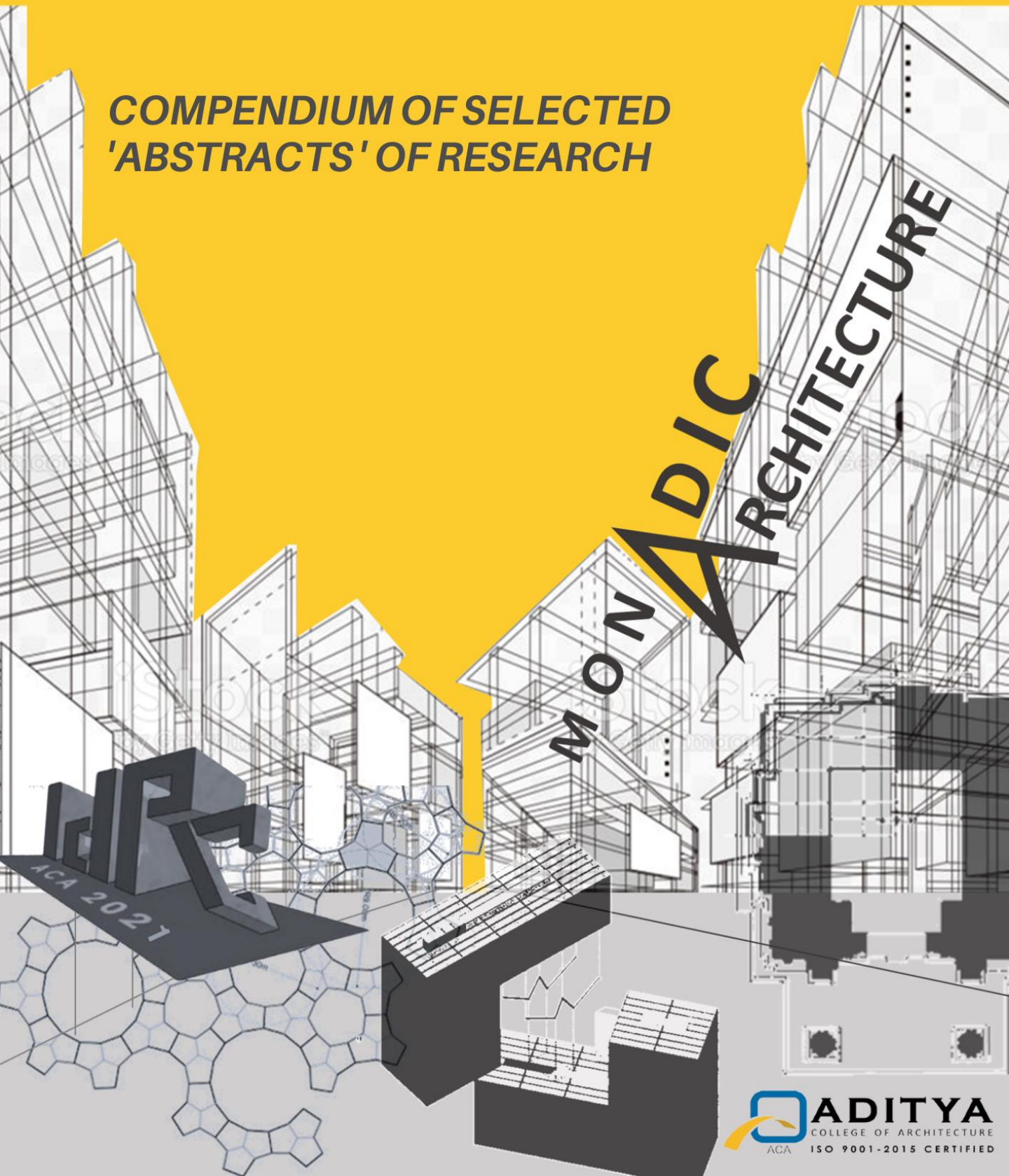


2ND INTERNATIONAL DESIGN RESEARCH CONFERENCE **2021**

**COMPENDIUM OF SELECTED
'ABSTRACTS' OF RESEARCH**

**MONADIC
ARCHITECTURE**



VISION, MISSION & QUALITY POLICY



- *To be globally recognized as an epitome of learning and innovation.*
- *Imparting multifaceted architectural education driven by social sensitivity and supported by state of the art infrastructure.*

- *To impart quality education that encourages students to be competent enough for best fit job roles.*
- *To provide faculty members with facilities to research, experiment and implement contemporary learning tools.*

“ We, the Management, Faculty and staff of Aditya College of Architecture are committed to offer excellence in architectural education, by pledging to our core value of Agility, Innovation, Integrity our academic environment and state of the art facilities and infrastructure to our students, thereby ensuring mutual respect and trust for them.

We will work as a team and interact with the students in pro-active manner to achieve our institutional quality objectives and fulfill all academic , statutory and regulatory requirements to continually enhance the satisfaction of our students. ”

VISION



MISSION



QUALITY POLICY



Aditya College of Architecture established in 2013 is affiliated to Mumbai University, India. Since its inception, the college has continuously been working towards a vision to take architectural education ahead of traditional curriculum and achieve higher goals in grooming better professionals every year. The primary objective of the school is to create 'global practices with local concerns' to achieve excellence in architectural design, practice and profession.

The campus has infrastructure comparable to the best in the world. An ideal environment for exploring new ideas that encourage creative and independent thinking of young minds. It also provides platform for promoting innovation and research for students and faculty. The pedagogy of the school is building professional capacity and cherished individual interest of the student.

With the vision that educating professional requires close coordination of industry and academic the institute encourages collaboration with eminent academicians and industry professions in the way of conducting workshops, seminars, and webinars in the present pandemic situation. The Institute has collaborated with Sri Lanka Institute of Architects by the way of exchange program and combine studios.



ABOUT ACA

This year Aditya College of Architecture (ACA) brings its 2nd International Design Research Conference (IDRC) with the theme 'Monadic Architecture', an attempt to derive at a plethora of design solutions using the concepts of modularity and self-similarity. Since the historic periods, the modularity involvement has gained extreme importance in the realm of architectural morphology of masses and spaces. Apart from being an economical and simplified approach, monadic designs come with the characteristics of easy prefabricated construction, simplified manufacturing, addition, and replacement thereby, leading to mass-production. This sustainable design approach also allows for incrementality and expansion, and hence turns cost-effective. Monadic architectural style is applicable at any scale from interior furniture design, facade, and fenestration designs to building spaces at any geographical context. The IDRC 2021 therefore endeavors to explore monadic or modular architectural design features, thereby contributing towards a sustainable built environment.

The IDRC conference intends to cover an array of topics that enables students, researchers, academicians, and practitioners, to express their thoughts, hypotheses and ideologies and demonstrate their designs through research and practice. It will also enable notable speakers to showcase their experience, expertise, and knowledge on the subject.



ABOUT IDRC

Theme:

Monadic Architecture

Sub-themes:

- 1. Monadic modules- relevance and application under architecture, urban planning, urban design, landscape and product design in contemporary times***
- 2. Modularity in architecture and planning***
- 3. Types and prototypes of the built and unbuilt***
- 4. Exploring geometry-space and form as units of measurement***
- 5. The play of fractals in monadic architecture***
- 6. Monadic modules for socio-culturally and/or climate responsive architecture***
- 7. Mitosis of modules-contribution to technology /structure/policy framework under architecture, urban planning, urban design, landscape and product design.***



ABOUT IDRC

2nd INTERNATIONAL DESIGN RESEARCH CONFERENCE

“Monadic architecture”
Mumbai – December 18th, 2021.

SCHEDULE - 18th DECEMBER 2021

Session details	Session timings	
Inauguration of the IDRC 2021	08:45 - 09:00	
Welcome address by the Principal	09:00 - 09:10	Ar. Rita Nayak
Address by Guest of Honour	09:10 - 09:20	Dr. Vinod Patil - Director - Board of Examinations and Evaluation, University of Mumbai.
Address by Chief Guest	09:20 - 09:30	Shri Vinod Chithore - Chief Engineer (DP) MCGM
Inauguration of IDRC by Chief Guest	09:30 - 09:40	
Inauguration of IDRC compendium of selected abstracts by Chief guest	09:40 - 09:50	
Inauguration of Students exhibition and student magazine by Guest of Honour	09:50 - 10:00	Dr. Vinod Patil - - Director - Board of Examinations and Evaluation, University of Mumbai.
Address by Key Collaborators	10:00 - 10:15	1) PEATA - Shri Samir Hingoo; 2) COA TRC - Prof. Jayashree Deshpande 3) IIA – Ar. Nilesh Dholakia
TEA BREAK - 10:15 - 10:30		
About IDRC		Ar. Rasika Chodankar
KEYNOTE SPEAKER	10:30 - 11:15	Dr. Muhammad Nur Fajri Alfata - Researcher.
Q and A concluding remarks		
EXPERT SPEAK		
Speaker	11:20 - 12:05	Ar. Sachin Rastogi – Founding Director and Principal, Zero Design Lab.
Q and A concluding remarks		
Speaker	12:15 - 01:00	Ar. Shantanu Poredi - Architect Urbanist - Co-founder, MO-OF Architects.
Q and A concluding remarks		

ONLINE CONFERENCE DATES

18th December 2021.

VENUE

Aditya College of Architecture,
 Aditya Educational Campus,
 R M Bhattad Road, Ram Nagar,
 Borivali East, Mumbai,
 Maharashtra – 400 092.

REGISTRATION

20th August 2021.

CALL FOR PAPERS

Abstract Submission

20th September 2021.

FULL PAPER SUBMISSION

08th November 2021.

FURTHER DETAILS

Registration Link

<http://adityacampus.org/idrc/>

Email

idrc2021.aditya@aditya-arch.edu.in

Call

+ 91 22 6110 6135.

CONFERENCE CO-ORDINATOR

Ar. Rasika Chodankar

Associate Professor
rasika.c@aditya-arch.edu.in

IN ASSOCIATION WITH



2nd INTERNATIONAL DESIGN RESEARCH CONFERENCE

“Monadic architecture”
Mumbai – December 18th, 2021.

SCHEDULE - 18th DECEMBER 2021

LUNCH BREAK - 01:00 - 01:30		
Introduction of Review committee	01:30-	
EXPERT SPEAK	02:00	
Reviewer 1		Dr. Shilpa Sharma
Reviewer 2		Dr. Priya Choudhary
Research Paper presentations	02:00-03:00	Ar. Samreen Sultan (PhD Student participant) Ar. Sanyogita Murkumbi (PG participant) Ms. Senasige Chalani Janesha De Silva (UG Participant) Dr. Iyer Vijayalaxmi Kasinath (Academic Participant) Mr. K D Ruchira Prageeth Amarsinghe (UG Participant) Mr. Omkar Sanap (UG Student Participant)
Introduction of the COA TRC Workshop	03:00 - 03:30	Ar. Fatema Kabir
Selected paper presentation		Ar. Suhasini P Ar. Saniya Aafreen S
TEA BREAK 03:30 - 03:45		
About IDC		Ar. Swati Ray
IDC - Review and Announcement of the IDC winners	03:45 - 04:00	IDC Jurors
Valedictory	04:00 - 04:15	Ar. Samir Hingoo
Vote of thanks and end of the event	04:15 - 04:30	

ONLINE CONFERENCE DATES

18th December 2021.

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Ar. Rasika Chodankar

Associate Professor
 rasika.c@aditya-arch.edu.in

IN ASSOCIATION WITH



A Leader is one who shows great perseverance, integrity, determination. They are the ones with the ability to guide and encourage others to achieve their goal. However, it is the traits of mental strength, high moral character, authority, and ability to find new solutions that forces others to look up to them.

Aditya College of Architecture (ACA) is fortunate to have such a leader. Our chairman, Shri Harishchandra Mishra, a leader who is proactive and driven by his passion for education. One that effectively takes his team along with him to scale the heights of success.

It gives me immense pleasure to see how Aditya College of Architecture has flourished with its abundant academic knowledge, immense industry exposure, and innovative strategies in the field of education and research.

I heartily congratulate Aditya College of Architecture for organizing the 2nd International Design Research Conference 2021 (IDRC) on the theme "Monadic Architecture." This year, IDRC aims to highlight the architectural need of the society by utilizing the concepts of fractals and modular features to derive at simple, sustainable, time-efficient, and cost-effective architectural design solutions.

We hope that IDRC 2021 will educate and nourish everyone with valuable message and insight. I wish all the prosperity and fortune to the institution and to the students who will take the baton ahead, to illuminate the world with their spark.

On behalf of Aditya College of Architecture, I wish International Design Research Conference 2021 a grand success. May our team succeed in transferring knowledge.



**Shri Harishchandra
Mishra**

Founder Trustee &
Chairman

Message From Founder Trustee

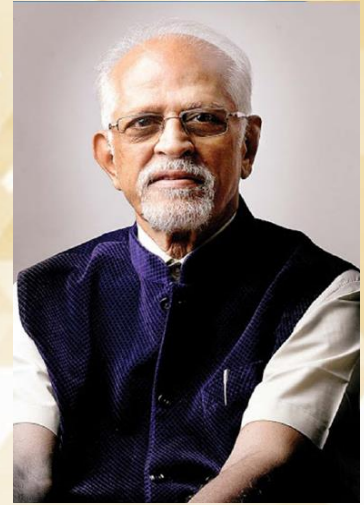
As a Mentor of Aditya Collage of Architecture for last 9 years, I take great pride to keep on record that the college, after successfully organizing International Design Competition consecutively for last 7 years and launching the 1st International Design Research Conference in 2020, is majestically organizing 2nd International Design Research Conference on 18th December 2021.

The management, faculty and students deserve all praises and compliments for spending their enormous time and putting their efforts for the success of conference, in-spite of calamity of pandemic. ACA is known for its vision and has been nurturing its students making them think out of the box. A plethora of themes for last all IDCs proves the truth. The theme selected for the 2nd IDRC 2021- "Monadic Architecture" is the record very apt for current global situation.

Understanding the need of the time, ACA came forward and shouldered the responsibility to bring all concerned together to deliberate on the design challenges mentioned under respective sub themes.

I hope that this year's conference will prove to be useful and derive at design solutions that are sustainable and humane by using modular design features, which can later be placed before the concerned authorities in State and Central government.

I wish the Conference a grand success.



Ar. Gurunath Dalvi

Mentor & Advisor

Message From Mentor

The concept of modularity has been with us for several years, yet 'monadic architecture' seems to be rarely ventured in the world of architecture. However, many architects and builder communities have worked and are working with this type of architectural designs, and hence, its most characteristic advantages are gradually permeating the public.

But what is monadic architecture? We can define it as design based on modules, elements that are equal. This differentiates them not only from traditional houses, but also from prefabricated ones, with which they share certain characteristics and achieve a spatial character that is human and sustainable.

The term 'Monadic' with its characteristics of modularity, fractalness, self-similarity, scaling and never-ending is represented in architecture as a formative idea and form generator. From cellular patterns to growing grains, the concept of 'monad' or modularity can imbibe chaos and complexity on one hand and rhythm and pattern on other hand in the realm of art, philosophy, and architecture. Architects, while designing using modularity, tend to use it aesthetically, creating decorative, simple, or complex patterns which can be easily perceived by the public. This has resulted in the use of modularity concept as well as monadic architectural features in designing attractive architectural masterpieces. The concept of self-similarity also allows for greater control of the construction process, easy manufacturing, replacing, thereby making the procedure safer and more convenient, as well as more precise and easier to replicate.

With unprecedented urbanization, there has been an increasing demand for architects to build cost-efficient structures. Monadic architecture can be utilized as a concept which revolves around assembling multiple prefabricated modules to create a volume of space. By joining similar elements together in various ways, modular architecture allows for more flexibilities in design and standardized repair, thereafter, reducing time and cost.

This year the IDRC 2021 platform with the theme of 'Monadic Architecture' reached out to students, academicians, subject experts, and professionals who are sensitive towards the need of sustainable and economically viable architecture. The abstracts presented in the compendium, elucidates the various fractal technologies and modular design strategies that can be employed in varying case-studies.

On behalf of ACA, I take immense pleasure in welcoming all to the 2nd IDRC event that aims to inspire architecture fraternity towards a socio-economically viable and environment-sensitive built-environment.



Ar. Rita Nayak
Principal

Message From Principal

Dr. Vinod Patil holds a Ph.D. in Computer Management from North Maharashtra University, Jalgaon. At the postgraduate level, he completed his Master's in Computer Management from the University of Pune, 1992 with an A grade.

At present, Mr. Patil is posted as Director, Board of Examinations & Evaluation at the University of Mumbai. He has worked as Head in Examination Management at NMU Jalgaon as well. Mr. Patil was Nominated as Nodal Officer by the University for successful implementation of the E-Suvidha Project.

Dr. Patil has Presented his research & papers at renowned conferences including National Conference on Research Trends in Computer Technology organized by B.P. Arts College, Chalisgaon and International Journal of Research in IT, Management and Engineering. He has received the 'BEST PAPER AWARD', at the national conference at Ramanand Arya D.A.V. College, Mumbai



Dr. Vinod P Patil

Director, Board of
Examinations & Evaluation,
University of Mumbai

Guest of Honour

Mr. Chithore has pursued B.E. (Civil) from Amravati University in 1987. Thereafter worked with 3 Pvt. Companies including “Hindustan Construction Co. Ltd”. Worked with MHADA as Assistant Engineer for 2 years & further joined MCGM in 1990. He has worked with more than 7 Engineering Departments in MCGM since 1990 and also worked as DMC (Special Engineering), Director (Engineering Services & Projects).

At present, Mr. Chithore is posted as Chief Engineer Development Plan. He & his team are dealing with the approval of building plans in the City of Mumbai within MCGM as a Planning Authority. He was awarded various appreciations by MCGM, GoM & World Bank under Ease of Doing Business.

The initiative of Online Building Plan Approval System under a single-window is initiated by Mr. Chithore under the guidance of the Municipal Commissioner, with the directions from Govt. of Maharashtra & Govt. of India.

He has worked as Director (Engineering Services & Projects) wherein a lot of policies are made for the benefit of the citizens of Mumbai. He has completed more than 31 years of service in MCGM.



Shri. Vinod P. Chithore

Chief Engineer
(Development Plan),
MCGM

Chief Guest

We here at ACA are proudly launching the 2nd International Design Research Conference (IDRC 2021), along with the constant success of our International Design Competition. It gives me an immense pleasure and I also feel honored to be a part of this venture while leading as well as working with a team of passionate and hard-working colleagues. For IDRC 2021, we decided to opt for a relevant and meaningful theme- Monadic Architecture. The concept of 'Monad' or modularity or self-similarity has been prominent since ages in the architecture realm, with an aim to derive at a plethora of simple design solutions.

The 2nd IDRC 2021 conference has reached out to international extends, where eminent architects from India, building scientists from Indonesia and other nations have been invited. We strongly appreciate our collaborations and associations with such industry stalwarts, whose work strongly sync with our theme at large.

Like last year (IDRC 2020), this year, we have received immense response from the architectural fraternity. We are thankful to the enthusiastic participants and to the esteemed review committee for their continuous effort and commitment. The plethora of topics selected by the researchers based on the sub-themes of the conference highlight the need, significance and sensitivity felt by the community about this concept. It strengthens our ideas to nurture the ideas within ourselves as mentors, for upcoming generations.



Ar. Rasika Chodankar
Associate Professor

**Message
From IDRC
Coordinator**

Modular architecture or “modularity in design” is a design approach that subdivides a system into smaller parts called modules or skids that can be independently created and then used in different systems. A modular system is characterized by functional partitioning into discrete scalable and reusable modules, rigorous use of well-defined modular interfaces, and making use of self-similar standards for interfaces.

The direct benefits of modular design are flexible in design and reduction in costs, while combining the advantages of standardization with that of customization. Through modularity, a plethora of designs can be achieved, which will be cost saving in design and construction. Thus, modularity is pushing out the productivity frontier in design creation. Within a modular system, the array of hypotheses underlays a reference frame with production control and scale purposes, that nonetheless enables variability in the outputs. Modularity of physical components is conceivable under a discrete aegis, which envisions a potential complexity achievable in the fashion of the discrete math of algorithms. Research in modularity in the context of the built environment has been following three main trends: (1) deepening on to the nature and/or features of module(s), from which a network of relations can evolve to create a range of shapes; (2) focusing on modular applications, i.e., in the engineering and assembly processes implied for modular structures to be brought about in real-life applications; (3) onto broader aspects of modular systematization. Further research should be executed on a synthesis of these concerns, as it deepens to the modular nature of the study object while addressing its applicability in varying fields.

The theme for IDRC 2021 conference ‘Monadic Architecture’ or modular architecture is to investigate modular design features to derive at innovative, simple, and sustainable design solutions.



Dr. Ahana Sarkar
Assistant Professor

**Message
From
Publication
In charge**

Monadic Architecture is a term derived from the word 'Monad' which means a single unit. This year's IDC as the name suggests is based on the manifold of prototype units to achieve a spatial character that is human as well as self-sustaining. When imaginatively formulated, Monads, can contribute algorithms that range from a single volume of space, scaling up to form the urban fabric of a city. As our cities continue to grow and expand rapidly, there has been an increasing demand for architects to build and design structures that provide more effective solutions. The benefits of modular design are universal, giving flexibility in design, reduction in costs and efficiency of time.

We at ACA believe that the time has come to introduce Monadic architecture in the contemporary domain as an undeniable answer to meet some the rural and urban building needs.

This year's IDC 2021 was an attempt to inculcate this need of the future and encourage young minds to embrace this method of design evolution.

The Competition brief involved the conceptualization of a singular unit and its replication to resolve a pertinent issue of the participant's home country. We received several entries across five continents addressing serious issues like refugee housing, mid income housing and rural education.

We do hope that through this platform we have been able to inspire young minds towards a more socio-economically responsible built environment.



Ar. Swati Ray

Associate Professor

**Message
From IDC
Coordinator**

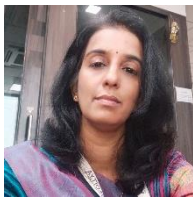


Ar. Rita Nayak
Principal

IDRC TEAM



Ar. Rasika Chodankar
IDRC Coordinator



Ar. Varsha Swar
Research Paper & Conference



Dr. Ahana Sarkar
Publication In charge



**Ar. Samreen
Khanam**



**Ar. Sasmit
Chitnis**



**Ar. Disha
Barik**



**Ar. Salman
Chouhan**



**Ar. Abhilasha
Gupta**

IDC TEAM



Ar. Swati Ray
IDC Coordinator



**Ar. Manali
Rane**



**Ar. Arundhati
Nagargoje**



**Er. Soham
Chowdhary**

About Our Speakers

Dr. Muhammad Nur Fajri Alfata obtained bachelor's and master's degrees from the Department of Engineering Physics UGM Yogyakarta and the Department of Architecture ITS, Indonesia, and a Doctorate degree from Hiroshima University, Japan.

His main research interest is energy conservation in buildings focused on thermal comfort and passive cooling. Currently he is interested in research in the field of smart buildings and the internet of things (IoT) for buildings.

He is a member of professional associations such as the International Building Performance Simulation Association (IBPSA) Chapter Indonesia, the International Association of Building Physics (IABP), and the Indonesian Association of Built Environmental Researchers (IPLBI). In addition, he is also an active member of international networks such as LETCHI (Low Energy in Tropical Climates for Housing Innovation).



Dr. Muhammad Nur Fajri Alfata

Researcher,
Ministry of Public Works
& Housing, Indonesia

Ar. Sachin Rastogi holds a bachelor's degree in Architecture from the School of Planning and Architecture, New Delhi. At the postgraduate level, he completed his Masters in Science program in Sustainable Environmental Design from Architectural Association (AA) School of Architecture, London.

At AA, Mr. Rastogi's key research interests were passive and low energy solutions for high-rise residential buildings in a composite climate which would act as a typology to improve the energy efficiency of the existing buildings.

His works towards improving the quality of life in symbiosis with the environment through the holistic lens of research, design, & construction.



Ar. Sachin Rastogi

Design Principal, Director
Zero Energy Design Lab

About Our Speakers

Ar. Shantanu Poredi is an Architect, urbanist, academician, and the founding partner of MO-OF Architects/ Mobile Offices in Mumbai. He studied at the School of Architecture at CEPT, Ahmedabad (1995). He further pursued his Masters in Architecture (Urban Design) on a J.N. Tata Scholarship grant during 1997-1998 at the Architectural Association, London.

Mr Poredi is currently a visiting faculty at Kamla Raheja Vidyavidyalaya Institute of Architecture, Mumbai where he has been teaching for the past 18 years. He has been invited to lecture and also presents the firm's work in Amsterdam, Berlin, Shenzhen along with several other cities and towns in India. His areas of interest and concern are the design of offices environments, healthcare institutions, educational institutions, exhibition design, and art collaborations.



Ar. Shantanu Poredi

Architect, Urbanist
Co-founder of
MO-OF Architects

About Our Reviewers

Dr. Shilpa Sharma holds a doctorate from RTM Nagpur University for her research on the ranga mandaps of Hindu temples of Karnataka. She has also been the national winner of the prestigious IIA Awards for Excellence in Architecture in 2018, in the category for Research for her paper, Architectural Strategies used in Hindu Temples to Emphasize Sacredness.

She is an Associate Professor, Mumbai University at the IES COA and heads the Humanities Dept., and has been the Coordinator, M.Arch. in Constr. Mgmt.

She has been involved in teaching since she graduated with a First Class from the Academy of Architecture. Along the way she took a sabbatical to pursue pottery in Delhi and was also involved with research for INTACH, Delhi. This led to an interest in environmental behavior and eventually her doctoral studies.



Dr. Shilpa Sharma

IES College of Architecture,
Mumbai

Dr. Priya Choudhary is an architect-planner and is currently working as Professor and Head of the Urban Design Department at Smt. Manoramabai Mundle College of Architecture, Nagpur. She accomplished Ph.D. from Visveswaraya National Institute of Technology, Nagpur under the guidance of Dr. V.S. Adane in 2014. During doctoral research, she was awarded Fulbright Nehru Doctoral and Professional Research Fellowship and had been to the University of California, Berkeley in 2011.

She has been actively involved in conducting Teachers' Training programs in collaboration with NIASA by the Council of Architecture, New Delhi in and outside India. She is impaneled by the Council of Architecture for research assignments.

She has vast experience in the field and has worked on many architectural designs and planning of Institutional, residential, commercial projects in and around Nagpur in the last 20 years.



Dr. Priya Choudhary

Smt. Manoramabai Mundle
College of Architecture,
Nagpur

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“PEDAGOGY OF MODULAR DESIGN APPROACH IN ARCHITECTURAL DESIGN.”

Ar.Suhasini, Associate professor, Measi academy of architecture, Chennai, Tamil Nadu

Architectural design a unique designing process that takes parts of the system and turns them into a whole holistic solution. In architecture pedagogy, what is more important is the approach towards solving these design problems at the level of a simple artifact to the level of a megastructure. The challenges are multitude, and it is imbibed at different levels incorporating the various architectural and allied technical parameters. How they integrate these various parameters, trickling down to simpler solution, integrate with the design inquest results in the eventual architectural solution. The basis to begin Architectural design start with understanding of modular design. In architectural design, the student should get well prepared in totality to cram the design complete. Students design ideas and notions are very nascent at this level and is not very complicated. To make student understand the essential of design that is building is not only monument which positions only for aesthetic reason, but it is to occupy human beings and has to be functional and meaningful connection with environment, appropriate technologies, and social structure. Modular design is rooted deep in design theory and has been used by a number of designers for a long time. In fact, Historically, in classical architecture, the diameter of a column was used as the basis for a number of modules. This paper tries to encourage design beginners how important is it to use modularity? A typical process to establish modular design approach in architectural design. The challenge of modularity to conceive the modular architecture, the advantageous when the scale and scope of the project are relatively large, conveying it as a practical and economic option. Also, the beauty of modular architecture by answering is in the way how we use modularity, to understand the objectives, concepts, benefit of modular systems with examples. What are the issues associated with modular design and in which design stage modular design to be considered and in detail How to start with modular design (1) module creation/identification, (2) interface analysis/evaluation, and (3) module selection/configuration, viz., synthesis?

“A COMPARATIVE THERMAL ANALYSIS OF COOL ROOFS IN HOT-HUMID CLIMATE, ”

Dr. Vijayalaxmi J, Hindu Haridass, School of Planning and Architecture, Vijayawada

The absorption of solar radiation by roof contributes to the heat island effect while making the indoor thermally uncomfortable. Most of the studies on building thermal performance focus on the walling material and insulation and the cool roof technology as part of the solution is not well established in Indian Context. The main aim of this study is to assess cool roofs and its thermal performance in buildings in hot-humid climate. Numerical comparative analysis is carried out to evaluate the thermal performance of four types of roofs namely tiled cool roof (Roof A), White elastomeric-coated roof (Roof B), green roof (Roof C) and a bare roof (Roof D).. The thermal analysis is conducted for the 21st of summer months on an average hourly basis. Findings revealed that the different cool roof materials has an effect on the heat transfer on the building envelope and the results obtained indicates that the performance of this passive technique for cooling the indoor environment of a building is largely dependent on the climate and construction morphology. Cool roofs have greater energy savings than conventional, heavily insulated roofs. The comparative analysis indicates that the percentage heat gain for Roof C is 18.5% on the building envelope, which remains constant throughout the summer months and is considered the most effective solution to reduce the cooling load of the building in hot-humid climate.

“READING MORPHOLOGY IN SETTLEMENTS OF DELHI: MAPPING THE BUILT AND THE UNBUILT.”

Samreen Sultan; F/o Architecture and Ekistics, Jamia Millia Islamia, New Delhi, India

Dr. Qamar Irshad; F/o Architecture and Ekistics, Jamia Millia Islamia, New Delhi, India

Unprecedented urbanization experienced by Delhi typically provokes discussion on its altering morphology. As changes in the socio-physical fabric keep happening overtime, planners are not able to gauge the pace of urbanization and morphological transformation which is evident in the latest master plans that have come up (MPD 2021). For instance, in some areas single storied buildings has been converted to a multi storied structure, hundreds of commercial areas defy the Master Plan guidelines and yet no significant research from the authorities has been able to map the evident morphological change in a systemic/methodical manner for various settlements in Delhi. Hence, an attempt has been made to read the morphology of purposefully selected settlements of Delhi. The article seeks to uncover the network changes that exist between ‘the built’ and ‘the unbuilt’ across the relevant scales of settlements based on principles/quantitative and qualitative attributes of urban morphology. This is an evidence-based study in which varied cases are selected to study the changes in urban morphology vis a vis changes in Building structures, Land uses and Urban tissue. Case of Lala Lajpat Rai Market is taken to realize the market forces bringing a noticeable change in building structures, Case of Shahjahanabad is taken to study intrusion of commercial land use into residential land use due to the changing socio-economic needs and case of Abul Fazal and Shaheen Bagh on Yamuna flood plain is taken to study the development of high density areas in an unauthorized manner which are changing the fabric/tissue of the zone gradually- guided by the changing real estate forces. The analysis of this study will be drawn upon by fieldwork that will be carried out in the spaces of above selected settlements. The fieldwork would employ two important urban research methodologies in parallel. Based on observation, “Ground Truthing method” and “ethnographic method” will be used to study the spatiality of the above selected settlements and it would be interpreted from an urbanist’s point of view to understand the on-ground situation developing an idea of the built and unbuilt layers. By inter-referencing mixed data (Google maps, historical maps, archival records, observation of interstitial space by walking and making field notes, photography, and critical drawing), mapping of the most salient and hybrid features of these spaces would be done. The mapping would later be enhanced by ethnographic method, the space would be examined from the point of view of its residents and users. This approach will rely on interviews, mapping participant trajectories, photo-ethnography, and scratch notes. Finally, in a concluding section, after collaborative documentation the authors will discuss aspects of morphology resulting in hybrid spatiality and altered building structures. The research would attempt to expose various forms of activity, both conscious and unconscious, that change the morphology of these settlements. Identified constructs focusing on the case of Delhi, would be collated at the end.

“CREATIVE ARCHITECTURE IN MASS PRODUCTIONS THROUGH 3D PRINTING TECHNOLOGY.”

Ar. Anurakti Yadav, Assistant Professor, SMEF’s Brick Group of Institutes, Pune, India

The technological improvements and the current market conditions are aligning in such a way that modular construction is now finally ready to deliver the sunlit world of speed, efficiency and flexibility. Most important of all perhaps, a global shortage of traditional building skills is causing problems for the developers making the chances of flourishing of modular technology in the market that is hungry for new methods of procurement. Nowadays the main debate is the issue of how mass-produced elements can be made to work with creative architecture. This paper presents one of the ways that might offer a solution, that is 3D printing. It includes the discussion about the potential of this technology like faster construction, more accurate production of more flexible designs, cost effectiveness, volume production, greater integration of function, and less waste produced etc through various projects.

“STUDY ON THE SUITABILITY OF GREEN BUILDING TECHNOLOGY FOR AFFORDABLE HOUSING .”

Ar. Kuntal Shah MSc. Urban Planning in Developing Countries, OBU, Oxford, UK Bachelor in Architecture, SCET, Surat, India

In recent years, gained attention and moved towards a large-scale introduction within the sustainable residential development. During this process, national and international criteria for sustainable buildings are drawing more and more attention to adopt. Architects, Planner and Policy programmers are now giving importance to putting together regulations for Green Routes.

The research provides a general overview of the present green trend in an effort to spot an appropriate approach for affordable housing, presents a selected analysis of specific cases representing differing types of Green Buildings consistent with their features in scale, location and performance.

Now government is focusing on financing affordable housing to address the housing problems of a large number of low-income residents and migrant workers is in high demand. The adoption of green building technology to improve building performance is a new requirement.

The specific service attributes of affordable housing determine its typical characteristics of low construction costs, its compact nature and short construction period, which distinguish it from commodity housing. However, the current research on the suitability of green building technology mainly focused on individual technologies or lack the capability to evaluate a given green building technology system from a comprehensive performance aspect. According to the requirements of green affordable housing, this study established a multi-objective suitability evaluation model with maturity, economy and environmental load and quality as evaluation indexes.

Limited access to fundamental infrastructure related to water and sanitation can make health conditions worse. The research further focuses on the low-energy building as an element in our society and it provides a market diffusion analysis to gain understanding of the contextualization process.

With a primary focus on new typologies, this research analyses how to create opportunities for more people to live in healthy homes adapting multidisciplinary research approach and tools. The ability to create new solutions among urban development for both energy efficient and hygienic buildings and creating opportunities for housing that is safe, healthy and affordable is going to be key to a stronger global economy when we can declare that we are past the pandemic.

“INTERPRETATION OF GOLDEN RATIO OF MAYAN ARCHITECTURE ON FUTURISTIC BUILDING.”

Sanyogita Murkumbi; Architect (PG student) Ashoka School of Planning & Architecture Hyderabad Telangana

The paper explores the fundamental system of geometry and proportion of the well-known pre-classical examples of Maya architecture and the objective is to identify the significance of the Maya geometry and Golden ratio in various forms of sacred spaces of their cosmos by using the same geometry to layout and design their architectural physical environment as well as their vernacular houses, altars to complex geometrical formulae used to design great pyramids, temples and the exquisite artworks of Ceremonial centers’, analyzing its importance and potential to designers in future architectural design.

The methodology of the study included understanding and analyzing visually the classic and modern Maya structures, elements contributing to the beauty of Maya geometry and architecture may be extensive use of the geometry and golden mean, content analysis by studying the use of geometry and aesthetics in design and identify the use of the Golden Ratio as a measure in architecture, case studies of soaring pyramid temples and ornate palaces across Mesoamerica represent a zenith of Maya art and architecture and its influence on the successive buildings. Throughout the observation of diverse components and rhetorical distinctions, elements of Maya architecture have become an important key to understanding their religious beliefs and culture as a whole.

The paper attempts to investigate the interpretation of these principles to explore and evaluate harmony design which is closely associated with mathematical relations, Designers can utilize these methods to study and engage the geometrical concepts and apply Golden Ratio in the architecture of futuristic buildings.

“DECODING THE MONADICITY AND MODULARITY OF TAMBOUR UNITS ”

Sankeerani Shrinivasan, Associate Professor, School of Environment Architecture And Design, SRMIST, Ramapuram, Chennai

In contemporary Indian living, the area of liveability is slowly minimising due to the rapid growth of population. Residences are today more towards compactness and effective accommodation in optimal space. Every city today is vying for more household units and in this process reduces the super built up area which in turn evades in the carpet area. Kitchens have become compact.

Modularity of kitchen gained momentum in the start of the previous decade and since then has been researched at varying levels. Modularity is a combination of multi utility monadic units. One such versatile unit is the tambour. Tambour units are not just functional, they are easily adaptable to the aesthetics of the design. Tambour can camouflage with other units and also be a standalone unit in any kitchen design making it a designer's personal favourite. It is one of the most user friendly, aesthetically enviable module that deems to play various roles as per the user's choice.

This paper traces the usage of the monadic yet modular, versatile, pliable quality of Tambour Units in Indian kitchen through case study of 5 Indian kitchen designs in compact apartments of 2BHK and 3BHK MIG strata through contextual inquiry after probable sampling analysis, comparing the efficient usage of spaces with tambour unit in various multiple ways. Analysis is dependent on various factors like size, shape, concept, planning etc. and focuses on Tambour as a monadic module.

Indian Kitchens have their set of parameters according to cultural and geographical background. How monadic module like a tambour efficiently elevates the space planning is the crux of this paper.

“COMPARING DIVERSITY IN AN OLD CITY WITH ITS NEW CITY – A CASE OF SHAHJAHANBAD AND NEW DELHI.”

Aishwarya S, B.Arch student, TKMCE, Kollam

More than half of the world's inhabitants live in cities. Yet, why do some cities seem more vibrant and livelier than others? To acknowledge this, we should understand the facts that makes the cities vibrant and diverse. The existing belief in city planning has been replaced by diversity. Are planned districts natural homes to diversity like organically evolved historic cities or is it just a coincidence?

Ultimately people want their cities to be great places to live and work. Throughout history, comparative analysis of cities has been one of the eminent sources of insight into the characteristics of the lifestyle of city dwellers. The aim of this study is to analyse and find the diverse city among a historic city (Shahjahanabad) and its new city (New Delhi), both born in similar context. Furthermore, to find the strategies to be adopted while planning a new city aiding the city to sustain and prosper on its own.

Different types of supporting diversities in cities were identified and the comparison is done based on the diversity conditions outlined by Jane Jacobs. For the comparison, the significance of time spread is taken into account for both cities.

Comparing the different aspects of diversity in terms of functioning in Chandni Chowk of Shahjahanabad (historic city) and Kirti nagar of New Delhi (new city), it was found that the old city of Shahjahanabad breed more diversity in different ways that impact neighbourhoods and social life. Thus, proving the hypothesis that “old cities are more diverse and vibrant than new cities”.

“AN EXPLORATION OF CO-WORKING SPACE AS AN OFFICE SPACE TYPOLOGY WITH SPECIAL REFERENCE TO COLOMBO.”

K.D.R.P Amarasinghe- student, Dr. R.M.K.U Rajapaksha- Senior Lecturer, Bachelor of Architecture, University of Moratuwa, Sri Lanka

In the modern developing world, new designs and techniques have been implemented to improve the standards and quality of the designs. There are several types of buildings, with office buildings being the most common. Co-working spaces are a growing trend in office space development. The employee is the person who is most affected by the workplace's physical, psychological, and social conditions. Based on worker satisfaction and prevailing concerns, the study assesses the effects of time on a construction trend that was recently introduced to the industry. The study's primary goal is to comprehend the fundamental factors that influence user satisfaction and investigate the links between worker satisfaction and the physical work environment. Employee satisfaction theories guide the literature review. The research is being conducted in three different co-working spaces in Colombo's commercial urban area.

A survey is done with an equal number of employers with each co-working space based on architectural factors of working space satisfaction level and comfortability.

Using three case studies examined the characteristics of the most employer-satisfied co-working space. These findings revealed a link between co-working space employee satisfaction and Architectural design factors.

By applying these architectural theoretical principles and findings, co-working users' effectiveness could be increased. 80 %of workers desired a visual connection to nature, 20 % desired natural thermal comfort. The remainder desired mechanical, thermal comfort, 30 % preferred natural lighting in the workplace, and the rest liked adequate mechanical lighting.

“THE AESTHETIC APPRECIATION OF SNAKES: AS A LANDSCAPE ARCHITECTURAL STRATEGY TO MITIGATE HUMAN - SNAKE CONFLICT IN SRI LANKA .”

DE Silva, S.C.J., Department of Architecture, Faculty of Architecture, University of Moratuwa, Moratuwa, Sri Lanka

Sri Lanka has been identified as a hotspot for snakes which provides habitats for approximately 105 snake species with 50% endemism. Yet they are the least appreciated vertebrates that are victims of negative values and ideas which lead to the human-snakes conflict. The objectives of the study were; Studying co-relationship of people's attitude towards snakes, knowledge level, and metaphoric perspectives of snakes: Developing a landscape architectural strategy to mitigate human-snake conflict by applying those findings and Yuriko Saito's and Allen Carlson's theories of aesthetic appreciation. The data collection occurred from July to August 2020 and consisted of an online questionnaire that applied to 185 study participants according to their knowledge levels. A literature survey was conducted to examine the main factors of Aesthetic appreciation theory named Animal ethics, Positive aesthetics, and Rewilding, and to study the role of landscape architects in mitigating human-snake conflict. From the findings, I confirmed that; The lack of knowledge and the metaphorical perception of snakes are the reasons for creating human-snake conflict; The role of Landscape architects is important when finding solutions for the conflict; The main factors of Aesthetic appreciation theory called Animal ethics, Positive aesthetics, and Rewilding can be used as a landscape architectural strategy to mitigate the conflict.

“MONADIC ARCHITECTURE MEDIATES SOCIO-CULTURAL COMPONENTS OF THE OCCUPANTS AND EMPIRICAL STUDY OF SELECTIVE HOUSING TYPOLOGIES IN TAMILNADU.”

Prof.K Komagal anupama, Research scholar, PMIST, Vallam, Thanjavur

Dr.C.V.Subramanian, PMIST, Vallam, Thanjavur

Architecture is the fundamental need for human being which accomplish a range of activities including short term and long-term socio-cultural goals that sustain human habitation in our planet. Perhaps, architecture is always perceived as an outcome of a social cause filtered through values of cultural components.

For human beings, space becomes the unit of life and architecture deals with design of space for living in general and Monadic architecture in particular refers to the process of articulating spaces by repetition, of modules with purpose and meaning for living. The aspect of demarcating the physical space for different functions and activities become the embryonic framework of housing design typology. Since the design of houses is an assemblage of personal attitude, belief, intention, subjective norms and inherited cultural components like art, science, technology, values, belief systems, language, lifestyle and customs etc. The division of space is to manifest the space for its temporal effect among the occupants of the house. One significant strategy to articulate the spatial form is by repetition and variation of a range of environment stimuli.

In light of the fact, this paper discusses the effects of spatial repetition which reinforces spatial memory in architecture focusing the relationship between the purpose of monadic architecture in housing typologies and its effect on socio-cultural components like territoriality, adaptability, privacy, identity, unity and variety. From this study, it is found that the monadic architecture has strong mediating relationship among the study variables in the selected housing typologies of Tamil Nadu.

“MUD ARCHITECTURE- A COMPARATIVE STUDY OF CSEB & RAMMED EARTH TECHNIQUES IN KERALA CONTEXT.”

Unni Ammu, TKM College of Engineering, Kollam, Kerala

The rising use and depletion of natural resources is demanding the use of more sustainable building materials like mud in the construction industry. With Compressed Stabilised Earth Blocks (CSEB) and Rammed earth being the most popular modular technique among the mud techniques in Kerala, there is a need to further conduct a study on which among them proves to be the most suitable technique in Kerala context. Analysis based on a proposed set of parameters assessing these techniques right from its sourcing to its post construction aspects is done in this study so that a clear image of why and what are these techniques is conveyed to the reader. For this, previous study data were referred to understand their physical properties and environmental aspects. Interviews of three eminent mud architects were conducted to further analyse these set of parameters based on the present status of mud construction in Kerala. To validate them, case studies of mud structures, two cases for each technique were further conducted analysing these techniques: Residence at Karyavattom by Bhoomija creations, Residence at Pathanamthitta by Wallmakers, Residence at Thazhakara by Wallmakers, IHA Residence, Trivandrum by Wallmakers. Based on these analyses, all the popular misconceptions on the strength, durability and maintenance of mud structures were proved wrong. The findings indicate that lime stabilised CSEB is a better modular option than rammed earth when considering all the parameters assessed. It allows for a more modular approach towards the design where spatial geometry can be explored to its maximum.

“ARCHITECTURAL PSYCHOLOGY OF WORKPLACE DESIGN- ANALYSING THE IMPACT OF SPATIAL CONFIGURATION ON EMPLOYEE PRODUCTIVITY.”

Sandra Sreekant, B.Arch Student, TKM College of Engineering, Kollam, Kerala

People in today's world spend more than three quarters of their time in a day, indoors. It is vital for us to understand how these built spaces affects the health, wellbeing, cognitive capacities and emotions of its users. This research is based on work environments and their impact on user psychology. The main aim is to study the effects of workplace architecture on the behavioral traits of its employees, and to arrive at specific design strategies, that shall improve employee performance and organizational profit. The methodology followed is the factor-based analysis of spatial configurations and their influence on employee productivity, by means of a modular evaluation tool, i.e. space syntax. Space syntax is the predominant mode of quantitative assessment used, to study how each spatial module affects employee output in an open-plan workplace. Simulations are generated via DepthMapX, a software tool. Qualitative modes such as user surveys and literature studies are utilized to statistically record aspects responsible for employee perceptions and distractions at workplaces. Three common types of workplaces were analyzed i.e. open-plan, activity-based and hotdesking. Comparing the three via case studies, it could be concluded that activity-based workplaces were more successful in enhancing employee performance. Open-plan layout analyzed in this paper was hypothetically altered into an activity-based configuration. As per simulation graphs generated via space-syntax, altered activity-based layout offered better results in comparison with the existing open-plan. A flow chart is tabulated on the basis of these findings, to highlight various design strategies that may be adopted to improve productivity.

“FEASIBILITY STUDY OF A TOURIST CIRCUIT IN BARAK VALLEY.”

Anindya Dutta, PG Scholar, National Institute of Technology Hamirpur

Tourism is amongst the most prosperous and flourishing industries today, accounting for over 10% of the global GDP. Most Indian states have witnessed substantial flourish in this sector. Barak Valley is a conglomeration of 3 districts in southern part of a north-eastern state of India, Assam. The valley has some of the most picturesque vistas in the country. It also has a strong heritage, making it an absolute fit for tourism. The sad reality is anything but otherwise. The principal reason for this could be the lack of research of tourism potential of the valley. Though the valley does have a handful of recognised tourist spots, but the recognised tourist circuits of neither the Government of India nor the Government of Assam passes through the valley, discouraging a continuous and cyclic flow of tourist in the valley. This paper aims to identify a potential tourist circuit in the valley and conduct a feasibility study for the same. The research method is mixed in nature, using both qualitative as well as quantitative data for analysis. A break-even analysis is to be conducted for substantiating the proposed tourist circuit. Detailed interventions are to be suggested for ensuring the sustainability of the proposed circuit.

“VERNACULAR MODULARITY- CASE OF PREFABRICATED HOUSES OF MUNSHIGANJ.”

Humayra Anan, Bangladesh University of Engineering & Technology

To coexist with the scourge of endemic river erosion in Bangladesh, local builders of Munshiganj came up with an indigenous response: prefabricated and portable wooden houses which can be dismantled and relocated during disasters. Bought and sold as products in local “Ghorer Hat” (House Markets), these houses are responsive to the everchanging landscape of the erosion affected areas. Houses of “Ghorer Hat” have become a part of the socio-cultural identity as this local housing provision thrived in last three decades. But as years progressed, increasing-price of timber, hassle of deconstruction and continuous lapse of quality resulted in a steady loss of customers; pushing the local building culture towards extinction.

In this study, the local production and selling compound of these portable houses known as “Ghorer hat”, have been closely observed to understand as well as to document the local construction process and techniques. Observation of homesteads in the adjacent neighborhood tissue revealed latent modularity and scope of upgradation to fulfill the rising needs of the dwellers such as extension, customization, adaptation and affordability. Community based approach has been adopted in the process of data collection.

The conservation of the learning from this vernacular practice has been the primary strategy of this study, to serve as a resource for future investigations. There is a need for upgradation of the existing system which can maintain the cultural identity sought by its local people and ensure scope of variety to address everyone’s need of belongingness and growth. This study locates the innovation needs and explores the scope of offering improvements based on successful existing practices which can be implemented by a collaboration among the architect, the producers (local businessmen), the builders (local masons) & the users (local people).

“INFLUENCE OF MONADIC ARCHITECTURE AND ITS IMPACT ON LATEST REQUISITE IN BUILDING INDUSTRY MODULARITY IN ARCHITECTURE AND PLANNING.”

Professor- Ar. Kunnakudi V.Srinivasan, Measi Academy Of Architecture, Chennai

Innovative constructional methods adopted will steeply reduces typical redundancy of multi layered material in modular constructions. Monadic architecture elaborates in concept of Modularity, which in turn have wide approach and exponential combination of materials amalgamation. Holistic, design-driven and parametric approach to urban housing, with adaptable, sustainable and qualitative nature will be main ingredients.

Key thrust area to enhance the same and read the modality of its approach so as to favour the affordable and sustainable endurance. The importance of such need will pose volume in constructions and at the same time the time saving technology been adopted. Enquiring such provisions will definitely be technical friendly to the society and the building industry. Content exercises will be taken to adopt Low-carbon construction, a high-performance building envelope, and on-site renewable energy which enhance the sustainability of the project.

Criteria of liveability, affordability, durability and sustainability inform the development of a customizable and modular mass system, which can adapt to grid spacing and module sizes as well as to structural requirements. Prefab system with modular composition of multiple heterogeneous elements in combination will be or greater challenge. Monadic architecture has functionally de-coupled interfaces between components. In practice, this often leads to monadic architecture that is one, where the functional elements in the building are mapped one-to-one to the components of the design. This modularity brings several advantages such as reduced capital requirements and economies. Modularity in combo of Monadic approach is especially advantageous when scale and scope of the project are relatively large.

“THERMAL PERFORMANCES THROUGH KINETIC ARCHITECTURE.”

Ar. Nivedhitha A, Assistant Professor, MEASI Academy of Architecture, Chennai

The new emerging building technologies are playing a great role in the contemporary style of Architecture. The man-made and natural features are affecting the flow of resources and minimizing the performance of a building. India will be facing an energy crisis very soon due to overpopulation and to increase the energy resources latest innovations can be a great option, one such is the building skin. The approach of adding a façade treatment is highly aesthetical and even more intriguing when it offers a sustainable solution to the problems. The building envelope is an important element on which the environmental differences can be regulated. This paper discusses how the movable, yet adaptive façade treatments can improve the quality of life inside and out of the building through various conceptual studies. This dynamic façade design gives the occupants a different dimension and lets them realize the transition of architecture on the building with its high-performance energy in architectural solutions. The research methodology also attempts to understand the movement of the building elements that rapidly modify their functions flexibly, without disturbing the structural integrity and increasing the energy performance of the building. The aim of this article is to investigate the impact of Kinetic architecture as an element in façade and its effect in the interior spaces with relevance to thermal performance.

“FRACTAL GEOMETRY- A GENESIS TO MONADIC ARCHITECTURE .”

Ar.S.Saniya Aafreen, Post graduate student, Bharath University

Nature has been a mystery around us that never remains the same and never enough to be known to all. Each day and every moment we look at various wonderful examples of many inspiring and interesting natural forms. These natural forms are not aesthetical wonders but potential resources to observe, analyze and study from. A keen observation of various examples of nature will unfold its immeasurable mystery with the use of fractal geometry. Fractals are small fragmented shapes that can be subdivided into parts and these parts are smaller replicas of their whole. Historically one can see many architectural examples that exhibit fractal geometry, from Hindu temples to Gothic architecture. This paper is a study of various types of fractal geometries in nature that otherwise appear as irregularities in nature and the usage of these fractals in Monadic architectural examples. The purpose of this study is to look at the various possibilities of fractals observed in nature and the application of these fractals in the design of Monadic Architecture. The paper will advance with a preamble of various types of fractals in nature and analysis of topics which includes fractal dimensions, fractals in historic and contemporary architectural examples, and conclude with discussions that relate fractal geometry to Monadic Architecture through cited examples further in the paper. Through analysis, the main intent of this paper is to demonstrate that fractal geometry is the genesis of Monadic Architecture.

“EFFECT OF DESIGN ON HUMAN COMFORT CASE: VERNACULAR HOUSES OF PUNE DISTRICT.”

Ar. Mahesh Bangad, Assistant Professor, Department of Architecture, Dr. Bhanuben Nanavati College of Architecture, Pune

This research aims to explore and assess passive solar design techniques (at unit level) that promote high thermal comfort in vernacular houses in the District of Pune in the State of Maharashtra in India. The study of these houses provides useful insights for designing energy efficient houses (in modern times) that provide thermally comfortable conditions. An analysis of these houses in Pune District provides a context for the field research. Pune district predominantly has different styles of vernacular houses which change as per the regions. These houses were constructed, without any mechanical means, in a manner such as to create microclimates inside them, to provide high thermal comfort levels. Hence the study of thermal comfort levels in these buildings in relation to the built environment in today's context is significant. As part of data collection, interviews will be conducted with the occupants of various houses across the district of Pune. A sample size of FIVE houses (each with a different vernacular response through design to the climate) will be selected for detailed experimental analysis.

“MODULAR ARCHITECTURE: EMERGING IMMENSELY PROMINENT.”

Samruddhi Phalak, Associate Architect, Rizvi College of Architecture

In recent years, we've witnessed a surge in the usage of volumetric construction, which includes constructing as much of a structure as feasible off-site before bringing it to its final location. A typical volumetric project would be the construction of a complete room, including a bathroom, a portion of the corridor and possibly some external finishing. Even though modular architecture has been around for a long time, it appears to be a one-of-a-kind advertisement in the field of architecture. The building industry has never stopped moving forward and coupling materials and techniques, making it impossible for a disruptive movement like the modular design to gain traction. The modular architecture is based on connecting modules to create some structure. Modular homes, unlike traditional houses, are constructed outside of their final destination. Thus, distinguishing them from both traditional and prefabricated homes, through which they display some characteristics. The modules are constructed off-site and transported in the same manner to their final destination. The features of the buildings and modular homes also allow it to reduce its environmental footprint in two ways. Many architects and notable builders, on the other hand, have worked with and continue to work with this type of construction, and it appears that its most defining aspects are slowly gaining popularity among the general public. In today's world, modular architecture has become increasingly fashionable. This research aims to search how modular design has become a trend in the building business and how it has changed it.

“IMPLEMENTATION OF BIOMIMETIC INSPIRED FROM VORONOI DIAGRAM IN ARCHITECTURAL DESIGN.”

Reshma Banu S, Assistant Professor, MEASI Academy of Architecture

Throughout history, nature has served as an idea for architecture and city planners, they have tried to include the harmonious patterns of nature into architectural form because it produces very organic looking patterns, and it's also useful for space creating spatial forms in urban projects. For example, Frank Lloyd Wright, Santiago Calatrava are the best examples where their works reflect the dual skills. Multidisciplinary in Architecture will be its Future. For example, “Mathematics” integrated into the building sciences will surely be a great tool to explore various generative forms and iterations as a design part in architecture. One such nature inspired concept in the field of mathematics is the Voronoi diagram.

Voronoi diagram it is a way of division of space, and it emerges through the application of a specific operation or algorithm to a given set of inputs. In this way, the specific spatial relation between neighbouring cells depends on, and emerge locally from the given spatial relations of the specified sites.

The development of interest in geometric forms encountered in nature, and their implementation in design solutions is expanding with the help of modern computer technology has enabled the use of generative models.

The focus of the paper is that on the architectural uses of Voronoi diagrams and to explore new opportunities through the entire design process which began with site analysis to space organization.

The implementation of Voronoi diagrams within the architectural design process has been experienced through architectural project course.

“HOW MODULAR ARCHITECTURE CAN REVOLUTIONIZE INDIAN ARCHITECTURE AND BY DEFAULT THE LARGER SOCIETY,.”

Shrestha Bhadra, Saloni Jain, Undergraduate Students, B.Arch., Visvesvaraya National Institute of Technology

Modular architecture or “modularity in design” is a design approach that subdivides a system into smaller parts called modules or skids that can be independently created and then used in different systems. A modular system is characterized by functional partitioning into discrete scalable and reusable modules, rigorous use of well-defined modular interfaces, and making use of industry standards for interfaces. With the onset of Modern Movement in architecture, industrialization, mass production and standardization principles came to the fore. Modular architecture is the result of this thinking wherein creativity has been replaced by the prospect of standardized mass production of buildings at a faster rate and lower cost.

Having said that modular architecture is yet to charm its way into third world countries like India, Sri Lanka, Pakistan, Bangladesh. Yet the increasing population, space crunch and depraving economic condition means this kind of architecture might very well be a revolutionary concept in such developing countries. In this paper we explore the origin of modular architecture, the challenges this kind of practise may face in the future, the scope of such ready-made objects-from the point of view of developing countries specifically focused in India. We speak about already existing examples in other developing countries and also contemplate on whether this type of computerized form of buildings can jeopardize the traditional creativity of Indian architecture and shed some light on the economic effects this new dimension of architecture can bring about In India.

TEACHING “RESEARCH IN ARCHITECTURE”

Vasanti Londhe, Academician participant,

I observed while teaching the subject “Research in Architecture”, that this subject is perceived among architecture students as a purely theoretical subject and is not well understood by them. Hence there is a general reluctance among students to attend the classes as well as giving timely submissions.

Hence, this paper is an attempt to address this issue through studying and analysing the existing teaching methods and applying new methods to take a fresh look at the existing methods.

Various live experiments were conducted among students to get them excited about doing research in Architecture.

The result of these exercises were documented, analysed and conclusions drawn.

The conclusions were very interesting, and students truly enjoyed going through this process.

“MODULATION THROUGH JOIST AND SLAB FLOOR SYSTEM IN TRADITIONAL BRAHMIN DWELLINGS OF “DWARKA”, GUJARAT.”

Hitesh Changela, Associate Professor, IPSA, Rajkot

Modularity has been used across history, though its meaning and manifestation in architecture have changed in every tradition. This study focuses on modular space-making through specific regional construction practices and associated religious beliefs.

Dwarka is a religious town in western Gujarat, having layered history. The prominent Brahmin community resides around the temple complex, still follows cultural practices which define their dwellings. The construction of these houses is characterized by walls in limestone masonry, floors and flat-roofs in wooden joist and stone slabs, and large underground rainwater harvesting tanks.

The paper aims to decode the relation between construction modulation and space dimension in these houses. In joist and plank/slab floor system, available wooden joists govern the span of the spaces. Whereas repetition of joist governs the non-spanning dimension. The community at Dwarka have a specific belief about number joist in a space. In the house, no space can have joist in the multiplication of three. This pattern considers every 3rd number as “Yam”, which is forbidden at the end of the organizing system.

The paper will be presented in two parts. The first part will focus on documentation of case-studies, with details of construction techniques. Second will analyze the modulation of space dimension specified by the said belief system and resultant proportion of spaces.

Dwarka is a place with a scarcity of material resources and drinking water. Socio-cultural values and beliefs govern their built-form and lifestyle even today, which in turn reflect an understanding of the local environment and resources.

“STUDY OF MONADIC MODULE ADAPTED IN INTERIOR CONSTRUCTION OF TRADITIONAL MAHARASHTRIAN WADA”

Rakhee Kulkarni Joshi, Academician Participant, JNEC, MGMU

A wada is a vernacular style structure found in Maharashtra. It is basically a climatically responsive residence constructed using local material and labour.

Timber columns act as a load bearing element in Wada interiors. The spacing of these Timber columns is modular. It is in multiples of a unit called 'khan'.

This paper is an effort to understand evolution of a 'khan'. Size of timber column and dimensions of a khan depends upon resources available. The study will try to elaborate on this dimensioning of the module, khan.

“MODULARITY IN SOCIAL HOUSING THROUGH CLIMATE-RESPONSIVE ARCHITECTURE.”

Zannat Ara Dilshad Shangji, Assistant Professor, Shahjalal University of Science and Technology

The housing crisis is an issue that has been going on for decades. Rather than lowering the curve, the problem is rising upwards due to unplanned and improper housing solutions. Natural calamities caused at different times have made the scenario worse. People are losing their households and belongings including land because of floods, river erosion, and other reasons. Every year thousands of people become homeless during floods. Many villages remain submerged in floods for at least two to three months. During the monsoon season, flash floods and excess rainfall make the houses uninhabitable. The wrong choice of materials and construction techniques along with adverse climatic conditions has added a burden to this problem. To solve this long-awaited problem, people need mass production of effective housing in a short time. This study adopts a modular approach to housing that can be moved or relocated during an emergency response and analyzes the positive aspects of the climate-responsive architecture of flood prone regions to come up with a potential housing solution. The study area covers the river basin domains of Bangladesh to analyze the existing condition and find the best modular solution that will be suitable for human habitation with optimal use of local materials and low-cost techniques. Qualitative research methods would be conducted with the primary data collected through observation, interview, and questionnaire during the field survey along with the secondary data. Various software would be used in data processing to achieve the highest outcome of the study. Proper guidelines and alternative low-cost modular based solutions would be provided along with governance strategies to solve the social housing issue. This study shows how modularity can play a vital role in flood-affected areas in terms of form, function, structure, affordability, and climate to provide the easiest and quickest solution to the unsolved housing problem.

The International Design Competition (IDC) annually hosted by ACA is in its 8th successive year. The aim of the competition is to develop a sensitivity towards prevailing social and environmental exigencies, from the onset of their architectural careers. We at ACA believe that without this key trait neither can the world be ecologically restored, nor can it fulfil its ecological needs.

The IDC is a platform that reaches out to students across globe, inciting them to express through design their thoughts and notions taking nascent steps towards a better world.

This year's theme "Monadic Architecture" is based on the arriving at building solutions through the multiplication of single prototype units to create humane and sustainable built environments.

Modular architecture, we believe is in its resurgence phase and its long-term benefits of reduced waste, more consistency and economic design are well established. With this venture we believe that students across the world can gain exposure not only towards the technology adopted but also the creation of spaces that are more attune to the needs and aspirations of the users.



ABOUT IDC

List of IDC 2021 winners and their design entries:

1. *First Winner - 2021_IDC0098 - Yiqun Tang*
2. *Second Winner - 2021_IDC0059 - Sudipto Das*
3. *Third Winner - 2021_IDC0044 - Ambika Lambah*

GROWING IN THE STREET

Location: Dashilan West Pedestrian Street, Beijing, China
Project type: Individual work

IDC code: 2021_IDC0098

Standing in the center of Beijing, Dashilan has a history of 600 years. The city is developing, but this pedestrian street still maintains its old appearance, and many problems have been exposed, such as the old-fashioned atmosphere and the old environment. In this regard, this project will seek an organic renewal method to solve the existing problems of the entire pedestrian street and inject new vitality into it.

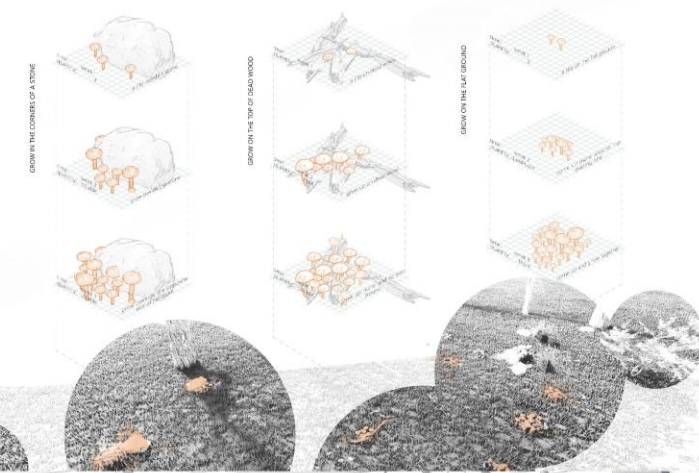
BACKGROUND

The 'street economy' in Beijing, China is regarded as a representative case of the commercial streets in the old city, but the imperfect merchant entry mechanism has led to the ecological imbalance in the commercial area. As its representative, the status quo of Dashilan West Street Commercial Pedestrian Street: poor living environment, serious aging, and lack of historical and cultural attributes.

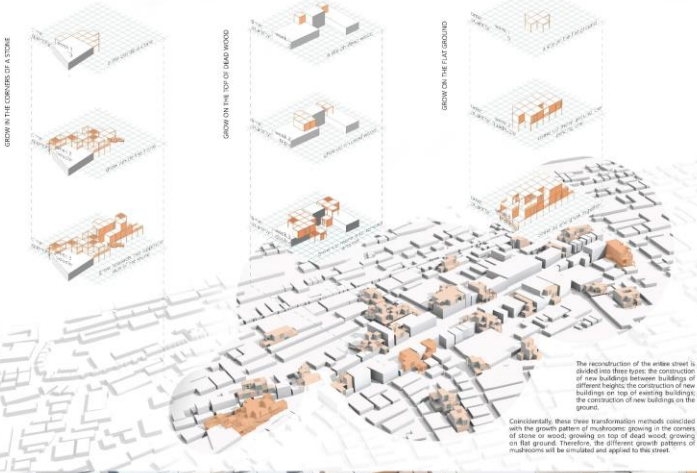
NEIGHBOURHOOD INVESTIGATION



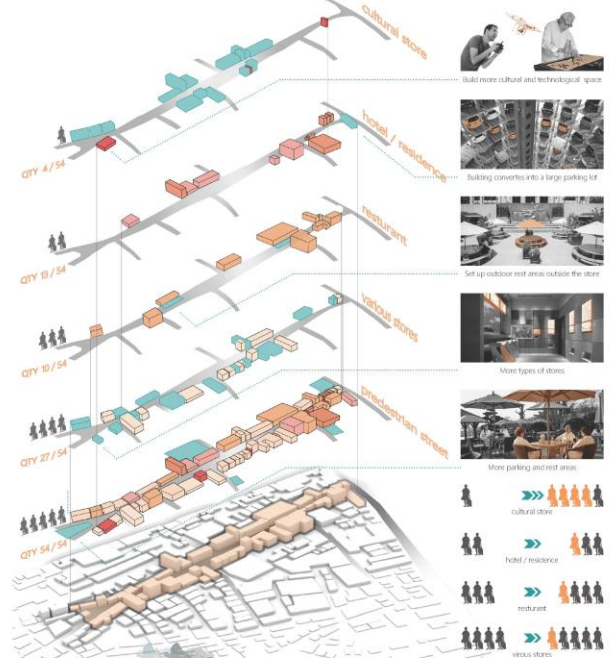
THE GROWTH PROCESS OF MUSHROOMS



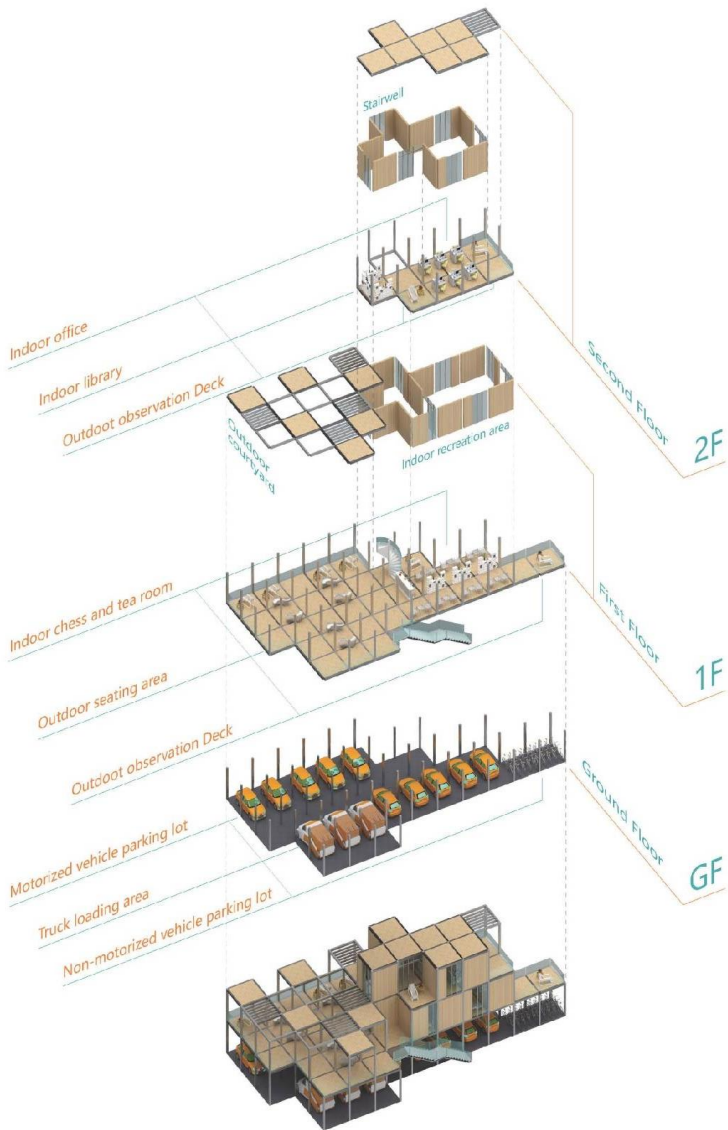
THE GROWTH PROCESS OF "URBAN MUSHROOMS"



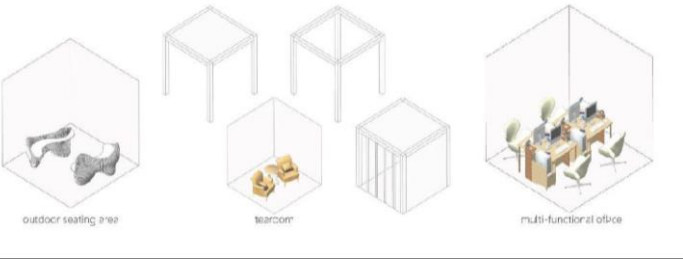
SITE ANALYSIS



EXAMPLE OF FUNCTION ANALYSIS

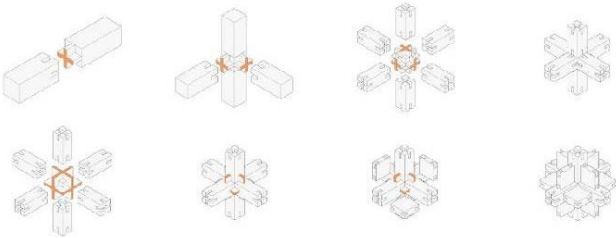


COMPONENT

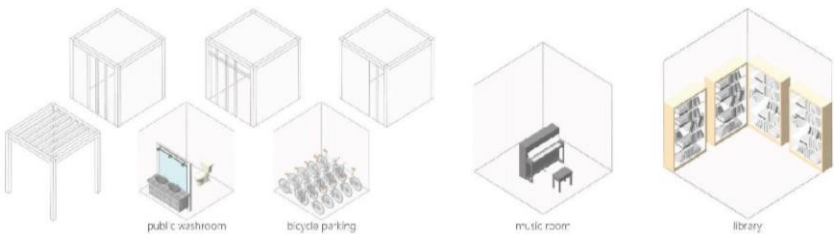


STRUCTURE NODE

The structure refers to the Chinese mortise and tenon structure, and is convenient for installation, disassembly and transformation; steel is used as the main material of the structure, and the plates that separate the space are optional, providing diversity for the entire module.



2021_IDC0098





as scaffolding for the living units.

TOWARDS A BRIGHT AND SUSTAINABLE FUTURE

Concrete block "Costly heavy not good for the environment"

Used cargo container "Cheap, lightweight, good for the environment"

Retrofitting the container for domestic use.

Adding services and furniture for daily use.

1 2 3 4

MATERIAL AND COST:
A used 20' shipping container costs about 1200 USD.
Wood planks for insulation and furniture cost about 400 USD.
Recycled steel square bars roof frames and structural support.
Floor mat and fabric made from recycled plastic and rubber.

DESIGN STATEMENT:
Bangladesh is a land of opportunities. Some 47.6 million or 30 percent of the total 158.5 million people in Bangladesh are young (10-24 years), and it will be between 10 and 19 percent by 2050. But according to world bank report Bangladesh is 168th in global ease of doing business. Throughout the world young entrepreneurs and visionaries like Mark Zuckerberg, Elon Musk have shaped the world that we live in now. But Bangladesh young talents are finding it very difficult establishing their startups due to proper guidance, facilities and services.

THE INCUBATOR provides the young populous in Bangladesh with a low-cost option of living close to their workplace and adequate services like fast Wi-Fi and network connection, easy global transaction access and a co-operative and congenial environment with both creative professionals and marketing professionals.

The built form incorporates used and recycled materials into the building process and decreases its carbon footprint at its birth. Ensuring proper ventilation and natural light its dependence on electrical energy sources is greatly mitigated. Moreover, it encourages collaboration between different professionals that can result in the growth of multi-disciplinary start up and business effort which will certainly be beneficial to our country's economic development as a whole.

TOTAL UNIT COST
approx 2000 USD

50 Housing units made from used cargo containers.

Elevated planes on top of living units for interaction.

Ground plane for gathering and indoor games.

PLAN at 4500 mm

SCALE 1:150

PLAN at 10500 mm

SCALE 1:150

2021_IDC0059

SPATIAL ORGANIZATION

SECTION AA'

- GREEN PAVED ROOF WITH TREES AND FLOWER GARDENS ENCOURAGING SOCIAL AND COMMUNAL GATHERING.
- LIVING SPACES ALONG WITH LIVELY CORRIDORS AND SMALL COURTYARD TYPE SPACES FOR INTERACTION BETWEEN INDIVIDUALS OF DIFFERENT CREATIVE PROFESSIONALS.
- VIBRANT COURTYARD EMBODYING DIFFERENT ACTIVITIES.

SECTION BB'

- VERANDAS FOR LIVING SPACES FOR BOTH PUBLIC AND PRIVATE GATHERINGS.
- ELEVATED LOOK OUT PLANES FOR MULTI DIMENSIONAL VISUAL AND VERBAL COMMUNICATION.
- REMINISCENCE OF TRADITIONAL SUN LIT AND VIBRANT COURTYARD ADAPTED INTO MODERN CUTTING EDGE BUILT FORM.

SECTION CC'

- OPEN STAIRS ENCOURAGING SOCIAL INTERACTION AND INSPIRES PEOPLE TO MEET AND GREET RATHER THAN LIVING CONFINED TO THEIR OWN LIVING SPACE.
- DIFFERENT INDIVIDUALS WITH DIFFERENT PASSIONS AND KNOWLEDGE LIVING SIDE BY SIDE INSPIRING CO-LEARNING AND CO-SHARING.
- WELCOMING ENTRY FROM ALL SIDES SO THAT PEOPLE FROM ALL WALKS OF LIFE CAN HAVE EASY ACCESS TO THE INCUBATOR.

SECTION DD'

- ROOF GARDENS AND TREES PROVIDING OXYGEN AND OPEN PUNCHES IN THE BUILT FORM PROVIDES DAYLIGHT IN ALL THE INDIVIDUAL LIVING SPACES.
- SPACE EFFICIENT STUDIO LIVING SPACES THAT MAKES ROOM FOR LARGER OPEN SPACES IN THE BUILT FORM SO THAT TALENTED PROFESSIONALS ARE ENCOURAGED TO PRACTICE PEER LEARNING RATHER THAN LIVE IN SECLUSION.
- OPEN SPACES IN THE BUILT FORM TO ENSURE ADEQUATE WIND CIRCULATION AND VENTILATION.

SITE PLAN

PLAN AND ACTIVITY PATTERN

FORM GENERATION AND SPATIAL PLANNING

CLUSTER LAYOUT

SECOND FLOOR PLAN

THIRD FLOOR PLAN

FIRST FLOOR PLAN

ROOF PLAN

SECTIONAL PERSPECTIVE

AXONOMETRIC PLAN

ROOFTOP GARDEN

VERANDA

COMMUNAL SPACES

COURTYARD

ENTRY

DWELLING UNITS

COURTYARD

CONNECTIONS

STAIRS

2021_IDC0059

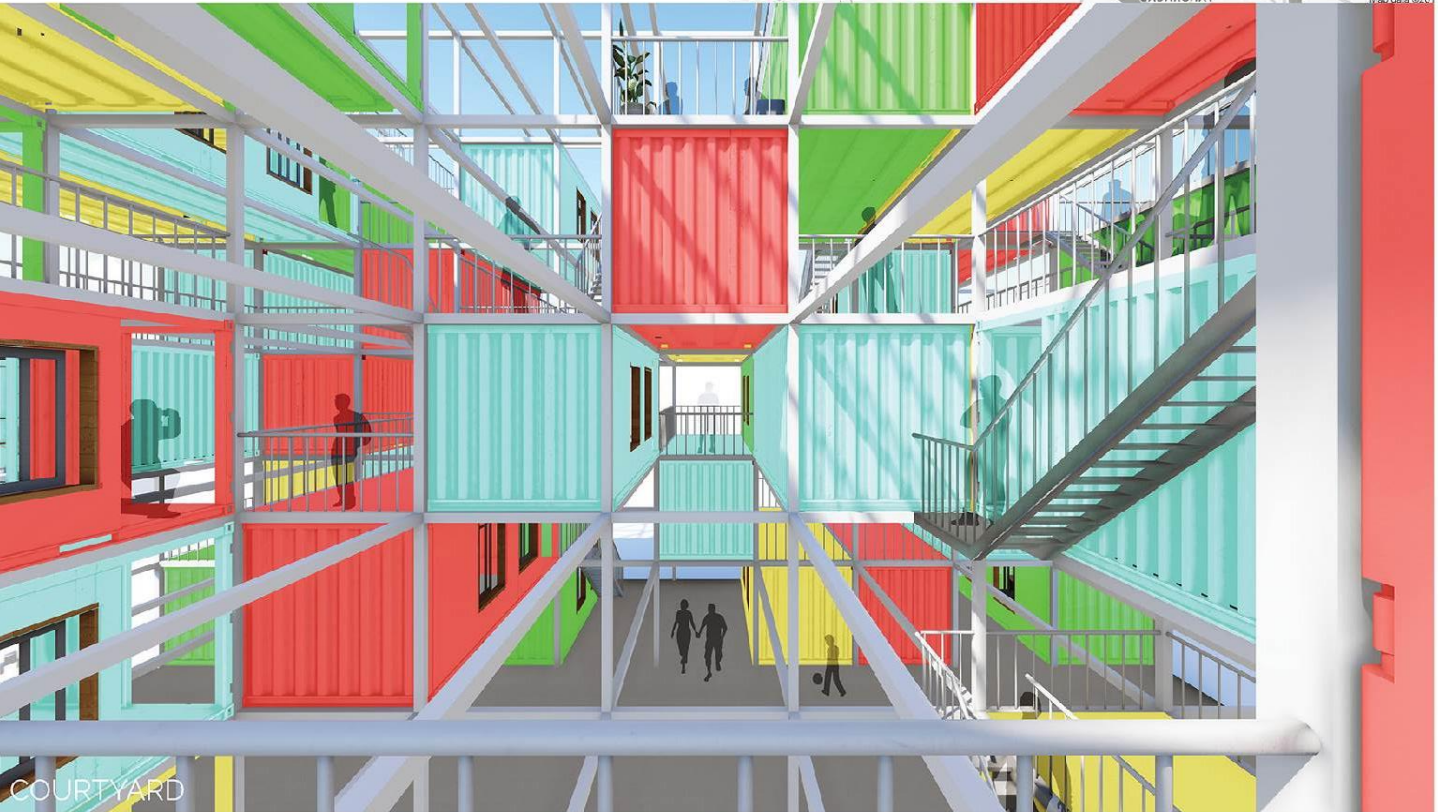
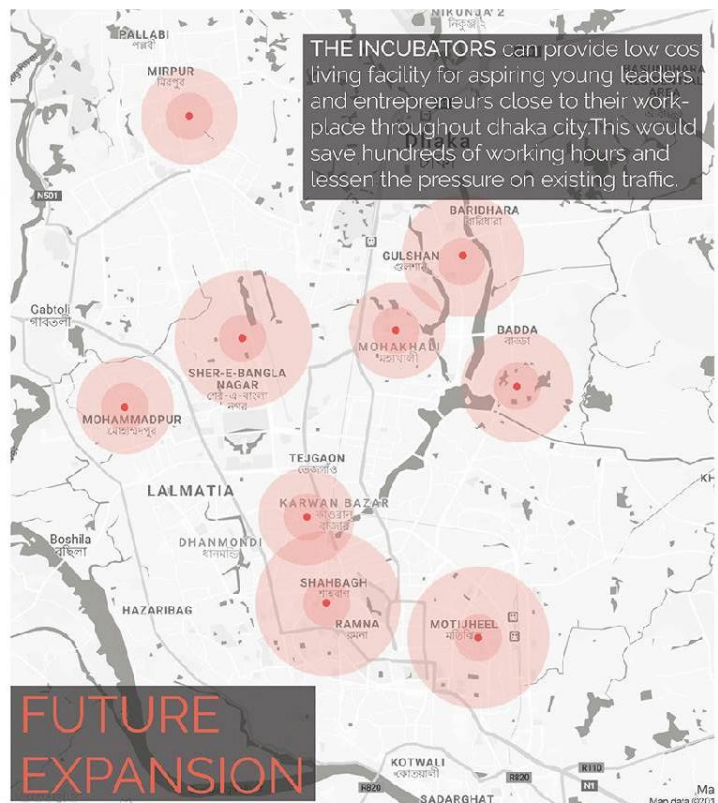
COUNTRY: BANGLADESH

COLOUR PHYSIOLOGY

Colour is an important part of design and it effects on our perception of other things. As the incubator is home to the youngest and brightest of our country, I tried to make their homes enriched with vibrant colors. Colors that inspire passion, drive for innovation and will to do something new and different.

The young bachelors in Dhaka city face a lot of difficulty in procuring a suitable living space. Most often they seldom get to see nature's colors being confined with solid walls. The incubator provides them with the blue skies, green trees and lively colors that creates an environment of co-operation and co-learning.

THE INCUBATORS can provide low cost living facility for aspiring young leaders and entrepreneurs close to their workplace throughout dhaka city. This would save hundreds of working hours and lessen the pressure on existing traffic.





COURTYARD ENTRY



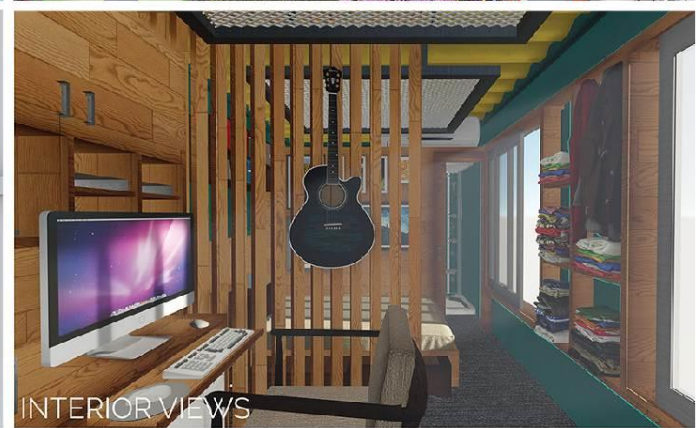
STAIRS LEADING FROM COURTYARD



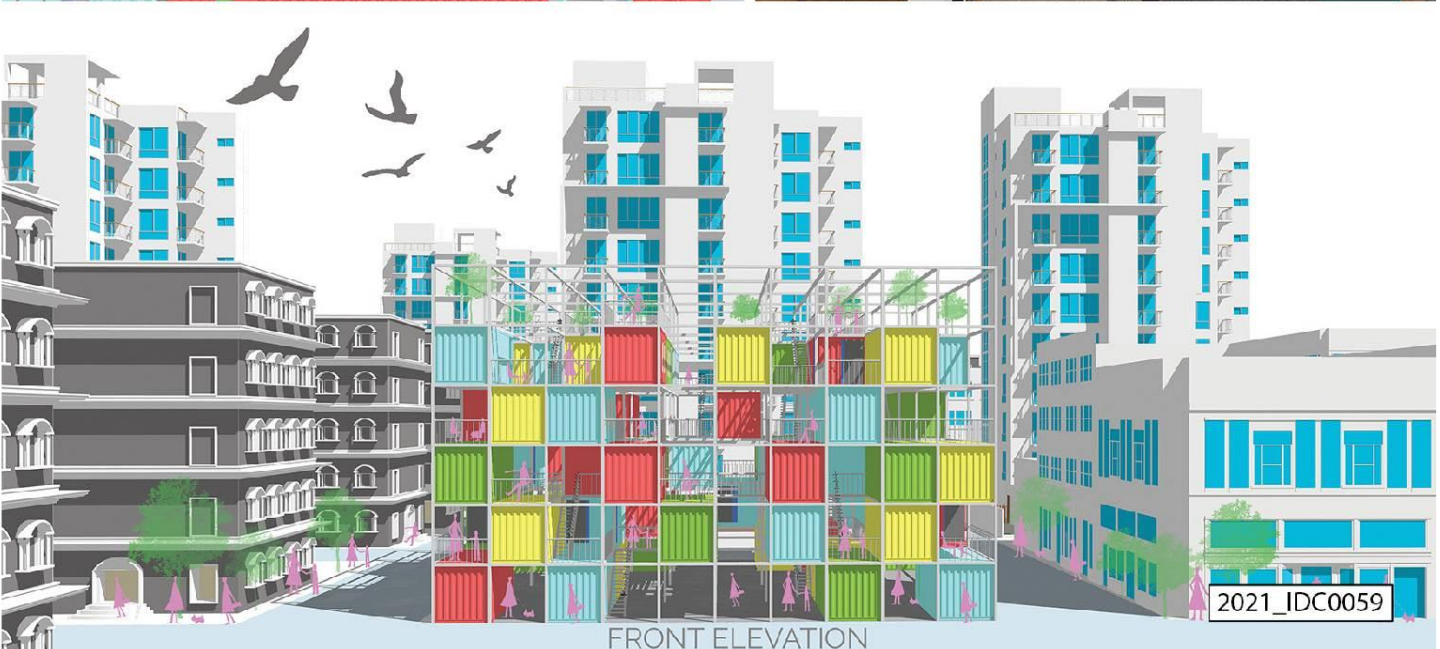
ROOF TOP VIEW



VERANDA SPACES

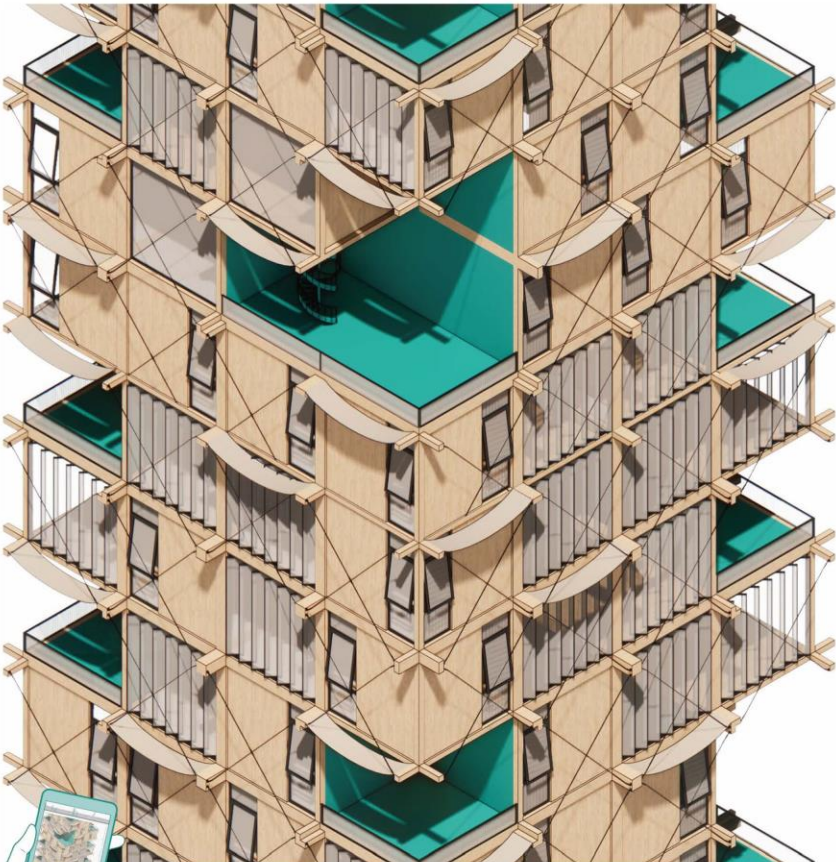


INTERIOR VIEWS

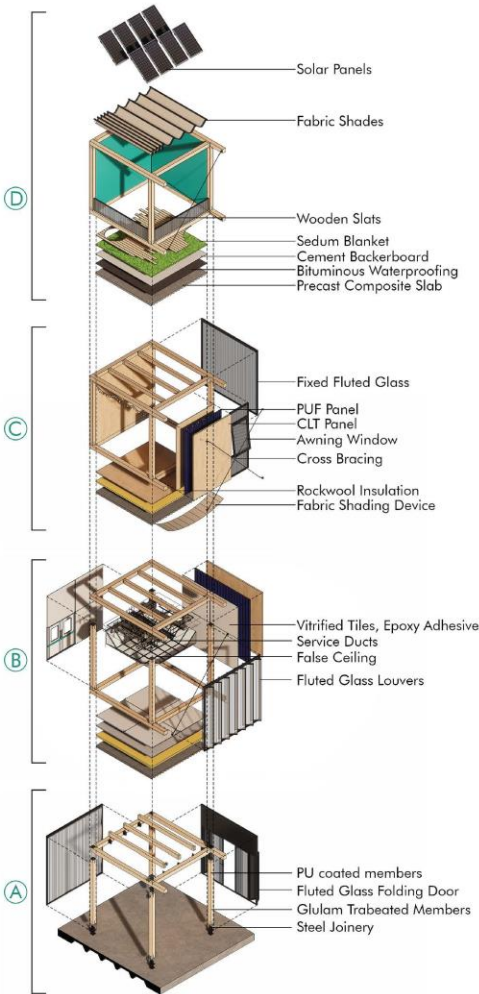


FRONT ELEVATION

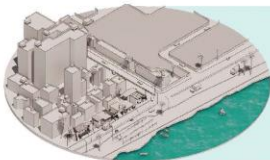
MEDICAL MODULES



Hospitals are the ideal program for the use of prefabricated modular configurations for they require a higher degree of flexibility. Integrating this fast-paced and affordable method of construction with considerations of the local context, this project lies on a site in Khar (West) Mumbai. A Children's Hospital with green voids on each level, providing respite to its users and exhibiting vibrant materiality in order to engage its young visitors.



CHILDREN'S HOSPITAL IN KHAR (WEST), MUMBAI



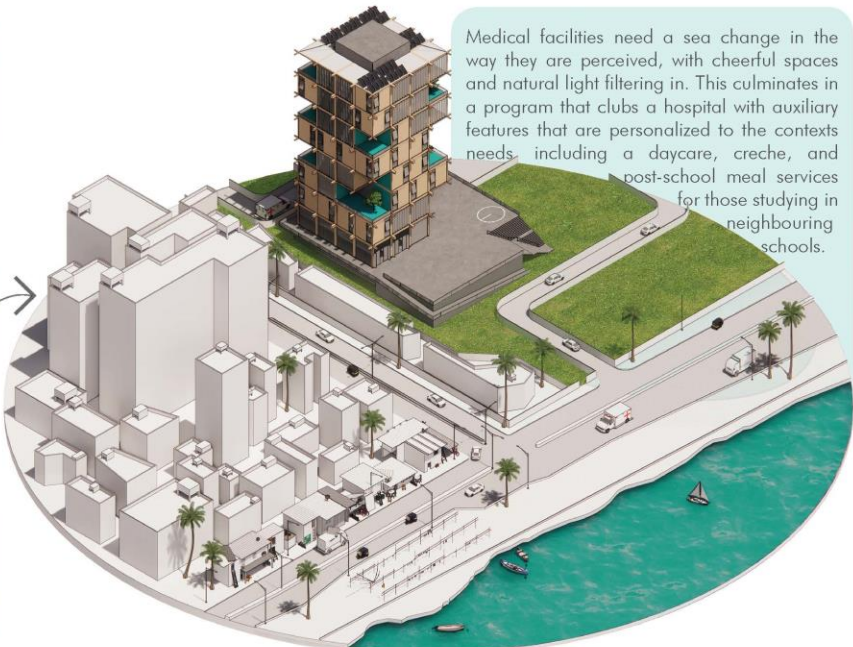
A range of socio-economic groups in the context implies that the structure has to provide affordable health-care to a range of patients.



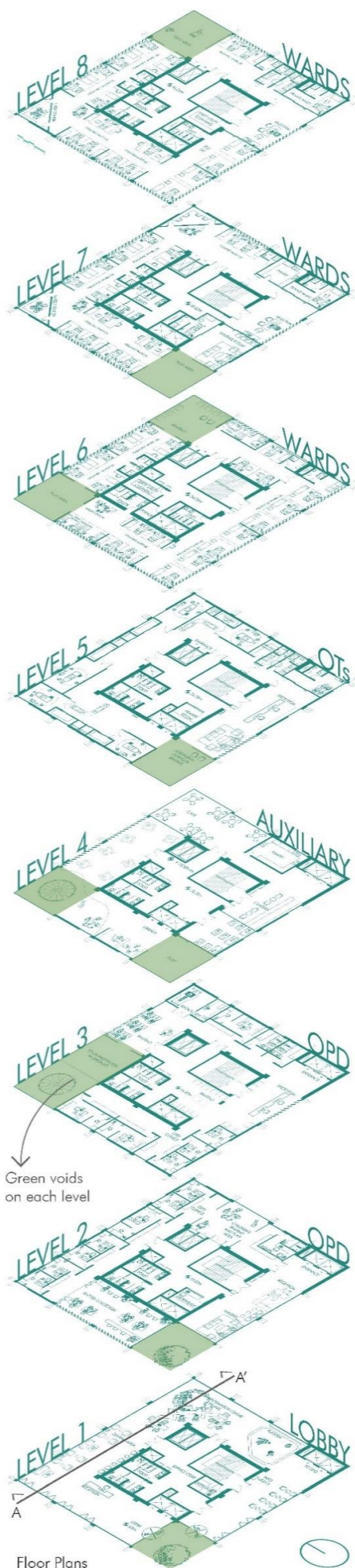
SpeedCore technology helps create a pre-fabricated core that reinvents the way we look at core-cantilevered structures.



A lightweight network of glulam beams and columns creates a flexible periphery, whereas the core houses the services and circulation.



Medical facilities need a sea change in the way they are perceived, with cheerful spaces and natural light filtering in. This culminates in a program that clubs a hospital with auxiliary features that are personalized to the contexts needs including a daycare, creche, and post-school meal services for those studying in neighbouring schools.



Green voids
on each level

Floor Plans

STEEL JOINERY:

The use of sleek steel joinery such as knife and gusset plates with bolted connections are optimal for prefabricated structures that save the time of construction by a considerable degree.



West Elevation



South Elevation



Modules of 6x6x6m are deployed. This height is optimal for a hospital as they have heavy ducting requirements which cut down on the amount of clear head height. Glulam is a material that can take the aforementioned spans and still retain its lightness.

This, along with its natural and warm tone makes it ideal for a Children's Hospital. Any issues of moisture are dealt with by PU coating and the use of rigid steel joinery.



Section A-A

About Our Associations

The Council of Architecture (COA) has been constituted by the Government of India under the provisions of the Architects Act, 1972, enacted by the Parliament of India, which came into force on 1st September 1972. The Act provides for registration of Architects, standards of education, recognized qualifications and standards of practice to be complied with by the practicing architects. The Council of Architecture is charged with the responsibility to regulate the education and practice of profession throughout India besides maintaining the register of architects. For this purpose, the Government of India has framed Rules and Council of Architecture has framed Regulations as provided for in the Architects Act, with the approval of Government of India.



Council of Architecture – Teacher's Training Centre facilitates faculty training program on innovative teaching methodologies, explore novel ideas and exploration in Architectural Research. It also aims at conveying the importance of practical knowledge in academics. The training imparted to the faculties provides an overview of various traditional and contemporary approach to teaching. It also helps to inculcate and encourage personal research and exploration that will enrich pedagogy.



The Indian Institute of Architects (IIA) is the National body of Architects in the country. Established in 1917, the institute today has more than 20,000 members and plays a major role in promoting the profession of architecture by organizing and uniting the Architects of India to promote aesthetic, scientific and practical efficiency of the profession both in Practice and in Education.

IIA is represented on various national and international committees connected with architecture, art and the building industry and is also actively associated with International Union of Architects (UIA) Commonwealth Association of Architects (CAA) and South Asian Association for Regional Co-operation of Architects (SAARCH).

About Our Associations



PEATA has come to the age of youth on completion of 37 years of its inception. All great institutions have humble beginning. During years 1962 to 1965 architects whenever they met in Municipal offices at V. T., Bandra or at Ghatkopar, they used to talk about their grievances. There is nothing new about it. It is today's phenomenon too. But the murmur then was different. Circulars were confidential. Architects were suddenly confronted with faith accompli "Sorry, now Commissioner has instructed not to approve any plans in the wards". Some influential could get through but rest were left high and dry. They were flabbergasted. In those circumstances several young architects contemplated the positive actions and approach. Side by side the efforts of continuing education by means of work shops, seminars, symposiums, study tour being integral part of activities of any professional body were carried out wherever possible jointly with other like-minded bodies.



FOUNDED IN 1965

PRACTISING ENGINEERS ARCHITECTS
AND TOWN PLANNERS ASSOCIATION



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