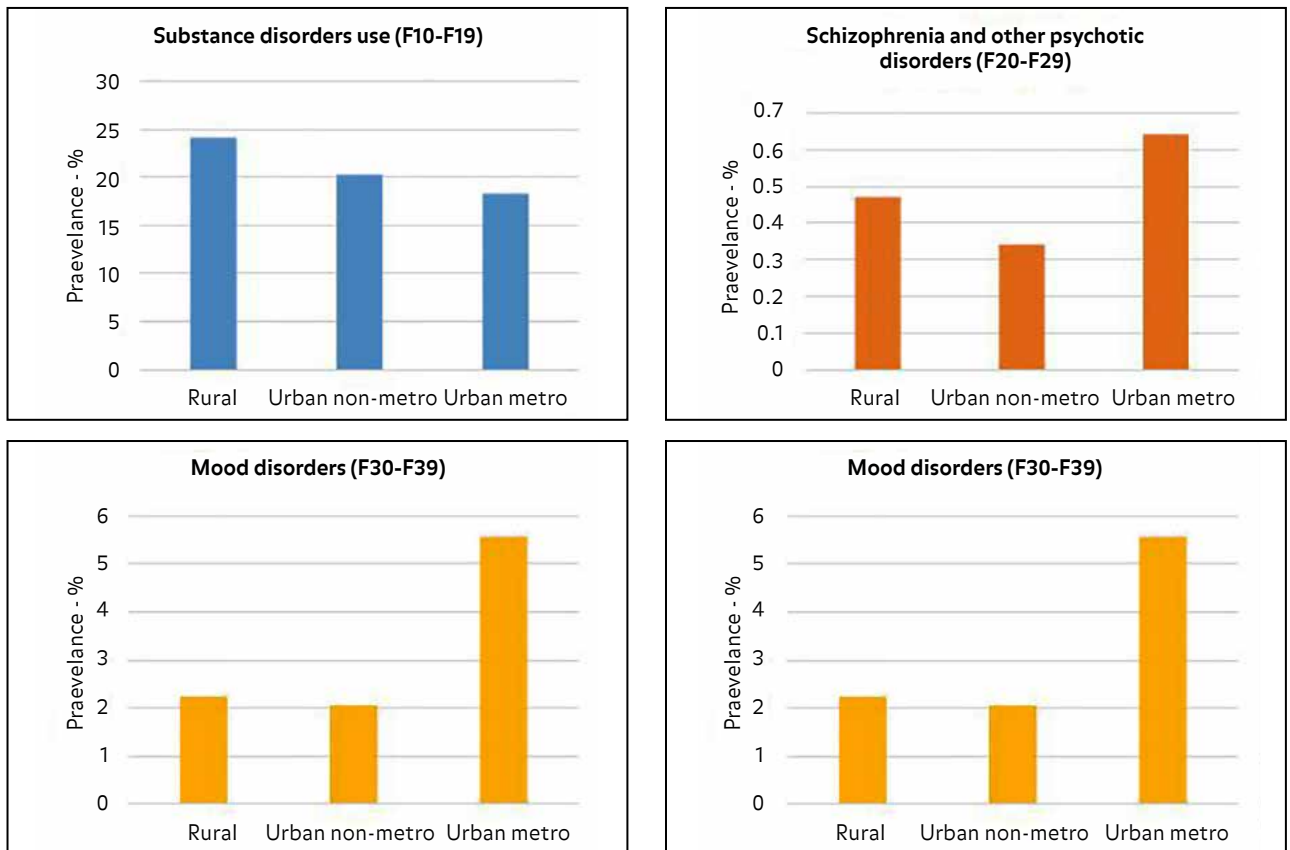
Figure 3: Distribution of mental disorder across place of residence
(Source: National Mental Health Survey of India, 2015-16, Prevalence, Pattern and Outcomes, NIMHANS, 2016)

important for a natural healing process. This sense of coherence consists of comprehensibility, manageability and meaningfulness.

b) Senses of a human being
- **Sight :** The role of sunlight, colour, view and impact of artificial lighting strongly associate with the role of sight in the healing of the human mind. Sight helps in finding a sign of recognition with something that the person has seen before.
- **Light :** Especially natural lighting can control recovery through visual needs and responses. It regulates the circadian rhythm of a body and therefore, allows the person to understand the pattern of days and nights leading to a speedy recovery mentally, rather than remaining into a perennial sense of confusion (Ulrich, 2008).
- **Sound and silence :** Sound and silence, both play a significant role in the healing environment. A noisy environment has been studied to conclude that it disturbs the recovery pattern of a human being as it leads to incomplete sleep, increased stress and slow recovery.
- **Smell and touch :** Smell and touch have also been very crucial for healing. While aromatic therapies are used even today to calm down, touch has been recognized to be extremely useful for the familiarity of an environment to a person. The contrast between visual perception and touch can often lead to confusion and thus, it is suggested by the studies to adhere to the basic perceptions of the texture of a material (Sterberg, 2009).

c) Healing Gardens
Gardens have gained importance as rehabilitating environments as they provide a healing process that is beyond the constraints of the built environment. Elements like simply looped pathways for easy way-finding, dark pavements to avoid glare and carefully planned vegetation are just some of the many steps. (Hartig & Marcus, 2006)

FEASIBILITY
One of the model projects under the Deendayal Disabled Rehabilitation Scheme is Halfway Home for Psycho-Social Rehabilitation for Treated and Controlled Mentally Ill Patients. The said project will lie under this category and can be funded by this scheme.

INFERENCES
Therefore, the psychiatric rehabilitation centre will be designed:
1. For the patients of age ranging from 13 to 18.
2. At Noida, Uttar Pradesh
3. Irrespective of gender or physical disability
4. To help kids at preliminary and treated stage and reconnect with the community.
5. As a wellness home that shelters therapy blocks, residential units and a zone for interaction with local people (open to all)

DESIGN ASPECTS
After studying the existing literature, and working closely with two friends who were diagnosed with mental illnesses, the main idea was to keep the complex simple.
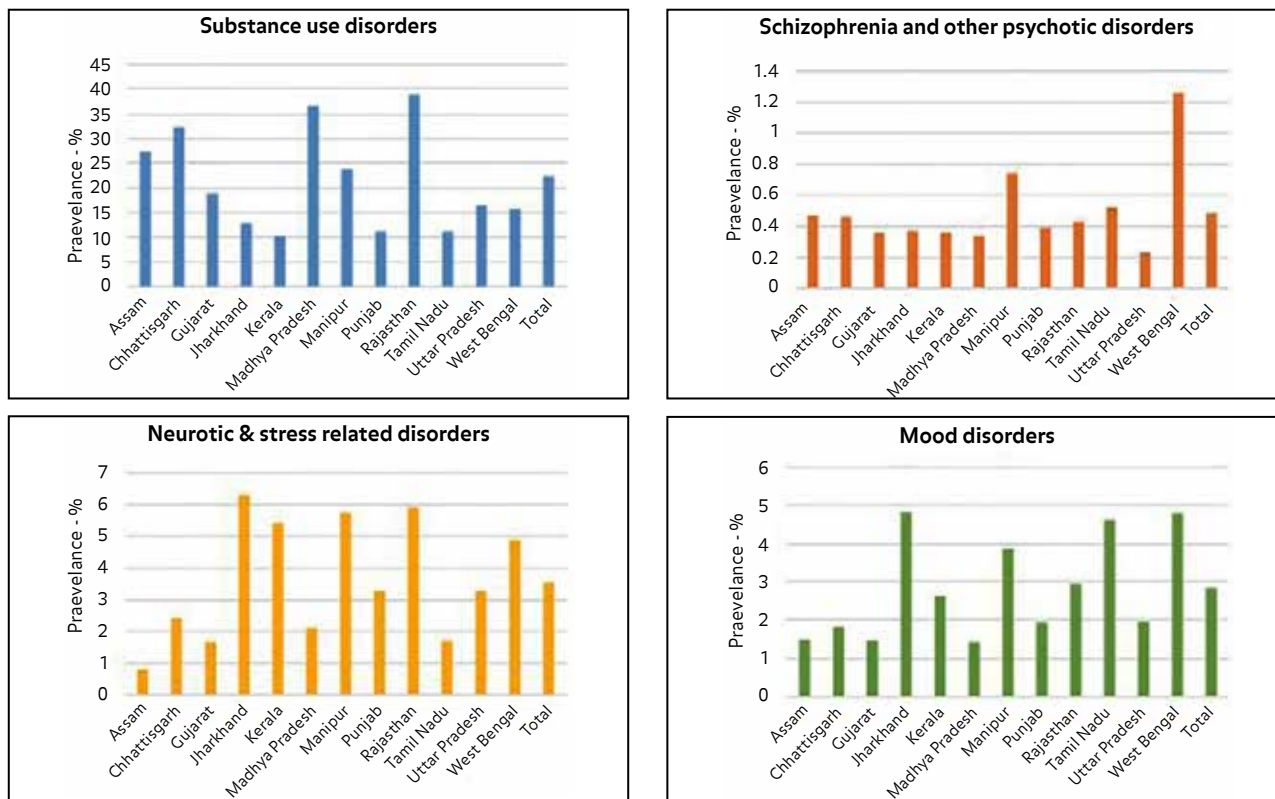
Figure 4: Trend of mental morbidity across NHMS States
(Source: National Mental Health Survey of India, 2015-16, Prevalence, Pattern and Outcomes, NIMHANS, 2016)

Table 1: Primary and secondary case studies observations *Source: (Archdaily, 2021) & (worldarchitecture.org)*

Case Studies	Functions	Climatic Condition	Patient Type
Saksham Halfway Home, Delhi (primary)	therapy rooms, courtyard system	hot and dry	voluntary from age 30
Vidya Sagar Institute of Mental Health, Amritsar	residential units, occupational therapy units, continuous corridor system	warm and humid	voluntary and involuntary- all age groups
Daycare Centre for Mentally Handicapped People, Spain	residential area and therapy spaces	warm	voluntary- mainly adolescents
Nuuk Psychiatric Clinic, Greenland	gathering spaces, plan with reduced confinement, design of volume	cold	voluntary/ involuntary- all age groups

After conducting analytical hierarchical process between sites located in Noida and Gurgaon based on the criteria of connectivity by main roads, proximity of hospitals providing psychiatric care, nearby open spaces and visibility to the site, a site at Noida was selected that optimally satisfied all the conditions.

The site has three access points- from the main road, sub-arterial road and lastly, that connects the adjoining local park to the site for casual visits by local people.

The zone towards the local park has been assigned for the "Open to All" Block which has a common play area that acts as a meeting place for patients and local people without any disparity. (Figure 6)

(B) FUNCTIONAL ASPECTS
The complex consists of the following blocks:

1. Administrative Block
2. Outpatient department block (counsellor's room, psychiatrist's room, time out room)
3. Specific therapy block (art therapy room, music therapy room, family therapy room, speech therapy room)
4. Occupational Therapy and Vocational Skills Block (exercise room, loom, bench, table workrooms, bakery, computer room, photocopy and printing unit)
5. Group Therapy Block (group discussion room, activity room, theatre therapy room)
6. Residential Units for 30 patients
7. Open to All block (exhibition room, multi-purpose area, library)
8. Administration and Services block

Substance use (F10-F19)

Mood disorders (F30-F39)

Schizophrenia and other psychotic disorders (F20-F29)

Neurotic & stress related disorders (F40-F48)
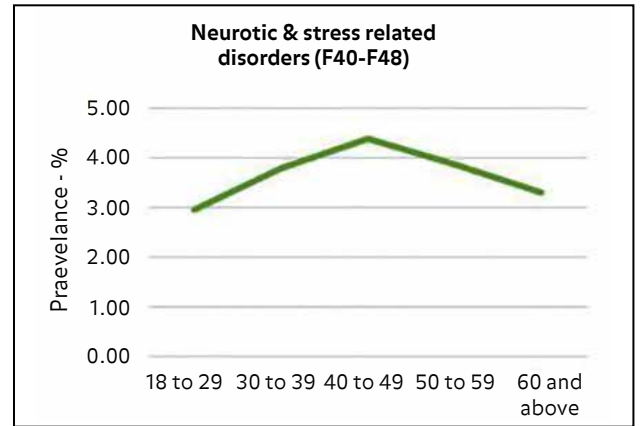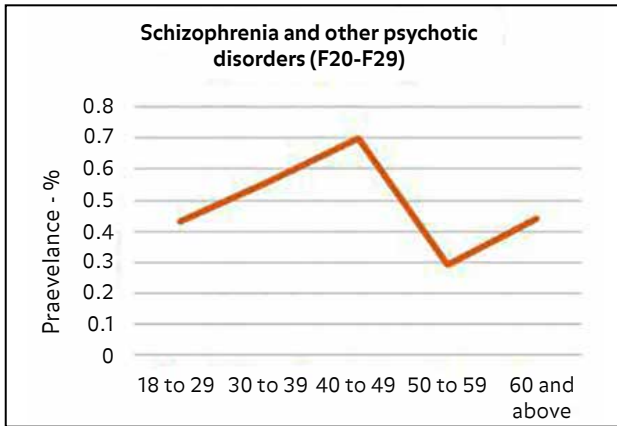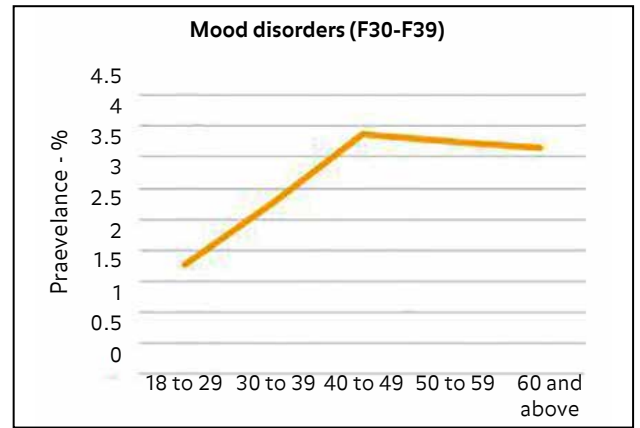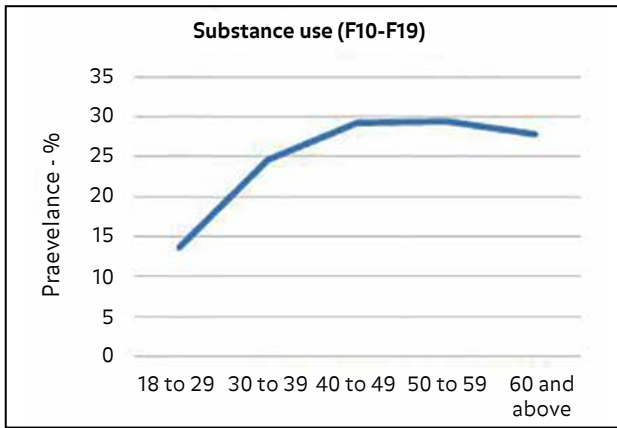
Figure 5: Trend of mental morbidity across various age groups
(Source: NIMHANS, 2016, National Mental Health Survey of India, 2015-16, Prevalence, Pattern and Outcomes) (NIMHANS, 2016)

Figure 6: Common space for interaction between local people and patients *(Source: Author)*

Figure 8: The central courtyard of the therapy block *(Source: Author)*

Figure 7: Varying fenestrations of therapy and residential blocks, climbing walls for kids and play area *(Source: Author)*

Figure 9: Outdoor semi-covered space for exercise *(Source: Author)*

Apart from site planning, the design started from conceptualizing the section as volume plays a huge role in making a person feel comfortable. Each room has an increasing volume as height varies from 3 m to 4 m. Some rooms have larger volume based on the level of interaction as it has been seen that change in heights and areas can moderate a conversation from intimate or light to retrospective. All the therapy blocks are one storey high to prevent accidents from greater heights as well as create an environment different from the surrounding filled with skyscrapers.

The four blocks have been designed as per the stage of illness of the kids. The form of the blocks comprises varying staggered rectangular units, as linearity helps in lesser confusion and sense of direction. Indirect lighting through skylights for reduced glare and fenestrations have been designed as per the comfort of patients with their surroundings (Figure 7).

None of the blocks have definite waiting spaces. Each block has a central courtyard that has extended plinth for seating. These courtyards are semi-covered and act as a casual waiting place with loose furniture to give the patients the independence to select their place and keep them visually busy through various activities taking place around them (Figure 8).

The design is responsive to the climatic conditions, varying needs of patients, role of colours, materials and textures and finally, the balance between vigilance and independence (Figure 9).

CONCLUSION

The opinion of users is most important for designing a healing environment. Even though one may never be able to satisfy the personal and emotional needs of every individual, it is important to consider the patients, staff, families and social context. Therefore, this work is a product of interviews, meetings and discussions with several mental health professionals, patients, artists and architects who have closely observed people's lives and could point out minute details that we, as architects often tend to miss.

Aratrika Sarkar
Aratrika Sarkar is a graduate from Jadavpur University (2021). This article is based on her final year thesis guided by Dr. Jayita Guha Niyogi. Aratrika takes keen interest in people belonging to different backgrounds and wants to understand the role of inhabitants in the designing of built environments. This thesis is born out of the idea of helping teenagers fight this pandemic through a sensitively designed mental health care facility.

Dr. Jayita Guha Niyogi
Dr. Jayita Guha Niyogi is Professor at the Department of Architecture, Jadavpur University, Kolkata. She acquired her doctoral degree from Indian Institute of Technology, Kharagpur in 2005. She has 33 years of experience in the architecture and planning profession, teaching and research projects. Her domain of interest includes integrated land use and transportation planning, environmental planning and management and quantitative techniques.

REFERENCES

1
Antonovsky, A. (1987). Unravelling the Mystery of Health. *Jossey-Bass.*

2
Archdaily. (2021, July). Retrieved from archdaily.com: https://www.archdaily.com/342719/residence-and-day-center-for-the-mentally-handicapped-aldayjover-arquitectura-y-paisaje

3
Bhide, A., & Chakraborty, K. (2020). General principles of psychotherapeutic interventions in children and adolescents. *Indian Journal of Psychiatry, 299-318.*

4
Hartig, T., & Marcus, C. C. (2006). Healing Gardens: Places for Nature in Healthcare. *Medicine and Creativity,* 368.

5
Lawton, M., & Nahemow. (1973). Ecology and the Aging Process. *American Psychological Association,* 619-673.

6
Ministry of Law and Justice. (2017, April). Mental Health Care Act. *Gazette of India.* Retrieved Nov. 5, 2020, from https://egazette.nic.in/WriteReadData/2017/175248.pdf

7
Mottalebi, L. G. (2002). Environmental Psychology: New Knowledge in the Service of Architecture and Design. *Fine Arts Magazine,* 52-67.

8
NIMHANS. (2016). *Prevalence, Patterns and Outcomes.* National Mental Health Survey of India. Retrieved Nov. 5, 2020, from http://www.indianmhs.nimhans.ac.in/Docs/Summary.pdf

9
Scroll. (2020). *Scroll.* Retrieved from https://scroll.in/article/977451/in-india-coronavirus-crisis-has-been-particularly-hard-for-mental-health-patients-and-hospitals

10
Sterberg, E. (2009). *Healing Spaces: The Science of Place and Well-being.* London: The Belknap Press of Harvard University Press.

11
Ulrich, R. e. (2008). A Review of the Research Literature on Evidence-based Healthcare Design. *Health Environments Research and Design Journal,* 61-125.

12
UNICEF. (2019, June 3). *Adolescent Development and Participation.* Retrieved Nov. 7, 2020, from https://www.unicef.org/: https://www.unicef.org/india/what-we-do/adolescent-development-participation

13
Vishwanath, B. (2020). Common Presentations of psychological disturbances post COVID 19. *Department of Psychiatry, NIMHANS.*

14
WHO. (2003). Investing in Mental Health. *World Health Organization.*

15
worldarchitecture.org. (n.d.). Retrieved July 2021, from https://worldarchitecture.org/architecture-projects/gffn/staff-housing-vsimh-amritsar-punjab-project-pages.html accessed

CALL FOR ARTICLES PROJECTS & PAPERS

Journal of the Indian Institute of Architects invites original and unpublished contributions from members (academicians, practitioners and students) under the three categories given below.

In order to be accepted for publication, all material sent in these categories should be sent in the following components:

❶ MS Word document file with text only. Please do not format it in anyway. The numbered captions for all the images will also be in this document.

❷ Folder with all images (minimum 300 dpi), numbered according to the captions given in your text file

❸ Photograph of the author/s (minimum 300 dpi)

❹ Author biodata – Maximum 50 words.

❺ PDF (optional)– showing the intended layout. This pdf should include text and all images, with numbered captions.

Category 1

Essays, interviews, articles (1500- 2500 words) and book reviews (600 and 750 words) in the areas of architecture, planning, urbanism, pedagogy, heritage, technology, ecology, theory and criticism, visual design, practice or any other relevant subject pertaining to the built environment. (Details of the format will be available on the JIIA website given below).

• For a design project, please include the "Fact File" with the following details : Project Name, Location, Plot area, Total built up, Structural consultants, Project completion. Also please give the photo captions and credits. Please ensure that the image is referred to within the text. For eg, "As seen in Figure 1…". This is essential for the layout.

• For design projects, plans and sections of the project are desirable along with the photographs.

• Further, it is important that along with the manuscript, we receive an undertaking from you that the stated architect/ architectural firm is the author of the architectural projects mentioned in the article, and that IIA and JIIA is in no way responsible for any matter or dispute arising out of the publication of the same.

Category 2

Summaries of dissertations (2000-3000 words)at the level of B.Arch. & M.Arch., and theses at the Ph.D. level. The Guide for that work will be mentioned as the Co-author. (Format will be available on the JIIA website given below)

Category 3

Research papers (2000-5000 words) in the prescribed format. The research may be based on their ongoing or completed research. (Format will be available on the JIIA website given below). All contributions in this category will be peer-reviewed before being accepted for publication by conducted by academic experts of repute.

Category 4

Contributions from Chapter Correspondents

(a) *Chapter News:* This includes various interesting activities from the Centres of your Chapters (maxm. 500 words for the news from the *entire* Chapter). All material sent should be sent in the following two components :

❶ MS Word document file with text only. Please do not format it in anyway. No pdfs will be accepted. The numbered captions for all the images will also be in this document. This should NOT contain any images.

❷ Folder with all images (minimum 300 dpi), numbered according to the captions given in your text file.

(b)*Projects:* Identify outstanding architectural projects of members and send them to JIIA Team to consider for publication. (Please follow the design project requirements as given in Category 1)

© *Obituaries :* Obituaries of IIA members should consist of the photograph of the departed soul, the dates of birth and death and a short 50-word note.

Note

❶ Please email all papers and articles through the Chapter / Centre or directly to jiiaeditorial@gmail.com.

❷ Format is available on the JIIA website :

https://indianinstituteofarchitects.com/wp-content/uploads/2021/06/Doc_for_Call_for_articles__projects_and_papers__10.6.2021_.pdf

DIALOGUE
WITH
AR. N. MAHESH

Many emotions come to the fore in this dialogue between
Ar. N. Mahesh [NM] and Ar. B. Sudhir [BS] as they go back to
events that were milestones in Ar. Mahesh's career which became
a trendsetter.

Ar. N.Mahesh
Ar. N. Mahesh has been head of M/s Iyer & Mahesh, a large and successful practice based in Trivandrum, for over 48 years, with many completed large and iconic building projects in India and abroad. He is the recipient of several national awards and honours. In 2002, Mahesh was honoured by the then President of India Dr. A.P.J. Abdul Kalam for his design of RGCB at Trivandrum. HIs work is prolific in hotel and resort projects, spearheading the revival of timber architecture through them and covered in his books, Amazing Timber Resorts and MaheshArchitecture. He founded College of Architecture, Trivandrum (CAT) in 2011. mahesh@iyermahesh.com

Cape Comorin Terminal Railway Station

Ar. B. Sudhir [BS]: What was your first major challenge when you started your architectural career?

Ar. N. Mahesh [NM]: There were many challenges but the cardinal ones were:

• Architectural practice was unknown to most people. Therefore I had to, in a way, enlighten the public and cultivate the importance of engaging an architect. Most people could not even spell 'architect' correctly!

• I had to establish the fact that architects are not just façade creators and propagate my ontology that a 'façade' is akin to attire whereas 'the plan' is akin to the character and intellect of a person.

• To establish an efficient professional office for private practice as there were no reputed firms to learn from.

BS: Was there any professional strategy that enabled you to launch a fledgling practice even at your age, then, 25?

NM: I should admit that those days, in the 1970s, there was a vacuum in this field especially for big and complex projects. I was perhaps there at the right time and therefore innumerable investors and clients approached me, and soon they were convinced that I was one of the few competent architects. Innumerable on-site hoardings showcasing the project details and my firm's name started springing up in the urban landscape of Trivandrum and Quilon.

Investors and the public became more aware of an architect's role and this paved the way for a quantum jump in my career.

BS: Which project launched you at par with the bigger league?

NM: It is good that you asked me that. This is an interesting true story of what led the Indian Railways to appoint me as the architect for the country's first post-independence terminal station of India when I was 26.

In 1977, The Southern Railways asked me to prepare the design for the prestigious Kanyakumari Terminal Station, as I was already engaged in designing 17 other stations. The Chief Architect of Indian Railways, Shri Toye however brought drawings for the terminal building supported by a massive scale model to present to the Prime Minister. However, late

Poovar Island Resort - Timber, mud & clay architecture

Top: Tamara Coorg Reception block; **Bottom:** Tamara Coorg – cottages
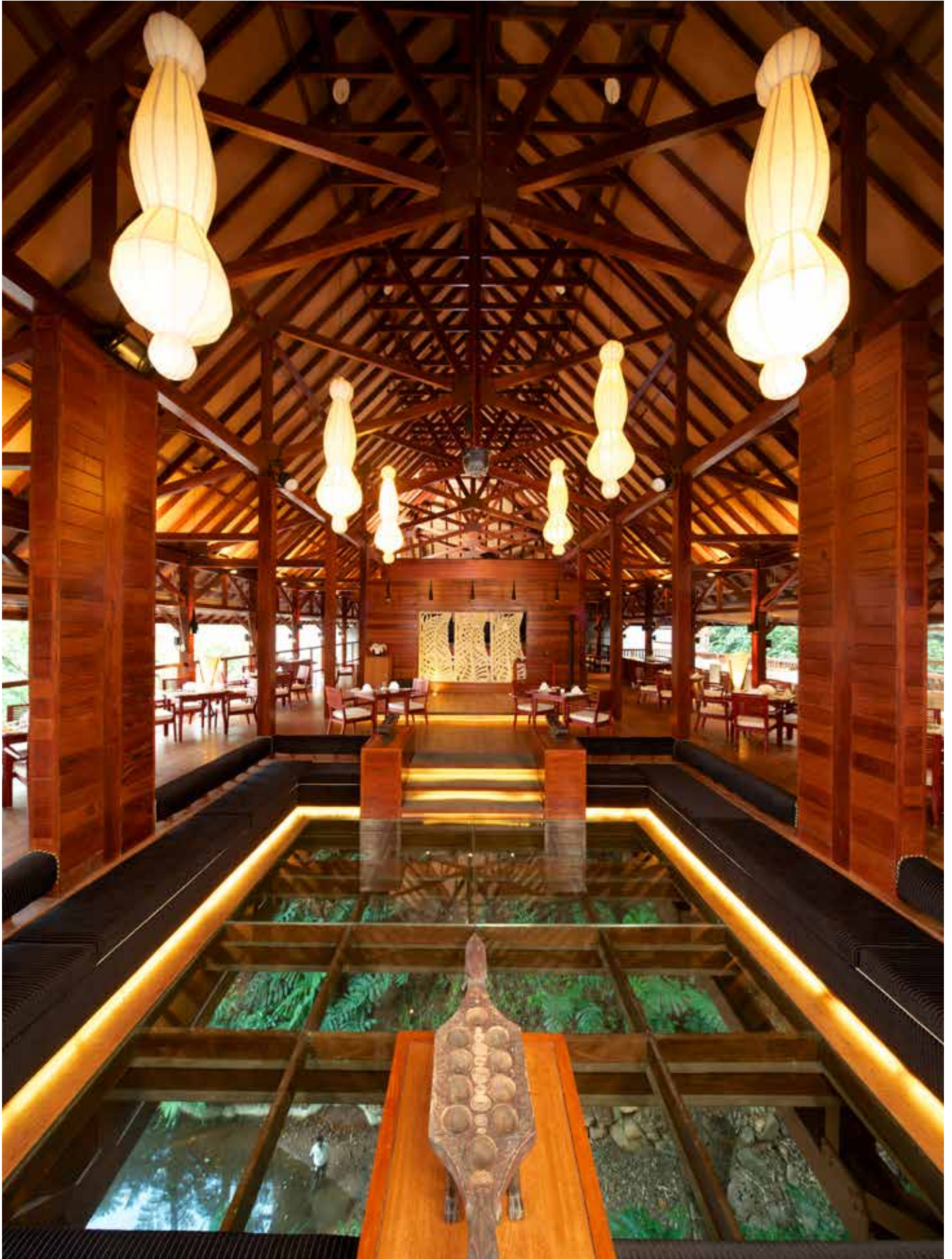
Bridge block at Tamara Resorts

Top: Diani Reef Beach Hotel Reception; **Bottom:** Classical vernacular Mahesh house

Shri Anwar Varghese, who was perhaps one of the greatest Chief Engineers of the Southern Railway stood behind me as he was convinced that as a young blood, my design would be a better solution and encouraged me to present drawings and scaled models to the VVIPs.

On the day of presentation at the Government Guest house, Trivandrum, in May 1977, the two design options were presented to the VVIPs Shri Morarji Desai, the Prime Minister, Shri. Madhu Dandavate, Union Railway Minister, Shri M.G. Ramachandran and Shri. C. Achutha Menon, Chief Ministers of Tamilnadu and Kerala. After the Railway's own design was presented by Railway Chief Architect Toye to the Prime Minister and other ministers, I was asked to present my design of the terminal structure. To my delight, on seeing my model of the station, Chief Minister Shri M.G. Ramachandran sprung up from his seat and openly appreciated the improvised Dravidian features of my Design and advised the Prime Minister to select my work.

At this moment The Chairman and Chief Architect of Railways who overheard the remarks, barged in to say that The Prime Minister has already cleared the design to which Dandavate asked which Prime Minister. The Railway Board Chairman had to say it was their opponent Indira Gandhi and at that momentous time, the stone was cast to commission my service as the architect for this most prestigious post-independence railway terminal at Cape Comorin.

The assignment included the remodelling of Trivandrum Central Junction, Nagercoil Junction and the terminal station at Cape Comorin, other than designing 7 stop stations, 3 flag stations and 5 halt stations. My type design of these stations are still used by the railways for other station developments.

BS: Who were your mentors?

NM: My paternal uncle, Ar. M. Ramaswamy Iyer was instrumental in nurturing me as an architect and therefore I owe my career to him. Professionally, I was influenced by Charles Correa with whom I worked for more than two years as a site architect in ITDC Ashoka Hotel at Kovalam and in Malabar Cements township at Walayar. I also had a short stint in Correa's office at Bombay. I should mention here that the eminent hotel and resort architects, Late Kerry Hill of Australia who pioneered minimalism and Lek Bunnang of Thailand who is a trendsetter in hospitality projects, influenced me a lot and continue to do so even today.

BS: Was there a turning point in your career when you deviated from what had been your thought process until then?

NM: Yes, this happened sometime in 1998 or so, when wisdom dawned upon me to innovate and shift my design language to something that is sustainable and eco-friendly. I realized that most of the buildings in the 19th and 20th centuries were heavy masonry and concrete structures of performatory contemporary style. I was convinced that we were ignoring good old native wisdom of using timber structures, which are lightweight, organic, aesthetic and sustainable. After all, timber as Thomas Friedman remarked, is a 'cradle-to-cradle' material due to re-forestation and afforestation possibilities, whereas concrete or steel require mining which in contrast, are 'cradle-to-graveyard' materials.

Thus my new professional life began with the totally earthy concept, beginning with the Poovar Island Resort where reforested timber was profusely used for the superstructure, coconut scantlings for the roof and chemically-treated and kiln-seasoned rubber wood for joineries. At Poovar Resort we also used mud plaster inside and outside, clay floor tile as paver and Mangalore clay tile for the roof.

This project was a turning point and I have never looked back since. During the last 25 years, my office was associated as principal architects and interior designers for more than fifteen luxury star hotels, resorts and spas which positioned my firm Iyer & Mahesh as one of the most preferred architects for design of resorts and hotels in India.

BS: What is the most interesting, or in a way, challenging project you have handled?

NM: The Tamara Coorg is indeed the most demanding as it had to be conceptualized, planned and constructed deep inside the 220 acre forest at Kakkabe which also had coffee plantations on an extremely hostile topography infested with reptiles and wild animals.

By around 2006, The Tamara Coorg's journey from conceptualization to commissioning was an epic by itself. Where today stands a world-class resort was once just a coffee plantation, and to many, a beautiful wilderness that was mystical and out-of-reach.

Our mission was to create an environment where guests could, without intrusion, enjoy the natural environment where the soft timber architecture melted with the virgin forest.

I had to create an ambience of exclusivity and luxury while minimizing disturbance to the forest ecosystem. Perhaps there is no resort hotel in this part of the world where the total footprint of the entire resort is less than 1% of the plantation area. I decided that this could be achieved only by propping 60 timber cottages on stilts and all other common guest facilities mounted on two large span steel bridge blocks spanning above the two streams. The Tamara Coorg today is one of the most awarded and patronized luxury resorts in India.

BS: What is your advice to architects in India?

NM: My considered advice would be that architects in India should innovate in terms of sustainable design and appropriate technology. Also, the culture of socially acceptable design and attempt towards inclusive planning are pivotal. Since COA's Code of Practice does not allow architects to publicize their service in mass media or social media, the only solution is for architects to show resplendence and brilliance in each of the consultancy assignments and this automatically increases visibility and confidence among prospective clients.

BS: As a member of COA's Empowered Committee for preparation of the Manual of Architectural Practice, can you elaborate how this will impact the profession and practice of architecture in India?

NM: I should here admit that in all my life, I have not been a part of a more satisfying exercise. After 64 sessions spanning 3 hours each, the 9-member Empowered Committee, consisting of the best brains among practising architects and government architects, has prepared a biblical document through which all architects in India will hereafter enjoy and benefit greater legitimacy, respect, justifiable credibility and ethical practice.

Top: Conservation & re-adaptation The Tamara Kodai; **Bottom:** Revival of Timber Architecture Ananta Resort at Pushkar house

Performatory contemporary - Technopark III, Trivandrum (Collaborative work with Ar. Hafees Contractor).

42

This 5-volume, 400-page compendium of Architectural Practice consists of Acts, Rules, Guidelines, Codes and a few regulations, all of which will significantly and positively impact the professional practice of architects:

- There can be no more fake or pre-fixed competitions.
- Due to the prescribed fee band, architects can claim legitimate fees.
- There will be no fraudulent awards and honours.
- There will be no more quacks or unethical practice.
- Architects will get due indemnity and protection through liability insurance.

The manual also contains an extensive chapter relating to setting up and running of an efficient architectural practice.

Architects in India owe it to the President of COA, Ar. Habeeb Khan and the ebullient and proactive Council Members who have spearheaded and supported the making of this Handbook of Professional Practice.

BS: You are probably one of the few architects from Kerala who have worked on projects overseas. Could you also share your experiences of working on such projects?

NM: My experience has been in designing a 300-room 5 star beach resort, Diani Reef Beach Hotel and a Mall and serviced apartments in the capital city of Nairobi, Kenya and a large garment factory in Dhaka, Bangladesh.

The Mombasa Resort demanded a lot of detailing as we were commissioned to remodel and upgrade an existing property. We used native 'makutty' roofing which is made out of locally available sisal wood and thatch. We also used a lot of clay tiles and mud plaster, which were used by villagers in Africa. Altogether it was a challenging assignment.

In contrast to the Mombasa Resort, the ultra-modern mall and serviced apartment project at Nairobi, Kenya is a marquee building set on a 2-acre plot in a fashionable location of Nairobi. This mall block has retail space, food court, a multiplex, commercial office and eight-storeyed serviced apartments which houses 100 residential units along with other lifestyle facilities.

In 2007, we designed a large span garment factory in Adamji Industrial Estate near Dhaka, Bangladesh. The uniqueness of this project is that considering the 6000 odd workers who are largely illiterate, the movement in and around the premises had to be guided by colour coded pathways, doors, lockers, toilets and even for the tailoring workstations.

BS: Mahesh-watchers are often amazed and sometimes confused about why you do not stick to a particular philosophy or style of architectural design as most other architects do. Your variety is amazing!

NM: Could be because my approach is not to thrust my own 'style' upon clients and I fervently feel that it is unfair and unethical to have the same design style and thought process for all your projects, whether it be an urban site, beach side or hill station location.

I always believe and am convinced that architecture should be site-specific, sensitive to cultural influence, show concern for cost factors, is climate-responsive and sustainable, while also respecting the sentiments of the client and his aspirations.

This principle in practice led to my designs under these four distinct schools of thought.
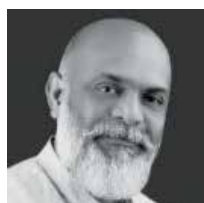
Ar. B. Sudhir holds a B.Arch. from the University of Kerala (1993). He has thirty years of experience in the field of architecture. He was the Chairman of the Committee of Social Responsibility, Architects Regional Council of Asia (ARCASIA) during the period of 2017 - 2019 and has been the Chairman of Institute of Indian Interior Designers (IIID) during 2017 - 2019. He has written several articles in JIIA and many other leading architectural publications. His firm Architects' Consortium was the National Award Runner up for IIID Design Excellence in 2017. archsudhir@gmail.com

CHARLES CORREA
A TRIBUTE TO THE MASTER

Ar. Ashish Acharjee

Buckminster Fuller and Correa: Search for an Indian Idiom
(Photo credit : Charles Correa Foundation, Goa)

Milestones : Bharat Bhavan
(Photo credit : Charles Correa)

Charles Correa was not only arguably the most significant contemporary architect of Asia, he was much more - a humanist, a socialist, a philosopher, a thinker, an activist, a protagonist and a teacher - all at the same time. His evolution is the story of a seeker who set out on a ritualistic pathway in search of truth. As he progressed and made his way through uncharted territory, pointers and revelations led him onto comprehensive understandings of man and his context. By context he understood both the manifest and the non-manifest worlds. He tried throughout his life, in thought and action and through his life's works to bridge the two worlds like a yogi.

Correa was born in Secunderabad and grew up in Bombay. He went to St. Xavier's School and later St. Xavier's College before travelling to USA for his higher studies.

Fuller and Correa

At the two institutes - University of Michigan at Ann Arbor and MIT that trained him as an architect, his favourite teacher was Buckminster Fuller. "Bucky" according to him gave the architects the freedom to invent. Bucky Fuller's concepts went on to influence Correa throughout his entire career, particularly his ideas about the future of urbanisation. Correa's use of "the landscape" was perhaps an intellectual synonym for Buckminster Fuller's "scenery."

Fuller believed that multi-layered material and intellectual resources could be laterally linked and technologically optimised to support human activity and enhance human life. For Correa, "the landscape" included specific, localized information at multiple scales, from extant socio-political regimes to socioeconomic characteristics, and from urban infrastructure to the specifics of individual dwelling unit. Landscape to Correa was all-encompassing, containing within it the totality of human inhabitation and all that it implied physical as well as intangible, permanent as well as temporal. [1]

Search for an Indian Idiom

His Indian origin provided him with two unique opportunities - firstly he entered the profession immediately after India's independence that held as a prospect, wide open arenas for participation and involvement in the architecture of contemporary India and secondly, the spiritual, cultural and mythological landscape of India provided a limitless reservoir for delving into, understanding and evolving a new idiom and vocabulary while thinking design. His quest was so laden with deep passion and meditative engagement that he succeeded in finding a way of connecting and communicating with the sacred.

Correa believed and subscribed to the existence of a non-manifest world simultaneous to the manifest that was expressed through philosophy, religion and art. Architecture according to him was a myth based construct in time and space that "expresses the presence of a reality far more profound than the manifest world in which it exists". Throughout his practice, Correa has tirelessly and most intuitively sought to bridge the two worlds with bold as well as subtle master strokes that was so uniquely his own. The relationship between man and his surrounds was the central premise that all his quests focused upon. And building on this, he studied its manifestations in varying scales - from the basic dwelling unit to the city. He tried to look for the unknown entity that pervaded all man-environment relationships.

In the foreword that he wrote for the catalogue of *Vistara,* the travelling exhibition during the Festival of India in 1986 [2], he talks about chronological metamorphoses of man and his context through the times and about his outward expansion as well as his inner contraction that result in heightened consciousness which in turn manifests itself in his engagements with the world.

"The exhibition, structured around 'Manushya, Mandala and Mantra' not only impacted the architecture profession but also perhaps our understanding of Indian culture and cultural productions. It showed that culture emanates from varied locations in society and encouraged architects to see that there were multiple agents of history and of making. It produced a revolutionary expansion of horizons to include practices and discourses on domains like craft, folk, tribal, or the vernacular. It established that the architect could be not only

Milestones : Jawahar Kala Kendra
(Photo credit : Mahendra Singh)

someone looking inward to address the profession, but that the architect could be someone who was a contributor to culture at large." Ranjit Hoskote [3]

Correa's conviction that culture belongs to the people almost as a civic entitlement, integral to life was built on his subscriptions to equity and citizenship-where culture is not elitist, but belongs to the common man.

In the cultural institutions that he built - Gandhi Smarak Sangrahalaya, Crafts Museum Delhi, Bharat Bhavan, Bhopal, Jawahar Kala Kendra - he brought the street to the inside and shattered the notions of elitist exclusivity. Invited and welcomed, the common man could experience the brilliantly sequenced spaces assembled in geometric and axial sequence and punctuated by open-to-sky spaces, natural elements and graphics. The visitors could become active participants in the design. The cosmic and mythical diagrams that Correa imbibed in his designs translated into spaces for human interaction, assembly and other layered transformations at different times to afford varied informal events and human activity.

Milestones

All Correa projects became milestones not only for him but also in the history of contemporary Indian architecture. In each of them, he rediscovered himself and mined his inner depths to bring forth a new and original architectural expression to a unique programme that he devised to address the functional requirements. It is the strong programmatic content and the story telling in each of his projects, the interweaving of the built and the non-built that make all Correa buildings come alive and include the user and visitor as integral parts of the narrative without them realising it. The movement through his buildings are always a delight in its gradual unfolding steeped in contemplative and emotive themes.

"He sought to reposition the Euro-American dominance of modern architecture alongside India's emergence from colonialism and an appreciation of site sensitivity." Ar. Kaiwan Mehta

Correa states, architecture cannot be all 'adjectives and exclamation marks', it needs content, a language or idiolect of form. His buildings almost always have at the heart, great public spaces, in an overarching gesture to compensate what the buildings removed. [4]

The Handloom Pavilion, Delhi, Gandhi Ashram (1958) and Hindustan Lever Pavilion (1961) marked the beginning. This was followed by the proposal for New Bombay (Correa, Pravina Mehta and Sirish Patel 1964) - the boldest planning initiative undertaken in independent India. For the next two decades, Correa's experimentations with housing and various housing modules and typologies continued unabated in varying of Indian conditions culminating with Kanchanjunga Apartments and Belapur Housing (1983) at two ends of the housing spectrum. Crafts Museum (1975) redefined the relationships between the craftsmen, cultural space and the common man.

In the 1980s, Correa continued to create mesmerising compositions that were as much sculpture as architecture, as much painting as landscape [5]. Vidhan Bhavan (1980), Bharat Bhavan, Cidade De Goa, Bay Island Hotel (1982), Kala Academy (1983) came into being in quick succession. Post Vistara- the exhibition curated by Correa- his projects seemed to emerge from an invisible and perineal source of intricate and sublime beauty revealed only to the evolved. He designed during this time, architectural masterpieces such as Jawaharlal Nehru Institute of Development Banking (1991) Jawahar Kala Kendra, LIC Centre Delhi, MRF head Quarters, Madras, British Council (1992), the Inter-University Centre for Astronomy and Astrophysics (1993), Vidhan Bhavan (1980-1997), Salt Lake City Centre (2004).

All Correa's buildings abroad carry his signature style - uncluttered and beautifully simple, bold and articulated with extreme care and mastery. The Permanent Mission of India (1993) to the UN in New York is a sleek building, clad in Indian granite and Rajasthani timber doors that distinguish it from the surrounding glass and brushed stainless steel.

Permanent Mission of India to the United Nations, New York
(Photo credit : Charles Correa)

His last three works - the MIT Brain and Cognitive Sciences Complex in Cambridge (2005), Massachusetts; the Champalimaud Centre for the Unknown (2010) in Lisbon; and the Ismaili Centre in Toronto (2014) marked a sharp shift from the buildings that he had crafted before. Correa felt like an artist in the last days of his life becoming unselfconscious that brings in a burst of new energy and creativity. [6]

"In evaluating Correa's work within the non-Eurocentric world of architecture, attention would be paid particularly to three aspects of his work having distinctly Asian qualities. One, Correa's work reveals the persistence of pre-modernism and its inability to distinguish - at a conceptual as well as physical level -the difference between the modern and the pre-modern. Two, his work has all the qualities of hybridity, which in creative work is a particularly Asian quality because revolutions and wars have not plucked out the past from the present. Three, Correa's work respects the notion of the sacred. The sacred, in however an abstract way, finds its way into his works. The wonder of it is the relaxed way in which he is able to play with notions of the sacred without any denominational aspects." Ar. Romi Khosla [7]

Disappointments

In the 1960s, his plan for the creation and development of New Bombay (in collaboration with Pravina Mehta, Sirish Patel) was implemented half-heartedly by the government. Instead of a well-connected sister city built around commercial districts,

relieving the strain of Mumbai's exploding population, New Bombay remained a dormitory town for decades. The suburban railway was extended to it only in the 1990s.

In 1996, nearly 600 acres of centrally located high-value land released by the Government takeover of 26 mills in Mumbai threw up a huge urban renewal opportunity for its inclusion and development in Mumbai's urban-scape. As the head of a government-constituted committee, Correa proposed a three-way split: one-third of the land to be used for public spaces and facilities - gardens, schools and hospitals, one-third to be developed by the government for affordable housing, and one-third to be given to the mill owners for residential or commercial purposes. But not only was Correa's proposal never implemented, the land sharing formula itself was changed in 2001 to give the bulk of the land to the mill owners. After the legal challenge against the amendment was lost in 2006, Correa made a last effort by suggesting how the area could be comprehensively planned even under the amended land-sharing formula. Yet the proposal was unheeded and instead the land was allowed to be sold in plots for mega housing and office complexes. The impact was severe. The area suffered irreversibly a deeply inequitable and chaotic development without the enabling substructure of roads, engineering services and rational decision-making.

Architectural Education

Correa's thoughts on the training and psychological positioning of an architect advocates a dialectical approach-one that is intensely passionate and dedicated about one's own convictions on the one hand while being open to distancing oneself from all that is learnt and of self-questioning and finally one that can break away from one's own self and remake a new approach.

On Urban Arts Commission

Correa though that all our major cities should have an Urban Arts Commission :

"There are so many different agencies taking decisions, you must have a body to take a holistic overview. Of course to be effective, this commission should have the full backing of the government, and must be free of interference from politicians and bureaucrats. Unfortunately, right now our cities, especially the larger ones, are being used to enrich political parties. This is how our political system is financed - by urban real estate. And our cities are getting ruined in the process. It's a national tragedy of the highest order."

Legacy

Charles Correa worked tirelessly, creating timeless architecture, and he left behind an architectural legacy that shall remain the greatest body of work by an Indian architect. Perhaps more than anything else, it was his belief that architecture can shape society which ensures the continued relevance of Correa's work. "At its most vital, architecture is an agent of change," Correa once wrote, "To invent tomorrow-that is its finest function."

While present day visionaries grapple with big investments, high energy and technology-driven systems in the realm of smart city planning, Correa's body of work, ideas and directions are particularly relevant in the context of India.

"His vision was of energy efficient, inclusive, aesthetically pleasing and egalitarian cities where even a pavement dweller is accorded dignity and space." [8]
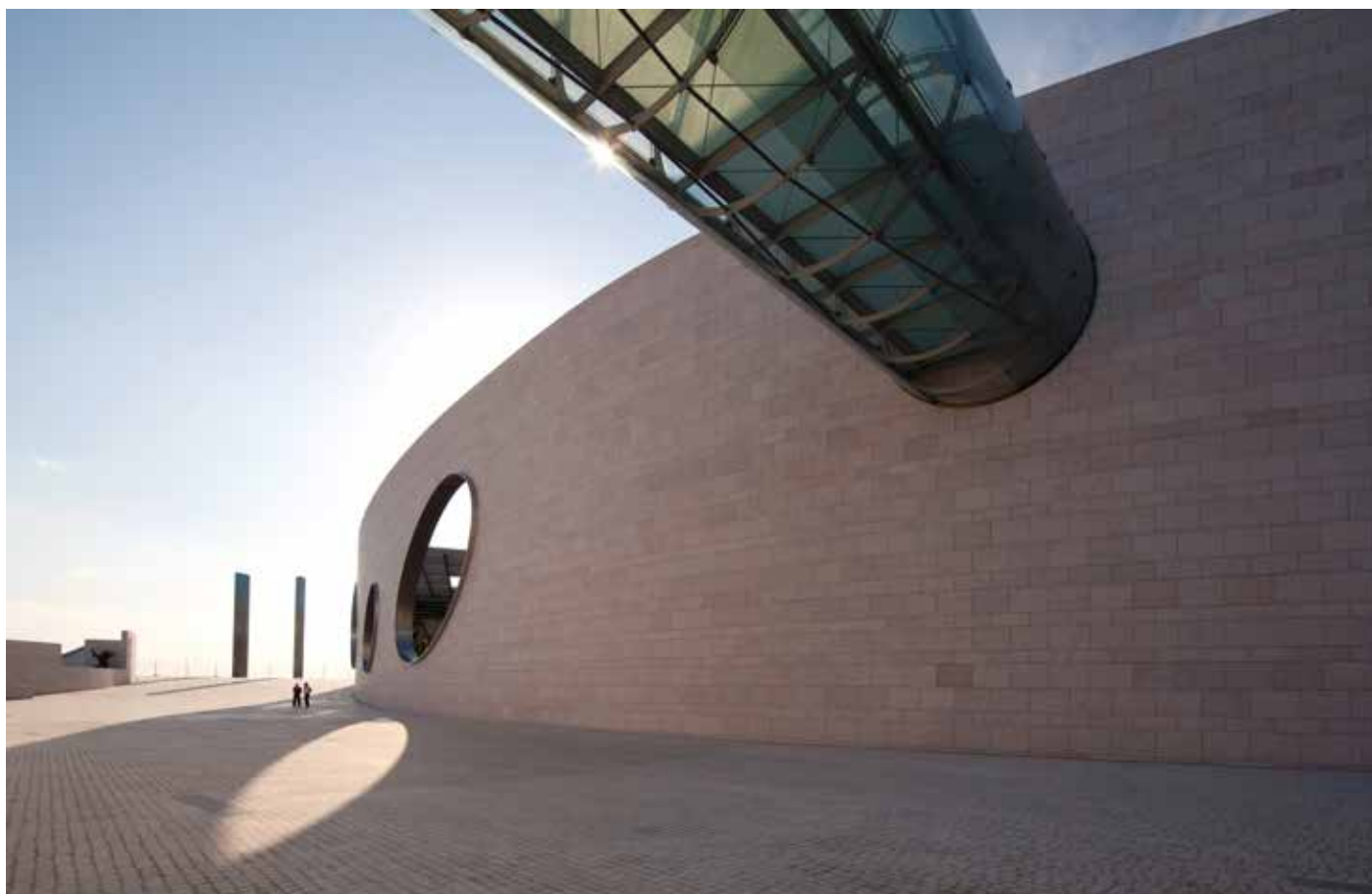
Top: MIT (Photo credit : Vanderwarker); **Bottom:** Champalimaud Centre (Photo credit: Jose Campos)

Ismaili Centre, Toronto
(Photo credit : AKDN/ Gary Otte)

48

The new Indian smart city needs to be more humane and eco-sensitive while employing cutting edge technology and convergence in its operation and management. It has to transcend mere functionalism and imbibe the Correan qualities in its form and spread.

The generations of architects that Correa has inspired and minds that he has illuminated have in turn inspired and illuminated many more. Wherever an attempt will be made to address his values and concerns in private and public realms of architecture, space and the city, there will be the spirit of Correa at work. He will forever shine like the North Star guiding practitioners towards the right direction and helping them evolve and traverse their paths towards the unknown.

"He made architecture a magic word and instilled in all of us architects a sense of pride in our profession and the true purpose of our work. His legacy is his concern for the poor and their needs, particularly housing, still remains unaddressed in our urban areas."
Ar. Brinda Somaya

Endnotes

[1] Ghosh, Swarnabh. "From Scenery to Landscape: Charles Correa by way of Buckminster Fuller," in *The Avery Review,* no. 11 (November 2015), http://averyreview.com/issues/11/from-scenery-to-landscape-charles-correa-by-way-of-buckminster-fuller

[2] *Vistāra - The Architecture of India,* Catalogue of the Exhibition, https://architexturez.net/doc/az-cf-123816

[3] Hoskote, Ranjit. *Charles Correa: Trajectories and Contexts,* https://thinkmatter.in/2020/09/01/charles-correa-trajectories-and-contexts/

[4] Jackson, Iain. "Charles Correa (1930-2015)", 19 June 2015. *Essays,* https://www.architectural-review.com/architects/charles-correa

[5] Bhatia, Gautam. *India's architect Charles Correa,* https://indianexpress.com/article/opinion/columns/indias-architect-charles-correa/

[6] Mehta, Kaiwan. *The Difficulties and Pleasures of Being Charles Correa in India.* https://thewire.in/culture/the-difficulties-and-pleasures-of-being-charles-correa-in-india

[7] Khosla, Romi. *Charles Correa: He was not a modernist, but radiated hybridity.* https://economictimes.indiatimes.com/blogs/et-commentary/charles-correa

[8] Choudhury, Chandrahas. *Charles Correa and India's smart city.* https://www.aljazeera.com/opinions/2015/6/23/charles-correa-and-indias-smart-city

Ar. Ashish Acharjee
Ar. Ashish Acharjee interned with Charles Correa in 1987 and worked with him in 1988 – '89 as project architect on MRF Corporate Headquarters, JKK, JNIDBI, Cavelossim Beach Resort, Goa. He practices in Kolkata.
ashish.acharjee@gmail.com

OPINIONS

JIIA is starting a new section where we discuss the current issues relating to relating to architecture, profession, education or regulations. Experts will deliberate varying points of view, so that our readers get a holistic understanding topic at hand.

To begin with we discuss the recommendations made by COA for architectural education in line with the new National Education Policy (NEP).

NEW EDUCATION POLICY
AND ARCHITECTURE EDUCATION

Ar. Pushkar Kanvinde

One of the important and ambitious agendas of the current government is to bring sweeping changes to education in the country. This dream is narrated in the New Education Policy (NEP) 2020 approved by the Union Cabinet and has been published. The policy envisages restructuring higher education in a manner that the student shall have the choice to select a bouquet of courses that may contain core as well as supporting content for his/ her intended career specialisation, while giving a choice to also pursue one's interests in related or non-related fields. For example, a student may choose to learn dance or literature while pursuing core education in the field of technology or science. Such choices were hitherto not available for the student. As envisaged in this policy the current specialised institutes of engineering, architecture, pharmacy, management, etc. will cease to exist and will be replaced by institutes offering multi-disciplinary education. The policy also prescribes an end-to-current system of colleges affiliated to universities. Instead, institutes and colleges will get autonomous status and offer their own programs leading to degree/ diploma/ certificate as per the duration of the study. Architectural education may also need to restructure itself to fit into this national scheme.

We should look at this policy as an opportunity to bring in the changes to address the known current shortcomings of architecture education in India and align it with global trends in the field.

Such transformation will provide a competitive edge to future generations of architects in the global field.

Architecture education is holistic in nature with a multi-disciplinary perspective. Architectural Design, the core subject of learning is supported by three major streams of subjects: art, technology and humanities. Further, the architect also needs to learn many aspects of design and profession through other supporting subjects such as, economics, law, commerce, management, environment, psychology, etc. This characteristic of architectural education gives it immense benefit and flexibility. I would say that architectural education is one that may very easily absorb the changes and adapt to the New Education as envisaged by the policy.

An architectural institute, therefore, may offer programmes in Fine and Applied arts, Industrial and Graphic Design,

Interior Design, Building Engineering, Project Management, etc. in addition to Urban Planning, Social Sciences and Economics as envisaged in the NEP. Each institute, depending upon its vision, strengths, local and regional context and resources should be free to choose and offer such programmes, in the true spirit of autonomy.

This process of key transformation must be properly conceived and monitored as the colleges may need support to turn the event to benefit the quality of education and strengthen one or many disciplines. In the interest of the profession of architecture, the Council of Architecture, has proactively engaged with the NEP to provide guidelines that will facilitate mapping and smooth transformation while enhancing quality of architectural education.

Today we have no structure or process for accreditation of architecture courses conforming to the international practices such as the Canberra Accord. Council of Architecture has framed and proposed criteria and process for accreditation of architecture programs. Such processes must be put into practice as soon as possible either through the Council of Architecture alone or jointly with NBA. Preferred mechanisms should be independent boards for accreditation of architecture programs at the national level in the same manner as they exist in most developed nations and other signatories of the Canberra Accord.

Proposed Academic Program structure

The professional degree programme for architecture that forms an important requirement for registration as an architect shall be of minimum duration of five years after completing high school education (12th standard). However, this alone will not allow registration as an architect as the case at present. The institutes may foster novel and engaging programs either by coursework or by research. To facilitate multidisciplinary undergraduate education, we can offer multiple entry and exit provisions to the candidate. Few examples are given in the table below.

The undergraduate degree program can be of three or four-year duration after 12th. The three years' degree program may offer 'major in architecture' while the four years' program with fourth year dominated by research, may offer 'honours in architecture'. **However, neither of these degrees will be considered as sufficient for registration.** Completing two years' post-graduate degree in architecture will lead to partial completion of requirements for registration as 'architect'.

First year of an undergraduate degree program can be a foundation course common to multiple disciplines with a major portion of the curriculum devoted to imparting common necessary skills. The programs may be so tailored that the candidate undergoes a foundation course common to a cluster of programs. During this basic training/ education, the institute may administer an aptitude test and as per inclination of aptitude the candidate may be advised to choose courses across disciplines offered by the institution and based on number of credits acquired, to receive the undergraduate degree that may be oriented to a particular discipline. Institutes may offer exit after the Foundation Year with a Certificate stating the acquired skills of knowledge. Such a certificate should possibly prove useful for the candidate to further his studies in other disciplines. Candidates with the prescribed core architecture credits at 10+3 diploma level may seek admission directly to the second year of undergraduate degree, skipping the foundation year altogether.

Completing a three year undergraduate programme will equip the students with enough skills that will help him/ her get a job placement in architectural offices/ building industry at appropriate levels as per skills acquired or may help him/ her in enrolling in architecture or may seek an exit with bachelor's degree to pursue other allied courses such as design, management or construction field as per his choice/ aptitude. This scheme will also give an opportunity for a student to take a break and join a PG programme later. These entry and exit options should be considered from the perspective of which courses in other disciplines could be permitted for admission to the next stage of the architecture programme.

Post-graduate education, however, will be more focussed to acquire specialisation in a particular discipline, including architecture that forms part compliance of eligibility requirements for registration as an architect.

Some universities may offer a one year programme after bachelor's degree and one year professional training leading to bachelor's degree in architecture (B.Arch.) as a professional degree. However, any candidate seeking exit through this program will need to acquire the prescribed core architecture credits for part compliance of eligibility requirements for registration as an architect. This option will be available only for Category A and B candidates.

Category	Entry Options	Exit Options
A	Candidates entering after SSC (10th) having option of 3+2+2 or 3+3+1 to acquire a professional degree.	Candidates will have three exit options, after 3 years (Diploma) further 2 or 3 years (UG degree) further 1 or 2 years (PG Degree – professional).
B	Candidates entering after HSC (12th) have options of 3+2, 4+1 or 3+3 to acquire a professional degree.	Candidates will also have three exit options, after 1 year Certificate, after 3 or 4 years (UG degree) and further 1 or 2 years (PG Degree – professional).
C	Candidates entering after Bachelor's degree having option 1+2 to acquire a professional degree.	Candidates will essentially come with a Bachelor's degree in any field. However, those candidates not having sufficient Core Architecture Credits to his/ her account may have to put in one additional year/ semester as pre-master's program and acquire required credits before joining the regular PG program.

CoA may recommend subjects/ courses to become eligible to gain entry to the post-graduate program in architecture and also to be eligible to seek registration. At undergraduate level such credits should be the majority of the total credits required to acquire an undergraduate degree.

Master's degree programmes leading to required professional qualifications in architecture stream can be flexible, with a basic duration of two years for those who have acquired a three-year undergraduate degree. A candidate with honours may choose to complete the program with one year of learning. A candidate with sufficient research credits to his account on completion of masters and not wanting to pursue the profession (practice), may join a doctoral program (Ph.D.). One who does not have the required research credits may have to complete coursework before continuing with a doctoral program. Registration as an architect shall be considered equivalent to Ph.D. in architecture. To facilitate these kinds of entries and exits to and from a programme, the Council of Architecture shall define the nature of courses and program outcomes (PO).

**Role of Council of Architecture in the new environment**

As of now regulation of both, education and profession of architecture are under the purview of the Council. As such, the Council is able to monitor the quality of education imparted by an institute through periodic inspection of facilities as well as outcome (students' work), thus ensuring a certain minimum quality or standard of those entering the profession. This practice is ideal and has been very well established over the period. Introducing an accreditation scheme would make this practice complete in all respects. However, with NEP being implemented, regulation of education is proposed to be under the different bodies formulated by the government. Council of Architecture, in the new situation, is expected to play a role in only three of the four verticals proposed and that also in a very limited way:

● In its **first vertical** a National Higher Education Regulatory Council (NHERC) will be established and will be a single point regulator. Multiple regulatory bodies (such as AICTE/UGC) will cease to exist or cease to have powers and NHERC will act as a single regulator for all streams of education. Here it is important to understand how COA can play a role which is a point of discussion within the framework of NEP. Here, representation of COA in the regulatory council is suggested.

● The **second vertical** will be a mechanism to enable regulations as prescribed by NHERC through accreditation which will be governed by National Accreditation Council (NAC). The accreditation will be based on the basic norms as prescribed by NHERC, public self-disclosure, good governance, and outcomes. The accreditation will be carried out by an independent ecosystem supervised and overseen by NAC. COA is expected to assist NAC in formulating the parameters for accreditation of institutions. It is suggested that the Council may frame the accreditation guidelines considering the provisions of the Canberra Accord and look forward to being signatory of the accord that will facilitate easy movement of students.

● The **third vertical** will General education council (GEC) who will be forming the National Higher Education Qualification Framework (NHEQF) and will be defining the "Graduate attributes" such as learning outcomes, credit transfer, equivalence, specific skills to be acquired by the student with an aim to have well rounded graduate. All the professional councils as per NEP will be invited to be members in the GEC.

● The COA may not have much role to play in the **fourth vertical** dealing with funding of institutions and research.
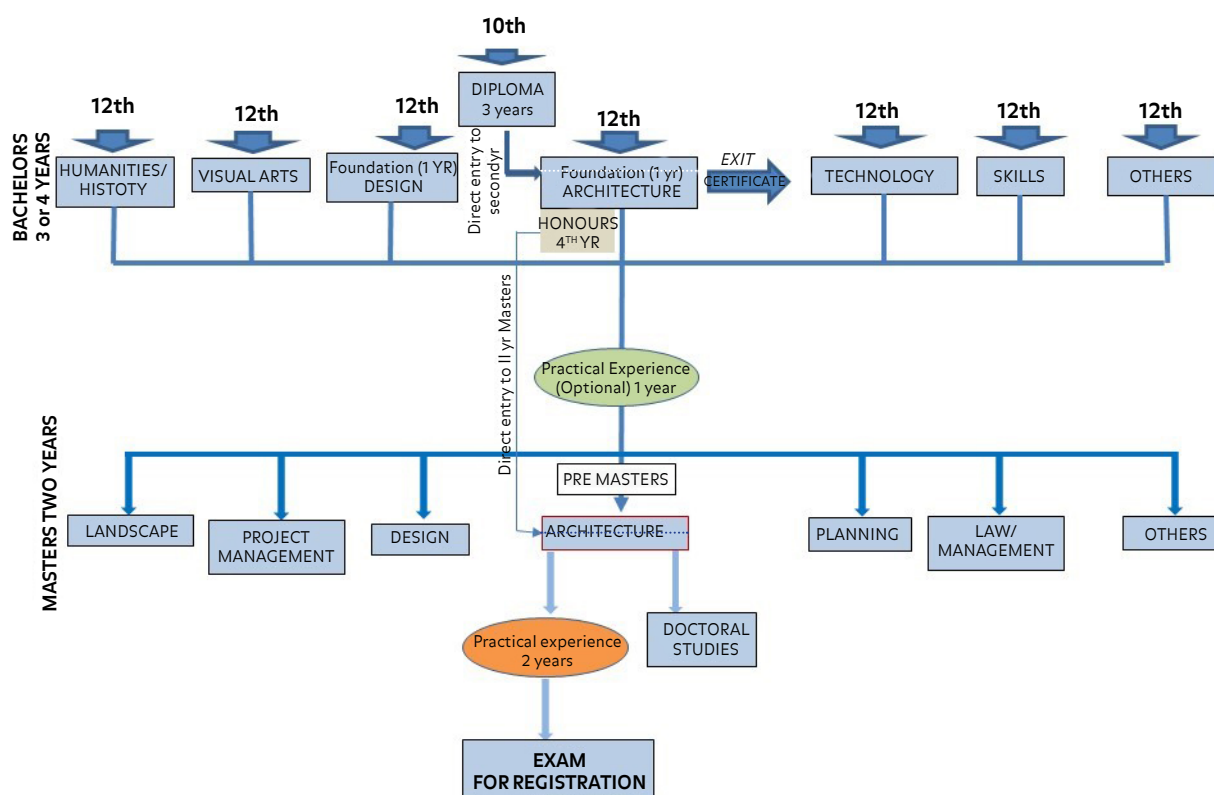
Thus, the role of COA, as envisaged in the NEP, will mainly be in setting professional standards as well as registration of an architect. As a professional standards setting body (PSSB) the Council can prescribe the content and duration of education and also the prerequisites for registration. The Council has to set high standards of expectation of education as they directly impinge on professional standards.

Many developed countries do not offer a 'Bachelor of Architecture' programme any more. They offer a bachelor's degree in architectural design/ sciences as a non-professional degree at the end of three years of UG education. Master's degree in architecture, conferred after five years of academic work and duly accredited, is considered as a professional degree. Even after acquiring this qualification, most countries prescribe two years working in an architectural firm followed by an examination as the standard path for registration/ license to practice. We may also need to adapt to this system to facilitate architects from India to practice abroad. A mechanism of examination for registration as an architect (license to practice) can be adopted by COA.

Registration as an Architect

The candidate applying for registration shall fulfil the following requirements:

a. Must have acquired a degree from a programme duly accredited by the National Accreditation Council (of India or the respective country where the program is attended). Such a degree shall have a minimum five years learning after 12th standard or equivalent schooling and the candidate must acquire core architecture credits as prescribed by the Council. Any shortfall in credits may be covered by undergoing a bridge course/ additional semester of coursework.
b. The candidate shall acquire professional experience by working in an architect's office or in an organisation involved in architecture/ real estate development/ construction, under supervision of a registered architect (with at least 5 years standing), full time, for minimum two years. This training could be in two parts of one year each. The first part can be after completing three years of learning (acquiring UG Degree) while the second part, shall necessarily be after acquiring the above referred degree after five years of learning. The second part must be undertaken in India irrespective of from where the degree is acquired.
c. The candidate, on complying with the above two requirements, shall be considered eligible to appear for examination for registration conducted by the Council of Architecture through a designated arm or agency.
d. On passing the examination the candidate may seek registration as an architect with the Council.

The process shall be common for all candidates who have studied architecture from anywhere in the world. Candidates may also have to undergo a bridge course during professional experience, if required, to homogenise with the local context. The Architect's Act 1972 needs to be amended to incorporate these changes.

To Conclude

The National Educational Policy, although approved by the Central Cabinet, subsequent bills for formation of various councils are yet to be presented to the Parliament. Only after getting approval from both Houses, will it come to the stage of implementation. While this still may take some time, we must remain informed and prepared for accepting and absorbing the changes precipitated. I hope the process will get completed soon. However, as a caution we must note that twice in the past, similar efforts were initiated by earlier governments but aborted half way through.

In my personal opinion, education and profession should be regulated by the same body, that is, the Council of Architecture, rather than splitting it with different verticals. Further, an institute with architecture at its core and sustaining a total enrolment of 3000 is a far-fetched possibility. Typically, enrolment in the architecture institute ranges from 200 to 600 or at the maximum 750, if it also offers post-graduate programs. When School of Planning and Architecture, New Delhi, was at its academic peak in terms of quality of outcome, enrolment was 300 to 350 (UG and PG together). As the enrolment increased, decline in quality was visible. As such, enrolment of 2000+ is a bit too high for architecture and related fields institutes. It needs to be deliberated further how we can achieve it without diluting the core.

Ar. Pushkar Kanvinde
Pushkar Kanvinde is an architect and urban designer from Pune. For more than 38 years he has been in teaching and practice. He was entrusted to head the National Institute of Advance Studies in Architecture (NIASA), as its first Director. His office has completed more than 500 architectural and interior projects. He has also contributed to many schools of architecture and universities in India as Advisor, Mentor, Member of Board of Studies, etc. He is deeply involved in bringing in reforms to architectural education in India.
Email : pmkanvinde@gmail.com

SHOULD ARCHITECTURAL EDUCATION BE A PART OF NEP 2020?

Ar. Premendra Raj Mehta & Ar. Prakriti Mehta

Standards without standardization is the hall mark of architectural education. It is holistic in nature, focuses on originality and creativity, believes in an evolutionary process, expects alternative answers, is people-centric and region-specific, revolves around socio- cultural resource factors, absorbs science and technology and ultimately prepares one for self-learning and self-evaluation.

The world, including India, has architectural practice as a regulated profession and its education is rated as one of the most interactive education system of teaching and learning. While NEP 2020, chose to leave out medical and legal education out of its bounds, architectural education has found itself brought into it. Perhaps there was no one to highlight the beauty, peculiarity, uniqueness and lessons it can offer to other educational systems.

Higher Education Commission (HEC) of India, visualized under NEP 2020, is a complete centralization of the process of regulating standards of higher education, including that for regulated professions. It also moves out from the hands of subject specialists to forums that will be composed of persons drawn from multiple disciplines, tasked to deal with a variety of degree programmes being offered in thousands of institutions. Though NEP 2020 talks of 'autonomy of institutions', in reality, the proposed regulatory framework over-steps the very concept of the 'autonomy' of a university, enshrined to it by law under the scope of Entry 25 of List III (Concurrent subjects) of the 7th Schedule of Constitution of India and desire of respective state assemblies or the Parliament to promote a particular education for the benefit of the society. These three issues are key to whether or not one would have individual thinking to flourish, or if one would have standardization of higher education, guaranteeing mediocrity as the bench mark. The present regulatory system in India has three distinct tiers:

• The First Tier

The first tier is national level Regulators. It includes UGC and AICTE, created under the UGC Act and AICTE Act respectively, by the Parliament, under the scope of Entry 66 (Coordination and determination of standards in Institutions of Higher Education). UGC has never dealt with academic standards and restricted itself to the structure of transaction of business in a University and making available grants to universities for specific projects. There are a number of deemed-to-be-universities created under UGC Act, an alternative route to legislative action. On the other hand, AICTE has only dealt with the prerequisite for imparting technical education, skirting around the intent and outcome of academic programmes in engineering and technology. The provisions of the AICTE Act and their implementation has always been under scrutiny of the Supreme Court, so much so, that architecture, management and pharmacy education stand deleted from the definition of 'technical education'. The Supreme Court has also ruled that some of the provisions of the AICTE Act shall not apply to universities, etc.

The first tier also includes National Level Professional Statutory bodies like Council of Architecture, Medical Council of India, Bar Council of India and the like, created under respective legislations passed by the Parliament under the scope of Entry 66 of List I, Entry 25 and 26 of List III of the Seventh Schedule of the Constitution of India. These bodies are composed of subject specialists, representing central and state governments, professionals and academicians. These statutory bodies prescribe the minimum standards of education of a professional to be registered with it. These have an in-built mechanism to oversee the maintenance of minimum standards of education by any institution. Periodically, it shares its observations/ reports, which are largely outcome-based, with the institution, its university and the government, for making improvements. Thereafter, it makes recommendation to the central government for recognition or de-recognition of a qualification awarded by a university. Minimum standards are prescribed by way of specifying 'intent' of the programme and the expected 'outcome'. Possibility exists that there could be a variety of content which could address an 'intent' and it is left to the university to evolve a unique content for its students.

• The Second Tier
The second tier is a university and its affiliate colleges or an 'Institution of National Importance'. These are created by a Central or State law. The content of a programme is prepared by the university around the specified intent prescribed by respective professional statutory body, else, the university has complete freedom to continuously evolve its own intent for a programme it may offer and create content to fulfill an intent. This happens at a university, through its Board of Studies, Academic Council and other like consultative forums.

• The Third Tier
The third tier is a college/ department/ school of a university. This is where education is imparted in a physical ambience, involving students, teachers and learning facilities. Here much depends on the academic leader and his teaching faculty, as they are free to evolve their own delivery mechanism to address the content.

The whole idea of this interwoven, three-tier system has been to allow different philosophies of thinking, teaching and learning flourish in different institutions or universities. This system has been prevalent in India since the 1850s, and we all are the outcome of this. Indian-educated human resources serve in at least 60 to 70 nations. This system or a part of this system, time and again, has been questioned for its adequacy to fulfill the contemporary or future needs and aspirations of our nation and/ or for it being unsuccessful or successful in achieving what was or is desired out of this, in spite of it being reasonably flexible. Lack of good leadership and inadequate resource allocation in higher education is something which everyone talks about. The 1986 Education Policy was the first formal review of the Indian higher education system and NEP 2020 is yet another attempt in this direction. It is said that it followed a consultative process attracting over 2,00,000 suggestions and comments.

The stated aim of Higher Education in NEP 2020 is to develop capacities of human beings- intellectual, aesthetic, social, physical, emotional and moral, in an integrated manner, through a holistic and multi-disciplinary approach to achieve effective contribution in the socio economic development of the nation (Para NEP 11.3) and increase employability (NEP Para 14.4.2 f). However, neither NEP nor any other document in Public Domain spells out the deficiencies in the existing system, reasons of setting forth these aims and what good it will do to the society in the coming years. Interestingly, the stated aims are very similar to the objectives of architectural education.

In order to achieve the above, NEP 2020 has set out an agenda. Some of the salient features are that Higher Education be holistic in nature (Para 11.3), multidisciplinary (Para 10.2), focus on research and Innovation (Para 17.6), have a choice-based credit system (Para 12.2) allow credit transfers (Para 11.9) and online learning (Para 12.5), learning should be practice-based (Para 11.8), institutions should be autonomous (Para 10.4), light but tight single regulatory system, with checks and balances (Para 9.3 and 18.2) and graded accreditation be done for the institutions (Para 10.4).

However, the NEP 2020, does not spell out the linkage between this agenda and the stated aim. As such it is impossible to believe the stated aim and objectives can be achieved, even if the agenda set forth in NEP 2020 is successfully implemented. It does not even make a mention that there could be an alternative strategy to achieve the stated aims and objectives, given the 170 years of experience of formal higher education in India and the diversity and plurality that exists in our country.

The core of this agenda is, to create autonomous multi-disciplinary Higher Education Institutions (HEIs) that are not too small and not too large, having an enrollment of 3000 students or more by 2040 (Para 10.1). The system of affiliated colleges is planned to be phased out by 2035. As per a report of Ministry of HRD, the student population in 2018-19 was 37.4 million. With increased access to higher education this figure is likely to be doubled by 2030 (para 10.8), implying the establishment of a minimum of another 1000 - 1500 autonomous HEIs/ universities from the present level of 1000 odd universities. A gigantic target set forth by NEP 2020 for the Parliament and/ or State Assemblies to pass the necessary bills under the scope of Entry 25 of Concurrent List of 7th Schedule of the Constitution of India, for creation of so many universities or for UGC, if it continues to exist, to make recommendations to the central government for creation of so many deemed-to-be-universities. As far as the creation of multi-disciplinary HEIs is concerned, the question remains as to whether one wants multi-disciplinary education or multi-disciplinary institutions, as the former will require a relook at the content of a programme, whereas the later calls for programmes from different disciplines in an institution.

The second core recommendation is the establishment of a conflict-free new regulatory regime. Emphasizing this need, NEP 2020 states that too much has been attempted to be regulated by the existing statutory bodies with too little effect, there is a heavy concentration of power, conflict of interest exists, and there is lack of accountability (Para 18). However, there is no data in the public domain which could have led the makers of this policy to reach such conclusions. NEP 2020 itself does not make any reference to any survey conducted on the functioning of the existing statutory bodies.

54

The NEP 2020 proposes establishment of a Higher Education Commission of India (HECI) having four verticals, each having a distinct role:

1. *National Higher Education Regulatory Council (NHERC):* Responsible for good governance and financial probity in HEIs, adequacy of infrastructure, faculty, course and outcome
2. *National Accreditation Council (NAC):* This body shall provide Graded Accreditation to HEIs based on autonomy, self-governance and quality of education. NAC shall discharge its obligations through outsourcing to public institutions.
3. *Higher Education Grant Council (HEGC):* It shall provide development fund to HEIs based on graded accreditation and scholarships.
4. *General Education Council (GEC):* This body shall deal with learning outcomes, credit transfer and integration of diplomas and degrees. Professional Standard Setting Bodies or PSSBs (like Council of Architecture, Indian Council for Agricultural Research, Veterinary Council of India, National Council for Teacher Education, National Council for Vocational Training and Education etc.) shall be represented in this body.

Incidentally, medical and legal education has been excluded from the ambit of NEP 2020 and one does not understand as to why specialized education of architects should remain included in the proposed system. Architectural education requires a very different approach to address its own peculiarities of holistic education, which is largely learning (not teaching) and outcome-focused.

As per NEP 2020, the role of PSSBs, as far as Standards of Education is concerned, shall be restricted to prescribing the curriculum framework, lay down academic standards and coordinate between teaching, research and extension of the discipline. These bodies are expected to have no regulatory function. On the other hand, as is the case now, HEIs or the concerned university shall be responsible for the development of curricula, coordination with PSSB and, more importantly, now be solely responsible for maintaining the standards of education, as the HEI is an autonomous body. There shall be no independent review of what goes on in an institution.

However, the standards of education prescribed by a PSSB can only be implemented with the approval of the General Education Council (GEC). Whether an HEIs is able to maintain the requisite minimum standards or not shall be witnessed by the outsourced agency appointed by National Accreditation Council (NAC), but HEI shall be graded by the NAC itself. When a question of recognition or de-recognition of qualification shall come, the subject matter shall be dealt with by the National Higher Education Regulatory Council (NHERC), but the decision with respect to this will have to be taken by the Higher Education Commission of India, as it has to take into account the prescription of PSSB, its approval by the General Education Council, Grade given by the National Accreditation Council and the recommendation of the National Higher Education Regulatory Council. The decision of the Higher Education Commission of India will then have to be considered by the Central Government before a qualification, Indian or foreign, is recognized or de-recognized, keeping in view the domestic situation and the commitments taken by India at GATS , WTO and/ or with specific nations, while signing the Economic Cooperation Agreements.

All this is in contrast with the present system, where all the functions are performed by a single body. NEP 2020 envisages these functions to be performed by five forums, having five different set of subject experts for the same subject. Differences of opinion between different forms of HECI will become a norm, rather than an exception. The schedule of transaction of business of each of the verticals of HECI will cause delays and blur the transparency of the system. Thus accountability will be a casualty, harming the overall interest of society and that of a student. The proposed cumbersome process, envisioned in NEP 2020, may make the entire system ineffective.

While we all know that, NEP 2020 is merely a wish of the Union Cabinet and its implementation would require repealing of certain laws, amendments in existing laws, enactment of new laws and, perhaps, amendments in the Constitution of India. The same may be worthwhile, if the likely outcome of the visualized regulatory system is sure to bring about a qualitative change. As it appears, it may be a long-drawn process, particularly when NEP itself is silent on the strategy to implement the intent of the NEP 2020 and also on the resource requirement.

Whether one agrees with the substance of NEP 2020 or not, one has to agree that every time is a good time to bring in reforms and experiment with the process of learning, as society has caused the setting up of the educational institutions to quench its quest of being served by learned minds. Fortunately, architectural design is an evolutionary process and so is its education. It has inherent flexibility, through studio exercises, to continuously experiment and respond to contemporary concerns of the society. The Council of Architecture should initiate a study and prepare a perspective plan for the next 50 years, so that the benefits of architectural education reach every citizen of our country.

Ar. Premendra Raj Mehta
Ar. Premendra Raj Mehta is former President of Council of Architecture and presently the Interim Chairman of National Accreditation Board of Education and Training (NABET) of the Quality Council of India and a member of the Technology Sub Mission of Mission Housing for All of the GoI. He has represented India at WTO on the subject of recognition of qualifications and has participated there in bilateral and multi-lateral negotiations on global Market Access for Architects
Email: prmehta@dagindia.com

Ar. Prakriti Mehta
Ar. Prakriti Mehta is an urban designer and is working as an Assistant Professor at Balwant Sheth School of Architecture, NMIMS University, Mumbai. She was acknowledged for her design entry at the Mumbai Street Lab Competition by BMC. She has curated international design workshops and delivered public lectures, including one at Ukraine. She has authored several policy-related research papers on micro-climate and migration, including on PMAY Affordable Rental Housing Complexes published by HUDCO and BMTPC, released by the Hon'ble Minister for Housing and Urban Development, and the recommendations made by her were reflected by the Hon'ble Prime Minister in his speech on national television.
Email: prakritimehta@gmail.com

EMERGING TRENDS IN ARCHITECTURAL EDUCATION

Dr. Amogh Kumar Gupta

At present mankind is living in the era of specialization with advancements in science and technology and rapidly-changing market demands. New fields are emerging in all walks of life, whether it's science, engineering, medicine or law. During the pre-Independence era, civil engineering emerged as the first branch of engineering to provide infrastructure such as roads, rails, water supply, sanitation etc. to the common public. Slowly with advancement in technology other branches started emerging, such as mechanical and electrical which themselves became core engineering branches. Later, with further enhancemaent in technology, auxiliary branches emerged out of these new core branches.

For example, from electrical engineering emerged electrical and electronics engineering, and in no time electronics engineering was recognized as an independent branch. With the discovery of computers under electronic engineering around the 1990s, computer engineering gained recognition as another independent branch. In due course many other branches too developed from electronics engineering such as electronics and communication engineering, signal and telecommunication engineering, etc. The process of further diversifying into many other independent branches with advancement in technology and to cater to the needs of the market is an ongoing process which will be continuing still further. The same is the scenario with all other core branches and that is why at present, we have numerous engineering branches whose genesis can be traced in the form of a hierarchal tree.

In the past few years, internet of things (IOT), machine learning and artificial intelligence (ML&AI) are taking an edge over all other disciplines. Inclusion of these new concepts are accepted by all fields and their curriculums have

been already revised or are in the process of revision. It is interesting to note that all disciplines are ready to accept and incorporate the challenges and ready to fuse their curriculum with new technologies to equip their students with state-of-art technology. Recent trends even show blending of the medical field with diverse disciplines such as electronics, computers, AI, and many others, realizing the involvement and impact of technology in innovations for this field.

Architecture as a skill and as a formal profession, similar to civil engineering, existed from pre-Independence periods. The terminology only was new. During the introduction of the earliest course, the curriculum was developed with the understanding that after graduation, the architect would be capable of designing all sorts of buildings such as residential, shopping, institutional, etc. The input of technology in buildings was limited, in terms of services and structure and the emphasis was on form and function. Architects took a lead role in designing and execution of buildings. Minor inclusions of few subjects, with advancement of technology were included as electives to give an idea to the budding architect about recent trends. Our recent curricula still follow the same tenet of being able to design all sort of buildings and be the manager of the project.

In the present context, we must introspect how capable we are to design all sorts of buildings including shopping malls, hospitals, airports, large scale housing projects, skyscrapers, public buildings, etc. etc. without associating or consulting other subject experts? In the present scenario, almost all large scale projects / buildings are technology-driven. Even their form and function are now guided by technology. For example, the form of skyscrapershas to be aerodynamic– are our students equipped to design technology-driven aerodynamic forms? This is just one example, apart from understanding structural systems of large-span structures, complex MEP services, hospital services, etc. Even in large-scale residential projects, we must introspect whether we can manage complete projects in terms of cash flow or material flow, predicting technical and non-technical labour requirements, as well as many other aspects.

In my opinion, the tenet that we have followedfor ages may not appropriate in the present day where technology is the main guiding factor even in designing form and functions. Apart from this inclusion of various new concepts such as green buildings, energy efficient buildings, building rating systems, goad the design process. Technological complexities have further increased with building automation and control using AI. Looking at the changing scenario, the scope of an architect is considered limited in conceptualizing and in the execution of building projects, and to be a manager.

In my opinion, we should also start thinking in terms of diversifying our curriculum, like Bachelors of Engineering, and start developing new courses such as B.Arch.(Design), B.Arch.(Structural systems), B.Arch.(Skyscrapers), B. Arch (Hospital services),B.Arch.(MEP), B.Arch.(Traditional architecture). NEP provides an opportunity to integrateB.Arch.and develop such new courses with fusion of other engineering disciplines. These new courses with integrated technology may open new avenues for budding architects equipped with cutting edge technology to cater to the technological demands of the building industry.

Further, looking to increasing the cost of education which might further increase with development of technical laboratories. NEP also provides the opportunity of various exit options and making our students capable of working at different levels and then continue their education to complete their degrees.

In view of NEP, the role of the Council of Architecture will increase multifold not only in terms of identifying the various courses, developing the course curriculum and detailed syllabus, but also take a lead on the capacity-building of existing faculty to equip them in teaching the technology-based courses. The Council must also take a lead role in identifying the critical exit options for better employability from all permutations and combinations, as too many exit options may be chaotic in terms of practical implementation.

To sum up, I feel the NEP is an excellent opportunity to upgrade and equip the profession with state-of-art and technology, expanding the realms of architecture from design to technical.

Dr. Amogh Kumar Gupta
Dr. Amogh Kumar Gupta is an architect and valuer from Bhopal. He has been practicing for more than 35 years. He is involved in the policy-making team of the government of Madhya Pradesh for the Town Development Master Plan, Development Control Regulations and also in academics. His office has completed more than 500 architectural and interior projects, including individual to group housing, stadiums/ sports complexes, schools and hospitals. Dr Amogh is a Member of the Council of Architecture and has contributed to many institutes, schools of architecture and universities in India as a Member of the Board of Studies, Member, Board of Governors, etc. At present, he is Chairman, BoG School of Planning and Architecture, New Delhi (an Institute of National Importance) and also heading School Of Architecture, SAGE University, Indore. He is actively involved and has contributed to the profession in different capacities. He is the Chairman of the Professional Service Board of IIA. He is also deeply involved in bringing in reforms to architectural education in India.
amoghkgupta@yahoo.co.in

58

PRODUCT FEATURE

"QUALITY OF WATER DETERMINES THE QUALITY OF LIFE"

Water is life and all living beings depend upon water. We all know how important clean water is to our health. Yet millions of people have either significantly restricted or no access to water that is fit for human consumption. According to the UN's WASH (acronym for Water, Sanitation and Hygiene) study today, 2 billion people lack access to safely managed drinking water services, and 3.6 billion people lack safely managed sanitation services. Unsafe hygiene practices are widespread, compounding the effects on people's health. The impact on child mortality rates is devastating, with more than 297 000 children under five die annually from diarrhoeal diseases due to poor sanitation, poor hygiene, or unsafe drinking water. Understanding the gravity of the subject, and as a global market leader in the piping industry, Viega brings its expertise and products to aid in the quest to optimize water quality. We believe that clean water should flow from every tap all over the world as a standard and as a fundamental human right since it is a vital aspect that determines our health.

Potable water quality is sensitive and can be compromised by many factors. But by combining targeted measures with our system solutions for building technology, it is possible to maintain potable water quality and, therefore, protect health. Handling and treating potable water in the right way is crucial not only for our health but also for the health of our planet. For a safe and secure future, we must achieve sustainable use of our water supply installations, not only in compliance with hygiene regulations but also fulfilling critical economic and environmental criteria. At Viega, solutions are designed to combine preventative health considerations and sustainability with cost-effectiveness and energy efficiency. Our commitment has been recognized by the 50 Sustainability & Climate Leaders project. This global campaign showcases companies worldwide that contribute to achieving the Sustainable Development Goals set by the United Nations, and of which India is also a participating country.

Viega has been committed to maintaining potable water quality for more than 120 years. At Viega, we ensure that our solutions touch each consumer's life in the best possible way. Our solutions not just protect but preserve water while retaining its quality, and we are proud to claim that we Install Lifelines for the buildings of tomorrow. Our brand statement "Connected in Quality" is at the heart of all our initiatives and product innovations.

SCAN ME

Viega. Connected in Quality
✉ innovations@viega.in

AMAN MOSQUE
BANGALADESH

Ar. Bayejid M. Khondker

Fact File
Location ▶ Aman Economic Zone, Sonargaon, Narayangonj, Bangladesh
Name of the Client ▶ Aman Group
Site Area ▶ 7788.96 sq.m
Total built up area ▶ 1492.27 sq.m
Year of Commencement ▶ 2016
Year of Completion ▶ 2019
Project Cost in BD Taka ▶ 4 crores
Principal Architect ▶ Bayejid Mahbub Khondker
Architect[s] ▶ Shibaji Bagchi, Samiul Alam
Consultant[s]:
Architectural ▶ Nakshabid Architects
Structural ▶ Engr. Monayem Hossain
Interior Design ▶ Liton kar
Landscape Design ▶ Nakshabid Architects
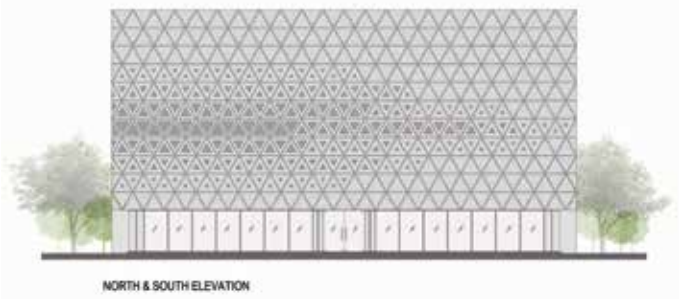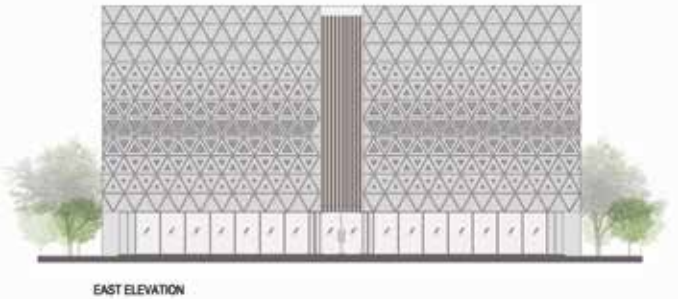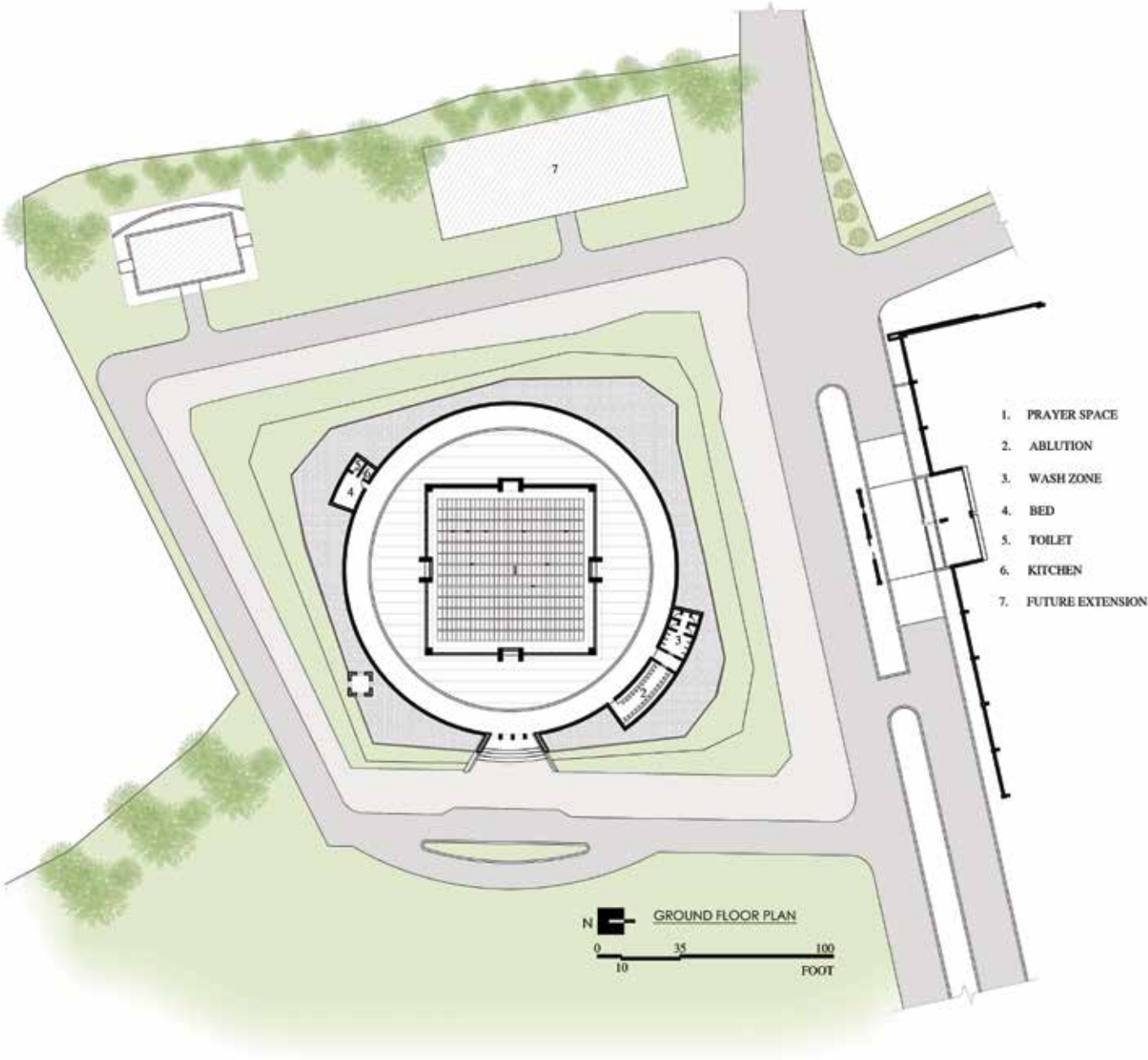**Photograph** ▶ Maruf Raihan

Bengal, a warm humid delta, complex by its nature, is the home of multiple cultures and religions. Throughout the course of time people of various cultural and religious backgrounds along with their own philosophies, beliefs and the unique techniques of survival came to this land and merged with the existing culture and people which resulted in a rich and diverse culture. The climate is also quite complex and unique due to its geographic location. Both these factors have highly governed the architecture of this region. The adaptation of new ideas and techniques have also been unique. People adapted new ideologies, new techniques, cultures, and rituals and blended with the existing ones. They accepted new forms but transformed its characters. Its climate influences them to behave in such a manner. Controlled daylight and provision of cross ventilation are the two very important factors that guide space layout and form attributes. Peripheral semi-outdoor spaces ensure diffused daylight inside the indoor spaces reducing glare of the sun and also give the scope to provide large openings in the facades that enable air to pass through the interior spaces. These are the essential factors, along with the influence of culture and heritage that signifies the architecture of this region.
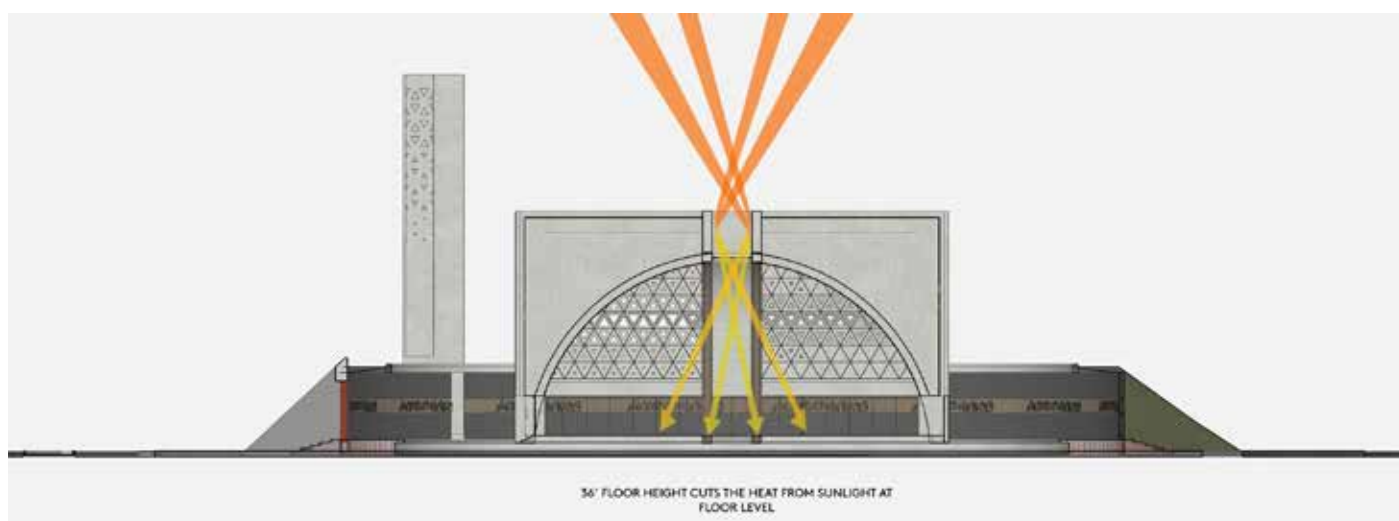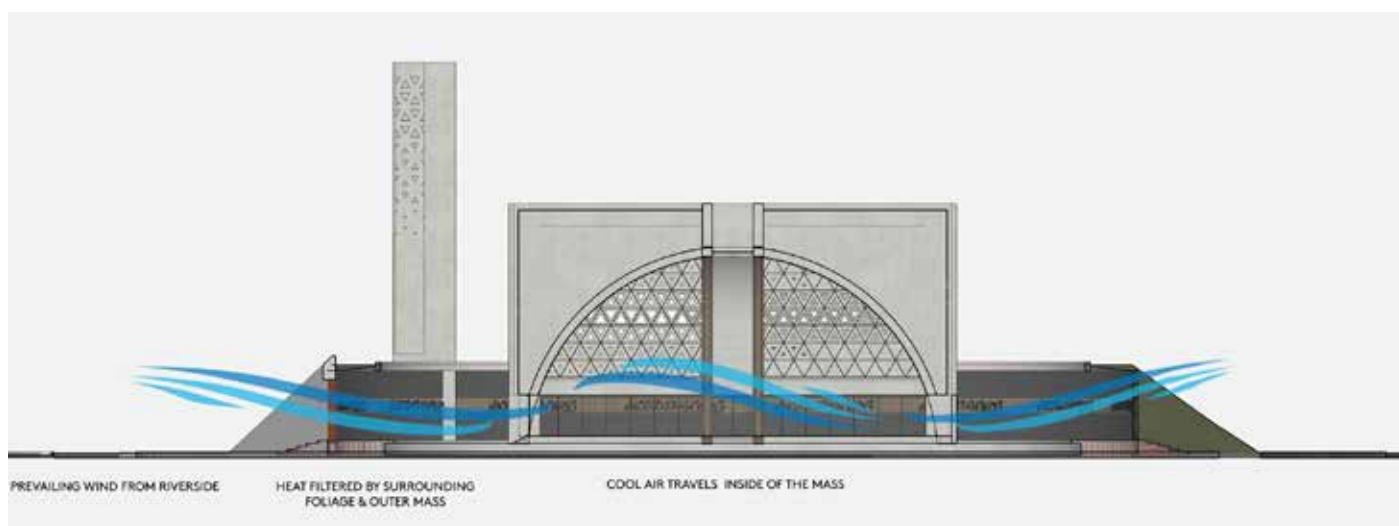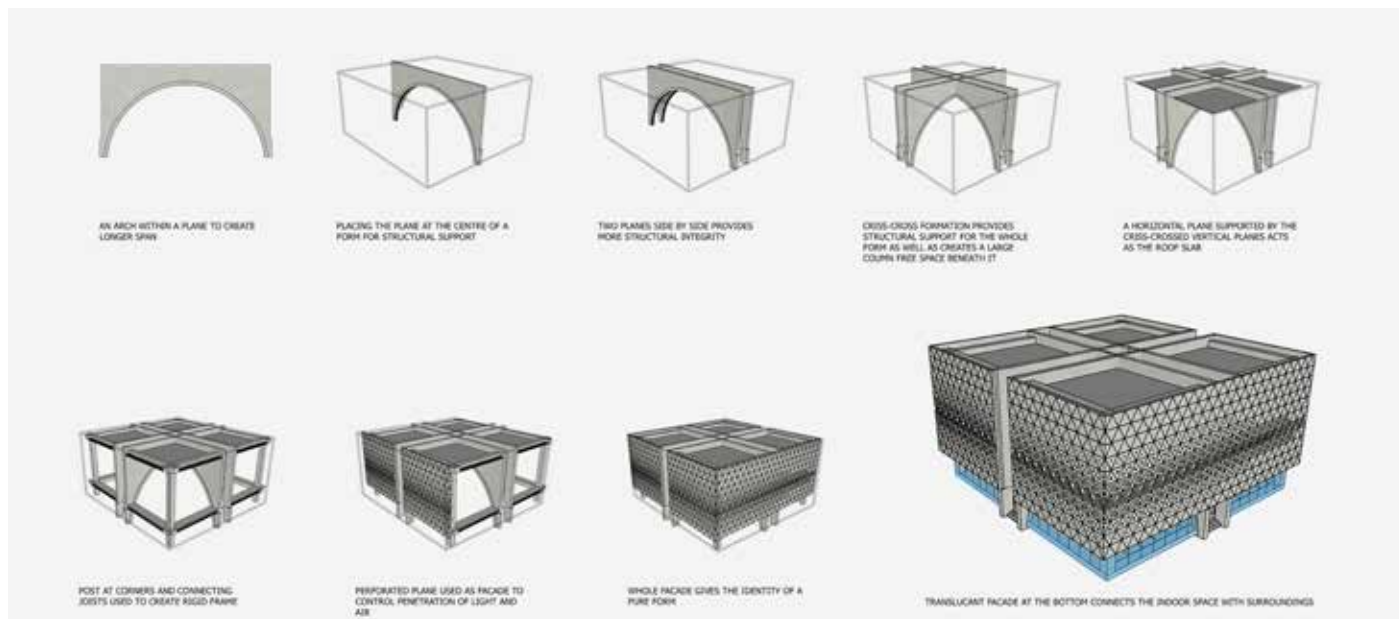
A mosque is a holy place of daily prayer and carries distinct characteristics and identity. The place is a serene and spiritual space that takes the individual close to the divine entity, and has a form that has its own identity and supremacy. The design process of the mosque started with the idea of embodiment of spirituality by creating a calm and serene environment. A pure form is being selected as the main mass in order to adhere to simplicity and singularity, at the same time attempting to explore beyond the limitation that comes with it.

Single geometric form depicts the intention of being pure in design approach and formal expression. A single volume of space created by the form accommodates the prayer hall which is significant in its scale and attribute. This massive form is supported structurally by two crisscrossed arches that helped to create the intended single volume of space without interrupting the continuity of the space. The crisscrossed formation creates the impression of an invisible dome above the prayer hall that symbolizes mosque architecture.
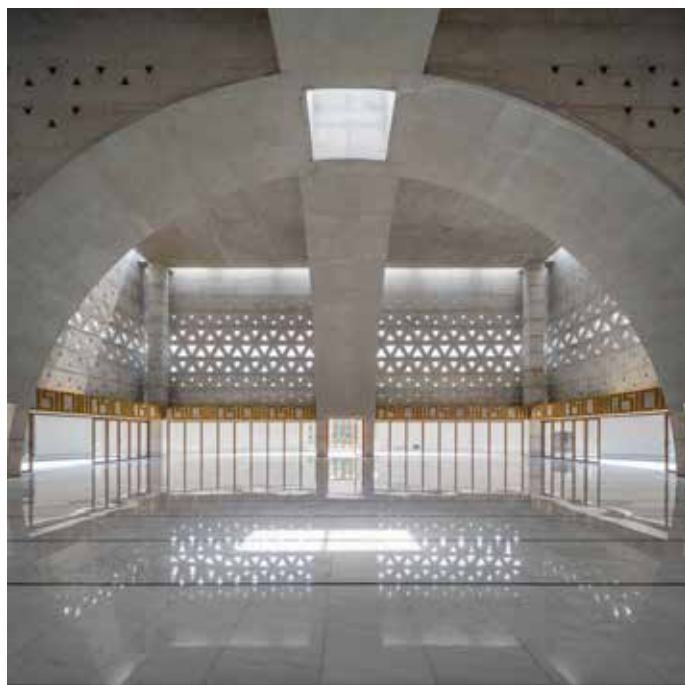
Facades of the built form are solid, monolithic and robust and help reduce the noise from surrounding industries as well as the glare of the sun. Triangular patterned openings at the facade allow sunlight to penetrate inside with a mysticism that renders the setting spiritual and sublime. This triangular pattern is the replication of traditional façade detailing in a much simpler yet significant form.

The building mass is surrounded by a circular semi-outdoor space. This open-to-sky space is the source of diffused light and ventilation inside the main hall. The lower portion of the building mass is transparent that connects the interior with its surroundings.

1. PRAYER SPACE
2. ABLUTION
3. WASH ZONE
4. BED
5. TOILET
6. KITCHEN
7. FUTURE EXTENSION

N

GROUND FLOOR PLAN

0   35   100
  10   FOOT

EAST ELEVATION

NORTH & SOUTH ELEVATION

AN ARCH WITHIN A PLANE TO CREATE LONGER SPAN

PLACING THE PLANE AT THE CENTRE OF A FORM FOR STRUCTURAL SUPPORT

TWO PLANES SIDE BY SIDE PROVIDES MORE STRUCTURAL INTEGRITY

CROSS-CROSS FORMATION PROVIDES STRUCTURAL SUPPORT FOR THE WHOLE FORM AS WELL AS CREATES A LARGE COLUMN FREE SPACE BENEATH IT

A HORIZONTAL PLANE SUPPORTED BY THE CRISS-CROSSED VERTICAL PLANES ACTS AS THE ROOF SLAB

POST AT CORNERS AND CONNECTING JOISTS USED TO CREATE RIGID FRAME

PERFORATED PLANE USED AS FACADE TO CONTROL PENETRATION OF LIGHT AND AIR

WHOLE FACADE GIVES THE IDENTITY OF A PURE FORM

TRANSLUCENT FACADE AT THE BOTTOM CONNECTS THE INDOOR SPACE WITH SURROUNDINGS

PREVAILING WIND FROM RIVERSIDE

HEAT FILTERED BY SURROUNDING FOLIAGE & OUTER MASS

COOL AIR TRAVELS INSIDE OF THE MASS

36' FLOOR HEIGHT CUTS THE HEAT FROM SUNLIGHT AT FLOOR LEVEL

The operable glass doors allow the air to pass through the interior that keeps the space cooler and soothing. The circular semi-outdoor space is surrounded by a high wall to block the bustle and noise from the heavy industrial premises outside and retain a calm and sound environment. The landscape around the semi- outdoor is sloped gradually to merge the building mass with its surroundings. This uplifted landscape creates the essence of a sunken courtyard where the building mass rests.

As a whole, the built form gives a new image and develops a new language of a mosque, that is far more transformed, simple but unique, and at the same time merges with its surroundings.

Ar. Bayejid M. Khondker graduated B. Arch from Bangladesh University of Engineering and Technology in 1996. As a Practicing architect in Bangladesh, he works on many typologies and scales. He thoughtfully designed public places and spaces, to build on the unique local characters and the best qualities of the forms that are inherent in that geographic region. He creates Architecture that engage in a dialog with the history, beliefs and needs of a particular place and time. At present, he is the Principal Architect of his firm, Nakshabid Architects.
bayejid@gmail.com

Photographer : Maruf Raihan

CONQUERING THE SANDS OF TIME
INDIA PAVILION, EXPO 2020, DUBAI

Ar. Dikshu C Kukreja

Fact File
Location ▶ Dubai, UAE
Site ▶ 1.2 acres
Built-up area ▶ 1,00,000 sq. ft
Year of completion ▶ 2021
Principal Architect ▶ C.P. Kukreja Architects
Project Management Contract (PMC) ▶ NBCC (India) Limited
Business Facilitators ▶ Federation of Indian Chambers of Commerce & Industry (FICCI)
Client/ Owner ▶ Ministry of Commerce and Industry, Government of India
Interior fit-outs ▶ Muse International
Digital Content curation ▶ Moving Pixels

There's an air of excitement as the world prepares for interaction 2.0. The past two years have been nothing short of a mental and emotional journey for people across the world. We witnessed a global shut-down; the world stopped moving for some time. We all skipped a year of planning and existence in any physical space. The aftermath of COVID has also presented mixed reactions – while some are ecstatic to see economies opening up, many of us are shocked, confused and demotivated. We have seemed to have lost sense of time and emotion.

Yet somehow, we are slowly picking up. People world over entertained themselves through group activities, virtual parties and gatherings, but it wasn't long before everyone could be seen getting agitated and missing leisurely activities outside of their virtual bubble. We seem to be rebuilding our ideas and schedules. We are truly pushing ourselves to explore where we left off. At this hour, through global events and business travels, economies are preparing to revive and make up for the damage caused due to the pandemic. Come October, the Expo 2020 Dubai, which was to launch last year, will be welcoming millions of visitors from around the world. In the past, World Expos have stirred innovation and given to architecture some iconic landmarks – Eiffel Tower (Paris, France), Crystal Palace (London, UK), The Atomium (Brussels, Belgium) and Space Needle (Seattle, USA) etc. Expo 2020 Dubai is no different: it is being prepared as a global stage for renowned architects from all over the world to represent countries whilst showcasing design finesse.

With an overarching theme of Connecting Minds, Creating the Future, it is a platform promoting partnerships for innovation, inclusion and understanding. We have been fortunate to be a part of this momentous occasion. For the prestigious design of the India Pavilion at Expo 2020 Dubai, C.P. Kukreja Architects were selected as the principal architects. Amalgamating the ethos of the country's mobility with technology infuses a sensory stimulus into the Pavilion. What makes it all the more significant is that it is one of the largest pavilions at the Expo, at par with pavilions of countries such as USA and China. It is also one of the three pavilions that will be retained for posterity in Dubai's legacy phase as an Indian centre.

Interaction through celebrations, travel, community gatherings are a few things that keep the human spirit alive. Mindfulness in architecture is the word of 21st century, bringing together eco-consciousness and technology in a holistic manner. Through the Pavilion, we hope to pay homage to the cultural multifariousness of our country whilst nurturing the idea of India as a pool of opportunities for investment and collaboration. As one of the fastest growing nations in the world, the design of the Pavilion imbibes the theme of India on the move.

The façade comprises of 600 individual blocks that move using kinetic architecture. The design also celebrates India's 75 years of Independence. Through seventy-five identified stories, the façade will engage visitors through the charm of storytelling through the day – familiarizing them with the history, geography and literature of the country to instil emotions of pride and enthusiasm. In the evening, the façade will turn into a vibrant show with sound, light and projections, almost as if hosting a festival. The awkward shape of the trapezoidal site has been designed to create a visual memorabilia and utilise the land to its full potential. The planning of the site is such that it condenses the vastness of India's culture and cityscape within it. Different design elements such as the radiant sun-dial and the elaborate amphitheatre are seamlessly tied into a single harmonious unit. The pavilion is the tallest at the Expo. We used sustainability as one of the key design features, integrating climatological influences of the region with technology. Movement in façade helps control factors such as sunlight and wind inside the Pavilion which is helpful in regulation of natural daylight and ventilation. We also incorporated a skylight in the design to optimise natural daylight in the interiors. Using solar panels installed on the terrace, we maximised the benefit from Dubai's harsh sunlight. The chakra is designed using steel construction with modular steel members that can be recycled.
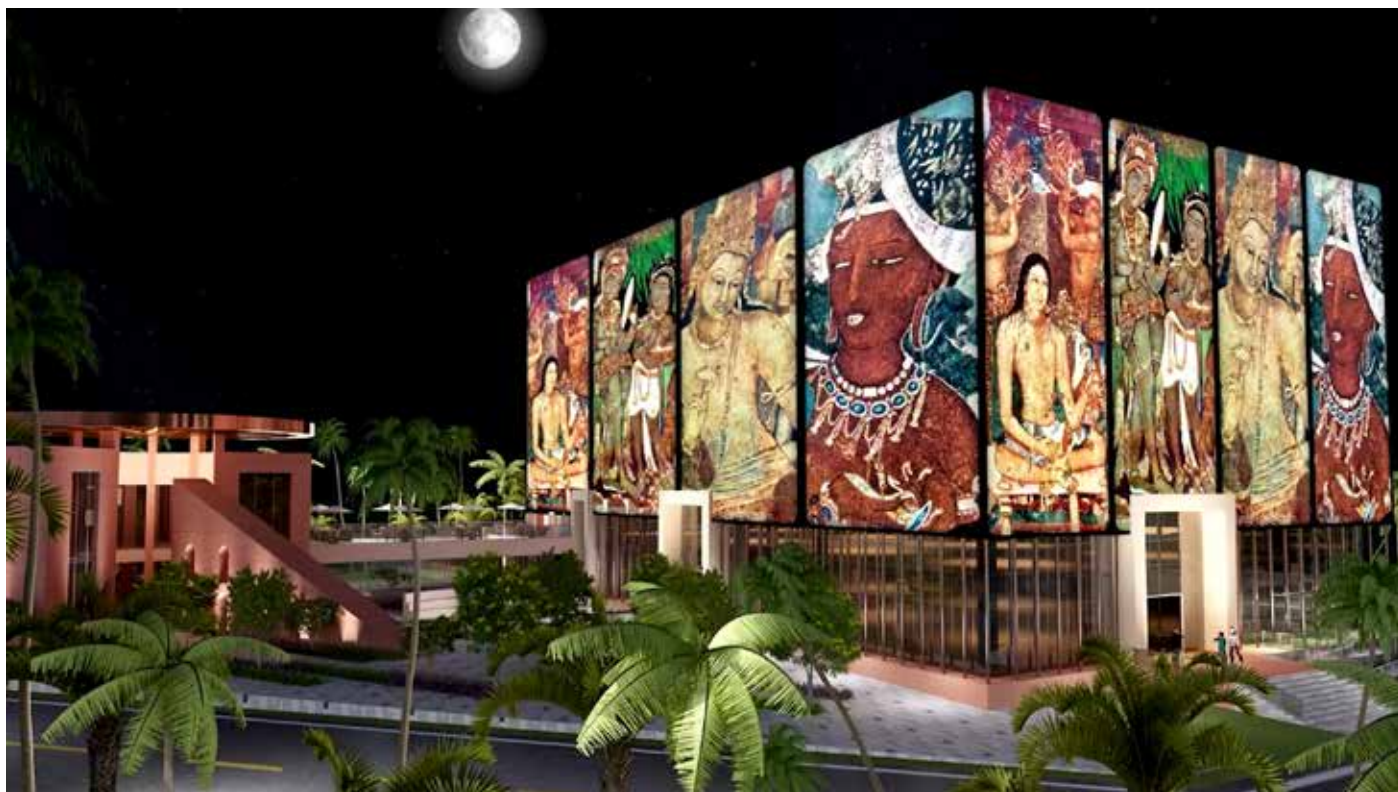
The interior design makes the journey inclusive and interactive for the visitors by employing the use of latest cutting-edge and innovative technologies. The visitors will get to witness both, physical exhibits as well as immersive digital content which would showcase various sectors in the thriving Indian economy. Such close integration of creative and technical approach is exhilarating, constructing an imaginative atmosphere for the visitors. Programs such as Make in India, Digital India, Skill India and Start-Up India campaigns would be featured as the key highlights, displaying the country's capabilities at an international level. The interior fit-outs have been designed by Muse International. The India experience inside the pavilion is designed under eleven themes. As one enters the building, one is fascinated by the starry space – guiding them through India's journey in space exploration. As a land of tranquility and healing, live yoga performers will have projection of mandalas behind them. A walk inside a giant radium will help the visitors to understand the many benefits of Ayurveda. On the first floor, the colours of India in an immersive environment are showcased with LED walls enveloping the visitors in a heritage experience. Mesmerising installations also help exhibit India's diverse culture. The second floor will display India as a land of endless opportunities. A state-of-the-art theatre hall will be open for meetings, conferences, cultural shows, reception as well as film screenings. The India Pavilion amplifies the country's position on the global map as a thriving hub of limitless possibilities integrating futuristic approach and mobility while projecting the Indian story in a global narrative.

The world has suffered emotional exhaustion at the hands of the Corona virus outbreak. In these uncertain times, economies around the world are working towards gathering any remnants of hope that remains. The Expo 2020 Dubai is one such attempt at reviving the spirit of celebration.

Ar. Dikshu C Kukreja
Ar. Dikshu C. Kukreja received his B.Arch Honours as Gold Medalist from School of Planning & Architecture. He attended the prestigious Taliesin Fellowship at Frank Lloyd Wright School of Architecture, USA and received his Masters of Architecture & Urban Design from Harvard University. He is the Managing Principal of C.P. Kukreja Architects at New Delhi, which is ranked amongst the top 100 architectural firms in the world. He has worked in India, France and USA and has lectured and taught at institutions both in India and abroad.
cpka@cpkukreja.com
dikshu@cpkukreja.com

DESIGN FEATURE

SAMUDRA
A THEATRE FOR LIFE

TWO i architects

The pampering of waves of our toes and the serenity of the sea is one of the best experience in Calicut. Not all places are geographically blessed with beaches, Calicut hold its pride on having the second-largest urban beach in India. Golden Sky during the sunset made its beaches the best place to gather and to rollick. Small and unassuming, the famous Bhatt Road Beach lies in the northern end of the urban beach in Calicut. It is all set to give free space for talent to perform in front of huge audiences. It is a city much loved for its cuisines and as a hub for the most ardent of the local community.

Samudra stands as an ideogram of an aspiring future by utilizing the allure of the family beach. On behalf of MLA Pradeep Kumar and IIA Calicut Centre, we are extremely proud and honoured to introduce Samudra - a dream project designed by *TWO i architects.*

FISH FLOCK

An important segment is who lives in the lowlands of Shanthi Nagar. This is a picture of the sorry situation at the colony. Each family of this colony is living in one cent to one and half cent that serves as home. More than 500 fisherman families live in proximity with a poor and undesirable environment daily. People from this waterfront locale experience an absence of space to conduct get-togethers and other ceremonies. They have to adapt with two or three houses to make their ceremonies take place. Even then there is not enough place.

The essence of the venture was to design a space for people to gather and connect, to do things together and pursue shared interests or activities. The purpose is very much determined by what the community would like it to be. The location and setting contribute very well to the programme. This dream space of every single person in the fishermen community residing nearby, was built along the lay of the land, capturing the vistas of the surrounding seaside. Since it is a sensitive zone, constantly battling natural calamities, the designed space is also intended to act as a disaster shelter.

PLANNED

In a 1200 sq.m lot, the program is resolved in a single floor, whose L-shaped volume generates two masses: the one parallel to the beach is the main hall and the latter is designed for other services. Upon entering, visitors walk through a long corridor with bamboo roofing where the hollow nature of bamboo is cleverly utilized to hang beautiful lamps and grow creepers. The open space near the platform overlooking the sea is used as a distribution square, simply leveled and could possibly be used to conduct outdoor activities. Observed from a distance, its body well integrates the indoor and outdoor sections of the Community Hall into a grey structure that sits on the edge of the beach view.

The objective of the exterior space was systematically sorted out. The way to or from the sea passes through the site. The outdoor stage is positioned towards the sea shore to host public activities, creating a new use for people. The absence of a wall to the boundaries of the beach, this consider the surrounding users to setup multiple recreational and entertainment venues such as birthday parties, cultural display, kudumbhasree meeting, fishnet weaving space or any other social events to make the venues safe and comfortable. This fully accessible parking space attracts people from the neighborhood to engage in walking or jogging.

Bringing community members into the design process and functioning of the space is a key factor to create a sense of pride, enthusiasm, and ownership among the community- all of which are critical to the long-term success of the project. The space can be leased by local individuals for an insignificant lease for their own social occasions, and is simultaneously rented to the general public at a nominal charge, which will contribute towards its upkeep. As a successful humanitarian architecture project, this building is intended to be a catalyst to achieve positive change in the community and improve people's lives, not only in times of crisis, but many years into the future, rendering it timeless.

THE MATERIALS

Lightness is one of the distinctive features of the Community Hall. As the location of the site is in a coastal setting, construction methodologies were customized to suit the context. Local materials were integrated with a steel structure simplifying the construction process to highlight the structural versatility of steel and develop new construction techniques. An innovative curved roof was designed for the main hall. The arched elements on the upper level are coated with synchromate to protect it from rusting. The stage area has jalis on both sides, so that it is less lit and more ventilated at the same time. The uneven brick pattern as shown in the image creates an interesting light pattern inside. The attempt was to achieve a contemporary concept through the harmonious blend of concrete, metal sheet and brick. We ultimately landed on this wave shape to represent the sea and resonated as the formulation of infinity. We wanted to design a building that simultaneously blends and grows out of the natural sea waves. The building is oriented to maximize the breeze from the wind and make it work with the wave form to passively cool the building.

BEYOND THE IMAGINARY

The design shows the structure that blends within the sea and surrounding landscape. The space incorporates a number of openings to the outside to take advantage of its proximity to nature. We managed to integrate the social aspect with their requirement of a space into a single structure, saving cost and time while adding sentimental and architectural value to both functions. Rather than imposing a structure on the site, we want to enhance what was already there. According to that, the decision to make the design open was simply logical as it maximizes views of the beach and surrounding landscape. It is a setting that allows them to feel that they are with nature.

We are making history within Samudra's construction. By improving the well-being of communities with non-profit organizations. We can raise public awareness of critical social and environmental issues and ultimately develop a sense of responsibility towards society and life as such. Humanitarian design gives us the means to return to the grassroots of our industry. This uses ingenuity to help people with a direct need of all that is fundamental within the architecture. Our long-term goal is to have a comprehensive sustainable program that not only includes best practices in building and maintenance but also enhances the participation of tenants so we can be more environmentally-conscious.

Now Samudra is set for wedding plans and all programs. Also in this pandemic situation, the government has decided to convert it into a COVID care centre. All sufficient healthcare facilities will be enabled for successful isolation during the period of incubation. At this moment, we realize the space can act as place with intense feeling. The space designed to raise the happiness of the land, and to give it an identity and pride it deserves.

About the Firm
TWO i architects
Architectural Design Studio

TWO i architects is a multi-disciplinary architectural practice, founded by Ar. Noufal C. Hashim, based in Calicut, Kerala. TWO i architects offers services in architecture, interiors, planning and landscape which highlights their social commitment. Since its inception, TWO i architects has been striving to conceive spaces that are functional, feasible and capture the essence of the site.
support@twoiarchitects.com

The firm integrates contextual responsiveness and innovation to create relevant design solution, fostering an environment that engages people holistically. The architects idea is made into reality with a keen perception of client needs and resource into detailing, paying homage to the traditions, culture and spirit of site.

YOUNG PRACTICE

EMOTIONS IN ARCHITECTURE
STUDIO EMERGENCE

The play of light and dark creates the intrigue to enter the "vortex"

The metaphor of life is rooted in Architecture. To be born, to grow, to be, is an architectural experience. Daniel Libeskind

One of the most important functions of architecture is to elicit emotions: it has an impact on how people feel spiritually and mentally. Architecture assists us in surviving the chaos of our daily lives by allowing us to experience real-time circumstances through various thoughtful design interventions. It is important for an architectural piece of work to emit a certain "sense of place" to respective users through various design interventions. The sense of place helps architectural forms to create and define a particular personality, and these different personalities known as sensible reflections of architecture trigger different human emotions.

As the aesthetics associated with architecture evolve and change, so do its techniques. Often rooted in an understanding of a futuristic landscape, Parametric Architecture is something as simple as designing with intent. While it does have its fair share of formulae and software, its heart lies in understanding the context and consumer. How can space be optimized? How can togetherness be fostered? How can wonder be encouraged?

It is as simple, and as complex as that.

When architecture engages emotionally with its occupants, the message that an architect intends to send through his piece of work and the message that he wants to express is felt more strongly and creates an emotional connection. Clearly, the perception of architecture is impacted by the occupants through the critical linking of the emotions. It's all about being moved with deep-rooted architecture, not about feeling good or miserable. It's an underground sense of passion, intensity, and involvement. Architecture should be able to evoke emotional responses in individuals by connecting them not only to the physical surroundings but also to memories that last forever. Hence, for every architect, it is always important to understand the subjective forms of emotional reactions in their design.

We at Studio Emergence strive to achieve the right balance between design complexities and its emotional impacts and palatability for its user. We believe in letting the site, the context, and its community speak to us in order to design and furnish the best possible solution that architecture and design can offer. We always look forward towards creating an amalgamation of sustainability and technologies in design, which defines "architecture of the future". In today's world, technological advancements bring with it endless opportunities which we try to dissect and experience in architectural creations. We're always eager to explore ways to understand this in depth, such as creating advanced algorithms, scaled models of conceptual designs and formulating design processes from concept to execution.

Our design philosophies also seek to bridge the gap between material properties, emotional parameters and digital techniques.

"We wanted to offer a sensory experience to the guests, who are invited to play, with the light of the landscape composed of lines and curves which culminate in a vibrant, ephemeral & interactive interior space

We believe art and architecture can bring people, space and nature on to the same frequency; it can unite audiences with experiences that inspire a reconnection with our planet. Our firm has engaged with various projects where we tried to establish the socio-physical relationship of architecture with human emotions. The idea of creating an impact through the sense of place motivates us to design bigger and better each time. Our design philosophy also talks about how shapes and forms actually influence your mood in a space. Some of our projects like The Vortex located in Mumbai and Hybrid Planetarium located in Andhra Pradesh have been designed according to these philosophies.

Vortex West is one-of-a-kind nightclubs in the heart of Mumbai City. The idea was to create a futuristic space which resembles a Vortex, a space where architecture creates impactful forms to showcase a seamless nature of one single entity. The concept engages with the exploration on how different shapes and forms can impact the dialogue of "sense of place" through mediums of architectural design. The design also speaks about the amalgamation of light and shadows by incorporating various concepts of lighting throughout the space.

The main wall that runs from the entrance to the back wall is completely curved up and it forms the key element of the space. This shape was achieved with complex 3D computation technology, wherein the shape was derived by creating 50 custom made portals, each of different size and shape. Thus, the desired output requirements were achieved. This shape was later converted into panels which could be digitally fabricated using a CNC machine and retrofitted on site. The entire portal had to be sound absorbent and conducive to loud music played in the club. Each portal also comprised of LED light strips running through it which were all connected to each other via loops, to create a dramatic effect which runs parallelly with the futuristic design of Vortex.

Talking about our philosophy of creating an architectural dialogue through varied forms on a larger scale, we would like to introduce one of our ongoing projects, Hybrid Planetarium located in the city of Vishakhapatnam, Andhra Pradesh. Forms and materials assume a poetic quality in architecture; instilling meaning and tangibility to the elements. Such places help create a meaningful dialogue with people, helping us see what exists in a new light. These forms and shapes open up possibilities for approach altering moods and memory. The multi-faceted approach to make it an experiential space is what makes the planetarium remarkable.

Inspired from the past, advancing towards the future; the Planetarium is a project standing in the Vishakhapatnam city. Located in the city of rich heritage, pristine beaches, and natural beauty; the Planetarium embeds nature looking right into the eye of the generation which represents FUTURE.

Exploration of physics, mathematics, space and other scientific experiments moulds the children to think pragmatically, to remain curious and know that there is a world of infinite possibilities beyond what humans have been able to comprehend. We wanted this structure to benefit the kid's mind and spirit. It can give great power to the imagination and stimulate creativity in children, the future of our society.

While designing a Planetarium, the study and research of Black Holes intrigued us due to their unpredictable nature in space. Our concept revolved around the abstract form of black hole by using the recently caught image of the black hole by NASA. The fascinating and captivating visual of a Black Hole fit perfectly well with our ideologies of a futuristic Planetarium.

The challenge lied in creating an abstract morphology of a blackhole in a 3 dimensional format. This exercise along with making sure the spaces feel relatable to children and adults alike was challenging for the studio.

The dome of the Planetarium replicates the glowing doughnut shape of the black hole, which will also be lit by led panelling on the exterior surface to visually highlight the concept of black hole. The outer ring which varies in height replicates the dust and gas orbiting the black hole's point of no return. As one walks through the ramp, we enter the upper level of the Planetarium Inner ring, which also has access to the outer exhibition ring and the planetarium dome. As we move down towards the lower level, ancillary spaces like the cafeteria, exhibition spaces, Admin and office spaces, astronomy club, library are designed keeping in mind the circulation patterns, proximities and easier accessibility to spaces.

In the same city of Visakhapatnam is a public installation located outside the TU 142 Aircraft Museum right on the famous RK beach road. This project allowed us to design a functional art installation which connected not only to its contextual built environment, but physically connected to its users as well. Located just opposite Submarine Museum this became one more major tourist attraction of Vishakhapatnam. Before entering into the aircraft, you can see display of various equipment and parts of aircraft placed inside one exhibition hall along with our architectural installation.

In today's world, we seldom encounter art projects on the streets that make people stop and gaze, reminding everyone of the value of art in our society. Through this project, we were able to design and execute a functional art sculpture, which not only responds to the environment, but also responds to the people. We tried to extract the best possible functionality out of the form that creates a platform of public interactions within a beautiful tourist spot in Vishakhapatnam.

We created a design form that aesthetically reflected the stunning location background. The functional sculpture was created in such a manner that it does not detract from the beauty of the museum's front façade while yet creating a powerful visual of reflection in the glass. Keeping the influence on the site environment in mind, we attempted to include numerous characteristics of the site setting into our sculpture. The form is derived from the site context of the

The challenge lied in creating an imaginary morphology of how a blackhole could be in a 3 dimensional form.

The entire structure emerges from the Cliff of the site with the rings in hyperbolic parabloas encompassing the glowing dome which houses the main planetarium.

Spaces that allow kids and adults to explore, learn and play.

beach, as it replicates the sea waves shape in design. Corresponding to the cool colour palette of the location, the sculpture is coloured in a gradient of warm colours which is strongly reflected in the museum's front glass façade.

As a team of young architects and designers, we always look forward to creating innovative interventions which showcase the importance of art and architecture. Our architectural installation, Vizag Seat is part of the Nerolac Breathing City Programme which aims to contribute towards creating transformative living spaces that are functional and aesthetically appealing. Our sculpture aimed to provide a functional platform to the people, in order to stir conversations about the need for better urban spaces, living conditions and public health. This programme is also included with the CSR initiative which focuses on promoting simple, safe and effective interventions for the growth and upliftment of our people.

Our research also involves the explorations of designing urban design interventions in the city's heart and studying how it affects the interconnectivity and social life in the micro environments. Projects like Sugee Sadan located in Dadar, Mumbai allowed us to indulge design with several social parameters of urban infrastructure. This urban Intervention is implemented to rejuvenate a major road junction in Dadar, Mumbai. This widely-used intersection of Gokhale Road leads directly to Worli, which is a major hub for commercial and high-end residences. The 5-metre wide footpath, is usually used to park two wheelers and used up by the hawkers, thus, reducing the usable space considerably.

Our primary concept started to explore the link between the quality of the built environment and its value, in health, social, economic and environmental terms. The urban places that most of us inhabit are made up of buildings, streets, spaces and landscape, various land uses and a community of users. 'Place' is therefore a socio-physical construct, and this

relationship is what defines the "power of place."

To initialise the design, the first conscious and practical decision was to retain a 3.5- 4 metre-wide footpath at every point. secondly, we used the rest of the space as a buffer between the oncoming heavy traffic and the people using these streets for commute every day.

We also studied the demographics of the users, considering the existing grounded relation of the mass with this context. The intersection is used by the people for various reasons ranging from people heading to work, to children going to school or people taking their evening walks. The design strategy hence was to incorporate all these parameters and use this data to govern the base massing. A seating space has also been incorporated in the mass itself such that the divider transforms itself into a seat which can house 4 to 5 people at a time.

It was a major challenge to execute the organic design. The varying curves and sectional profile at each point scared a lot of contractors at first. Hence architecturally exposed structural steel was our first choice. Structural steel being strong, durable and flexible. While designing the pavement, extra space was designed on the street not only for pedestrians but also to enhance future opportunities for
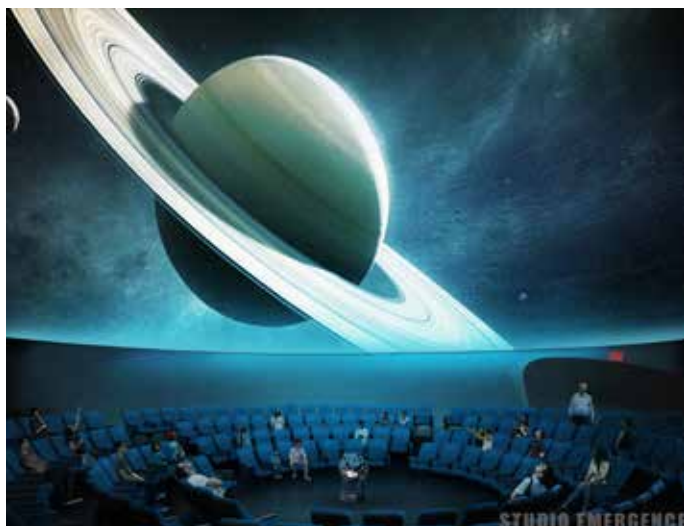
18 m dome screen viewing experience

planting of more trees and plants in the area which will also improve street furniture and landscaping. This project has also helped us develop an eco-friendly design trend, which not only save our city's health but also gives our community space and an aesthetic look. Here people can come together and build a stronger community. Through this we also wish to raise awareness to save our environment and help the community to derive a strong socio-physical relationship with better intricate public interventions. While learning about how we can create architectural forms which interconnect with human emotions, we also tried to understand the sensitivity of its historical connections.

It is important to understand the historical importance of its existing place and people in order to design a structure that belongs. As Kayomi Engineer puts it, "History has certainly moulded us and brought us to where we are, but history can only do so much. There is now a greater need for preservation of such living spaces." One of our projects that was designed while understanding this sensitivity was Sugee Akanksha, a residential project located in Dadar, Mumbai.

Dadar is often referred to as Mumbai's first planned suburb. Shivaji Park, located in the heart of Dadar is the largest park in the island city. By 1937 the Shivaji Park and the surrounding areas were developed. This public space was to become an important stage in the political drama which led up to India's independence. The later political history of Bombay also unfolded quite often in the same park, hence carrying a great historical and cultural value. With this massive playground named after the Maratha warrior king, gorgeous Art Deco buildings and the great Arabian Sea beyond, Shivaji Park was a coveted residential area long before Bandra and Juhu. This location lies in depth with the glorious architectural history and heritage of Bombay. The Art Deco in Mumbai, India-style, is a notable feature of the city's architecture. It was used primarily for office buildings, residences and movie theatres, during a period when India was part of the British Empire. On 30 June 2018, an ensemble of such buildings were officially recognized as a World Heritage site by the UNESCO World Heritage committee held in Bahrain as the Victorian and Art Deco Ensemble of Mumbai. Mumbai is also believed to have the second-most Art Deco buildings in the world, after Miami.

Being attached to the greatest political as well as architectural history, it is important for us as architects to keep the depth of emotions intact in order for the city to grow in its natural form. This residential project is based in this part of Mumbai where city transitions from the suburbs towards the original town. We based our concept on dedicating our design to retrieve the Art Deco style architecture of Mumbai. Inspired by the beautiful contextual heritage of this location, we tried to enhance the design without destroying the existing history of architecture embedded within the city. The location also has access to sea-facing views, hence trying to achieve maximum visual connect with the existing environment. We tried to provide luxurious apartment planning for each type of layout with bigger scaled areas for each space. Design detailing for the façade
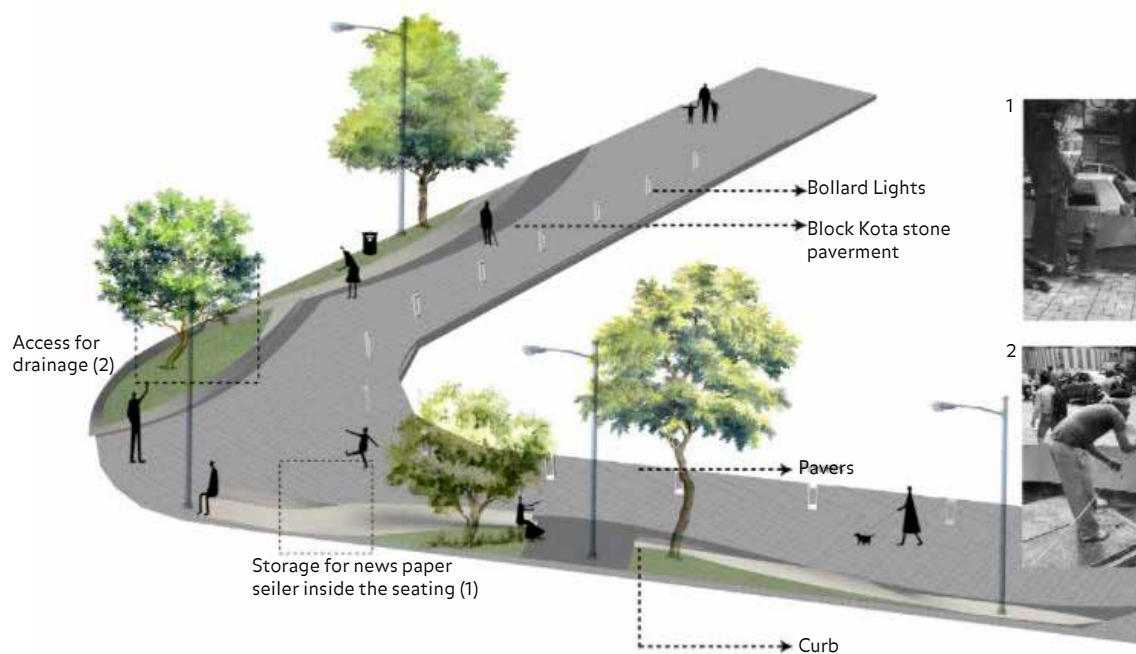

The sculptural seating is designed with colors contrasting from the surroundings for people to pause, wait and play around the public space.
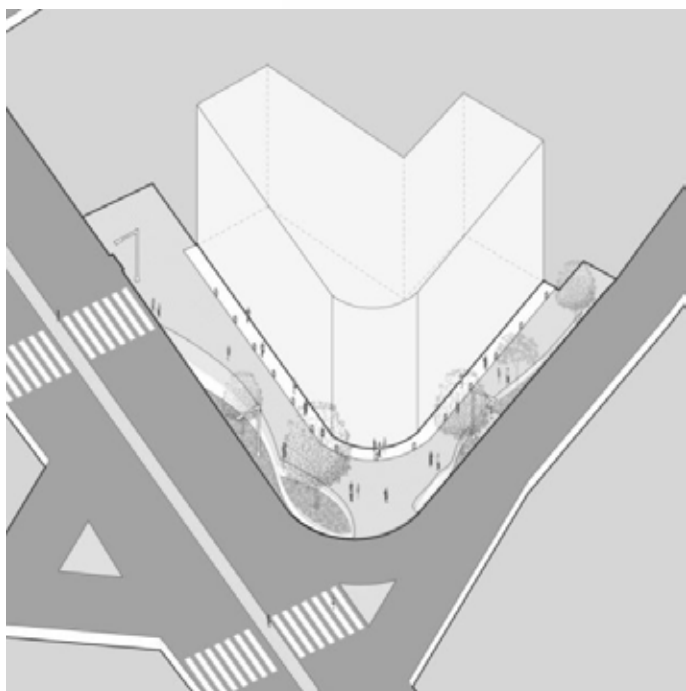

The shape shifting form offers dramatic play of angles for patrons to sit, lean, interact.

Bollard Lights

Block Kota stone paverment

Access for drainage (2)

Pavers

Storage for news paper seiler inside the seating (1)

Curb

A multi-use intersection sculpture to create a division, space to wait, play and add a bit of whimsy on your way

1

2

The installation designed to encourage pedestrians to cross the roads only through zebra crossings

was the major challenge for this project, in order to portray the best depictions possible of Art Deco style. Groove detailings and mouldings were designed on the façade with large stone claddings to replicate the style. The final goal for was to design a structure that looks inbuilt and amalgamated with the city's historical context, to be able to adapt the similar sense of emotion attached with Dadar's architectural heritage.

We believe that we embody the new age design that young Indian architects represent today. We have been at the forefront of this change in the language of architecture and have been working hard towards such manifestation of art which enriches daily life and beyond.

Our emotions attached to architecture exemplifies the new age of design that today's young Indian architects represent. We've been at the forefront of this shift in architectural language, and we've been working hard to create art that improves the "sense of place" that provides a better life every day.

Studio Emergence
Studio Emergence is a design studio found by two architects, Khushbu Davda and Seeja Sudhakaran, with a penchant for geometry in design and parametric design approach. Both of them have graduated from IES college of architecture, Mumbai in 2012 and have worked at prestigious firms acquiring knowledge in interior design and architecture before pursuing their Masters degree. Their post-graduation is from Elisava, Barcelona School of Design and Engineering, which is also the oldest design school in Spain. Khushbu did her Masters in minimal nets and boundary conditions. Her study of cartographies and maps is critical in the way the studio studies urban contexts. Seeja did her research in grid shells through form-finding techniques which focuses on materiality and optimization. Her thesis was among the highest- ranking projects in the university across verticals in the design school.
Their design process seeks to bridge the gap between the material properties, contextual parameters, digital techniques. They believe art can bring people, space and nature to the same frequency, uniting audiences with experiences that inspire a reconnection to our planet. They work on projects at various scales using the same ethos, be it an art installation, interior or urban design or a high rise building.
Emails : khushbu@studioemergence.in, seeja@studioemergence.in

FUTURISTIC VISION AND SUSTAINABILITY
CAMPUS AT SAC / ISRO

Ar. Nidhi Mishra, Ar. Matinder Kumar & Er. Rakesh Jain

ABSTRACT

The present approach for urban planning and establishing infrastructure results in exponential growth of the urban habitats. Over the years, it has appeared as a common phenomenon that this type of growth results in an increase in pollutants in the air, water and deterioration of the ecological system, i.e., extinction of various species. Further urban conglomeration results in merging of countryside dense green hamlets into the cities. Furthermore, to minimise the ill effect of rapid urbanization, the master plan of the campus was well conceptualised so as to make further improvement in the ecological biodiversity of the micro climate. In developed cities, campus development is now a trend, be it residential, institutional or industrial, and if the seeds of sustainability are sown there itself, we will cherish the self-sustainable cities in future.

The new campus has been planned to optimally utilize the natural resources considering the fact that developing countries like India essentially need to preserve the natural resources for future generations. The global need is to have a meticulous approach to incorporate sustainability right from the grassroot level which should realize the futuristic and bigger vision of self-sustainable cities or the country as a whole. At the new SAC campus, ISRO has proposed the establishing of mega facility buildings, along with allied service buildings. While planning the 38 acres of the campus, the prime focus was to utilize the resources efficiently and optimally. Land, as a precious resource meant that it should not be wasted. More ground coverage would result in a concrete jungle with no space left over for the ecosystem to survive. All intervention of humans shall be judiciously restricted to the extent which is essentially desirable.

Keywords: *campus planning, sustainability, green building, BIPV, Miyawaki Forest*

INTRODUCTION

The campus has been designed sensitively to the ecological context and following all green parameters to conserve water and other resources by recycling and reusing them onsite. Much of the brainstorming has gone into efficient and optimal utilization of perishable resources which can save on cost and provides easy installation and maintenance for such a huge campus having a critical facility for working 24x7. The campus mainly houses the lab facilities required for the future versions of satellites, surrounded with ancillary facilities around it. The office spaces, administrative, recreational and support facilities are also planned in the campus to make it self-reliant and sustainable.

The main objective behind the planning was to develop a self sustainable campus. The journey began with obtaining environmental clearance from the Central Pollution Control Board before commencement of the development work. Further, for evaluation and certification of our efforts towards green campus, few of the buildings in the campus have been registered for green building rating. This has resulted in efforts recognized with the award of platinum rating certificate for the Kiosk building.

At ISRO the main work is research-oriented which cannot be efficiently done under stress. The scientists need to refresh more often to release stress and to subdue mood swings. The Miyawaki forest and landscape have been developed to handle these aspects.

The campus planning is governed by green principles like conservation of the natural resources such as ground water, natural topography, preservation of top soil. Harvesting of solar energy by implementation of rooftop solar panels and Building Integrated Photovoltaic Panels (BIPV) as facade and skylights for the first time in ISRO. Gas Insulated Switchgear (GIS), a 66 kV substation has been

Figure 1 : Master plan of new Bopal campus

planned to optimally utilize the land which is maintenance-free with the latest technology.

Use of native and drought-resistant species, pervious pavements, creating water bodies, landscaped amphitheatre, terrace gardens, creeper-shaded walkways, nature-shaded parking, Miyawaki or mini forests etc. have been maximized which also reduce the heat island effect. A well-planned scheme has been implemented to efficiently harvest the roof-top rainwater and stormwater. A centralized facility for treatment of sewage has been provided and the treated effluent is effectively being used for flushing and landscaping. The centralized parking area has been planned to achieve a vehicle-free secured area.

Services like AC plant, electrical substations, pump house, GLR, softening plant, fire-fighting system have been located in a centralized location to maximize the utility of resources.

During planning of buildings, green features and usage of innovative building materials have also been knitted to it, enhancing the thermal performance of buildings, at the same time reducing energy consumption by integration of BIPV panels into the external building façade. This makes walls and roofs a live source of onsite energy generation.

MASTER PLAN CONCEPTUALIZATION

The campus is spread over 39-acres and in the close vicinity of Bopal Lake. The major facilities in the campus comprises fabrication, testing and integration of communication payloads. Ancillary facilities like Spacecraft Payload Production Centre (SPPC), Swagat Bhawan, administrative block, security block, cafeteria, recreational facilities and allied services are also planned.

Centralised planning of essential resources was conceptualized to realize the concept and a distribution network was worked out and laid down hassle-free implementation and future maintenance. The environment clearance of the campus was taken from GPCB way back in 2011 and till date the development is in progress.

The basic master plan was worked out based on different zoning criteria like natural terrain, which was the basic guiding principle, followed by functions of the building, planned according to its utility and placed considering the skyline and to not hinder the air movement and visual aesthetics of other buildings. Beginning from the entrance, the low-rise buildings are placed in front and high rises are pushed towards the perimeter of the wall. This enables optimal utilisation of the land and also no rear spaces are left unclean and unmaintained.

Further the campus is categorised into low secured areas, semi-restricted zones and restricted zones as per safety rules. The plan was prepared considering the following criteria:

i) Optimal utilization of land resources
ii) Possibility of future expansion of campus considering 50 years of futuristic vision
iii) Establish positive interaction among research, outreach, cultural and operational facilities
iv) Protect and enhance campus beauty
v) Organise the campus facilities so as to reduce capital cost by placing basic common facilities such as electrical substation, AC plant room, ground water reservoir, pump room in same zone.
vi) The buildings are connected by walkable, well ventilated service trench for better maintenance and enhance functional efficiency.
vii) Minimise environmental impact and maximise resource conservation through prudent and compact planning using renewable energy resources such as building integrated photovoltaic panels, low flow plumbing fixtures, sewerage treatment plan for reuse of treated water for flushing and irrigation purposes
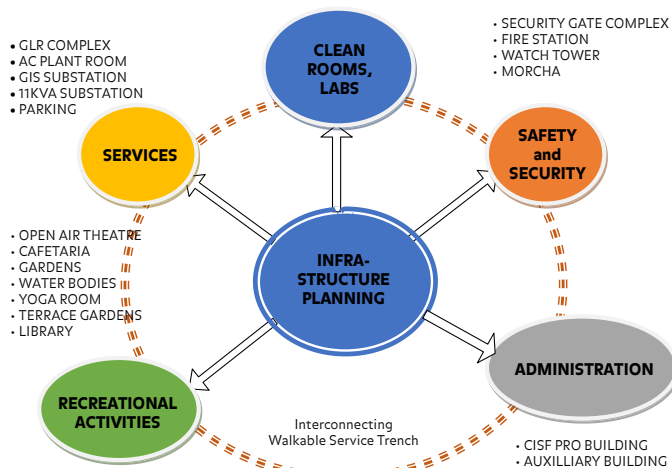
Figure 3 : Flow diagram showing various aspects of infrastructure planning

RESOURCE PLANNING

Centralized AC plant

Centralized AC plant facility consists chilled water pumps, cooling towers with condenser water pumps, thermal energy storage tank, electrical panel and building management system (district cooling concept) distributes thermal energy in the form of chilled water from a centralized location to multiple buildings through a network of underground chilled water pipes laid in utility corridor for better maintenance during its life. The concept of providing a centralized cooling plant eliminates the need to have separate AC plants near individual buildings, thereby saving cost for infrastructure and land. Large size centrifugal chillers with higher efficiency are installed to take advantage of the cost optimization.
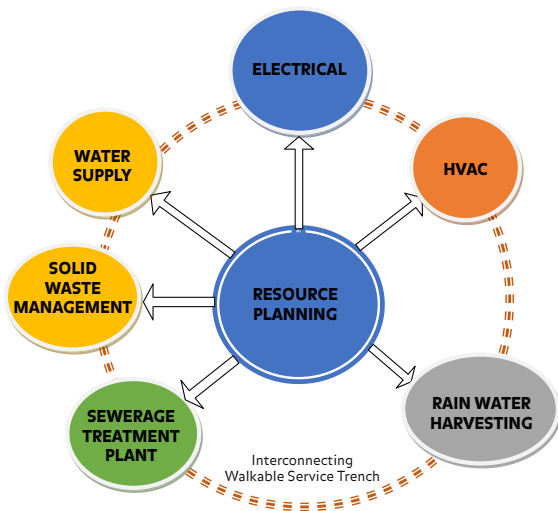
Figure-04 Flow Diagram showing various Aspects of Resource Planning

Salient features of the centralized AC system are :

- High efficiency with lower energy consumption
- Less space requirement at building level
- Efficiently meets diversified requirements
- Reduced noise and vibration in buildings
- Lower operating and maintenance cost in the long term
- Better reliability
- Lower electrical power requirement for catered building

According to Dincer and Rayash (2020), "This technology offers highly efficient processes leading up to more than 40 % of energy efficiency improvements and 20 % lifecycle cost savings compared to conventional air conditioning systems."

Centralised electrical distribution network

Working on the same principle, electrical services are also planned at a centralized location to optimally utilize the resources for the future. Two LT substations are planned at a centralized location from where power is distributed to all buildings of the campus through a well-planned network of underground electrical service trench. This network has made the installation and maintenance very hassle-free. These walkable trenches are planned with a light and ventilation shaft and sump for the drainage of percolated water. Individual buildings panel rooms for further distribution of the supply. Many buildings of the campus have critical labs where an uninterrupted 24x7 power supply is the mandatory requirement, and is backed up with UPS and DG set supply. DG sets are also planned at a centralized location to optimize utilization of the resources.

A 66 KV gas insulated system (GIS) substation has been planned for the campus to meet the huge power requirement of the campus. The main key factor behind selection of the GIS substation in lieu of a conventional substation is saving on land area by 80 %. Since it is gas-insulated it is maintenance-free and takes minimum time for establishment, thereby saving on installation costs over time.
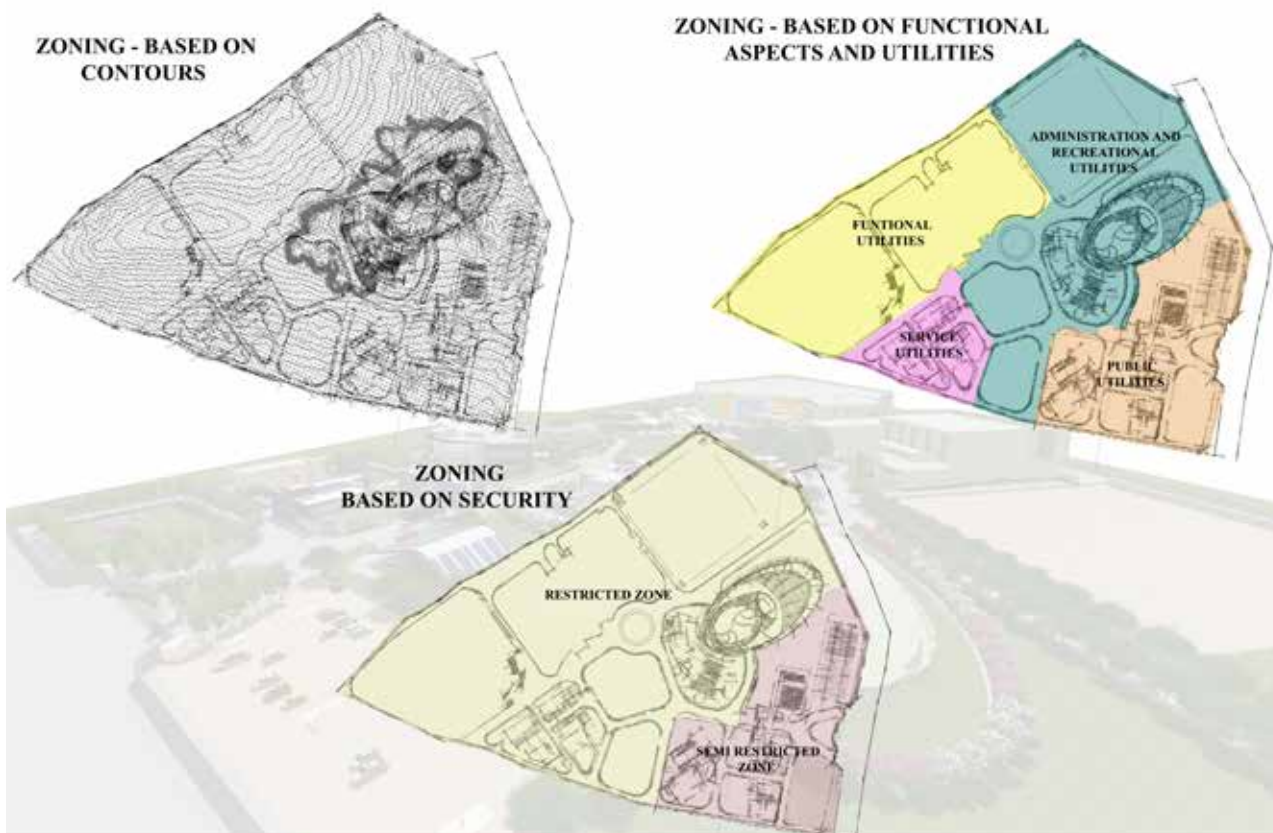
Figure 2 : Master plan zoning of new Bopal campus

Water Supply

All the water tanks, whether for drinking water, firefighting, soft water tank or roof-top rainwater collection, are planned at a centralized location with a single pump house to optimize the project cost. Water is getting effectively utilized with minimum wastage as the tanks are at a common location. It also limits the withdrawal of water from ground as if one building is not using it is being used by another facility thereby reducing the dead storage of water at any moment of time.

Rain water harvesting

Rooftop rainwater harvesting has been implemented at the campus with two centralised water collection tanks of 9 lakh litre capacity each. All the major buildings of the campus are being connected with this network. After online filtration, the collected water is used directly as soft water in AC plants. It drastically reduces the ground water requirement for AC in the rainy season and it lasts for many days and sometimes for months.

Surface rainwater harvesting is also planned after a ridge-and-valley analysis of the campus. After calculating the total ruff of the planned surfaces, eight recharge wells are being planned and implemented in a phased manner. The capacity of the RWH system captures almost 15% rainwater in an average peak month rainfall, i.e., 317.90.

During studying the drainage pattern of the site, the water balance sheet was prepared and efforts have been made to have a zero-water discharge campus. This means that no water will go out of the campus during the rainy season and 100% water will get recharged in the ground. Accordingly, the locations of the recharge wells have been worked out.

Sewerage Management

Maximum buildings in the campus have a dual plumbing system, that is, fresh water for drinking purposes and treated sewage for flushing and irrigation purposes. Almost all buildings have low-flow plumbing fixtures and in remaining buildings, all fixtures have been changed to low-flow plumbing fixtures in a phased manner, resulting in more than 25 % water savings. Sewage treatment plant of 115 KLD capacity is constructed for treating waste water (sewage) generated at the 39 acres of the new SAC campus and residential campus.

Solid Waste Management

Organic waste Converter (OWC) composting machines having capacity of 200 kg/day have been installed at campus to recycle the garden waste as well as organic waste from kitchen, canteen for production of organic in-house compost. Due to this, purchase of inorganic fertilizer has been reduced considerably

Biodiversity

To sustain the biodiversity in the 39-acre new SAC campus, Miyawaki forest (mini forest) has been created with dense and native trees adjoining the Vendor Complex which will become maintenance free after 3 years.

ENVIRONMENT-FRIENDLY FEATURES

During planning of individual buildings, efforts have also been made to incorporate maximum environment-friendly features to make it more sustainable. A few of them are as follows:

1. BIPV panels have been installed to generate renewable energy in Vendor Complex, CISF PRO, kiosk, gate complex, and auxiliary buildings at Bopal.
2. Terrace garden over roof of Vendor Complex, CISF PRO, auxiliary building, etc.
3. Building design includes passive architectural features like courtyard planning.
4. China mosaic roofing over terraces of all buildings of campus results in reduction of heat island effect.
5. To enhance the indoor environment, low VOC paints are used (VOC content ≤ 50 g/l).

Figure 5 : Miyawaki forest (mini forest)

Figure 6 : BIPV panels

6. Waste segregation and storage of recyclable waste has been followed during construction.

7. Double glazed units (DGU) and single glazed unit (SGU) using glass of low solar heat gain coefficient (SHGC) and lower U- value used for structural glazing/ windows to reduce the heat load.

8. Every building is made accessible for differently-abled persons.

9. Privileged parking space is kept near to the entrance of each building for differently-abled persons in addition to six parking spaces for 4-wheelers in the main parking at the entrance.

10. Energy-efficient lighting resulting in 40 % lighting power density (LPD) reduction.

11. LPD of the building has been reduced by providing BIPV modules in the facade of the building.

12. Permanently installed electrical metering to monitor demand (kW), energy and power factor at sub-distribution level.

13. Daylight control for indoor luminaires have been achieved by implementation of passive infra-red sensor (PIR)/ occupancy sensor in corridor areas.

14. Car parking for electric vehicles is provided with charging points.

15. Eco-friendly refrigerant gas based central AC plants (with screw compressor or scroll compressor)

16. VRF AC system and air-cooled AC plant installed to reduce electricity and water consumption respectively.

17. For maintaining good indoor air quality, a separate ducting system is provided for fresh air supply.

18. All buildings are declared as 'no smoking' and 'no tobacco' zones.

19. A good proportion of materials used in the buildings are either local material or material with recycled content.

20. Green cover enhanced by planting new trees, micro jungle, landscaping etc. There are 770 grown trees of different species in the campus in addition to landscaped areas which maintain the green cover.

21. To check the consumption of fresh water as well as treated water, water meters have been installed at building level and central level.

22. Water-efficient landscaping has been achieved by using low turf area and high drought tolerant species

Wholehearted efforts have been made by the in-house team of SAC ISRO to develop a new self sustainable campus equipped with all futuristic provisions and facilities. This futuristic self-sustainable and environment-friendly attitude shall fructify for the generations to come. Collective efforts by all of us can bring out remarkable change in the global scenario.

REFERENCES
Dincer, I., & Rayash, A. A. (2020). Community Energy System, Energy Sustainability. Science Direct, 101-118.

Ar. Nidhi Mishra
Nidhi Mishra is an architect and urban planner with 17 years of experience in the field. She is IGBC accredited professional, did certified course in Vastu design and published various articles and papers. She holds a degree in B.Arch and M.U.D.P. with distinction. She is serving as Scientist / Engineer SE in Space Applications Centre (SAC), ISRO, Ahmedabad. Her area of Interest is in development of sustainable green buildings and campuses for the future. She can be reached at nidhimishra.htc@gmail.com.

Ar. Matinder Kumar
Ar. Matinder Kumar is a scientist/ engineer at Space Applications Centre (SAC) , ISRO, Ahmedabad. He has completed his B.Arch. from NIT Hamirpur and Masters in Urban and Rural Planning from IIT Roorkee. He has vast experience of 14 years in Planning of various types of buildings. He is also an IGBC Accredited Professional. matinder.sharma@gmail.com

Er. Rakesh Jain
Rakesh Jain is a senior scientist and Group Director, Construction and Maintenance group (CMG) at Space Applications Centre(SAC), ISRO, Ahmedabad. He has done his B.Tech. (Hons.) in Civil Engineering from Harcourt Butler Technological University, Kanpur and has completed his M.E. (Hons.) in Highway from Punjab Engineering College, Chandigarh. He has over 32 years of experience in execution and project management of micro- electronic labs, auditoriums and planning of high-end civil infrastructure for ISRO. He has a keen interest in the concept of green building and the latest technology in construction and innovative interior design. rsjain7@gmail.com

Courtesy all images and figures : Authors

KAKATIYA TOWNS, TEMPLES AND TANKS AS LANDSCAPES
A CULTURAL PERSPECTIVE

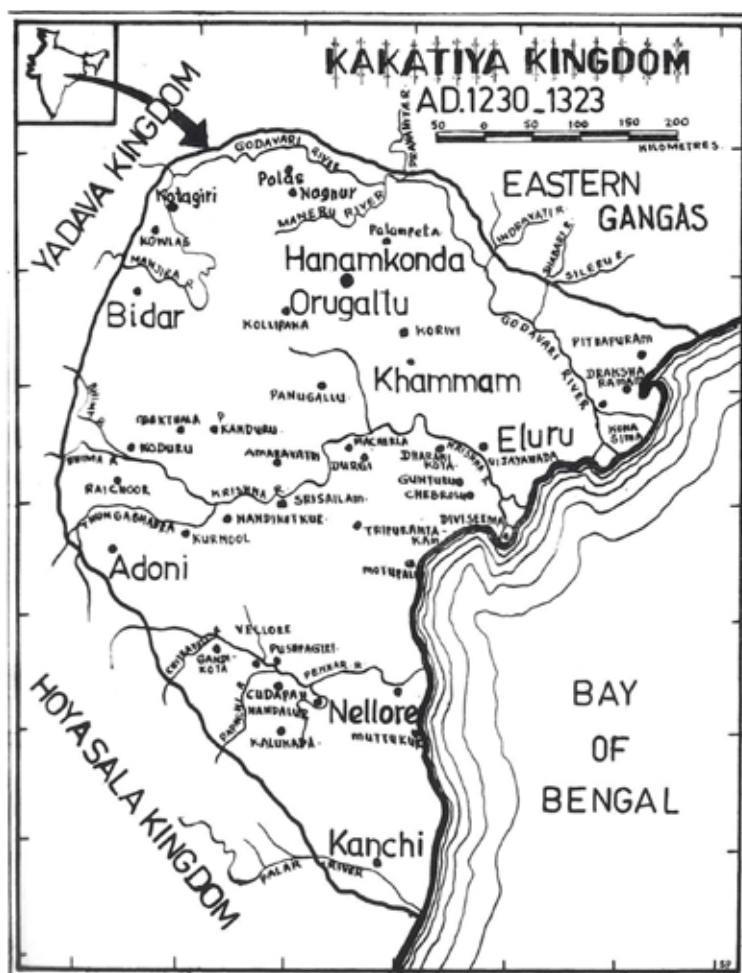**Prof. G.S.V. Suryanarayana Murthy**

Fig. 1 : Spread of the Kakatiya kingdom
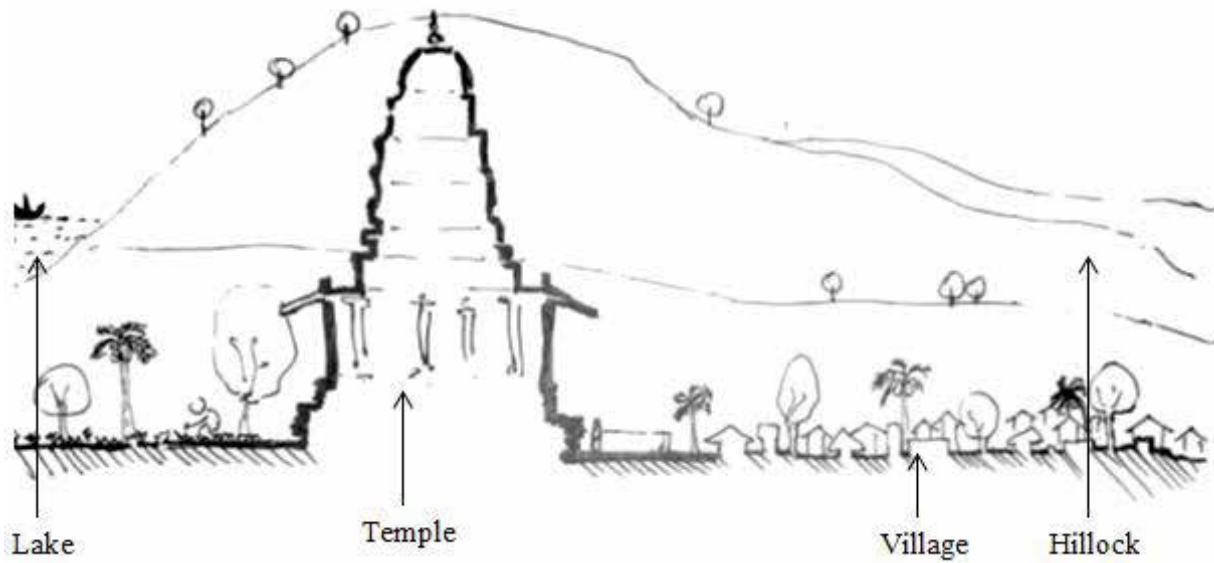*(Source : Kakatiya Heritage: A Medieval Kingdom of South India, 2020, Dr. M. Pandu Ranga Rao (ed.)*

Fig. 2 : Skyline of Kakatiya town
(Source : Cultural Landscapes of Kakatiyas and Mission, Kakatiya Scheme under Govt. of Telangana (2021, Springer), Prof. G.S.V. Suryanarayana Murthy, Vaibhavi Dhote, Ashita Agarwal)

The Kakatiya kingdom of Telangana in the Warangal District historically had Orugallu as its capital. They ruled for 300 years, marking their lands with the philosophies of *Saiva Siddhantha.* They built huge places of worship, brought hydraulic systems to their towns, developed trade and finance institutions, set up medical facilities and evolved merging with their surroundings. The Kakatiyas arose from the Chalukyas of Kalyani in Karnataka. The first Kakatiya- Beta I was appointed as a chief in Telangana. Beta I was succeeded by his son Prola who is said to have acquired the rulership of the Anumakonda region from Someswara I of today's Warangal district. Prola I thus, became the first Kakatiya king.

Culturally, the people of this region were religious and followed the feudal system for law and order. Special care was taken for external trade and commerce, and any kind of exploitation of the layman and traders was punishable. The Kakatiyas also followed the guild system. These guilds were mainly encouraged by the regional authorities. This feudal system included merchant guilds, traders; farmers, etc. at different levels. People of certain communities engaged in various activities related to agriculture, occupation and trade. These guild systems later established a connection between the rural and urban centers of the state.

Geographically, Telangana state consists of the Hyderabad plateau region, graced with the River Godavari and tributaries of rivers Krishna and Tungabhadra. The rainfall was minimal in the Warangal district and the Kakatiya kingdom seemed to have evolved in terms of the geography and topography to sustain livelihoods in building technology and architecture. The Kakatiyas evolved with their natural habitat to meet their needs of water and food production. They intervened into the existing landscapes by constructing artificial irrigation systems, *cheruvus* (lakes), tanks and bunds for the population. A general Kakatiya town settlement consisted of a temple, a water source, and residential settlements surrounded by paddy fields on one side and the hillocks on the other. The landscape typically can be imagined to consist of green fields, units of residential modules, a temple whose vimana raised to the sky, being the tallest of all building structures and a hillock in the background. Thus, the Kakatiya town portrayed the nature-culture relationship profusely. Such culture-induced landscapes can be seen in the sites of Palampet and Ghanpur. Palampet region consists of the Rudreshwara temple popularly called Ramappa Temple (dedicated to Lord Síva), and a large lake called the Ramappa Lake, and agricultural lands surrounding the village on the other side. The planning of the town included nature in its perceivable beauty, which can be perceived as both tangible and intangible heritage today. The connection of people to nature, their dependence on their surroundings was inevitable, but also they created resources to sustain in their lands and prosper through centuries. The Kakatiya landscape showcases the harmony between people with respect to culture and nature.

Fig. 3 : Madanikas in Rudreshwara Temple
(Source : Tanya, M/s Kshetra)

Fig. 4 : Kota Gullu Complex
(Source : Guru, M/s Kshetra-Guru)

Fig. 5 : View of Rudreshwara 'Ramappa' Temple at Palampet
(Source : Tanya, M/s Kshetra)

The Kakatiyas built statement consisted of religious spaces, political spaces and featured water sources for supporting livelihood. They developed and evolved in building irrigation sources and hydraulic systems throughout their rule. The artificial means of water storage for supporting day-to-day lives and majorly for agriculture in regions of insufficient rainfall led to the building of irrigation sources with techniques developed by understanding the topography of the region. The earliest form of irrigation was of course small scale that began with minimum investment and available manpower. They were mostly canals that were dug out from natural sources like rivers and later the digging of wells to procure groundwater. The information we have today is from inscriptions of the time that state the building of canals and tank bund in Telangana state. The Kakatiyas built irrigation tanks to meet the demands of the town. The contextual topography consists of stony ridges over granite mounds and black stone dykes occurring at regular intervals. The *sthapathis* (engineers) of the Kakatiya period used these mounds and sloping terrains to build thousands of *cheruvus* (lakes) connected through manually dug canals. The idea was to collect and store every drop of rain to be utilized and benefited for cultivation and livelihood. These tanks were built two to three times bigger than the store yield, to collect and store more water in case of a good monsoon period, which ultimately can be used during times of drought. A total of 46000 tanks were built along with open wells to manage and store groundwater. The land on the banks of these canals became fertile and fit for cultivation. Hence, these lands were contributed to fields that fed the village and also helped economically through trade. The Ramappa Lake of Palampet village mentioned earlier is an example. The act of the lake building was also seen as an act of charity from the Saptasananas. The Ramappa Lake was constructed along with Rudreshwara Temple (1213 A.D) as a part of Saptasantana given by Recharla Rudra. Ramappa Lake holds a capacity of 2.912 TMC, i.e., more than 2.5 times the irrigation required for a year's yield. The earthen bund connecting Vanagutta and Varalagutta to the north of the lake is 600 metres and has a width of 6.2 metres at its top. Ramappa Lake was about 100 feet in-depth and 1 km in width stretching from one hill to the other. This setting helped in collecting rainwater that flowed through the hills and ridges into the storage tank. The construction design of the Ramappa Lake was such that it had slopes both towards the inside and outside onto a flat top facilitating water to overflow. Excessive erosion was avoided by planting trees near the lake. For protecting the Lake from periodic flooding of the tank bund stones were placed on the inside of the ridges along the bund. Such a thought process was put in to prevent damage to the surrounding colonies and cultivation lands, at the same time, water to be available throughout the year. From the inscription stone present in the Sasana Mandapa (Inscription Shrine) of the Palampet temple (Ramappa Temple). There is a mention of the lake that was constructed with the perception of an ocean that

reflects the panorama of the town. The inscription also mentions that the water-dwelling had the austerity to soothe one's mind. Other lakes are the Pakhal, Laknavaram, Dharmasagar, and Kesamudram which are sustaining even today, constructed for irrigation and support the demography of the villages. These irrigation structures became essential features of the Kakatiya town landscape enabling sustainable living of the towns.

The town planning and construction followed the topography, geography, and geology of the region; another important feature was the defence. The town was to be protected from any kind of attack or any similar disaster. Orugallu (Warangal) capital was such a planned city, with huge fortification walls. This too was constructed with appropriate *Vastu* where the direction of the sunlight and wind

Fig. 6 : Sculptures of madanika and yali in Rudreshwara Temple
(Source : Alaknanda, M/s Kshetra)

Fig. 7 : Remains of Svayambhu Temple in Warangal Fort
(Source : Tanya, M/s Kshetra)

played a vital role along with the plan following ancient sigil shapes, forms, and patterns. The circular plan was a reference to such Pauranic traditions and knowledge.

THE TOWN OF WARANGAL : WARANGAL FORT

Warangal Fort was built in 1261 CE. The plan took the form of concentric circles where the outer wall was constructed with earthen material and the inner wall was built in stone masonry. The fort had four entrances. The concentric circle can be envisioned as the cosmic pattern- the spiral to attract spirituality and energies. The outer wall had seventy-five bastions at regular intervals which were guarded by security officers called *'nayakas'*. Today only the four gateways, the *Keerthi Thoranas* stand, and the rest are in ruins. Each *Keerthi Thorana* consists of two pillars supporting an entablature that projects laterally and is balanced by brackets on either side onto the pillars. The *thoranas* built in the four disas or cardinal directions- east, west, north and south. They have peculiar characteristics where the eastern and northern gates are similar and the western and southern ones are similar. The pillars of the gates are monolithic and the long horizontal lintel is supported by brackets carved in the form of lions whose heads are turned backward holding their prey. At the top of the entablature on the west and south gates are two beautiful swans carved in granite placed on either end. The lintel is also ornamented with symmetrical dripstone (7 drops) that appear to be lotus buds hanging downwards symbolizing purity and beauty.

The Kakatiya reign contributed to construction of many temples due to prosperous economic conditions. The construction designs for building structures followed the *Vastu Purusha* principles, hence, the square and rectangle forms were commonly used for the temples and residential colonies.

The shape of the temple according to the *Agni Purana* can be interpreted as the substance and shape which is the *Prakriti* (nature) while the form as a whole is the seat of the Supreme spirit. It was principally commissioned by the *Istapurusha* (favorite man of god) who essentially was the king. The Kakatiya kings built huge places

of worship as 'houses of God'. Interestingly the subordinates of the kings also built temples to commemorate God in the local regions away from the capital. The temple held the cosmic and spiritual significance of the *Mahapurusa* - Cosmic Man and revolves around the concept of terrestrial man becoming the cosmic man, an object of life to accept God. Temple construction during the Kakatiya reign began with a series of rituals and offerings to the gods after which the site was selected. The plan of Kakatiyan temples consists of the major temple components: garbhagriha, antarala and sabhamandapa. The temples can be classified further as ekakuta or the one-shrine temple, dwikuta- two-shrines temple and trikuta- three shrines temple.

The art and architecture displayed by the Kakatiyas are ingenious features of the temples. They inherited the architecture style from their superiors- the Chalukyas of Kalyani. they merged their style to the materials available in the region namely the chelvai sandstone, dolerite, and granite. The walls of the temples are graced with sculptures with the finest details, guided by the *Shilpashastras.* These sculptures tell stories of mythology and history. Some were for aesthetic purposes like the *dwarapalikas*- female figurines on the door frames of the garbagriha. Others were sculptures of Nataraja and Bhairava depicting their stories as seen in the Rudreshwara Temple at Palampet.

SVAYAMBU TEMPLE

The Svayambu Síva Temple enclosed in Warangal Fort is a self-manifested Linga of Síva that emerged during the reign of the Kakatiya King Prola I, who constructed a temple and a city within the fortification around the temple. The context around the temple consisted of a lake, and the *ekasila* (one stone) hill geographically and the fortification walls of the Warangal Fort formed important features of its landscape. Today the temple is in ruins. It seems to have been built with the central squared-sanctuary roofed with rectangular projections around the self-manifested *Linga* that opened to the outside in all four directions. When intact, all four directions would have featured four Nandis looking in the direction of the Linga. The east pavilion is well preserved which shows how the conjectured layout would have been.

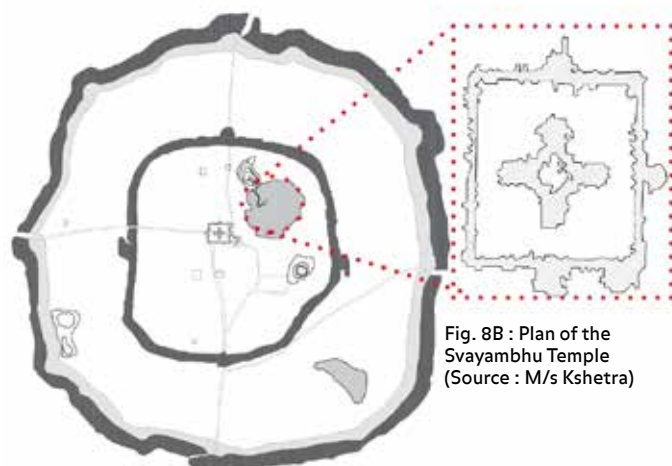Fig. 8A : Site Plan of Warangal Fort
(Source : M/s Kshetra)

Fig. 8B : Plan of the Svayambhu Temple (Source : M/s Kshetra)
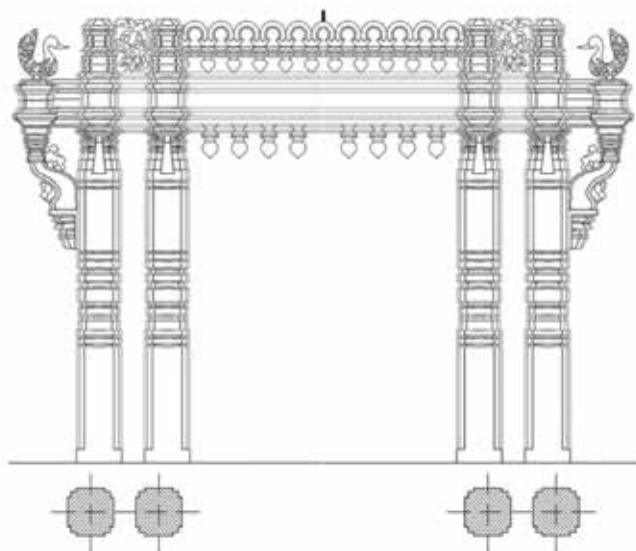
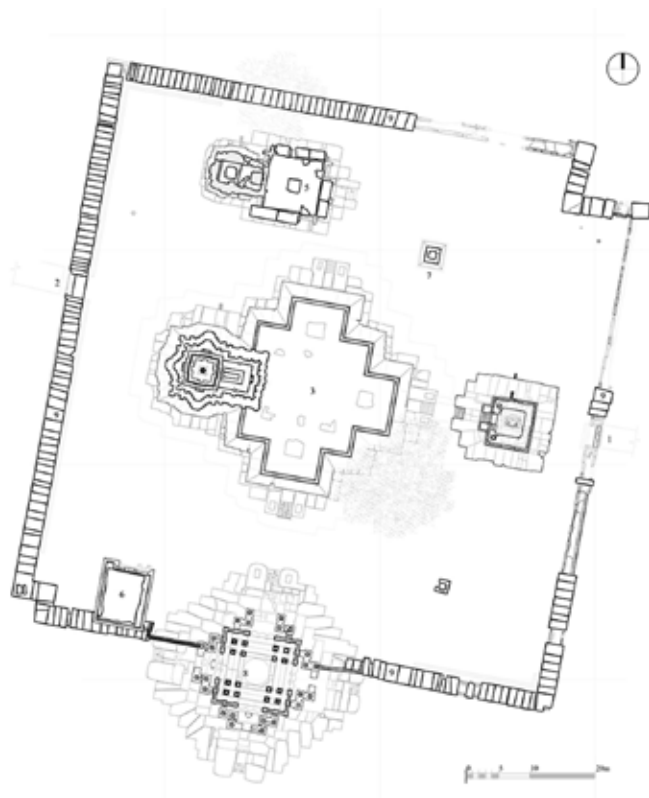Fig. 9 : Plan and elevation of thorana
(Source : M/s Kshetra)

Fig. 11A : Site plan of Rudreshwara 'Ramappa' Temple
(Source : M/s Kshetra)

91

Fig. 10 : View of Keerthi Thorana
(Source : Tanya, M/s Kshetra)

Fig. 11B : View of the vimana of Ramappa Temple
(Source : Tanya, M/s Kshetra)

RUDRESHWARA 'RAMAPPA' TEMPLE, PALAMPET, MULUGU DISTRICT

The Rudreshwara Temple, popularly known as Ramappa Temple is situated in Palampet village, Mulugu District in the Telangana state of India. The Ramappa Temple was built in 1213 CE. The temple is in the hub of a large irrigation lake, hill topography, agricultural lands and the village. Credit for the Rudreshwara temple goes to Recharla Rudra, the Commander-in-Chief. The Ramappa Temple complex consists of the Rudreshwara Alayam, the Kateshwara Alayam, the Nandi Mandapa, the Sasana Mandapa, and the Pakasala.

The Ramappa Temple is an exceptional example of the Kakatiya style of temple architecture with the use of engineering innovation by creating floating bricks, sand-box foundations, material selection knowledge and ingenuity in stone sculpting as a technological ensemble. The temple expresses great artistic splendors with forty *madanikas* and *gaja-vyalas,* 6 feet in height, relief sculptures, thematic sculptures and dance sculptures, 600 in all.

The Ramappa temple was awarded the World Heritage tag this year under Criteria I and III. The dossier was prepared in 2018. It was presented as India's nomination for World Heritage Site 2020 that emphasizes the human creative genius, monumental display, and interchange of cultural values in the area and to have a uniqueness representing the Kakatiya dynasty's art and architecture.

Fig. 12 : View of the Thousand Pillar Temple
(Source : Tanya, M/s Kshetra)

THOUSAND PILLAR TEMPLE AT HANUMAKONDA

The Thousand Pillar Temple is situated in the Town of Hanumakonda, 9 km from Warangal. It was planned in a setting with the water tank and a hill in the surroundings. Today the temple stands in an urban setting of the modern town of Hanumkonda. The Thousand Pillar temple is a trikuta temple built in the style of Kakatiya architecture. It faces the south and consists of three shrines divided into two sections- a triple shrine in the north and a mandapa in the south. The Nandi sits gloriously between the two, facing the triple shrine. The temple was constructed in 1261 CE by King Rudradeva to honor the gods Síva, Vishnu and Surya in gratitude for his many battle victories. A step-well was constructed for holy rituals in the north-eastern corner of the temple complex's compound wall called prakara. The trikuta form constitutes to give importance to the three gods, mainly Síva's *garbagriha* that faces the east. The religious importance of the temple has continued over the years valorizing the faith and the heritage of the Kakatiyas.

KOTA GULLU COMPLEX AT GHANPUR, MULUGU DISTRICT

Ghanpur village is at a distance of about 9 km from Palampet. It is said to be built in the first half of the 13th century during the Kakatiya King Ganapatideva. Similar to the Rudreshwara 'Ramappa' Temple, the Kota Gollu at Ghanpur is constructed adjoined to a lake and the main temple is dedicated to Lord Síva. There are about 22 temples in the Ghanpur complex of which 19 are small shrines and the main temple is placed at the centre. A sole Nandi Bull, at the centre of the courtyard, remains the only witness of the glorious days of the Kakatiya dynasty. The main shrine also contains bracket figures of *gajja kesaris, mandakinis,* and other mythical creatures from Hindu mythology. Even though being in a decrepit state, the temples still display the glory of the architectural style of Kakatiyas.

The 300 year rule of the Kakatiyas set an important chronological advancement in engineering and technology. It cannot be overlooked that the knowledge systems of the Kakatiyas are beyond the teachings of today both in science and culture. The marvelous art and architecture of the Kakatiya kingdom and the story of culture leave a significant mark on our Telugu heritage as discussed in the article. The culture-induced landscapes of Kakatiya show the nature-culture relationship from the anthropological perspective. It is understood that human beings and their culture exist with nature. Human needs will intervene with nature and the Kakatiyas portrayed boundless limits without exploiting it. It is important to merge with nature and help it prosper. Creating awareness and educating ourselves about Kakatiya's cultural and technological advancement will help in connecting future generations to its heritage. It can be concluded that the Kakatiya rule was the Golden Age of Telangana.

Fig. 13 : Ghanpur Temple
(Source : Manthan, M/s Kshetra)

Prof. G.S.V. Suryanarayana Murthy
Prof. G.S.V. Murthy has done his post-graduation in Architectural Conservation from SPA, Delhi. He is a faculty in JBR College of Architecture, Hyderabad. He runs an independent consultancy firm, Kshetra as the Chief Architect. He has specialized in documenting traditional Indian buildings and historical building knowledge systems. He has been felicitated by the Dept. of Tourism & Culture, Telangana, for the preparation of the nomination dossier for the Rudreshwara 'Ramappa' Temple, which helped it acquire the status of UNESCO World heritage site.
archprofsurya@gmail.com

DIFFERENT STROKES

TREADING
THE UNBEATEN PATH

Ar. Rekha Rani

By the time I was in my senior year of college, I knew I was no longer interested in architecture. A part of me always knew I'd switch to a profession I was more passionate about, I just never knew how. After graduating, I started working in Delhi for various architectural firms. I liked my salary and enjoyed working as an independent woman in one of the biggest cities in the country. The pay cheque was not enough to afford luxuries but would occasionally cover eating out and auto fares whenever I missed the bus.

In 1999, I got married and moved to Chennai. Like most other women of my generation, I moved to the city where my husband worked at the time. I left my job in Delhi and tried to find a stable job in Chennai. However, the salary and other travel expenses were not enticing enough for me to even consider them. One could say that this bump in the road was also one of my greatest opportunities. My husband got a job in Boston, Massachusetts, and I was beginning to consider other job opportunities and possibilities. Therefore, before moving to the States I took a computer diploma program and became a Sun certified Java programmer. But another obstacle presented itself when I reached the States. The IT industry was in recession and no company wanted to hire someone with only an H-4 visa (back then one couldn't work on an H-4). But I knew I wanted to make the most of the land of opportunities, so I decided to work towards grad school. I started preparing for the GRE while thinking about possible careers and major options. I was mainly conflicted between the accounting or finance and computer science fields. After consulting a few career advisors and some friends I decided on becoming a software engineer. I am glad that my children's generation in India also has access to such career resources. When I was a high schooler, all we knew was that if we were good in math, we would go into engineering, otherwise, it was med school.

After acing the GRE and taking some prerequisite CS courses at local community colleges, I got accepted into Worcester Polytechnic Institute (WPI). The next two years of my life were consumed with either university work, taking care of my son and volunteer work I did for an architectural firm. Luckily I still had Maggi and chai to help me get through my week. I missed out on a lot of social gatherings my friends made because of this, but I am glad I did well in my Master's program.

Though I worked hard in my Master's program, I was very anxious about entering the job market at the age of 30 with almost no experience in this industry. Luckily, my hard work had paid off and I landed a job with Pegasystems, a company I still work for. The first few years were difficult as I wasn't used to the professional side of the IT industry and had only studied theory so far. But once I got the hang of it, there was no stopping me. I started my career in Pegasystems as a fresher and currently work as Senior Engineering Manager. I lead the Collaboration tribe in Pegasystems. I love my work including the challenges, stress, and fun that comes with it.

THE HERITAGE HANDBOOK
A WALK THROUGH MUMBAI FORT

Ar. Manasi Chokshi

THE HERITAGE HANDBOOK

A WALK THROUGH

MUMBAI FORT

With MMR-HCS Heritage Map Mumbai Fort

Stories of Over 150 Heritage Buildings And Landmarks
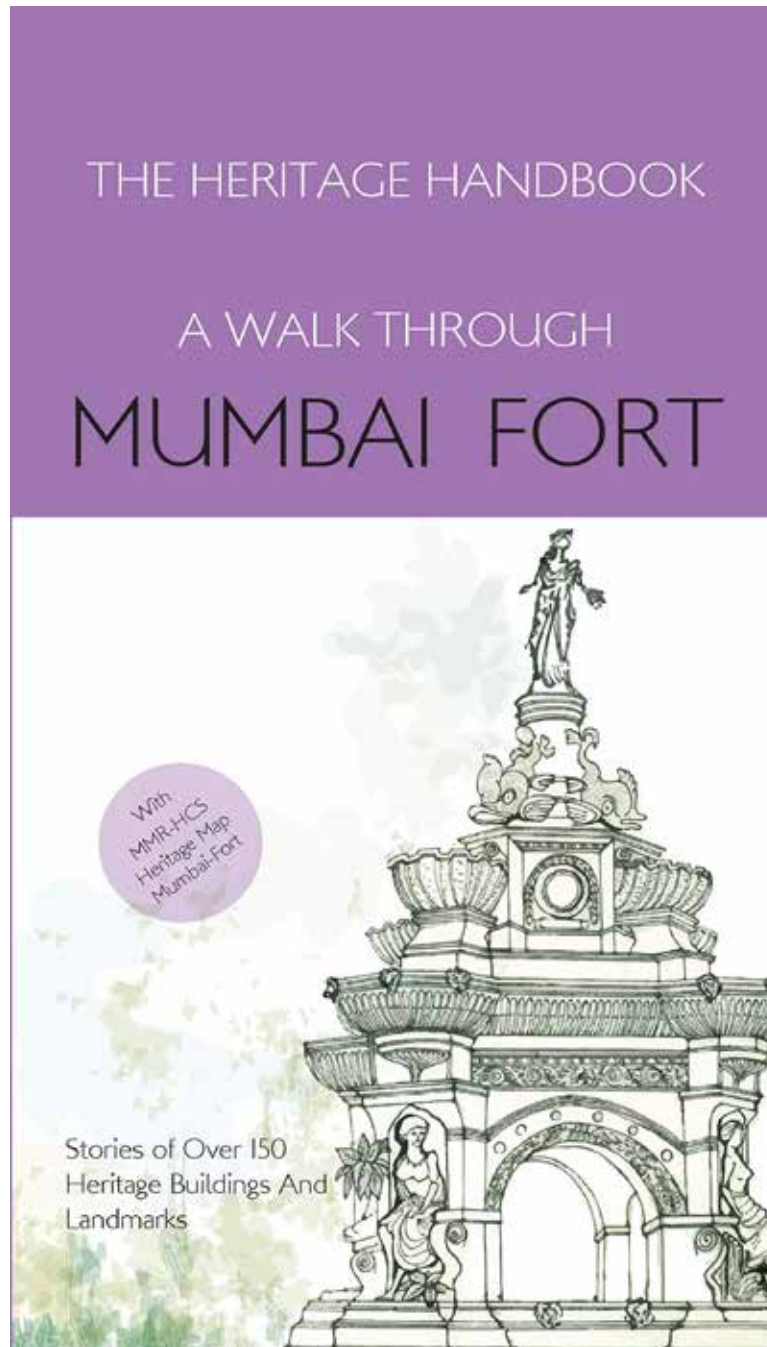
The Heritage Handbook – A Walk through Mumbai Fort is a compilation of the brief histories and narratives of 150 heritage buildings and landmarks of the city of Mumbai. It is curated and written by Bharat Ghotoskar, and conceptualised and published by the People Place Project. The book is an extension to the Mumbai Fort Map from the set of Heritage Circuits of Mumbai Metropolitan Region published by MMRDA-HCS.

The fact that it is an extension of the Heritage circuit maps, the intent of the book is to be used to explore the city. Yet, the cover page, the size and quality of paper, the design gives you a completely different grasp. It comes across as a comprehensive, thorough and an honest effort at documenting and compiling the local histories of the Mumbai Fort area, thus acting as a narrative guide or handbook for the locality.

The book begins with a brief historical overview of the city - something one can read if one is travelling to the Fort area of Mumbai. This is followed by 15 chapters of sub-precincts or geographical nodes. The precincts are based upon their geographical locations in the city from south to north. Thus these form the main 15 'chapters' of the book : each complete with a list of buildings along with a map of the precinct that indicate them. Each chapter too begins with a brief history of the precinct and then moves on to discuss the list of buildings. The chapters are interspersed with sketches of buildings that further aid the imagination.

These sub-precinct chapters are followed by a glossary of architectural styles, an index of buildings and concludes with classified itineraries (suggested heritage tours !)

The unique aspect of the book is one can read it in three different ways in collaboration with the map: one may choose a building from the map, trace it in the index and read about it; or one can select a sub-precinct from the book, trace it on the map and read; or one can simply walk along their suggested classified itineraries with the book in hand!

The sub-precinct of Oval Maidaan begins with its history, the origin and cause of 'Frere town'. There are 27 buildings demarcated on the map for this precinct including the famous Rajabai tower, Mumbai University Convocation Hall, the Bombay High Court, Elphistone College, the Cross Maidaan, the Oval Maidaan, the statues of various Indian leaders along with the modern Art Deco buildings that flank the other side of the Oval and the Eros Cinema. The chapter has highlighted snippets on some lesser-known facts of the city like the statues of the locality with its importance, the standard benchmark of the city, 'Hawa khana near Bhikha Behram well' and so on. If not all, most of the important heritage buildings belonging to different architectural styles and typologies of this precinct are captured in the chapter.

The style of writing, highlighted snippets, beautiful illustrations of the buildings and the collaboration with the map, creates a curiosity that is on par with the experience of witnessing a building in front of you. The book gives you an unbiased and non-prejudiced opinion of the buildings, and places them to the reader as they are. Some buildings are chaotic, some have lost their essence, but the writing portrays the best of them all.

The intent of the book complies with the experience of reading it, although if one is expected to carry the book while walking to these landmark buildings, the size of the book could be a bit of an inconvenience.

One way or the other, reading the book surely gives you some exciting and thoughtful insights of the city of Mumbai. The book can be a Mumbai enthusiast's happy place and deserves a 4/5 rating.

Author: Er. Bharat Gothoskar
Although Bharat Gothoskar studied mechanical engineering and business management, he actually wanted to be a conservation architect. The city's history and heritage has been an abiding interest in him since childhood, and that made him give up a 16 year-career in sales and marketing with corporate houses like Godrej, Pidilite and Mahindra to pursue his passion of #HeritageEvangelism through experiential travel.

Editor: Ar. Anuj Daga
Ar. Anuj Daga is a hybrid design thinker interested in engineering new ways of reading and intervening into the built environment. Trained as an architect from Academy of Architecture, Mumbai (2008), he went on to pursue his interests in design research through the interdisciplinary Master of Environmental Design program at Yale School of Architecture (2014). He is the recipient of the National Award awarded by Council of Architecture, India and also the Charles Correa Gold Medal for his undergraduate design thesis Cinema for the Blind. He was awarded the Kamla Raheja Research Fellowship 2009-10 where he undertook independent research on patterns of domesticity in Mumbai. Subsequently, his practice is informed by his diverse engagements in fields of design, research and academia.

Editor: Ar. Nisha Nair-Gupta
Ar. Nisha Nair-Gupta is the Principal Architect at Design [Variable]. With varied work experience as an architect, journalist and an active participant in public art initiatives, she oscillates between her two interests of design and writing, having spearheaded the first publication and curatorial project People Called Mumbai.

Reviewer: Ar. Manasi Chokshi
Ar. Manasi Chokshi is an Assistant Professor at the IES College of Architecture, Mumbai. Architecture, research and writing have been her key areas of interest. She has contributed to Ar. Kulbhushan Jain's book Learning Architecture in 2019 and for the People Place Project books since 2016. She has also been the recipient of the Best Teacher Award in the Humanities Category, 2019 from Maharashtra Association for Schools of Architecture (MASA).
manasi.chokshi@ies.edu

THE HIDDEN GLORY OF
MANDU

Ar. Ishan Natu

Mandu is a beautiful journey of splendour and impressive style of Indo Islamic, Pashtun, Persian, Afghani architecture and will take you to the zenith of Indian Heritage.
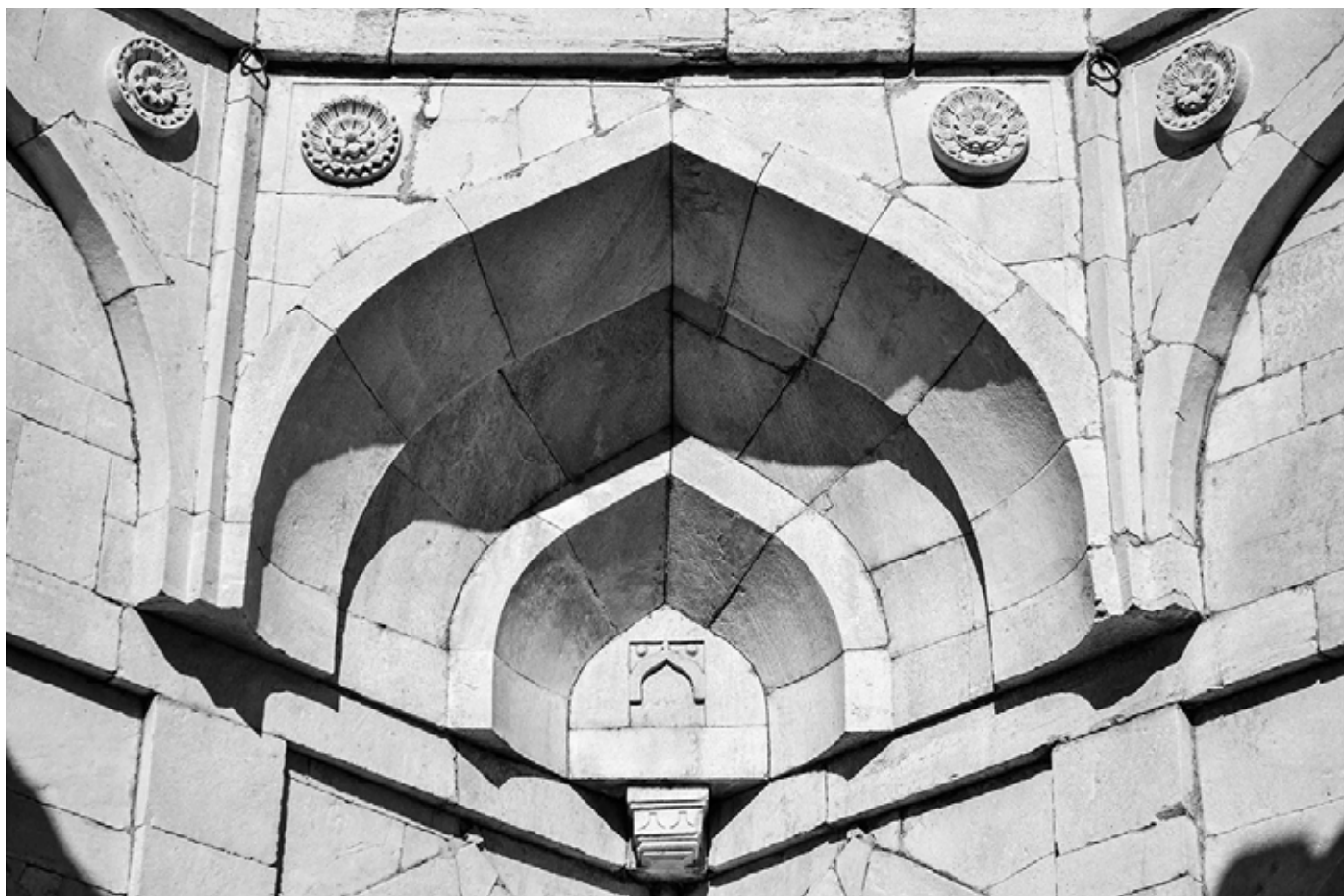
Pendentive

Entablature

Skylight

Pendentive

Water Channel

Engraving

Water Fountains

Alcoves

Ar. Ishan Natu
Ar. Ishan Natu works in his firm Natu Architects with project variants such as hotels, large developments and restorations. With a vision to expand in his firm on a global scale, he has established a collaboration in the Natu-Saeed Design in Dubai. He is the Committee Head of Natu Foundation, working over various activities to promote the heritage and cultural tourism at Mandu.

Ribbed Vault
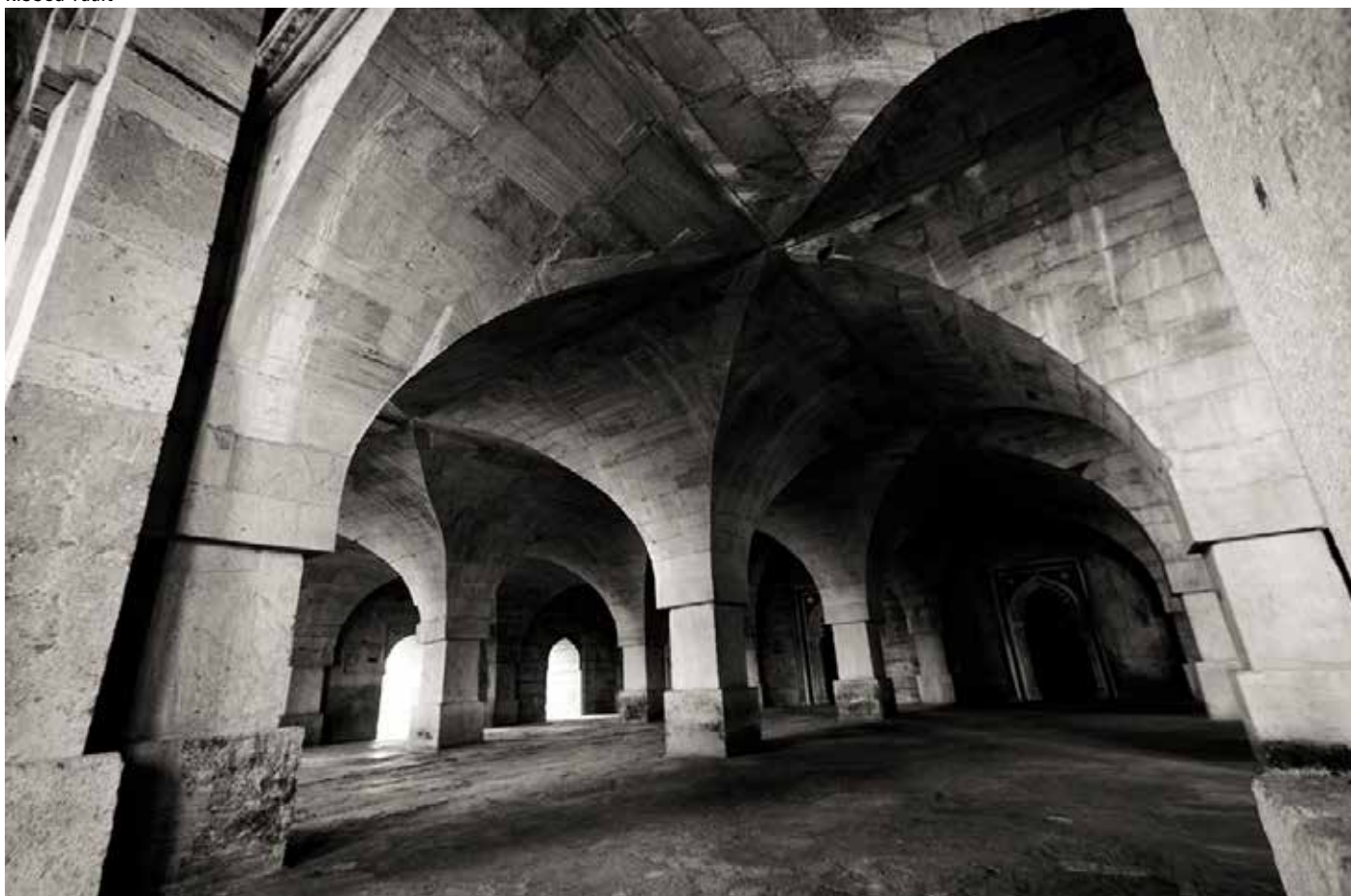
MY JOURNEY OF
LIVE SKETCHING!

Ar. Dhaivat Panchal

'I walk here as much as I can, but I'm very busy. It is absolutely beautiful here (even though it's in the city). There are lilacs and hawthorns and laburnums & c. blooming in all the gardens and the chestnut trees are magnificent. If one truly loves nature one finds beauty everywhere', wrote Vincent Van Gogh from London.

Where would you most like to take a walk?
You can see thousands of lines but where are they taking you ? Into the glorious history or the mysterious future? Continue to walk with them. They will take you into history and the next second you will see the future. It's like travelling into the universe through worm-holes, playing with your past, present and future. Isn't it an eternity?

Once upon a time these lines also needed inspiration to come onto the paper and flow like a roaring river. My nana, Artist Kanubhai Panchal ! Yes, That's how you know the importance of your heritage.

As a Co-Admin at the international community Urban Sketchers, Ahmedabad Chapter, I have been conducting live sketch walks and exploring the World Heritage City of Amdavad for the last three years and trying to translate them into my drawings using fountain pen and ink.

There is a world here of thousands of lines merging with the beautiful culture and living heritage of Amdavad. I don't know why, but I can draw thousands of lines: they are very spontaneous and sometimes don't listen to me but I am sure you would love their company.

Just lose yourself!

Anyway, let's take a walk! The famous Chandravilas restaurant is there waiting for you with its delicacy of jalebi and fafda!

Dada Harir ni Vav, Amdavad, Gujarat
Medium : Fountain pen on paper
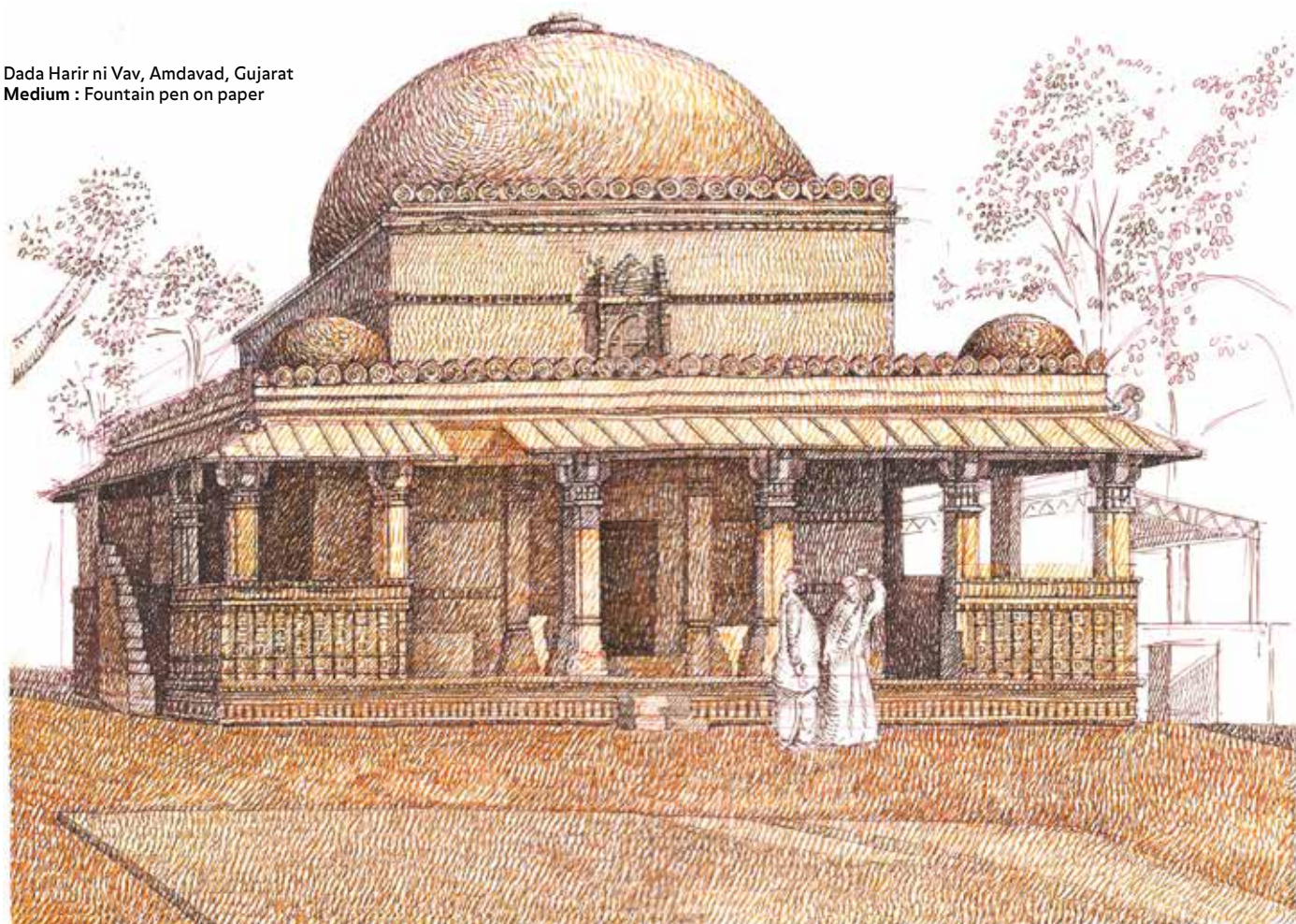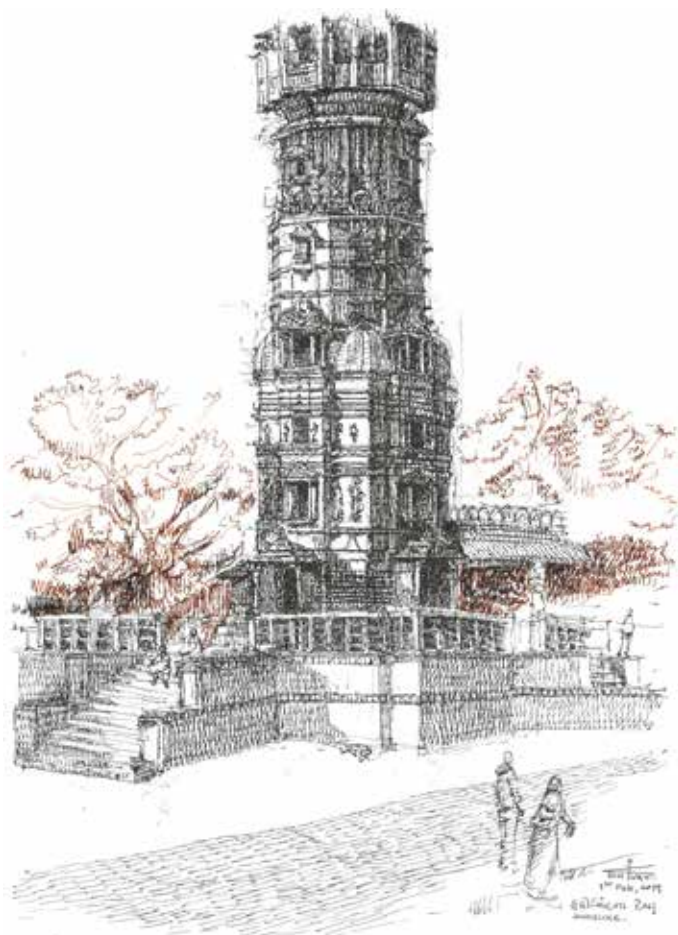
Kirti Stambh, Hutheesing na Dera, Amdavad, Gujarat.
Medium : Fountain pen on paper
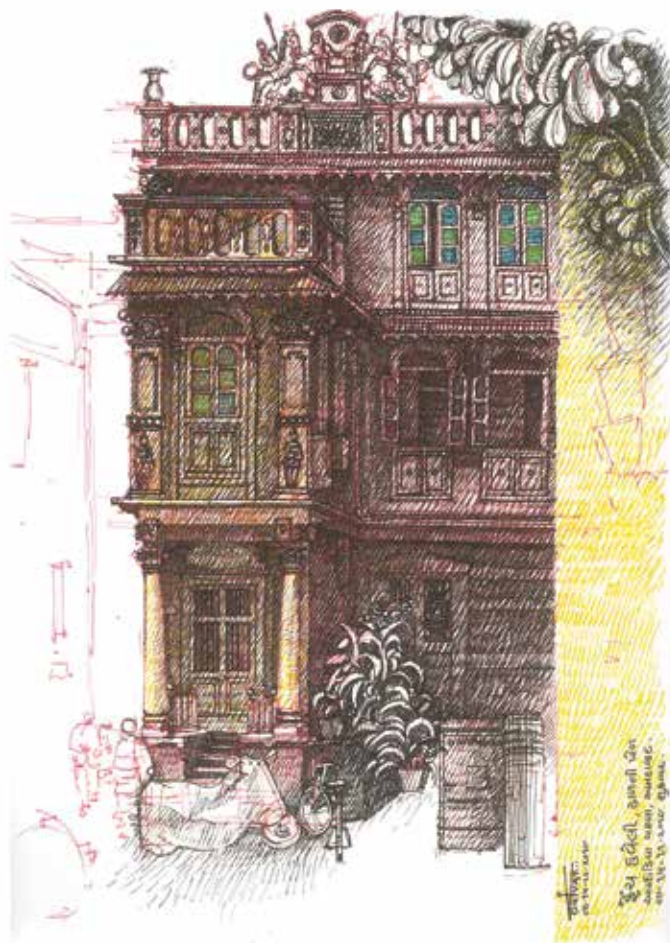
French Haveli, Amdavad, Gujarat.
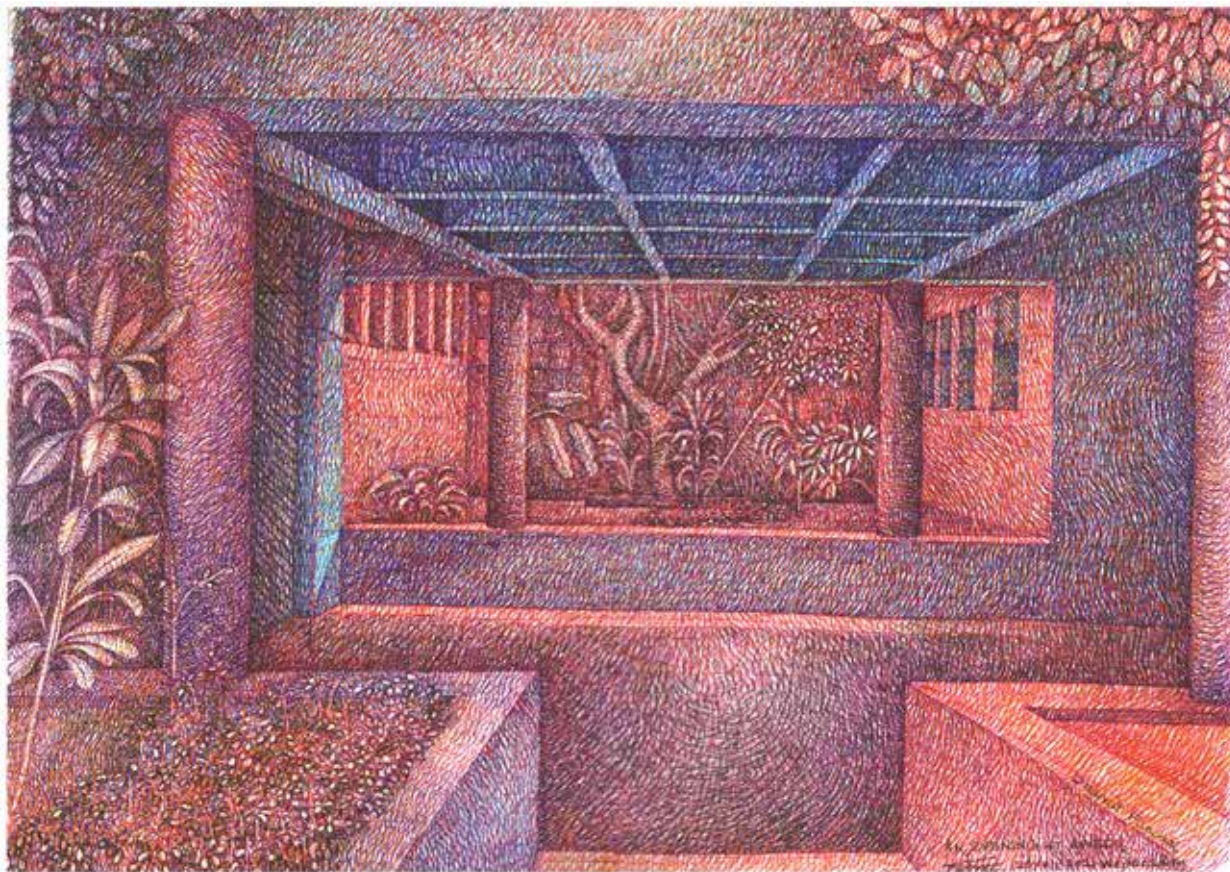**Medium :** Fountain pen on paper
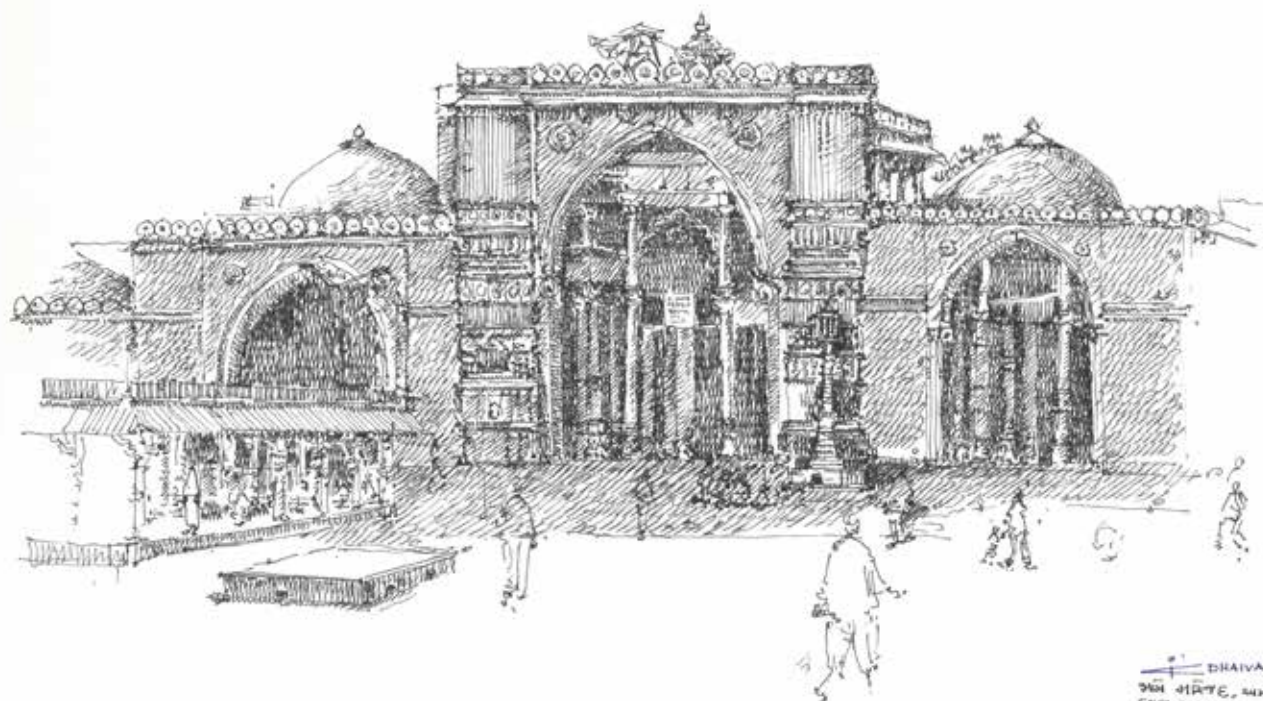
Jami Masjid, Amdavad, Gujarat
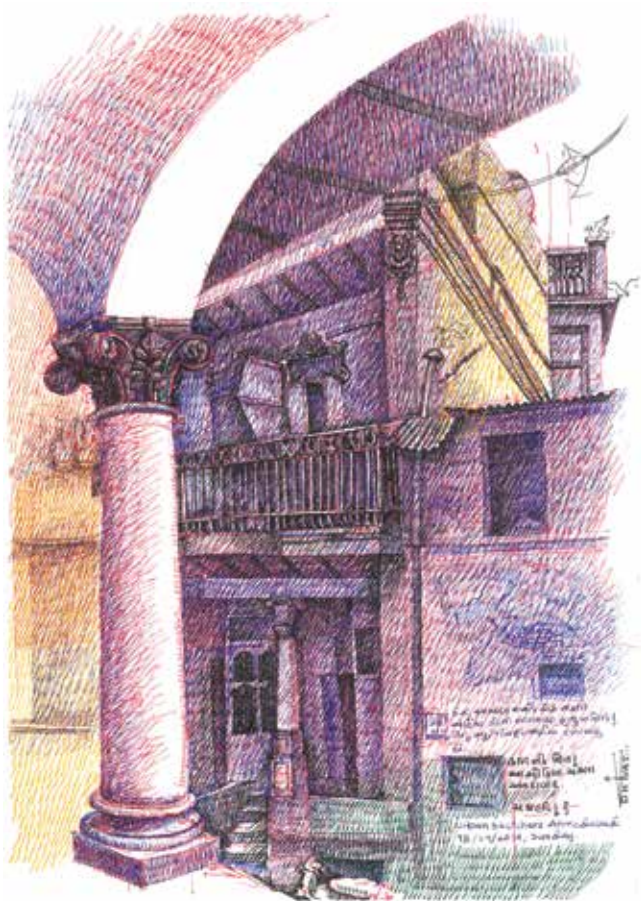**Medium:** Fountain pen on paper
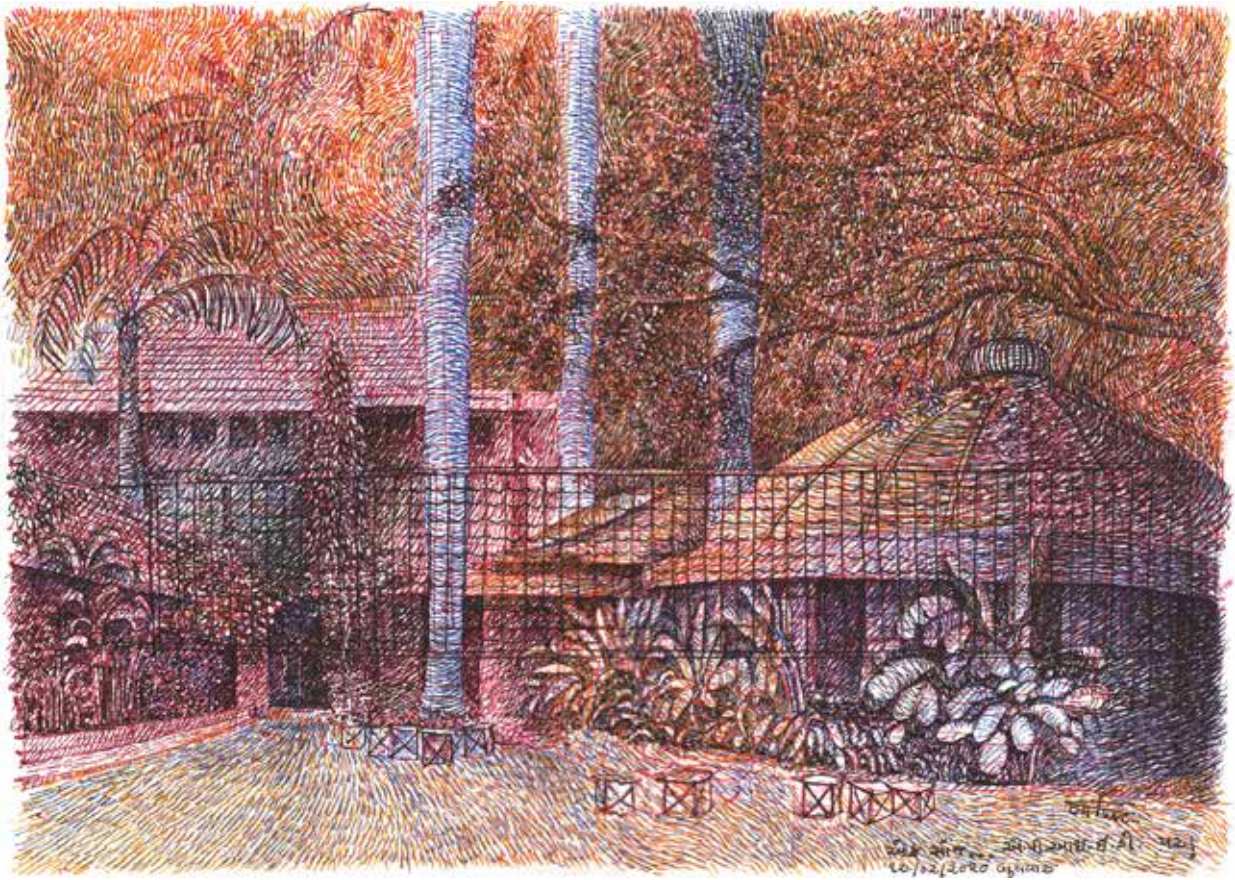
An Evening at My College APIED – 1
Medium : Fountain pen on paper
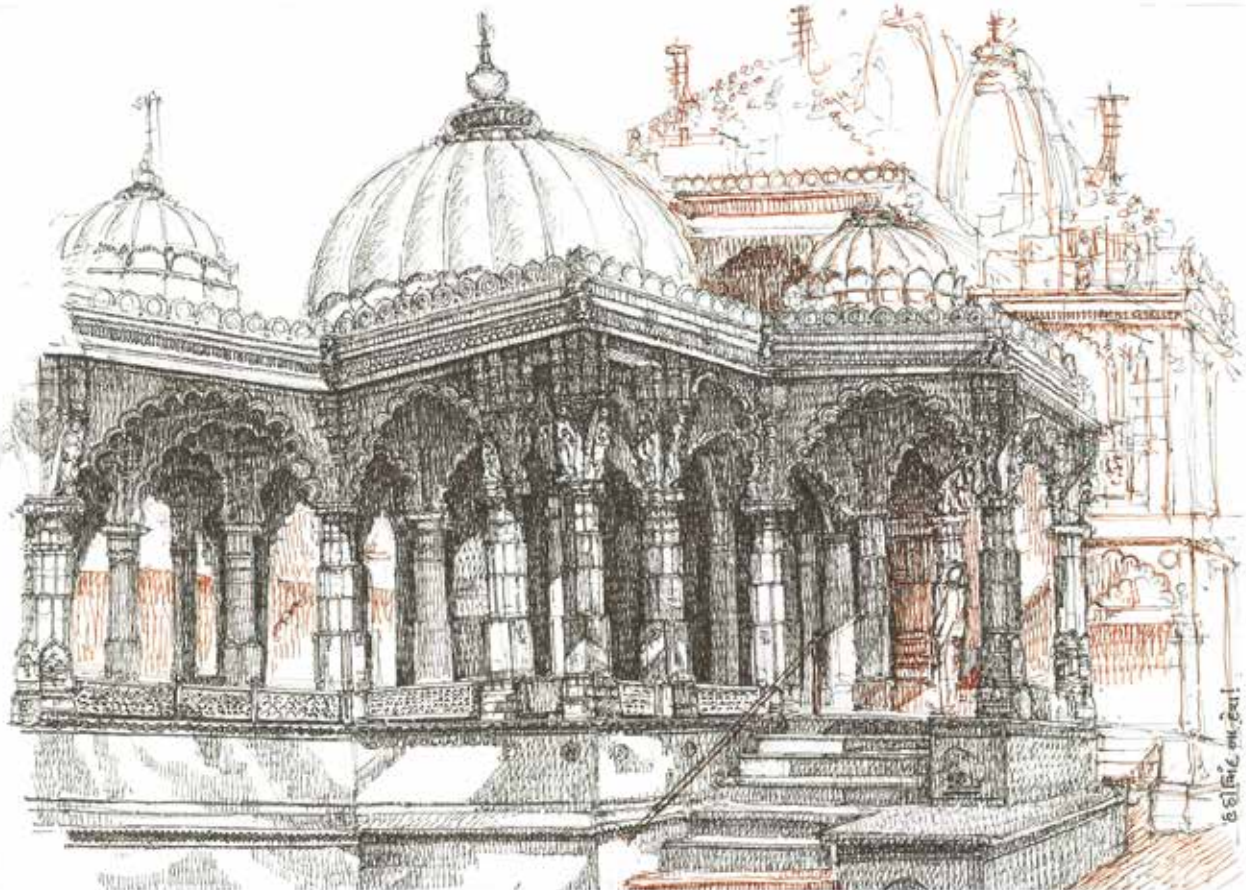
Hutheesing na Dera, Amdavad, Gujarat
Medium : Fountain pen on paper

An Evening at My College APIED – 2
Medium: Fountain pen on paper

Dhal ni Pol, Amdavad, Gujarat.
Medium : Fountain pen on paper

Ar. Dhaivat Panchal
Dhaivat Panchal recently graduated from
A.P.I.E.D., Vallabh Vidhyanagar, Gujarat. He
is Co-Admin at Urban Sketchers, Ahmedabad
Chapter, where he conducts live sketch walks
and explores the World Heritage City of
Amdavad, and translates it into his drawings.
As a hobby, he actively pursues Indian vocal
classical music.
Email : todhaivat@gmail.com

KHOJ

ख़ोज

मैं एक घर खोज रहा हूँ
चार दीवारें और एक छत खोज रहा हूँ

मैं वो जगह खोज रहा हूँ
जहां मेरी ख़ुशी का साया मेरे अस्तित्व की रौशनी से जुड़ा हो
और ना ही गुलाम हो औरों की रज़ामंदियों का

मैं वो दीवारें खोज रहा हूँ
जो कुछ ना कहती हो, खामोशी में अपनीसी लगती हो
मेरी सारी कहानियाँ सुनती हो

शब्द तो सारी दुनिया में शोर मचा ही रहे हैं
मैं एक शांत जगह खोज रहा हूँ

मैं एक मंच खोज रहा हूँ जहां मैं अपने सारे किरदार झटक पाऊँ,
चाहूँ तो आइना देख पाऊं पर ना चाहूँ तो अँधेरा कर पाऊं

मैं एक चौखट खोज रहा हूं,
जहां अपने सारे सपने खूंटी पर टांग पाऊं

चौखट पे दरवाजा तो हो पर ताला ना लगा हो
माना की मैं अकेले रहना चाहता हूं
पर कोई अंदर झाकना चाहे तो उसे, अंदर बुला पाऊं…

I am searching for a home,
a metaphor of walls and roof

I am searching for a place,
where my identity is woven by the warmth of my happiness,
not enslaved by others' opinions.

I am searching for those walls
that quietly connect with me in the silence,
and are open to my stories.

The cacophony of words is a chaos all around;
I am searching for a place of peace,
a peace that lets my music play.

I am searching for moments
where I can drop my veil
If I wish, I could look into the mirror,
or just settle in my shadows

I am searching for a threshold
where I can leave my burden of desires
Instead bring in my soul

A frame that has a door but no lock
Yes, I want to live alone
Yet there always will be a key….

Ar Akshay Rajendraji Mantri, graduated from VPSoA, Baramati (2016) and did his postgraduation from Oxford Brookes University, UK (2020) in M.Arch.D. in Applied Design. He is currently working as an Assistant Professor in ASAD, Pune, and continuing his investigations in deriving architecture design methodologies using various visual and literary arts.
arm.pune@aayojan.edu.in

PORT-OF-MANY
MAGICAL EXPERIENCES.

Darpana Athale reminisces about her wonderful trip to Porto, in Portugal.

"Port wine- Hurrah!"
"Pastéis de nata... Oooh yum!"
"THE Harry Potter Library? – Oh wow! What is this place we are going to?"

As an Urban Sketcher*, I was looking forward to my first Urban Sketching symposium, with a group of Indian sketchers, where people from all over the world would be congregating, and documenting the city through sketches. And as an architect and designer, the place where we were visiting excited me to no end: a mix of heritage, rich history, great engineering and craft, this being a World Heritage Site and also home to two legendary architects Alvaro Siza and Eduardo Souto de Moura, what more could one wish for? But as a traveller, I was most looking forward to exploring a new city and savouring the food and port wine, which got its name from this beautiful city – Porto, in Portugal. Of course, since I live in Goa, which is a mini Portugal in India, I was keen on seeing the similarities, if any.

Nestled on the Douro river, Porto also known as 'Oporto' meaning the port or harbour, is one of the oldest cities and centres in Europe, dating back many centuries to Proto-Celtic, Celtic and Roman times. Under the Roman Empire, this city emerged as a major trade port and also became an important site for the world's oldest recorded military alliance between Portugal and England.

The symposium venue was at the Alfândega do Porto/ Alfândega International Congress Centre, an old Customs House, now converted into a Convention Centre situated along the Douro in the historic centre of Porto. The renovations were done by Ar. Souto de Moura, and this three-storey building also houses the Museum World of Discoveries, a library dedicated to 900 years of history, as well as a large collection of objects, stamps, books and documentation of the Museum of Transport and Communication. Since the schedule of the symposium seemed hectic, few of us decided to look at accommodation closest to the venue. And luckily found the Happy Porto Hostel, just diagonally opposite. A very clean, cosy and well secured place, offering great views of the river and breakfast, this is ideal for any tourist looking for budget accommodations in the heart of the city.

Porto, while on one end is along the river, on the other side is on sloping terrain with cobbled streets and closely placed colourful houses. For those interested in walking and discovering a place, this city offers different vistas at every nook and corner. There is also an old traditional tram line apart from modern amenities like buses, taxis and buggy cars that can take visitors around. And a true traveller tries all, which is what I did. Walking in the Rebeira or the riverside neighbourhood with narrow streets, coloured houses and cafes, one realises why Porto is called Cidade das Pontes (City of Bridges)- one can see multiple bridges spanning the banks, each one an engineering marvel. The most prominent one being the Ponte de Dom Luís I, a double-deck metal arch bridge built by Gustave Eiffel, of the Eiffel Tower fame. Built in 1876, its 172 metres (564 ft) span was then the longest of its type in the world. The top-level deck is used for the Porto Metro trains, with an option for pedestrians, while the lower level carries traffic and pedestrians. The other notable bridge is the Arrábida Bridge, which at its opening had the biggest concrete supporting arch in the world, and connects the north and south shores of the Douro on the west side of the city.

One should not miss seeing the São Bento Railway station in Porto, declared as a National Monument of Portugal. A granite building, built in the Beaux-Arts style, the entry foyer is covered with 20,000 of the famous azulejo blue tiles and beautifully decorated friezes, all depicting the history of Portuguese history, as well as that of transportation in Portugal. Another monument that is a must because of its soaring height is the Clérigos Church Bell Tower (Torre dos Clérigos). 75 m tall with 240 steps going to the top, this 18th century Baroque-style historic structure is the city's most visible landmark, and

offers a breath-taking panorama of Porto. The Clérigos Church was one of the first churches in Portugal to adopt a typical Baroque elliptic floor plan, and the main façade of the church is heavily decorated with motifs. But the tower is the main highlight with its tapered profile standing out as a beacon across the city.

The city's commercial centre is another popular place to just walk around and absorb monumental neo-classical architecture, old churches in Baroque style, towers, azulejo tile-clad buildings, fountains, juxtaposed with quaint cafes and parks. The Avenida dos Aliados is a broad double-avenue lined with shops, stores, cafes and restaurants, and gives a vibrant view of the city's hustle and bustle. In the same area, one can walk to the Câmera Municipal, Porto's city hall, which crowns the top of the avenue. Close by is the site of the historic Mercado do Bolhão, one of the oldest marketplaces in Porto.

While travelling downtown in Porto, we witnessed a unique piece of architecture. Nestled between two churches is one of the world's narrowest houses, just about a metre in width! This house was built to be a dividing wall between the Carmo and Carmelitas churches so that there would be no contact between the monks and nuns. The façade of the Carmelitas church, part of a convent in the 17th century, is classical in style with a bell tower. Whereas Carmo Church was built later, in the 18th century, and is an amazing example of Baroque architecture. On the outside façade is a huge panel of blue and white azulejo tiles, representing the Brown Scapular imposition on Mount Carmel. This stunning panel was made in 1912 by Silvestre Silvestri and illustrates the legend of the foundation of the Carmelites Order. It also immediately distinguishes the church as one of the most recognised in the city. Both churches have gilded carved interiors and woodwork in Baroque and Rococo style.

If one is visiting Porto, one of the main attractions is the Se Cathedral, a 12th century imposing landmark that looks like a fortress.
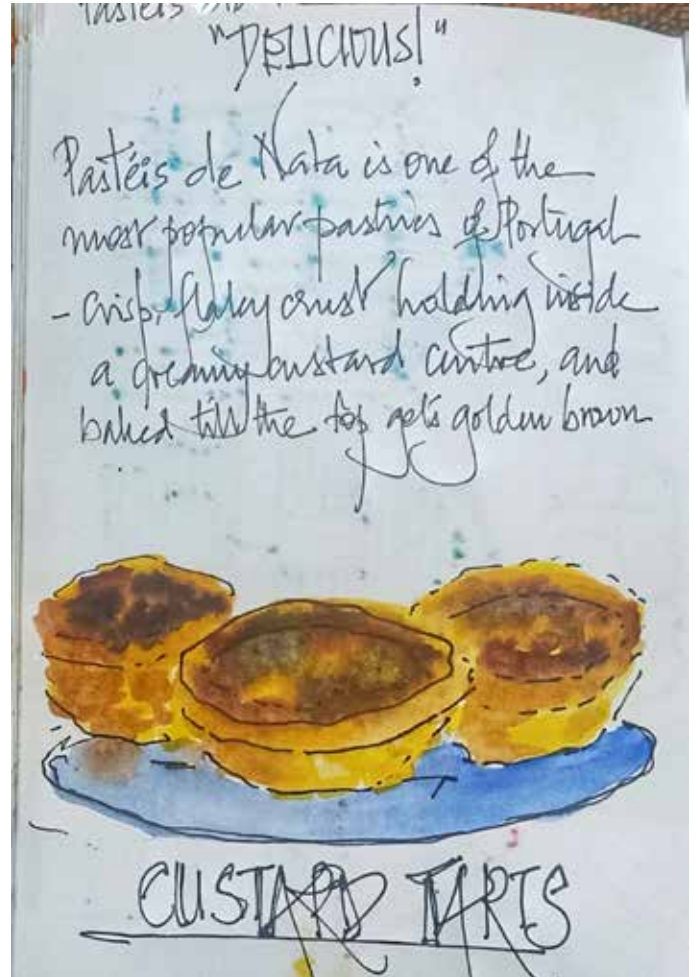
The view of the city from here is well worth the visit, as are the interiors in Baroque with azulejo tile panelling, and a 13th century Romanesque rose window.

From a tourism perspective, Porto is a known destination for its famous wine cellars. Nowadays many also visit to see its famous Livraria Lello, popularly known as the Harry Potter book store. When I reached there, there was already a huge line for buying tickets to enter – yes, this must be one of the few bookstores in the world that is ticketed! Considered the 3rd most beautiful bookstore in the world by Lonely Planet, it's a must-visit for architects and designers especially as the Art Nouveau and Neo-Gothic styled architecture is well-complemented with the Art Deco interiors in wood. Some of the highlights are a sinuous wooden staircase and stained glass skylight that renders this place almost magical, with no real connection to the Harry Potter book series.

On one of the days that we had some time on hand from the symposium, few of us went on an Alvaro Siza trip, trying to see as much of his architecture as possible within the city. Amongst the ones we saw across, it was the Serralves Museum of Contemporary Art Museum that I really liked. The minimalist designed building is offset by a huge green park around it. We were fortunate to catch a wonderful exhibition by the famous sculptor Anish Kapoor on display, which was a perfect moment of architecture, design and art all coming together. Another contemporary building that is well known for its architecture is the Music House or Casa da Musica, an international concert venue designed by Rem Koolhaas. It is a landmark project that aims to herald Porto into the 21st century.

What is a trip without food and wine? When in Porto, a visit to the wine cellars and tasting is an experience by itself. On the bank opposite the Rebeira, by crossing the Ponte de Dom Luis I bridge on foot, one can reach the Vila Nova de Gaia, a different part or suburb

of Porto where one can see the port-wine production and cellars in large 17th century buildings. One can end the evening with some wine tasting or have dinner anywhere along the quay, which is dotted with fine dine restaurants and cafes. This part is also a departure point for the many cruise tours of the river. To truly experience the city from a different viewpoint, a ride on the Teleférico de Gaia, or cable car is an experience to be had. The Monastery of Serra do Pillar is also an important landmark in this area, with Renaissance characteristics that are unique in the region and Europe. While on food and drink, a visit to one of Europe's most historical and Porto's most celebrated café is a must – the Café Majestic. One cannot miss the structure as it has very distinct Art Nouveau façade with curvaceous stonework and undulating motifs on the outside, and a vintage 1920s' ambience inside in original Belle Époque style.

Porto requires at least two weeks to be able to absorb some of the layers within its beautiful, rich urban heritage tapestry. I found it a great mix of old and new, well balanced by ingenious engineering too, bombarding my visual sense continuously. Even though it is Portugal's second largest city, it is quaint, peaceful, clean and very vibrant in its heritage. Given a chance, I'd love to visit it again, and again.

▶ *Other Places to visit:* Church of Santa Clara ● Palacio da Bolsa ● Igreja de São Francisco ● FC Porto Museum ● Soares dos Reis National Museum ● Jardins do Palácio de Cristal ● Muralha Fernandina ● Centro Português de Fotografia (Portuguese Center of Photography) ● World of Discoveries.

▶ *Food:* Pastéis de nata (one of the most famous desserts in Portugal) ● Local port wine ● Arcádia Chocolates ● Francesinha (baked ham and cheese sandwich with fried egg on top and beer sauce) ●Sardines – available in cans/tins

▶ *Crafts and Shopping*: Handmade tile jewellery ● Cork products and jewellery ● Port wine ● Roosters ● Artisanal soaps ● Porcelain objects ● Hand embroidered clothes and linen

*Urban Sketchers (USk) is a global community of artists that practices drawing in cities, towns and villages they live in or travel to.

Ar. Darpana Athale
Darpana Athale is an architect, editorial consultant and educator. She travels different worlds through design, photography, urban sketching and poetry. She heads Designs Pvt Ltd, a multidisciplinary studio based out of Pune and Goa, providing design-based solutions for different business verticals. She is also Director of In.Kaa, a repository of arts, crafts and design in India, founder of Urban Sketchers, Goa and co-founding member of the Association of Designers of India (ADI). darpana@sarvasva.com

Text, Photos and Sketches: Courtesy Darpana Athale

INCLUSION OF INDIC PERSPECTIVE IN ARCHITECTURAL EDUCATION

Prof. Dr. Ashwini Pethe

After Independence, India has seen an unprecedented growth in its education sector. Although most of these educational pedagogies were developed on the concepts already laid down by the British, a few nationalists struggled to draw inspiration from the traditional Indian knowledge systems. One classic example is the revival of Indian classical dance. At the time of Independence, it was absolutely neglected and was looked at with disrespect. Due to mammoth efforts by visionaries like Kapila Vatsyayan, Sunil Kothari; and dancers such as Bala Saraswati, Rukminidevi Arundale Indian classical dance forms were brought into mainstream practice. Today these dance forms have travelled across the boundaries creating one of the most popular disciplines. Similar is the case with Indian yoga. Due to enormous efforts by Hon. Prime Minister Narendra Modiji, Hon. Amit Shah and Shri Ramdev baba, 'International Yoga Day' is celebrated globally.

Unfortunately, this revival could not happen across all Indian art forms. India has been a cradle for numerous art forms throughout history due to its diverse environmental conditions and rich cultural inheritance. Art forms like poetry, painting, dance, music, iconography, architecture show diverse expressions in their physical form depending upon the regional and local influences but they are believed to be rooted in common philosophy and theory. Behind these pragmatic manifestations of art forms, there lies profound knowledge which remains unexplored.

All these art forms are strongly associated with the theory of aesthetics. As art appreciation involves experience by the viewer, the principles of Indian aesthetics are based on the theory of *Rasa.* This was posited for the first time in the *Natya Shastra* by Bharatmuni. *Rasa* is flavour, essence or juice that can only be relished individually. Hence the *Rasa* theory is an 'emotive theory' which has to be experienced individually. Once the art is manifested, artistic experience is intuited by the viewer, either individually or collectively. The practice of art is envisioned as an instrument to communicate philosophy to the common man. Therefore, in the act of experiencing art, perception of the viewer becomes important. This concept of perception is based on the quality of humans to retain 'memory' (Belsare,1963). Keshav Belsare ascertains that memory of past and projection of future is the fundamental quality that distinguishes Man from animals. This memory is responsible to remember past experience and evoke a similar feeling. "The only proof of the reality of Rasa is found in its experience." (Coomarswami, 1917). The theory of aesthetics expressed through *navarasa* is profound and emotive. Traditional art forms were able to create this profound experience of aesthetics through their physical manifestation in the form of sculptures, dance or architecture. But today's architectural education is completely devoid of this discussion. And that is a matter of concern.

Since long, the study of *Vastu Shilpa Shastra* has been derided by practitioners and academicians. But society is probing it. There is a gap between the aspirations of the society and industry professionals. It is because of the distancing of the discipline from its origins. Hence, there is a need to revive the traditional knowledge systems (classical as well as folk) in a practically applicable way in order to serve the needs of society.

There is a huge opportunity for architectural practices in small, medium towns and rural areas. Development of these areas need altogether a different vision. Residential built forms and public buildings in these areas are required to be built as per local sensibilities of design, based on art and craft using local materials. It is observed that the young generation of architects is more sensitive and inclined towards such innovative practices which are local, indigenous and sustainable. The percentage of young architects moving from urban to

Science and religion going hand in hand! Nataraja Statue in the forecourt of CERN in Geneva, bringing out parallels between the Cosmic dance and particle energy

Photo credit: Ryan Bodenstein 2017/Creative Commons

rural/ small-town practices is slowly increasing. This situation appears to be promising for the future. Today the world is facing complex issues such as global warming, public health, waste management, air and water pollution, contamination and scarcity of food and so on. The sustainable and eco-friendly solutions the world is yearning for are already present in the traditional knowledge systems (Handa, 2009). Hence, there is a dire need to develop a scientific rationale for the same in order to bring this knowledge into mainstream practice.

Construction of temples is one of the major architectural activities steered nationally and globally. This requires a specialized understanding of temple architecture, religion, art, craft, symbolism, mythology, languages, Indology and so on, much beyond the regular training of the bachelors' program in architecture. There is a need to establish core competency in the professionals in this specialized area. If this knowledge has to be percolated to future generations without becoming extinct, one must look for pedagogical reforms. This knowledge can percolate to the next generation effortlessly only if we have the right trainers. This knowledge is required to be presented on a global platform by equipping the same with computational technology. Integration of computational technology with traditional knowledge systems can open new avenues for the research in this direction.

The new National Education Policy (NEP) talks about an interdisciplinary approach and emphasizes the study of Sanskrit and regional languages. This vision resonates largely with the traditional Indian perspective of education proposed by Sage Markandeya in *Vishnudharmottar Purana.* This comes across to the readers as a conversation between the King Vajra and Rishi Markandeya (*Khanda* 3– a narrative of Gupta compendium on all arts). This conversation starts with King Vajra's inclination to learn *Shilpa Shastra,* on which Rishi Markendeya proposes the unifying rationale between all arts as follows: although understanding of painting - *chitra sutram* is extremely important to understand image-making, that is *pratima lakshana* and *Shilpa Shastra.* It is very difficult to know the canon of painting without the knowledge of dance that is *natya shastra,* which can't be understood without the knowledge of instrumental music that is *atodya,* and that is invariably based on vocal music and then literature and so on. This conversation proves the holistic nature of all art forms sequentially emerging from abstract art forms (e.g., literature, music) leading to concrete art forms (e.g., sculpture, architecture). Each discipline of Indian art is in unison with the other. And mastery of each discipline is prerequisite to the study of the next (Rabe 1993).

It is high time that the traditional architectural knowledge systems are looked at with scientific rigour and brought into mainstream education. Western scholars such as William Jones, Colin Mackenzie, William Hodges, James Fergusson, Alexander Cunningham, James Burgess, Percy Brown, Heinrich Zimmer, Stella Kramrisch and many others, made the initial efforts to systematically document and study Indian art history. Mostly these studies were based on Eurocentric thoughts except for a few. Contributions of Indian scholars like, Ram Raz, Rajendra Mitra, Upinder Singh, Gautam Sengupta, Ananda Coomarswamy, M.A. Dhaky are seminal. Historiography written by Parul Pandya Dhar brings out these schools of thoughts; the Eurocentric thought and the Nationalist one. The visual texts by the local artists (*sthapatis, devdasis,* etc.) who are responsible for the uninterrupted, unaltered continuity of our traditions lack mention in written history. Parul Pandya says: ". . . Natya Shastra *offers a clear example of the need to integrate shared artistic criteria and key terms explicated in texts on Indian aesthetics, poetics, and the performing arts with the specific visual art treatises to arrive at more comprehensive understandings."* (Dhar 2011)

It is important that we understand the merit in using an integrated approach towards ancient texts and literature, scientific study of building energies, Indology, traditional knowledge systems in arts, crafts, design and architecture, supported with state-of-the-art computational skills.

The current political landscape of India is also in the favour of the above. MHRD has started a division for Indian Knowledge Systems in June 2020 with a special statute to take significant steps and contribute towards unravelling the rich heritage of India and its rituals. Apart from this, one of the thrust areas mentioned in objectives of STRIDE (Scheme for trans-disciplinary research in India's growing economy) is Indian knowledge systems. Architectural education systems in India should take cognizance of the above and bring the necessary reforms. The point here is not to reject, in totality, the systems that exist, but experiment with fresh pedagogical approaches. At least ten percent of schools in India could try to experiment with a fresh pedagogy. It's time that we revisit the Indian education system that will create holistic professionals to be the ambassadors of rich traditional Indian knowledge across the globe.

REFERENCES

1
Belsare, K. (1963), Adhyatma Darshan, Joshi Prakashan, Pune

2
Coomarswami, A (1917), *The Mirror of Gesture: Being the Abhinaya Darpaṇa of Nandikeśvara (with Duggirāla Gōpālakṛṣṇa),* Harvard University Press; 1997, South Asia Books

3
Dhar, P. P. (2011). *A History of Art History, The Indian Context. Indian Art History, Changing Perspectives.* P. P. Dhar. New Delhi, D K Printworld (P) Ltd, National Museum Institute.

4
Handa, O. C. (2009). *Himalayan Traditional Architecture (with special reference to the Western Himalayan Region)* (First ed.). New Delhi: Rupa and Company, Infinity Foundation

5
Rabe, M. (1993). *Dynamics of Interaction between Indian Dance and Sculpture.* New Delhi, American institute of Indian Studies, Manohar Publishers.

Dr. Ashwini Pethe
Prof. Dr. Ashwini Pethe, Principal, MIT ADT University, School of Architecture, Pune, has been involved in teaching for over twenty years. She is the Managing Director of the Pune Biennale Foundation contributing to the urban aesthetics of the city. She is the visionary behind initiating the Master's Program in Traditional Indian Architectural Knowledge Systems for the first time in India.
ashwini.pethe@mituniversity.edu.in

YOUNG ARCHITECTS FESTIVAL

IIA YAF 2021

mcdn1.24fd.com/iiayaf21

The IIA Young Architects Festival 2021 is a national event, of The Indian Institute of Architects, to encourage & promote participation of Young Architects and to celebrate the contribution of the youngsters to the profession. This year the IIA Jharkhand Chapter has the pleasure and privilege of hosting this magnanimous event by providing a common platform where each participating architect can contribute by making presentation of their architectural works, share and circulate information, discuss on pertinent issues relevant for the profession, identify, promote, and instill skills and talents.

This event is being envisaged as a fun filled hybrid weekend extravaganza of design, culture, energy, and youth in the land of forests, where we hope to engage with as many young architects as possible. More than 250 Architects across the nation are expected to join the event physically at the venue and approximately 350-400 Architects shall be participating in the event via the virtual digital online medium. The event will be graced by all the National Council members along with all the Chapter Chairpersons.

ABOUT THE VENUE

Ranchi is the state capital of Jharkhand- The Land of Forests. Located on the southern part of the Chota Nagpur Plateau, Ranchi is richly endowed with enviable natural beauty and picturesque environs. It has numerous waterfalls located in the close vicinity of the city and is known as the 'City of Waterfalls and Lakes'. Because of its hilly topography, it enjoys a pleasant climate throughout the year. Ranchi is blessed with mineral resources in abundance and accounts for nearly eighteen percent of the national mineral production. With six industrial areas, it is an integral part of the industrial setup of the state of Jharkhand along with Jamshedpur and Bokaro.

Chanakya BNR, the venue for YAF, is a premium establishment, complete with all modern amenities and located strategically in the heart of the city.

RE CONNECT STORE THINK

BUILDING MATERIALS EXHIBITION

INTER-CHAPTER COMPETITIONS

TECHNICAL SESSIONS

VALEDICTORY CEREMONY

CULTURAL PROGRAMS

Speakers (L to R): Akshay Hiranjal, Madhav Raman, Abin Chaudhuri, Compartment S4, Vinu Daniel, Anubha Fatehpuria & Richa Bose, Shikha Jain, Pratik Dhanmer

RETHINK, RECONNECT, RESTORE

The theme of this year's YAF is....REthink, REstore and REconnect.... which has been framed in the backdrop of the pandemic that we are facing since the onset of the preceding year. It is being realized that the Architects' community must come together to delve and give a fresh thought to the entire process of Design and Construction. Speakers have been invited from leading practices all over the country to share their views and experiences relating to the theme.

STAND-UP SHOW

LIVE BAND & DINNER

VISIT TO TOURIST SPOTS

OCT 22-24 FRI-SUN

RANCHI, JHARKHAND

event schedule

22nd
FRIDAY

Registration of delegates and distribution of welcome kit	1400-1700
Inauguration of Building Materials Exhibition	1400
IIA National Council Meeting	1415-1700
-Tea Break-	
Inaugural Session	1745-1845
Stand Up Comedy Show by Ar Vaibhav Sethia	1900-2000
Flavours of Jharkhand Cultural Programme	2000-2045
Fellowship Dinner & Live Band	2045-2200

23rd
SATURDAY

RE:Think Technical Session 1	1000-1120
-Tea Break-	
RE:Store Technical Session 2	1130-1300
-Lunch-	
RE:Connect Technical Session 3	1400-1530
Session 4 Informal Session	1530-1630
-Tea Break-	
Valedictory Session	1700-1800
Inter Chapter Cultural Competition	1845-2030
Fellowship Dinner & Live Band	2030-2200

24th
SUNDAY

Patratu Valley and Dam Visit Excursion Activity	0900-1200

IIA YAF 2021

RE THINK STORE CONNECT

registration fees

for IIA MEMBERS

Defaulter IIA Member would be considered as Non-IIA member for Registration purpose.

online - ₹1200
in person - ₹3500

for non IIA MEMBERS

online - ₹1500
in person - ₹4500

for STUDENTS

online - ₹500
in person - ₹2000
Limited seats only

These charges are exclusive of Accommodation Service.
Charges for spouse is 4500INR.
18% GST will be charged on each category.

STAND UP SHOW BY AR. VAIBHAV SETHIA

To get the ball rolling on the three days of festivities, Ar. Vaibhav Sethia will be a performing a stand-up comedy act at 7pm on 22nd Oct. Vaibhav is a silver medalist from IIT Roorkee's 2011 B.Arch. batch. He is an accomplished comedian and content creator, with his own stand-up special "Don't" on Amazon Prime. The Kolkata-raised comedian has previously worked as an architect, a graphic designer, a writer and an assistant director. He co-founded Comedified in 2014, with fellow comedian Anirban Dasgupta, Kolkata's most popular comedy group, and was instrumental in starting a comedy scene in the city, leading to as many five open-mics every week, when there were none.

HOSTED BY

mcdn1.24fd.com/iiayaf21
iia.jharkhand@gmail.com
Instagram @y.a.f.2021

THE INDIAN INSTITUTE OF ARCHITECTS

JHARKHAND CHAPTER

NEWSLETTER SEPTEMBER

IIA Online Membership

The Indian Institute of Architects, in its focus for membership growth and to facilitate ease of application, is introducing an online application process for new members. Applicants can click on the link below to access the form, fill in the necessary details, upload the mandatory documents, complete authentication and pay the appropriate fee through the payment gateway. They will receive an acknowledgment.

On receipt of applications and on verification by IIA HO, the valid applications will be placed at the succeeding IIA National Council Meeting for election as Associate/ Fellow. On election the applicant will receive the physical certificate along with membership number.

https://newregistration.indianinstituteofarchitects.com/

IIA-Telangana Chapter

Hyderabad Heritage @ Crossroads

The inclusion of the Ramappa Temple near Warangal into the UNESCO World Heritage was a commendable win for Telangana's persistent efforts of over a decade. The last seven years have seen Hyderabad's heritage getting cold-shouldered. The government's withdrawal of protective regulations and wilful neglect and demolition of some hitherto-listed buildings set a question mark on the future character of this 400 year-old city. Recent focus has been on the 100 year old Osmania General Hospital, which the government intended to demolish.

In this context, the TS chapter thought it fit to discuss the issue in a comprehensive way. So, on August 27, we organised an online interaction which was conceived and curated by EC members G. Shankar Narayan and Srinivas Murthy. The session was ably moderated by Srinivas Murthy.

To learn how other cities deal with such issues, we had well-known Conservation Architect, Vikas Dilawari from Mumbai taking us through challenges faced in the heritage management in his city. Through examples of his own work, he laid out issues of ownership, rental acts, corporate involvement, law-making, etc. The moderator, Ar. Srinivas Murthy then opened the discussion to focus on Hyderabad. The panel was deliberately broad-based to get as wide a view as possible. Er. Sajjad Shahid, well-known historian and INTACH co-convenor, spoke about the changing regulations and political scenarios which have impacted conservation. He spiced his words with inimitable Urdu poetry. Mr. Faiz Khan, member of several Trusts which own heritage assets, brought in the perspective of the client/ user and the real challenges in owning/ maintaining and developing old structures. Ar. G. Shankar Narayan, who actively campaigns for conservation and better public spaces, said a proactive Conservation Committee and a Master Use Plan for heritage assets is the way forward. Ar. Srinivas Murthy wrapped up the interesting session with questions from the audience which consisted of citizens, including architects. The Chairman, Ar. Uday Shankar, made his concluding remarks. Ar. Aditya Singaraju, Jt. Sec. gave the vote of thanks.

IIA-Karnataka Chapter

Impact Assesment of Rani Chennamma Precinct and Flyover

An initiative Impact of Rani Chennamma precinct and flyover on the lifestyle of citizens of Hubballi City, was started by IIA Hubballi Dharwad (HD) Centre in association with the Chamber of Commerce, Hubballi and SOA, KLETECH, HubballIi. IIA HD Centre along with the students of Semester 7, SOA, KLETECH, prepared walkthroughs, scaled models and presentations on this project which were used to present an overview about the project to the citizens of Hubballi. IIA HD Centre and the Chamber of Commerce, Hubballi have now presented to almost 10 to 20 professional, trade and social organizations and have gathered the support of these organizations. Several citizen forums have also been reached out in this regard. IIA HD Centre and the Chamber of Commerce, Hubballi have met MPs, MLAs (past and present) and the DC many times and hope to have a large gathering in the next meeting with the District Minister in charge of Hubballi.

Model of Rani Chennamma Precinct and Flyover in Hubballi

Green Building Visit

A visit to a green building was organized by IIA young Architects Committee on 14 August 2021 for students of architecture in Bangalore. The students visited the Bearys Global Research Triangle (BGRT) along with their faculty. The engineering team and training and development team of BGRT briefed the students about the salient features of the green building and took them around in two batches. The students got to learn about benefits of a green building reduction in operational costs, increase in energy efficiency, conserving water and natural resources, improvement in air and water quality, enhancing occupant comfort, creating a sustainable community work environment, enhancing building value and marketability. Nearly 80 students from south Bangalore participated in the event coordinated by Ar. Tapasya Das and Ar. Abhimanyu.

Visit to Green Building - Bearys Global Research Triangle (BGRT) on 14 August 2021

Webinar on Vastu and its Principles

IIA HD in continuation of its online lecture series Future Focussed EP02 organized a presentation by Ar. Appanna Sardeshpande, Bangalore on the topic Vastu and its Principles in collaboration with IIA Karnataka Chapter and KLE TECH University on 7 August 2021. The event was moderated by Ar. Ananthashayana and Ar. Trupti Shah from IIA Mysuru Centre, whereas IIA HD Centre hosted the event.

ADVERTISE WITH JIIA

	3 ISSUES	6 ISSUES	12 ISSUES
BACK COVER	**12,00,000**	**20,00,000**	**36,00,000**
INSIDE COVER Front & Back	**9,00,000**	**17,00,000**	**30,00,000**
INSIDE COVER Front & Back Together	**14,00,000**	**24,00,000**	**42,00,000**
FULL PAGE	**7,00,000**	**12,00,000**	**18,00,000**

WHY SHOULD ONE ADVERTISE IN JIIA?

Advertising in JIIA gives a unique opportunity to reach the 'design elite' of the country directly, as a printed hard copy together with an electronic version, every month. The journal will be the perfect source for updates for the trends and happenings in the architectural/design/research/products world.

The strong brand value as the official journal of one of the largest organisations of architects in the world, The Indian Institute of Architects, will get automatically transferred on to the advertisers of the journal.

The advertisements will be very few and selected ones.

As a result the Architects/readers will have an impression of an Authorised Product, on advertising in the Journal. The new creative Formats, papers and advanced printing technology, can create a positive impact.

So advertising in JIIA will be worth the money spent.

--- PRESENTING ---

Everlux Collection

Re-imagine your bathspace with the compelling beauty of elegant finishes and classy design. Vacuum coated, using state-of-the-art PVD technology, which gives your bathroom a new expression of luxury. Experience the ultra-modern way of living with the Everlux collection.

Available Colors: Titanium Black, Brushed Black, Gold

Find your nearest Roca store

www.roca.in