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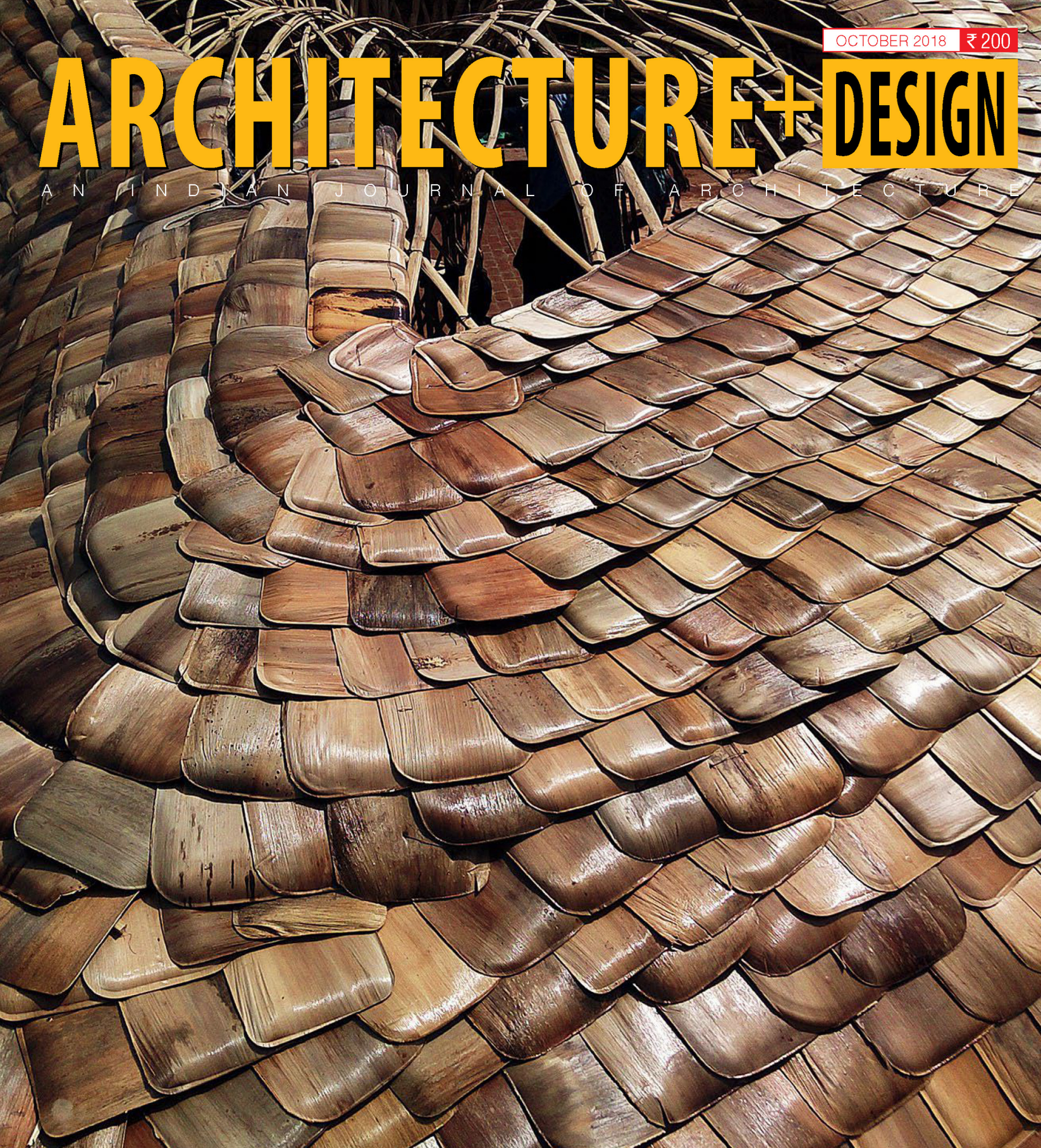

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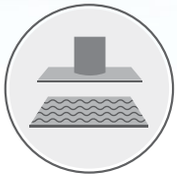

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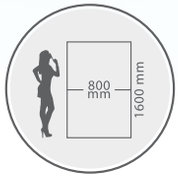

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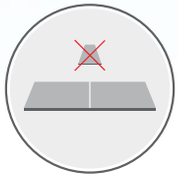

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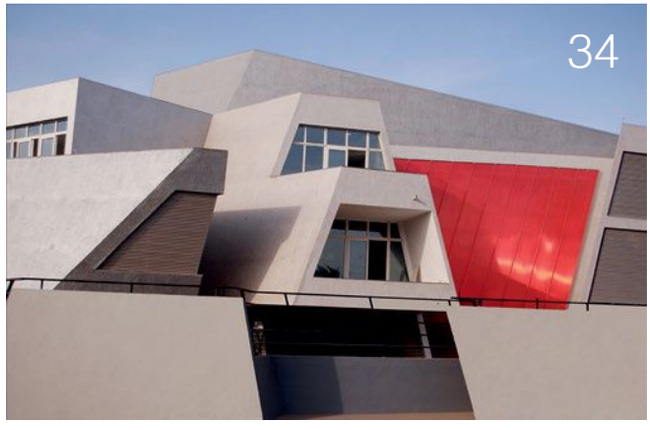

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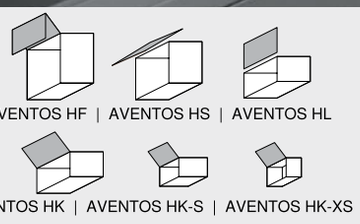

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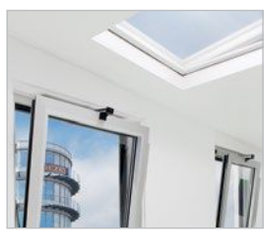

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Cocoon for Krishi Vigyan Kendra, Trichy, Tamil Nadu
Architects: Manasaram Architects, Bengaluru

All drawings and visuals for the projects and articles, unless mentioned otherwise, are courtesy the architects/authors.

What makes architecture exciting and holistic is the cohesion of tradition, the contemporary and the futuristic expressions. Explorations of ideas, technology, ideologies and materials has always been a driving force. Man's strong urges to discover, interpret and adapt concepts through different idioms is a basic instinct. Architects have always pursued creativity with passion and zeal. We bring you glimpses of two such architects from Bengaluru who have done exactly the same.

Architect Neelam Manjunath, fondly and respectfully addressed as the 'Bamboo queen', has led with conviction, the revival of the understanding of the ancient and time-tested bamboo as a material for contemporary urban contexts. With her vast experience in the utility of this versatile material that has a unique aesthetic appeal, she has constantly demonstrated through her designs and architecture, that bamboo can be as modern a material as glass, steel or then concrete. She explains in her precise documentation the precious worth of bamboo as a present-day material that can well be utilised as a structural entity also. In the Indian context, she has no doubt been a crusader in bringing awareness in different segments of the profession and society, to bamboo's unique powerful qualities. Her architectural practice in fact, provides vibrant examples to its use in the design and construction of urban architecture.

On the other hand, we have architect Kiran Venkatesh, who explores architecture with a modern and contextualised rationale. He explains his approach when he says, "As building technology becomes more complex, more detailed design control is being ceded to multiple specialist agencies. In such a context, resistance and subterfuge become relevant architectural strategies to leapfrog obstacles. It is important that the architect reclaims the entire narrative, that is assert control over the total project including the works of allied consultants." The few projects of his that we publish, also bring forth the firm's probe to interpret form in relevancy to the present social evolvements.

And of course, the section on Innovation, portrays design perceptions which have playful futuristic slants that dexterously fuse functionality and the visual order. Our other pages are equally engaging in the attempt to bring to you the vast diversity that is inherent in nature, art and architecture. We welcome our readers to send us projects/articles that work towards making our environs healthier and visually satiating.

Image of the Month

1

2

Art and Architecture… *1. "Support", an installation built on a hotel in Venice, Italy 2. "I See What you Mean", a sculpture installed by a convention centre in Denver, Colorado, US*

"An important work of architecture will create polemics."

— **Richard Meier**

"Architecture aims at Eternity."
– Christopher Wren

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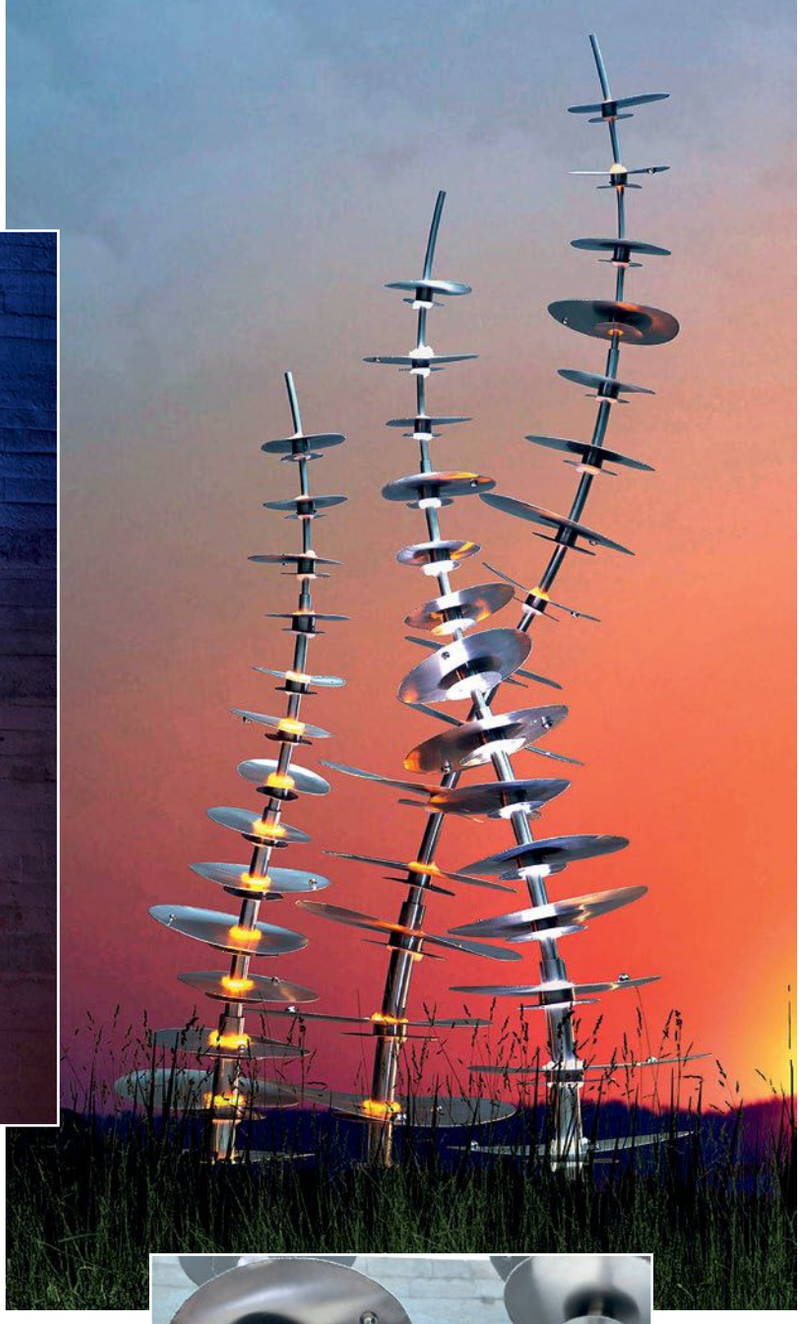

CAPTURING AN ORGANIC FORM…

FERN *is a light installation by Delhi-based artist,* ***Vibhor Sogani****. It takes inspiration from the growth and unfolding of a plant as it appropriates the same in the form of art. The installation is an abstract formation of stainless steel discs and a central stem, which curls and narrows as it reaches the top. The discs turn smaller too, thereby creating impressions of movement and growth. The edges are cast in mirror finish to glisten and accentuate the form. In some discs, mirror-finished hemispheres on top create an aesthetic akin to water droplets or morning dew.*

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Updates

Fast track

The Blloku Cube in Tirana is the new multifunctional center signed by Stefano Boeri Architetti, now under construction. The building stands right on the junction between the streets of Pjeter Bogdani and Vaso Pasha, in the heart of the Blloku, one of the most prestigious districts in Tirana which, in the post-communist era, has gone from being a military zone of restricted access to a nerve center of city life, thanks to the proliferation of facilities, shops, bars and restaurants lining its characteristic and regularly shaped blocks.

It is on these two streets that the main entrances of the building are positioned, to serve the retail center and the offices. On the ground floor, the square floor plan of approximately 30 meters on each side presents a significant variant: the way in which the corners have been cut in proximity to the crossroads between the street axes and the main entrance creates a semi-covered square as an extension to the sidewalk, in which the uniformity of the paving between the outdoor and indoor spaces invites one to enter the retail complex.

The floor plan of ground level extends to the first floor of the volume, also occupied by shops, where the west facade of the building slopes to connect with the floor above, which resumes its regular square shape. The inclination of the glass façade and its supporting elements create a resting point on a slanting surface where a seating system, literally leaning against the façade structure, offers an opportunity to admire the city and the public area below from an unusual viewpoint. The building continues to rise with its regular square floor plan for another five levels, all of which are destined to be occupied by offices, and is surmounted by a roof garden restaurant on the seventh floor.

The construction, started in July 2018, will be entirely managed by the Tirana branch of Stefano Boeri Architetti, which has already put its name to “Tirana 2030”, the new town planning scheme of the Albanian capital with UNLAB and IND.

Brigade Group has unveiled its creation, the Biowall, at the Brigade Opus office space in Hebbal, Bengaluru. The Biowall, a ‘living’ wall which comprises vegetation growing on/against a vertical surface, is designed to take over the conventional glass facades of the city. Measuring 400sq m, currently India’s largest, this wall houses around 15,750 different plants of 7 different species. Apart from its visual appeal, the wall will have a direct positive impact on the tenants by keeping the interiors of the building cooler and improving the air quality around it. It can be automated and monitored with natural air purification and humidification. It also functions as the office’s own natural air filtration system.

The wall has a sustainable design that includes recycling, rainwater harvesting and ensures zero wastage of water. The Drip Irrigation system it employs consists of the main line, lateral pipes, drippers and misters supported by an overhead fresh water tank, with automatic timed sprinkler systems and dust misters to keep the wall clean, fresh and constantly rejuvenated. By maximising both quality and quantity of the plants on the Biowall, there will be more photosynthesis taking place, which would result in more carbon dioxide in the building being converted to oxygen. The water system is designed keeping in mind constant recycling, rainwater harvesting and zero wastage.

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Updates

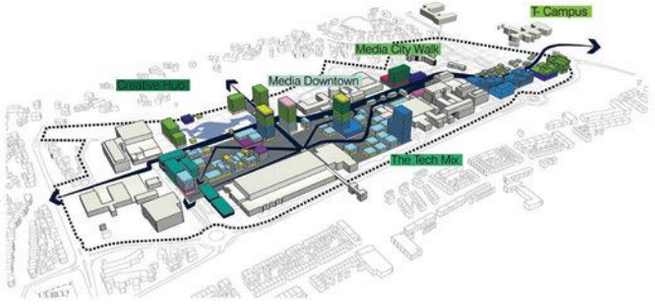
Fast track

UNStudio was recently selected by Hilversum Municipality and Media Park Enterprise to develop an urban vision which could offer a roadmap for the transformation of Hilversum's Media Park into a leading destination for future media content creation; this resulted from a collaborative process between all three parties that was borne out of the need to adapt to new technologies and shifting consumer demands. The vision includes potential programmatic, spatial and infrastructural development models.

With these goals in mind, UNStudio's vision proposes '5 Pillars of Growth' for the park, which are the keystones of the urban vision which will evolve the Media Park into a successful and thriving destination for the future: The Creative Hub: Work and education facilities, main public plaza, film and exhibition spaces; T-Campus: Labs, studios, offices and sports facilities; Media Citywalk: Studio, food and beverage, conference hotel, spa centre; Tech-Mix: Media Tech-focused work and living spaces; and Media Downtown: A mix of destinations for work, living. The vision also includes the aim to contribute to a sustainable future by reducing CO^2 emission by 90% by the year 2050.

The designers aim to create an industry hotpot by enabling cross-disciplinary links between once disparate sectors of media. VR developers, film producers and other creatives will work side-by-side, sharing knowledge and innovation. Additionally, on-site media and technology-focused educational facilities will drive young professionals to close the gap between learning and working and position the Media Park as a diverse hub of industry and content creation.

Open air studios, meeting venues, and increased modes of interaction create a social ecosystem where innovation is a spectacle and a community of interested parties can come together. The park will also serve as a hotbed of culture, strengthening the activities of the Museum of Sound & Vision. Hospitality and local amenities will cover the everyday needs of users, while the introduction of sector-based short-term living accommodation in a contemporary, modular style plants the first seeds of a new, park-specific community.



Ben van Berkel, principal architect of UNStudio, said "When utilised and applied correctly, technology can not only make cities smarter, but also more humane, social and inclusive. Sensor-based technologies also enable you to design and operate city districts and individual sites in ways that are highly relevant to their specific conditions and to their end-users."

Trade News

Space Matrix recently announced its expansion into China through the successful acquisition of interior design and construction company, Muraya. This strategic acquisition is part of Space Matrix's vision to expand its footprints across Asia. Muraya will be rebranded to form Space Matrix China. Globally, the company will now have a total headcount of over 400 employees across 14 offices.

Revenues are on track to grow over 40 percent and will hit $165 million this year. India has been one of Space Matrix's key pillar markets with nearly 45 percent of its global revenue coming out and a staff of over 250. The firm has undertaken more than 120 projects in India over the last two years for key clients such as Airbnb, Eli Lilly, Gartner, ITC, LinkedIn, Piramal Realty, Schneider Electric and TransUnion.

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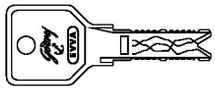

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Updates

Event

During the recent ART Basel, Laufen partnered with Pro Helvetia and held a concurrent symposium at its corporate headquarters in Laufen/Switzerland. In the presence of over 120 participating architects, both industrailists and architects from the industry debated the concealed qualities of architecture in a panel discussion entitled “Hidden truths of architecture”.

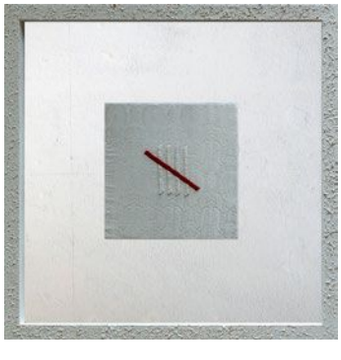
Marianne Burki, Head of Visual Arts at Pro Helvetia, said, “Laufen has already been cooperating with Pro Helvetia for seven years and supports us as a partner of the cultural foundation at the Salon Suisse, the accompanying programme of the Swiss pavilion at the Biennale in Venice.”

Pro Helvetia and Laufen had invited prominent personalities to form the panel; Tim Kammasch, Professor of Architectural Theory and responsible for the Salon Suisse at this year’s Biennale of Architecture in Venice, hosted the panel discussion and debated with the famous art historian Kurt W. Forster, Director and Professor Emeritus at the Yale School of Architecture, as well as the Swiss architects Gabrielle Hächler and Andreas Fuhrimann of AFGH Architekten, who were responsible for the Laufen stand at the Salone del Mobile in Milan.

Gabrielle Hächler said, “The ability to empathise with specific localities and situations is another important aspect. Empathic response is vital in architecture.” The architect defined this not only as the empathic response to the environment and the feeling for spaces and atmospheres, but also empathic interaction with the client when it comes to project budgeting.

To complement the symposium, Laufen had organised a diversified supporting programme.

Art Musings



Singapore-based artists Sachiyo Sharma and Sunaina Bhalla have collaborated to create a conceptual installation curated by Gauri Parimoo Krishnan at the Japan Foundation in October 2018. The work is inspired by the Japanese concept of ‘Ma’, which refers to the space interval defined as void. Both artists have addressed the idea of Ma in their own respective art practices which starts with a minimalist expression using materials they have either inherited or encountered through their work. This homage to Ma explores the impermanence of life, evanescence of life forms, emergence of calmness from trauma of life-threatening conditions using materials like woven linen paper, cocoons, gold and silver threads, cotton cord, bandages, and pins, through intense contemplative processes.

Sachiyo Sharma’s association with linen paper goes back to her Japanese calligraphic background and familiarity with paper, brushes and ink; she gives a new facet to traditional weaving with metal thread where asymmetry and irregularity of hand-made creations is the hallmark. Meanwhile, Sunaina Bhalla weaves steel pins on strips of cloth tied around woven cotton cords alluding to the immeasurable pain and existence affirmed by the pin prick of needles encountered and reaffirmed in the lives of many. She intends to evoke a chilling silence one submits to after bearing pain through illness.

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Tillany Fine Arts Museum and Gallery – exterior view

Kiran Venkatesh

Reflections on Architecture

*Bengaluru-based architect **Kiran Venkatesh** poses some pertinent questions to himself and rationally derives contemporary explanations to them…*

Can you speak a little bit about the context in which you operate your design practice currently? And tell us how you situate your practice within this context?

The Crisis of Design and the need for reclaiming the narrative: The intersection of fast capital deployment and excessive fragmentation of consultancy disciplines [specialisations, typologies, sub-disciplines, technology specialists etc.], compounded by the search for least cost and not best fit, has led to the current crisis in design [yes, there is one!]. Creation is no longer a patient search as speed of design and site realisation are valued over everything else, leading to flaws and failures in delivery. As building technology becomes more complex, more detailed design control is being ceded to multiple specialist agencies – for example, specialist consultants, subcontractors and suppliers [cladding, roof structures, glazing, mechanical and electrical installations etc.]. In such a context, resistance and subterfuge become relevant architectural strategies to leapfrog obstacles. Its important that the architect takes up the responsibility to reclaim the entire narrative [from content to concept to detail, from program to design to execution] and to defragment i.e. assert control over the total project including the works of allied consultants.

What does that mean for the architectural practice – are you saying that a studio today requires more management skills than design talent?

Scripting Architecture: No, I am not suggesting that! What I am saying is that through design, the architect needs to assert control on all disciplines and not just be an integrator of parts. Architecture is a very powerful medium for the communication of ideas. As a design studio, we are interested in how architecture can transcend the functional, and in leveraging design as the means to

create varying moments of intensity and pause in space. And also to reflect that in the aesthetics of the design.

Over the past twenty years, InFORM Architects has designed and built a large number of projects, each of them exploring a specific idea or telling a unique story. It is our belief that designs are most relevant when the idea and / or the story intersects the purpose and context of the project. Of course, when the script is in place, all the characters [disciplines] also fall in place and the design achieves its true purpose.

Can you elaborate on the nature of these ideas and stories?

An Architecture of Ideas: I can talk to you and show you some of the ideas we have explored in our projects:

- In the Tillany Fine Arts Museum and Gallery, we were interested in exploring three core ideas – an atrium that was not a one-liner, the display of art in a non-conventional way that would integrate it better even with circulation spaces, and how the human body "feels" in different spaces [sometimes vertical and expanded, sometimes horizontal and compressed etc.]
- A recent competition entry for a library investigated the potential of continuity in organisation of program [books and reading, in this case organised along the path of knowledge] within a volume and its reflection / expression on the exterior
- For an Institutional campus on 60 acres in a hot climate, we sought inspiration from the natural formations of deep canyons. The design deploys a similar geometry to articulate program and landscape spaces that encourage and intensify campus life in a climate-responsive setting.
- We believe that the nature of work-space is changing. In the design for an Office, we encourage serendipitous interactions by deploying a free section around an Atrium.
- Housing Tower One at ISB, Hyderabad campus uses varying balcony typologies to define and shade the apartments, which then goes on to define the external aesthetic.

Tillany Fine Arts Museum and Gallery – interiors view

InFORM Architects, Bengaluru, is an award-winning design firm founded in November 1997 by architects Kiran Venkatesh and Nithya Srinivasan. The studio is renowned for its critical re-thinking of architecture and is engaged in exploring design as a response to the complexities of client vision, contemporary architectural thought, real-world constraints and architectural redefinition. They are focused on singular and creative designs for projects; at the same time, they works with rational and functional design models that are engineered for performance and cost effectiveness. InFORM Architects' projects are spread across locations all over India. The firm is focused on delivering sustainable projects using best green practices and continues to work on [LEED / TERI GRIHA Certified] Green buildings.
The firm has won several National Design Competitions, 57 Awards at the National Level, and has been published in both national and international media. To date, it has worked on over 400 projects and completed over 125 projects.

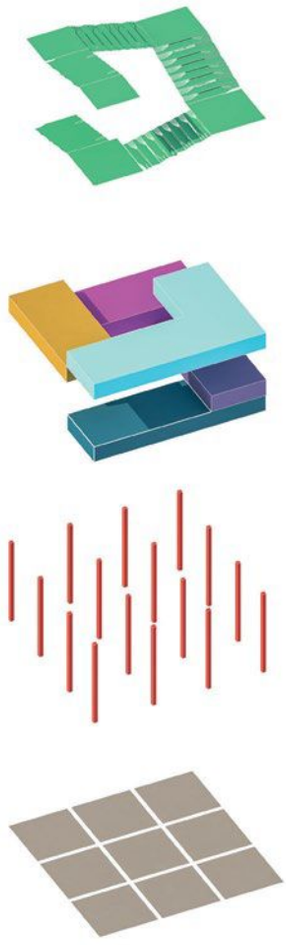


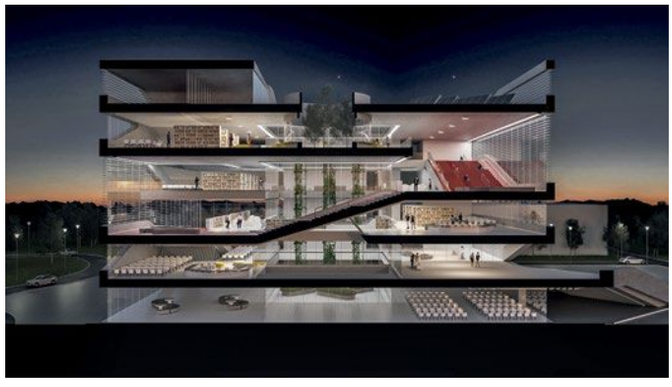
Diagram of Library interior organisation

How do you realise these ideas on site – is the construction a challenge?

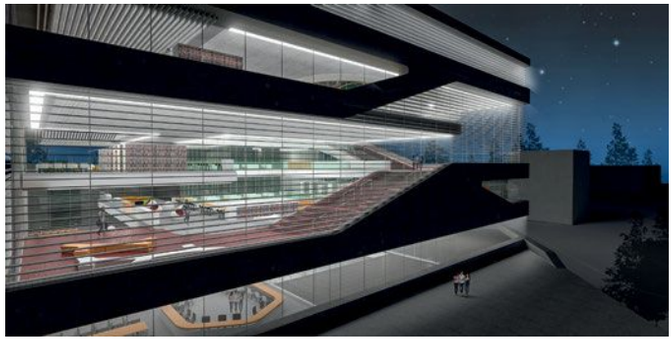
The Crisis of Construction and the need for mechanisation and technology: The volume, speed and numbers of projects being announced and under construction is simply staggering and unprecedented. However, the capacity to execute all these works in an appropriate and befitting manner is absent. Add to this, conceptual complexity / innovation, and it becomes a major challenge to deliver good design and ensure design integrity during execution.

Adoption of BIM software platforms assists in breaking up the complexity into simpler modules that can be costed and described / documented more coherently. Three-dimensional visualisation tools assist the execution team in understanding the design better. By effecting innovative variations of conventional methods or bringing in techniques from other industrial production models, it is possible to guide reasonably skilled contractors to execute complex projects. We have mostly relied on local skills for execution of our projects but modified design documentation and detailing to allow them to use their experience to deliver our concepts.

Going forward, one will see a proliferation of tools and mechanisation, perhaps even some automation and 3D printing – it becomes inevitable as the talent pool cannot keep up with the surge in demand. Pre-cast technologies are making a re-appearance and could even lead the way to realise the next Maison Domino revolution.



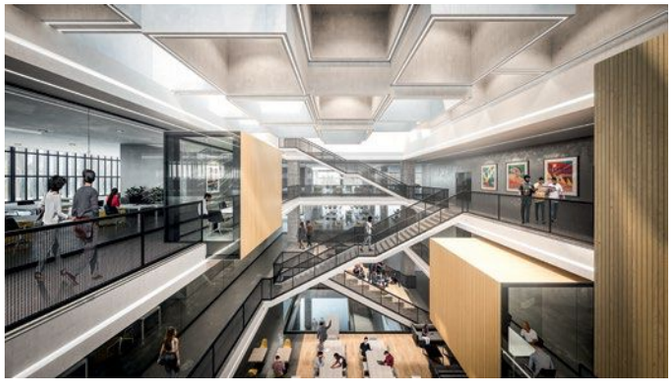
Interior view of the library



Exterior view of the library

MNLU Campus inspired by the canyons

VGS office – Exterior



VGS office – Interior

Housing Tower One, ISB – Balcony typologies

Is InFORM Architects active on social media? What do you see as the impact and relevance of these new forms of communication?

The Image is dead, long live the Image!: Rapid and rampant dissemination has killed the originality of the Image. Nothing is new anymore – every image seems vaguely familiar, hinting at some other image one's seen someplace else! A new image has taken over – the Instant Image, one that is transient and temporal. Shortly, in a Snapchat mates with Instagram moment, Snapgram will be born – images will vanish within two minutes of being seen, physically and from memory!

We have a Facebook page that is quite active but only because we took down our website for being too static and out of date. Our Instagram and Pinterest accounts are dormant and we don't have a twitter account, yet.

However, I do believe that there is merit in being active on social media – it helps reach out to an audience that is otherwise impossible to access. It helps communicate the core principles of the practice and to attract talent, interest prospective clients and create a brand for the studio. We recently designed a series of posters to commemorate twenty years of our practice that graphically and notionally linked our projects to superheroes under the title "Architecture needs Superheroes". It was a creative way to engage with the zeitgeist and the posters became very popular across audiences and platforms.

What do you see as the future of architectural practice? What are the aspects that'll influence it?

Architecture in the Age of Disruption and Hacking: I believe that architecture as a discipline must engage – with people, with society, and with changes/advances in work/lifestyles and other disciplines. Architecture must participate in the world around or be left behind in the back of beyond. Social media, the app eco-system, advances in transport and communication, and the shared economy are changing the world rapidly.

Design offerings that can be modified as pure service [basic design + execution solution] will cease to come to architects soon and will be diverted to app-based vendors who will integrate design – delivery and maintenance in a single window. If you can think of a service, there will be an app for it. Residential interiors will be just "first contact" for the changing app-scape of design.

Increase in public transport and autonomous vehicles will greatly reduce vehicle ownership and the need for parking. Parking lots can be appropriated into interesting new hybrid programs by architects. Maybe, Architects can design new "Pedestrian lots" [variations of plazas of yore] and return to the public, space that was lost out to cars!

The shared economy demands of architects to rethink space programming, functional relationships and the nature of work and living spaces.

Virtual reality, Augmented reality and seamless communication will enable new agile forms of practice – contingent teams that can connect, collaborate and deliver singular design.

I have always believed in the "Architect as a Thinker" model and with such rapid changes in the landscape of our society, I believe the Architect has the unique ability to lead from the front.

Bengaluru-based architect Kiran Venkatesh co-founded InFORM Architects in 1997. The firm has designed over 400 projects since its inception. He is also co-founder of InCITE – an architecture event space that functions as a platform for the exchange of ideas relating to the practice.

The Canyon of Surprises

"You cannot see the Grand Canyon in one view, as if it were a changeless spectacle from which a curtain might be lifted, but to see it, you have to toil from month to month through its labyrinths."
– John Wesley Powell

Project: Maharastra National Law University (MNLU), Nagpur
Architects: InFORM Architects, Bengaluru

(This project was a part of the Architectural Design Competition for the new Maharastra National Law University at Nagpur.)

A canyon is a deep cleft between escarpments or cliffs resulting from weathering and the erosive activity of a river over geologic timescales. Due to the 'buried and shaded' nature of canyon spaces, they are cooler than outside temperatures; as a result of the proportions and narrow openings at the top, light quality is dramatic and changing. Lastly, the weathered surface of the rock has captivating textures and finishes.

Nagpur is known for its extreme weather – heat waves, thunderstorms, dust storms, squalls etc. Inspired by deep, narrow canyons, the architecture of the campus is developed from a strategy to deal with the heat and dust.

The architectural response is to conceive a dense development that is a mix of low-rise and mid-rise buildings that are inter-woven with accessways. The connections are shaded, 'canyon-like' streets in the interior – paths that are

shaded by over-hanging inclined walls.

The external envelope has strip glazing and is wrapped by an inclined screen – the less penetrated, shaded exterior lets in light but keeps out the heat and dust. The quality of light is expected to be ever-changing and spectacular – as in canyons like the Antelope Canyon. A campus of a national law school needs to exemplify three important but diverse elements: Education, Law and Justice.

The fundamental ideas around education have to do with thinking and learning – the design of the new campus for MNLU is a response to the university's call for an academic environment that provides an opportunity to transform the pedagogy of education.

As learning increasingly focuses on critical thinking and less on information retention, the campus is designed to intensify interaction amongst its residents, so that learning is not just in classrooms but from peers and through various forms of collaboration.

The design works to exacerbate the capacity of the architecture to encourage accidental meetings and conversations. The streets, paths, courts, canyons, terraces and extra-programmatic contents of the design become settings for enabling arguments and fostering new forms of teaching and learning.

Law is primarily an interpretation of certain rules, which are codified in some form or the other. The design deploys geometry as a tool to re-write the code for campus spaces. The focus is on creating a network of connections that are linked through program and landscape

In building this new university, it is necessary to consciously bring in the idea of justice and place it within Law and Education. The notion of Justice is philosophical, and one could argue that Justice and Law need not necessarily align at times.

Through its organisation and three-dimensional form, the design tries to capture the notion that there is always hope, i.e. the light at the end of the tunnel.

The inspiration drawn from the physical form of canyons becomes philosophical in the context of the Law University. The campus is designed to reflect MNLU's quest for an ecologically sound, contemporary learning and living environment that is future-proof.

It aims to foster the creative enterprise of the University, to facilitate inter-disciplinary interaction between the professional world, academia and the MNLU community at large.

Original, world-class architecture can speak across boundaries while refreshing and enlivening the environment. MNLU seeks a visionary design and

engaging the building that will resonate the citizens of Nagpur, the people of India and the many international visitors drawn to the university.

We live in the age of social media – in the realms of Facebook, Twitter, Instagram, Pinterest and selfies. Too often, architecture is consumed by media and obsessed with image. In such a context, hunger for an iconographic architecture becomes nearly as legitimate as the search for a timeless space. The design for the campus seeks to create moments in space that can become backdrop sets for events – a selfie of a gowned graduate at the entrance, the hat-toss by graduating class etc. In its ability to engender multiple captures in different light and scenographic settings, the design reaches out to a larger audience, seeking visual recall.

The Bodhi Tree also known as Bo (from Sinhalese: Bo) and peepal tree was a large and very old sacred fig tree (Ficus religiosa) located in Bodh Gaya, under which Siddhartha Gautama, the spiritual teacher who later became known as the Buddha, is said to have attained enlightenment (Bodhi). The interior “canyon” spaces of the design enable the formation of multiple varied spaces that encourage the gathering and coming together of the community. In its shaded niches and landscaped alleys, architecture takes on the role of the Bodhi tree’s canopy – providing the spaces in between and beyond classrooms that become the soul of campus learning.

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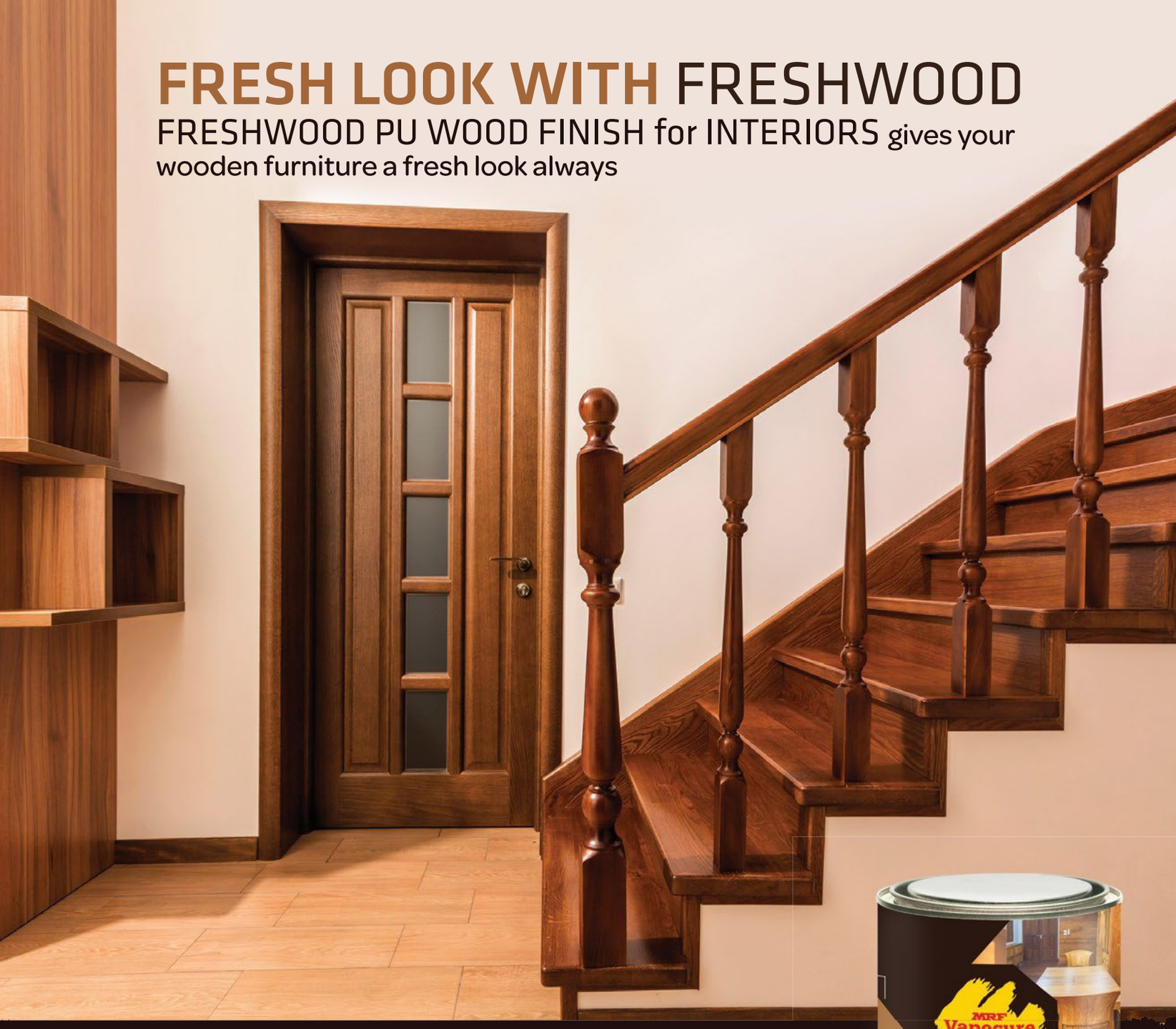

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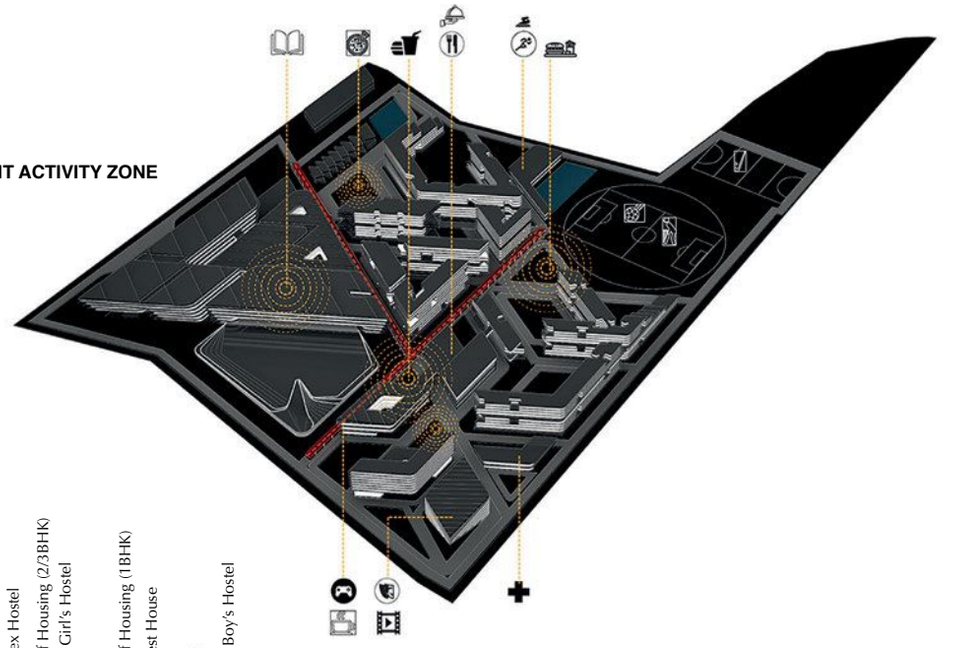
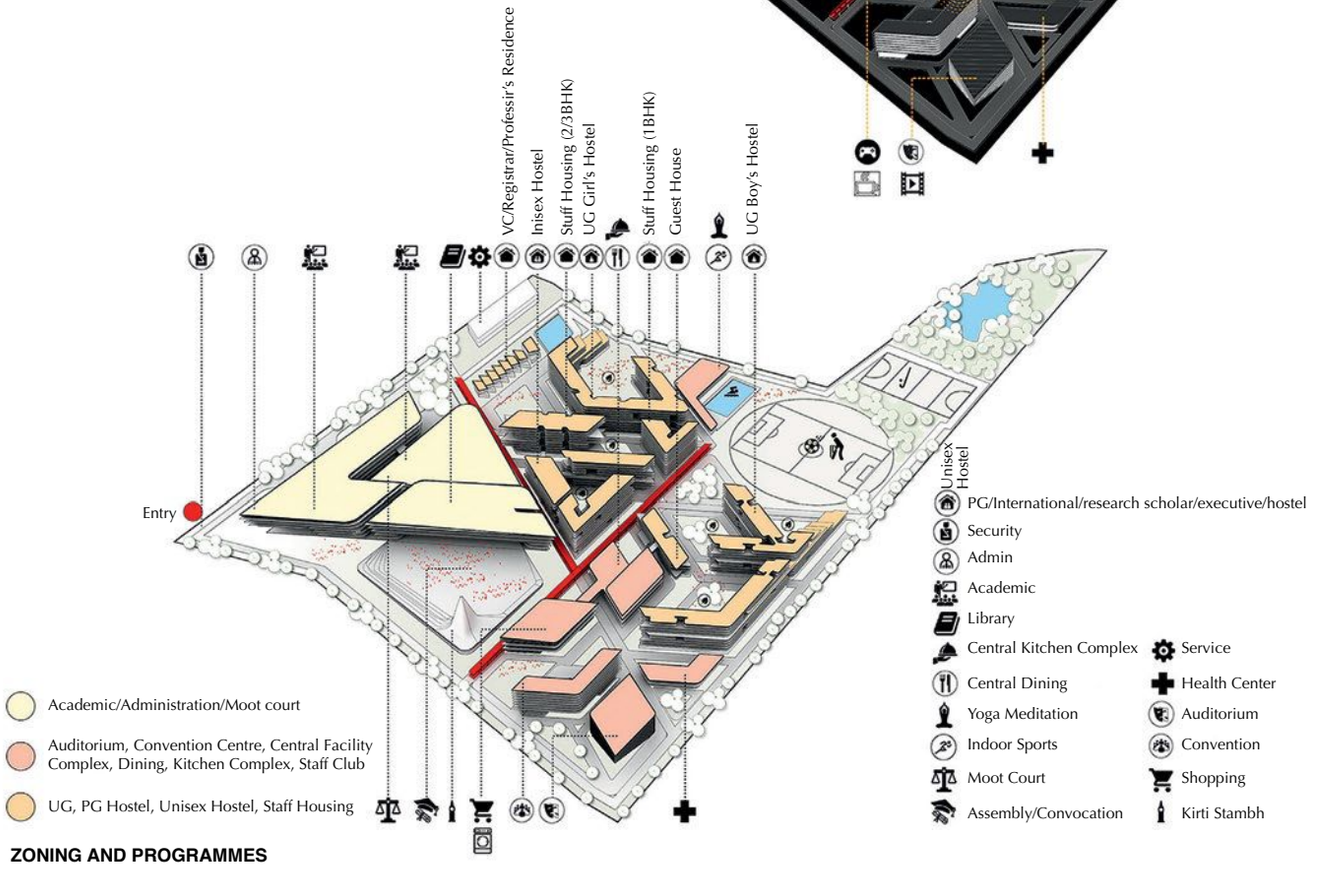
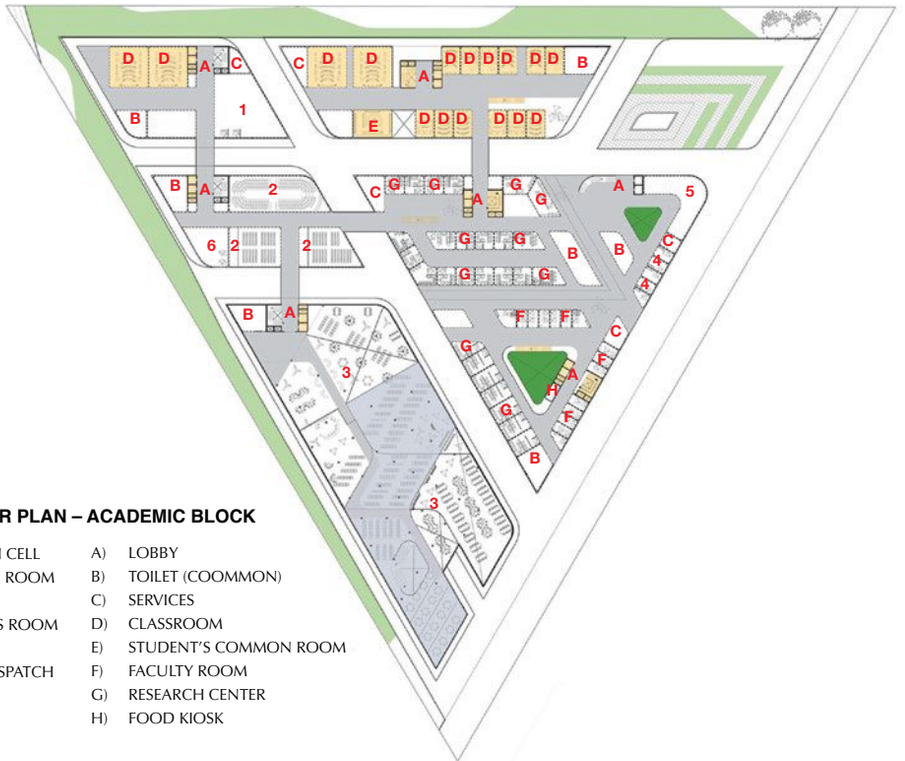


EVENING AND NIGHT ACTIVITY ZONE



ZONING AND PROGRAMMES



SECOND FLOOR PLAN – ACADEMIC BLOCK

1. PUBLICATION CELL
2. CONFERENCE ROOM
3. LIBRARY
4. ATTENDANT'S ROOM
5. CRECHE
6. MAIL AND DISPATCH

A) LOBBY
B) TOILET (COOMMON)
C) SERVICES
D) CLASSROOM
E) STUDENT'S COMMON ROOM
F) FACULTY ROOM
G) RESEARCH CENTER
H) FOOD KIOSK

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An Institute's public recall is primarily is its event space – the courtyard of the Salk Institute or IIM Ahmedabad, the MIT lawns in front of the rotunda, Harvard Yard and so on.

The design envisages ceremonies (convocation, commencement, graduation) to be held on the large, gently sloping lawns in the western part of the campus. The podium is under the open stilt of the library (knowledge above) and the building becomes the backdrop for the event in which the graduates bid good-bye to the Institute that nourished their ambitions. The Kirti Stambh towering over the graduates and the history wall at the base become silent participants in the event, reminding them of the challenges of the profession and the greatness that awaits if they always stand true to the principles of Law and Justice. The stepped amphitheatre becomes an ideal setting for the traditional hat-toss by the graduating class.

Programmatic organisation is very simple – similar programs are clustered together and linked by internal pedestrian streets. There are three major clusters – academic, residential and amenities/shared facilities – accessed directly as well as from each other. The interface between any two clusters houses over-lapping facilities.

Vehicular circulation and parking are restricted to the periphery except for emergencies. Pedestrians and cyclists are prioritised both by way of access-paths and close proximity of parking spaces to the programs. The network of shaded streets that are lined with varied programs encourage walking throughout the campus. The diagram shows the cars and two-wheelers parking on the periphery. The bicycle parking is distributed under respective buildings

The academic campus is pre-dominantly used in the day and the focus shifts to the residential zone towards late evening. The Eat Street triangle always becomes a way to activate the campus and is the go-to space for hanging-out. The day and night program visualisation seek to explain the shift in centre of gravity of campus activity over a 24-hour timeline.

The Figure Ground/Figure Sky is continuously changing, i.e. the footprint of the mass on ground and the silhouettes against the sky vary dramatically from one section to the other. From the entrance in the north to the southern or rear side, the buildings transition from a low rise- heavy mass academic campus to taller, thin slab residential and related spaces, before dropping off into flattened play grounds.

The campus plan is based on loops that link program spaces. Similar programs are linked by interior streets whereas the ends of these streets branch into loops for the other programs. The three main programs are academics, residences, and common amenities and the loops define the edges of these zones and penetrate them for internal circulation. The most public of the programs (for ex., food – eat street) are along the main loop(s).

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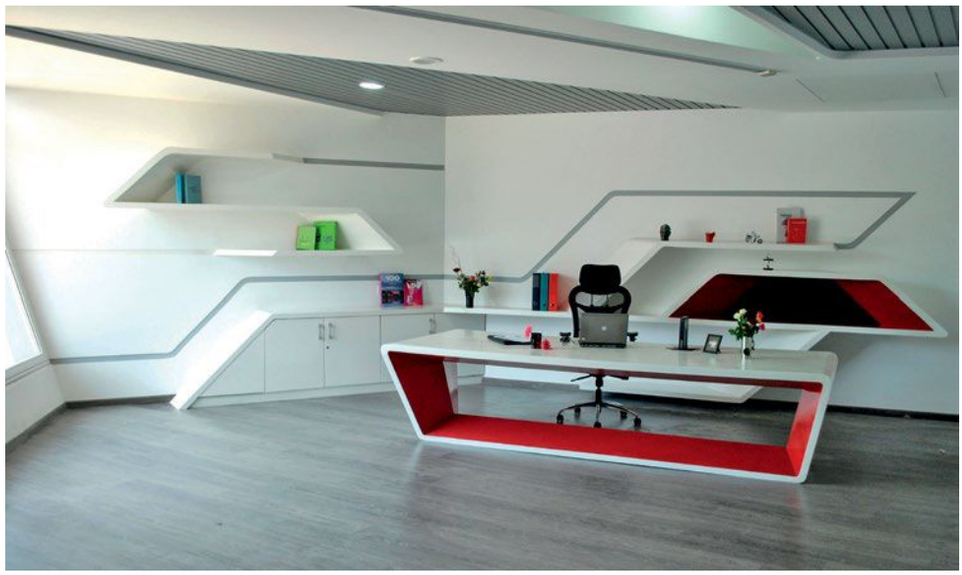
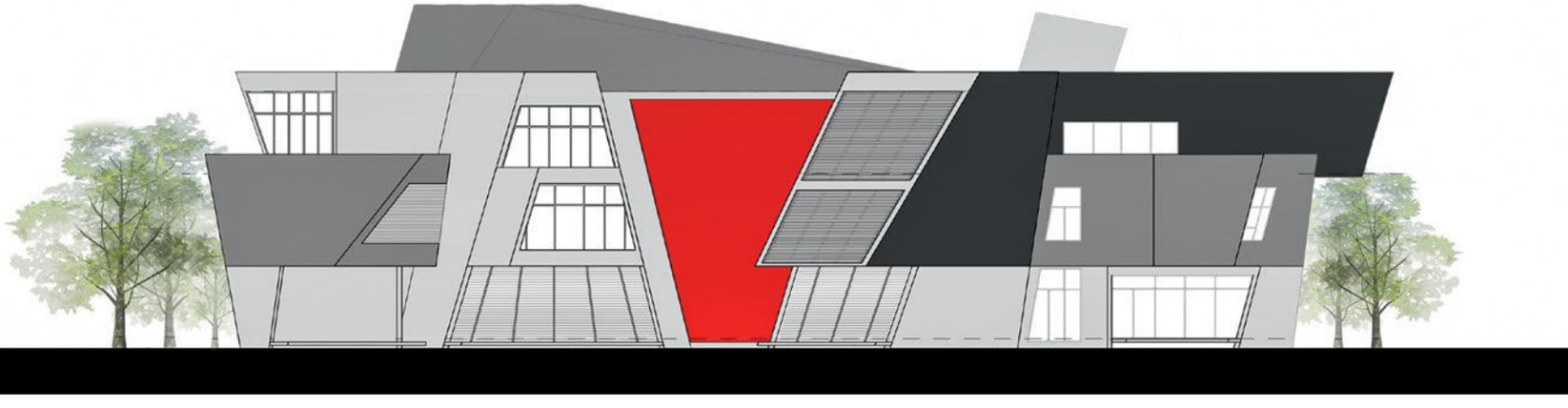


A Geometry-bound Assemblage…

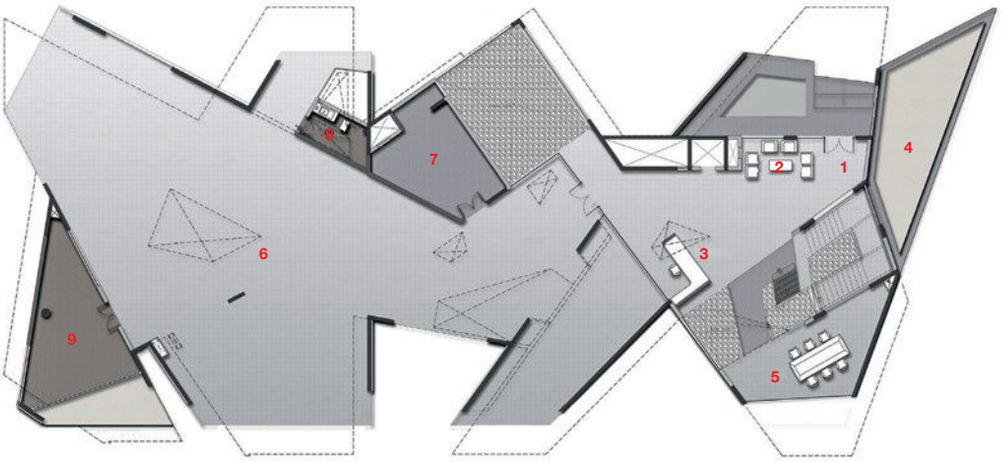
Project: Corporate Office for PBS & Sons, Hospet, Karnataka
Architects: InFORM Architects, Bengaluru

PBS & Sons is a company with a long history in Hospet and surrounding regions – iron ore mining is one of its key activities. As the company expanded, it felt the need for a corporate office to accommodate the activities of its directors. The program calls for cabins for its directors, a conference room and offices for support staff. The site is on the main road to Hampi and the clients desired a project with a good visual recall.

The program was quite banal – 10 cabins, conference room etc. and the site had very little character. Hence, the conceptual approach was to create a unique identity for every room and every space – through geometry, profile and fenestration. This eclectic, yet geometry-bound assemblage of cabins was organised along an articulated spine of varying dimensions with voids or craters that linked the floors in section. A twisting stair makes its way up the floors naturally lit through a large opening covered with red polycarbonate panels. The varying intensities of red light that fall on the stair geometry and black floors create a myriad of vibrant ambiences within the interior street. In order to have good views of the distant hills, the two main floors were raised on a quasi-stilt space that accommodates the reception and open meeting areas. Every cabin is designed with large windows and balconies to receive natural light and ventilation. Each of the rooms are spacious with workspace, display shelves and a lounge. The deep-set function spaces and roof-top



STREET SIDE ELEVATION



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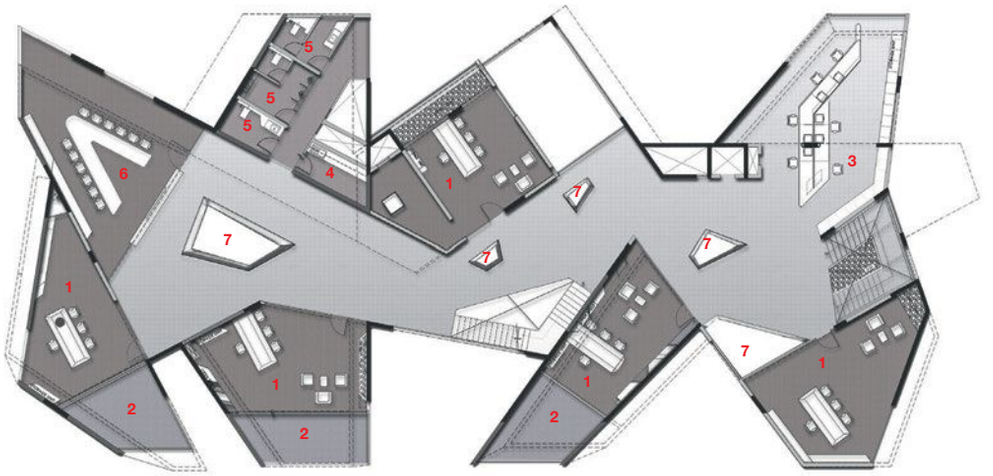
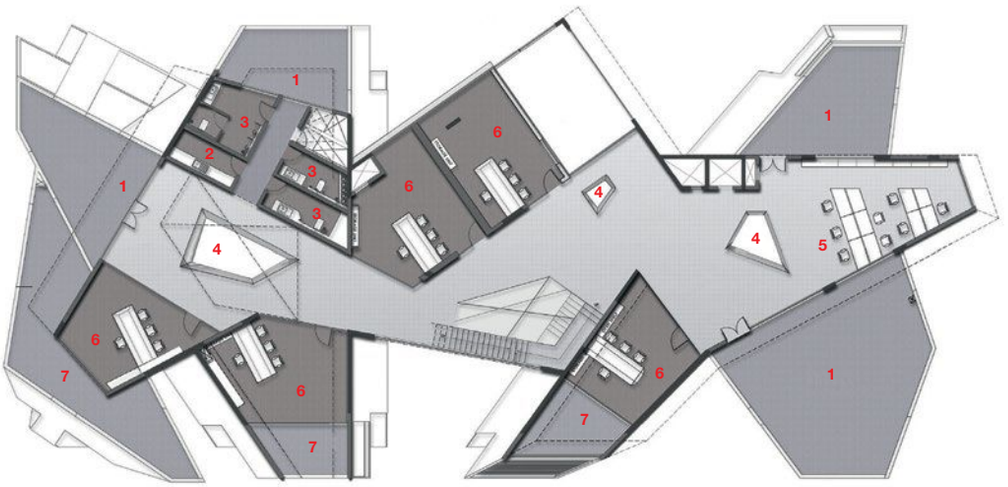
STILT FLOOR PLAN

1. FOYER
2. WAITING
3. RECEPTION
4. LANDSCAPE
5. DISCUSSION ROOM
6. PODIUM
7. ELECTRICAL ROOM
8. TOILET
9. STORE ROOM

1. CABINS
2. SIT OUTS
3. OPEN OFFICE
4. PANTRY
5. TOILET
6. CONFERENCE ROOM
7. CRATERS

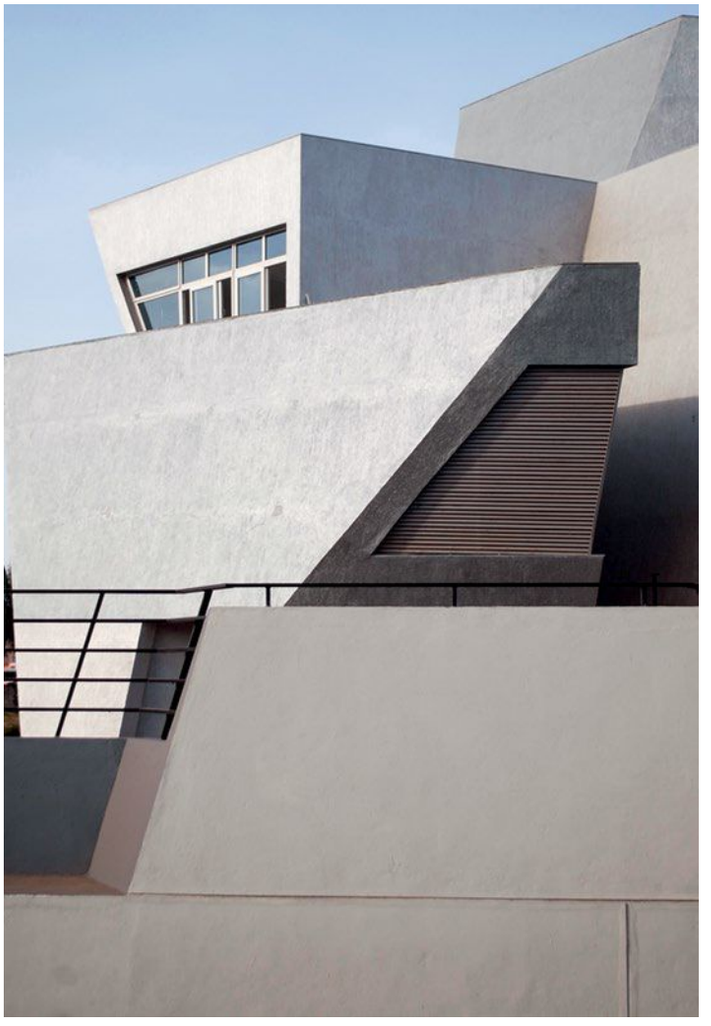


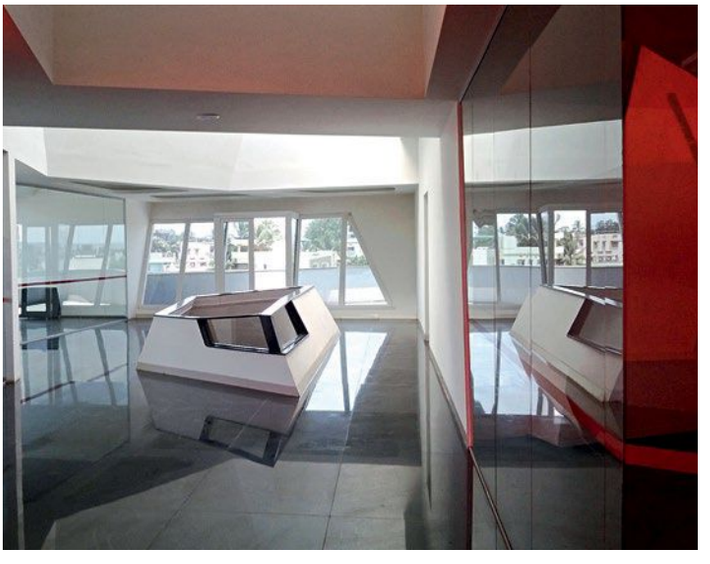
FIRST FLOOR PLAN



SECOND FLOOR PLAN

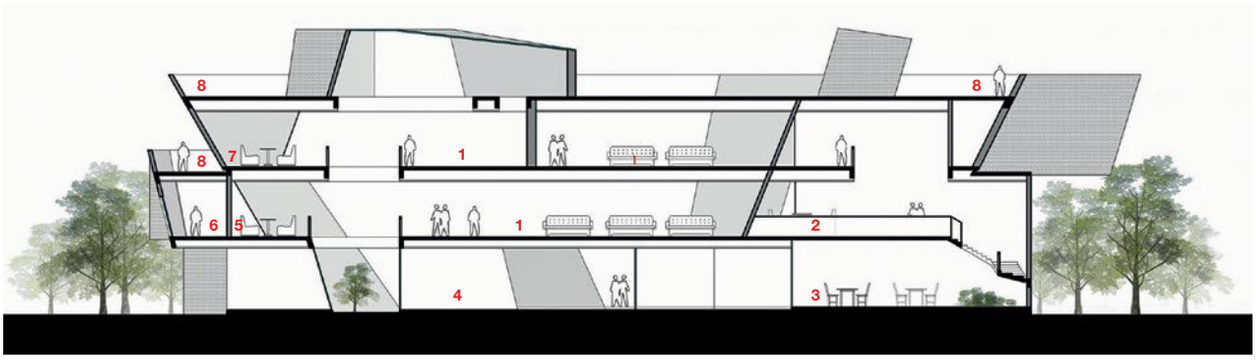
1. OPEN TERRACE
2. PANTRY
3. TOILET
4. CRATERS
5. OPEN OFFICE
6. CABINS
7. SIT OUTS





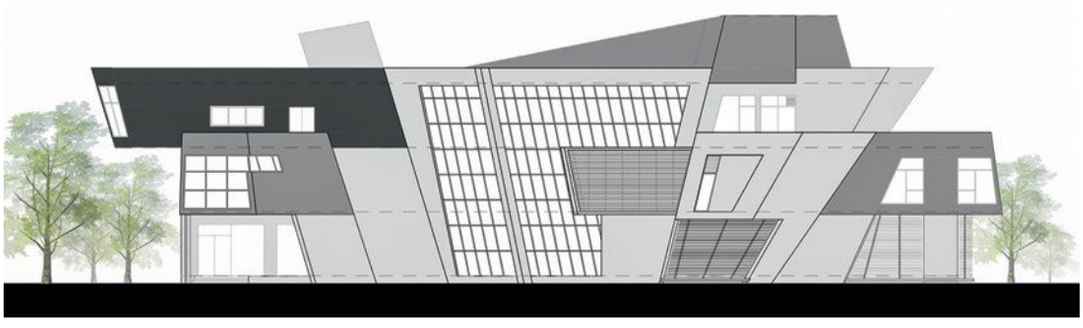
insulation combined with performance glazing helps maintain thermal comfort within the interior.

The resolution of the project geometry and its eventual translation into a realisable form through construction documents was a steep challenge. In order to keep costs under control and the project financially viable without losing design essence, it was decided to work with simple available technologies – an RCC framed structure using conventional shuttering systems even for the inclined RCC walls and structural elements. The form was broken



1. CORRIDOR
2. CABIN
3. LOUNGE
4. PODIUM
5. DISC ROOM
6. TERRACE

SECTION



ELEVATION

up into a catalogue of easy to build geometries that came together with precision and low tolerance.

The building form imparts a unique identity to the corporate office and has already become a subject of attention and conversation in the region. PBSS corporate office derives its presence and ambience through a form-enabled architecture of angular geometry combined with intentional materiality, resulting in pride of place for the client and as well as the architect.

Factfile

Client: PBS & Sons, Hospet, Karnataka

Design team: Shwetha G V, Rounak Mohta, Priya T, Sindhu Aradhya

Consultants: Design Tree Service Consultants

Contractors: Civil contractor – Kundur Constructions, Interior contractor - Intex Contracting, Electrical contractor – J.K Traders

Built-up area: 25182sq ft

Cost of the project: INR 9.5 Crores

Year of completion: 2014

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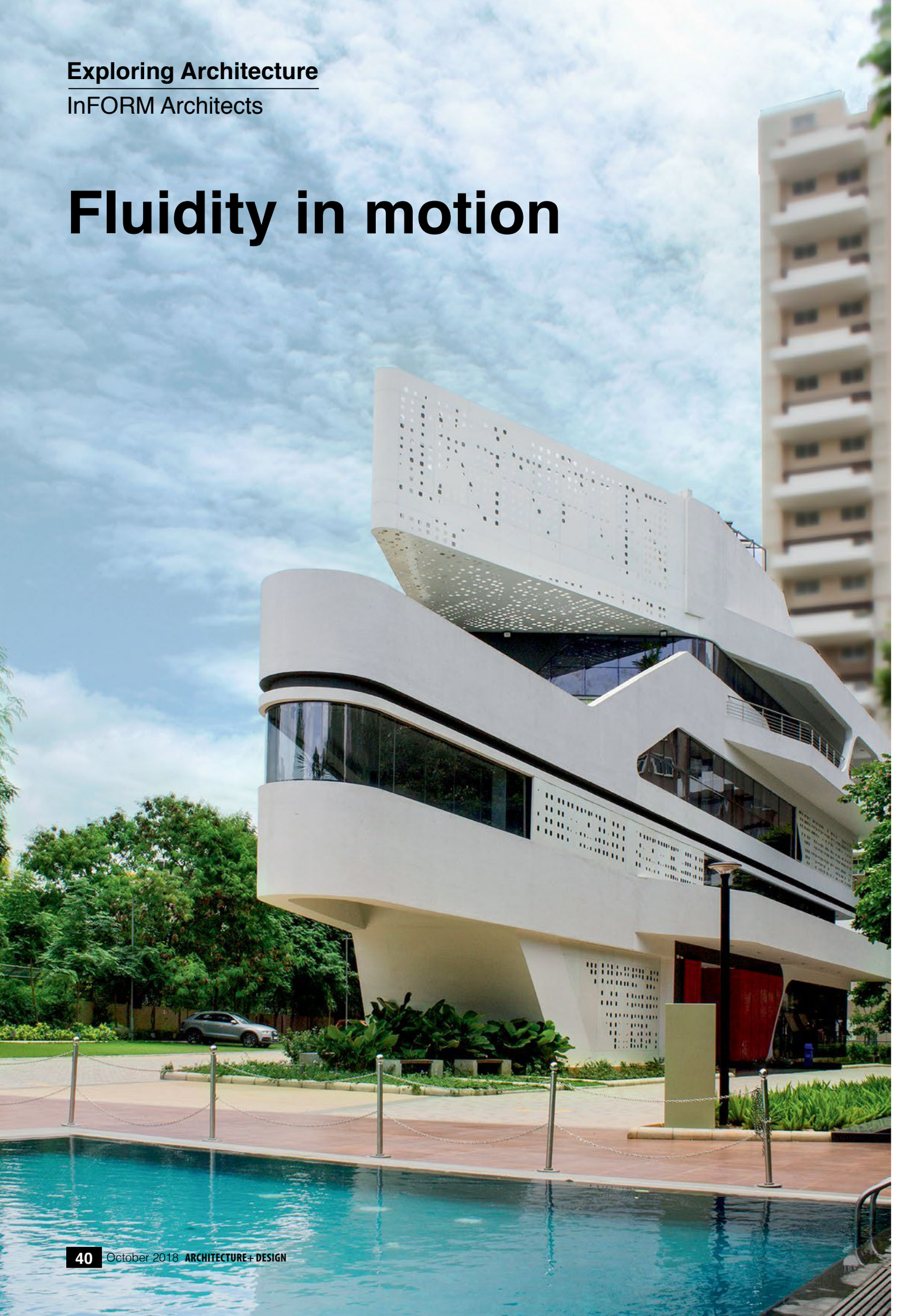
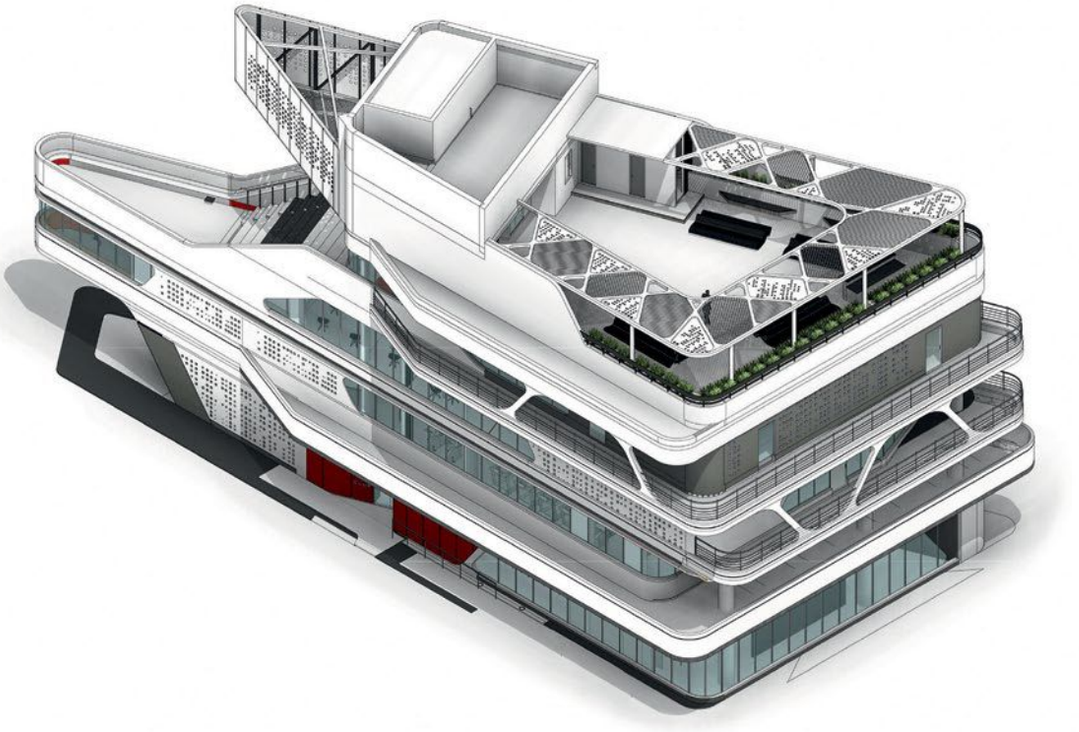
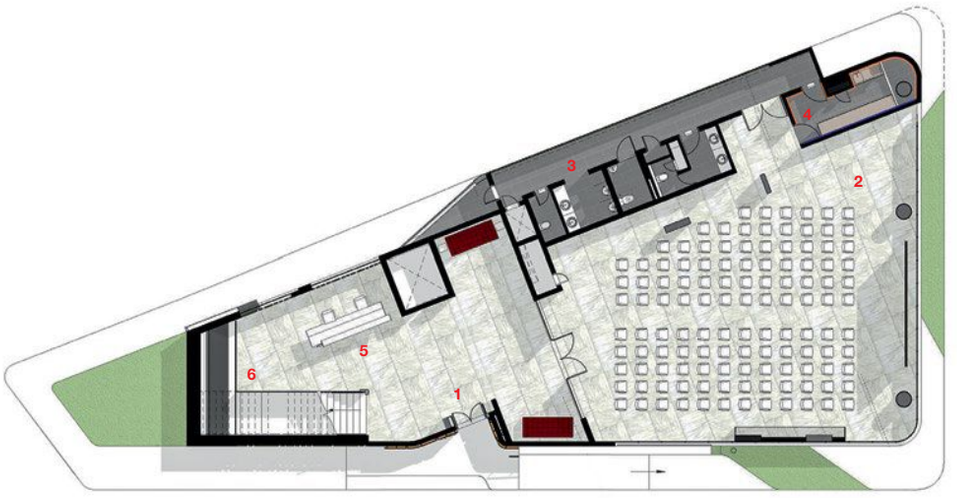


Project: VTCH, Bengaluru
Architects: InFORM Architects, Bengaluru

The 20,000sq ft project is sited on a triangular parcel of land to the south of the main apartment block. The design aims to convert this apparent constraint into an advantage – by transforming the contextual rigidity of the site profile into playful curves.

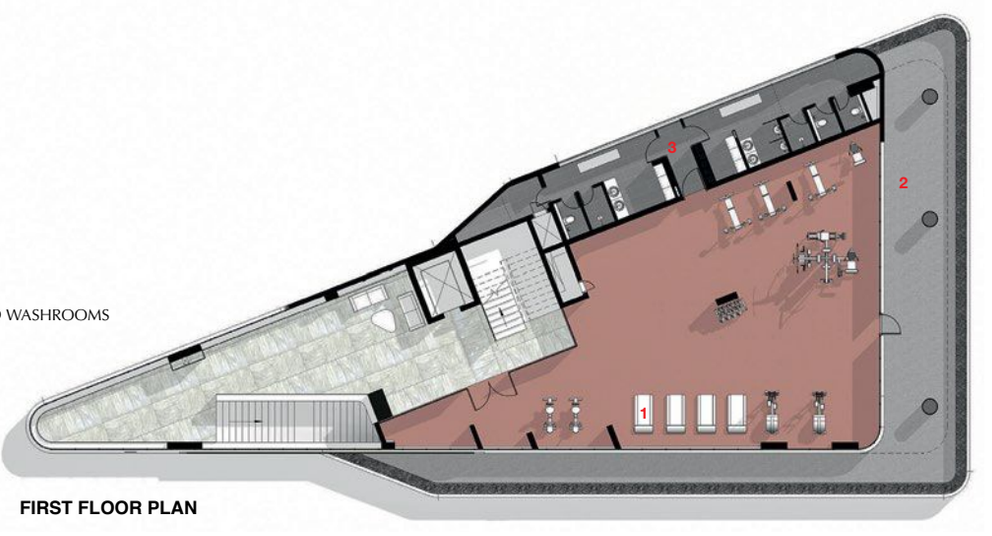
The building is visualised as a continuous ribbon of program, parallelly expressed in the façade. The exterior is a flowing envelope – unrestrained by the sharply edged plot. This playfulness in form gives rise to various combinations of large overhangs and deep recesses. Enclosures formed by these recesses accommodate diverse functions. Balconies at intermediate levels expand the program space into semi-outdoor conditions. These curves then move onto the facade to open up with fenestrations. The transparency of these openings is controlled by a skin with patterned perforations in response to the interior program. This play of recesses and offsets in the form not only holds the diverse program elements together but enable them to function cohesively as a system.





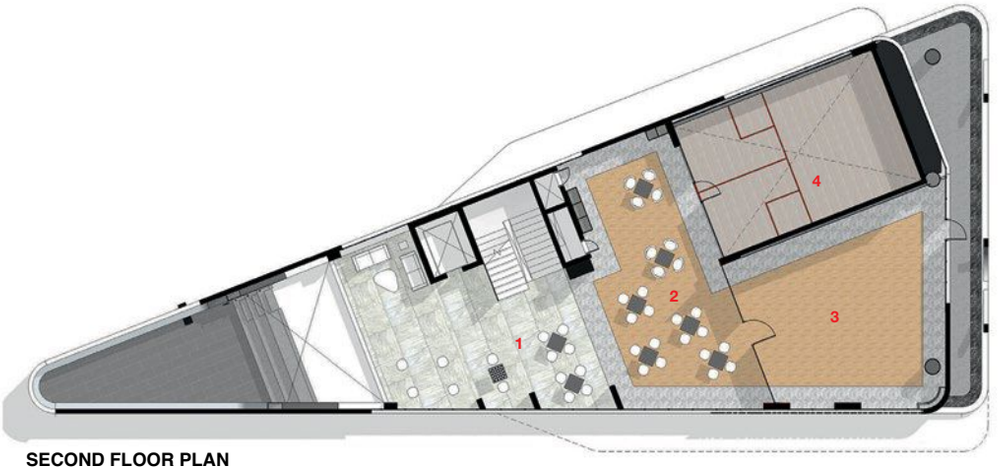
N **GROUND FLOOR PLAN**

1. ENTRY
2. MULTIPURPOSE HALL
3. WASHROOMS
4. PANTRY
5. RECEPTION
6. FOUNTAIN



FIRST FLOOR PLAN

1. GYMNASIUMS
2. BALCONY
3. CHANGING ROOMS AND WASHROOMS



SECOND FLOOR PLAN

1. BOARD GAMES
2. VIEWING GALLERY
3. TABLE TENNIS
4. SQUASH BOARD

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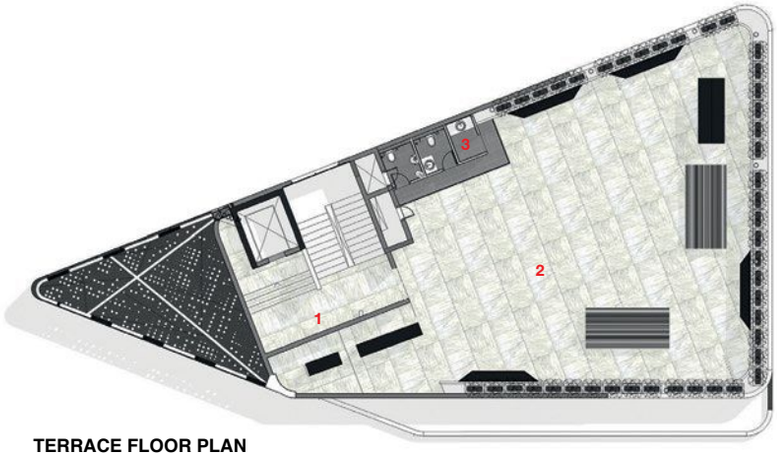
SECTIONAL VIEW

1. AMPHITHEATRE ENTRY
2. LOUNGE
3. BOARD GAMES
4. BILLIARD

THIRD FLOOR PLAN



1. TERRACE LOBBY
2. TERRACE
3. WASHROOM

TERRACE FLOOR PLAN

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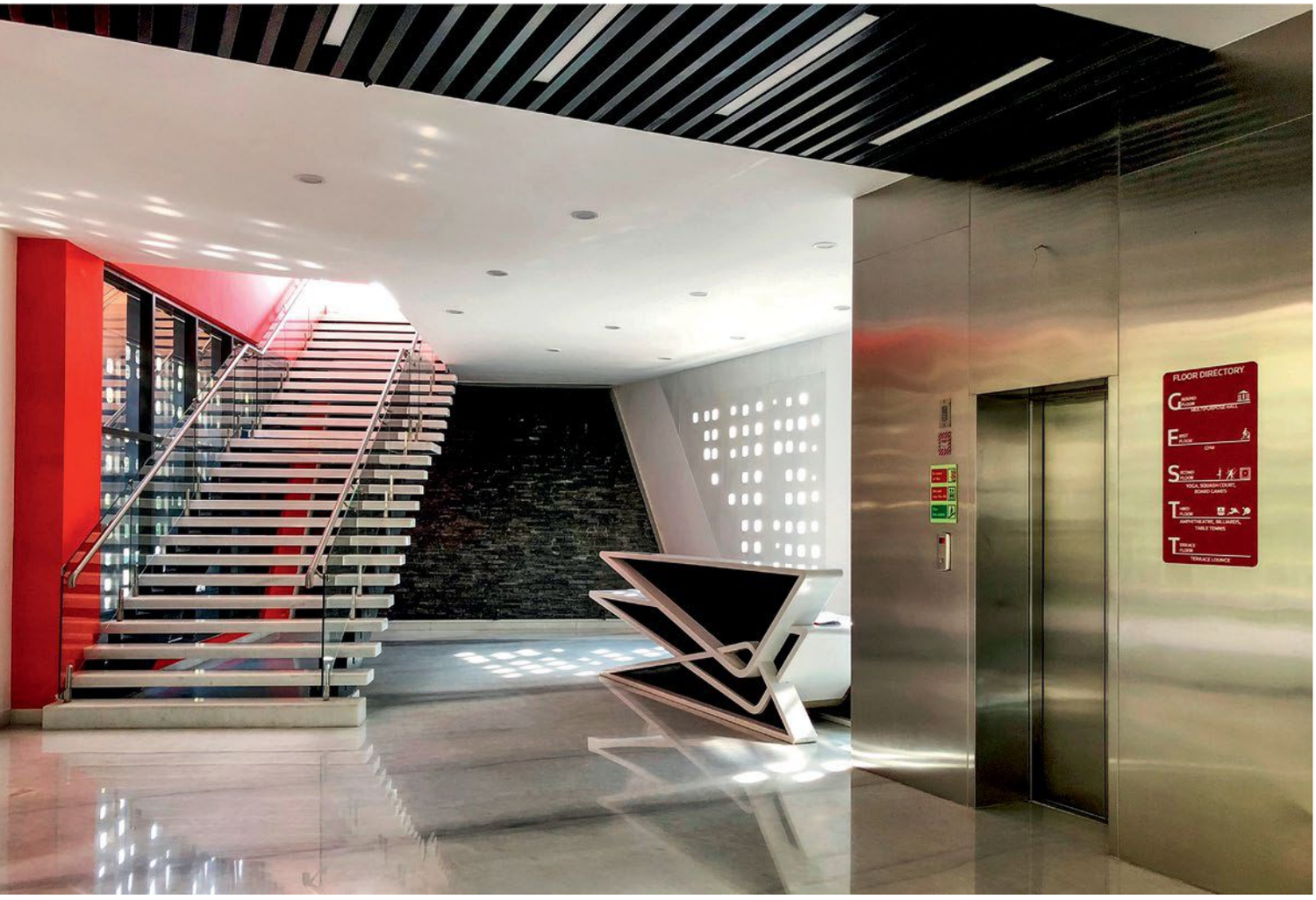

One of the core ideas was to bring together a variety of activities with different spatial parameters to increase the potential of social interaction between users. Every level consists of distinct functions of contrasting spatial scale – for instance, a double height space for squash and single height space for indoor games are located on the same floor. Similarly, a semi-open amphitheatre, billiards room and table tennis room are on the same floor despite having varied spatial qualities.

Exterior profiles of the different levels are driven by variations in the site. A double skin is wrapped around these levels, with fenestrations as an outcome of the functions inside. Aluminium panels with patterned openings are condition to the orientation of the building and ensure ideal indoor light conditions. Smoothened corners of the building increase the suppleness of the form and mirror the fluidity of internal movement.

SECTION

1. RECEPTION
2. GYMNASIUM
3. BOARD GAMES
4. LOUNGE
5. TERRACE LOBBY

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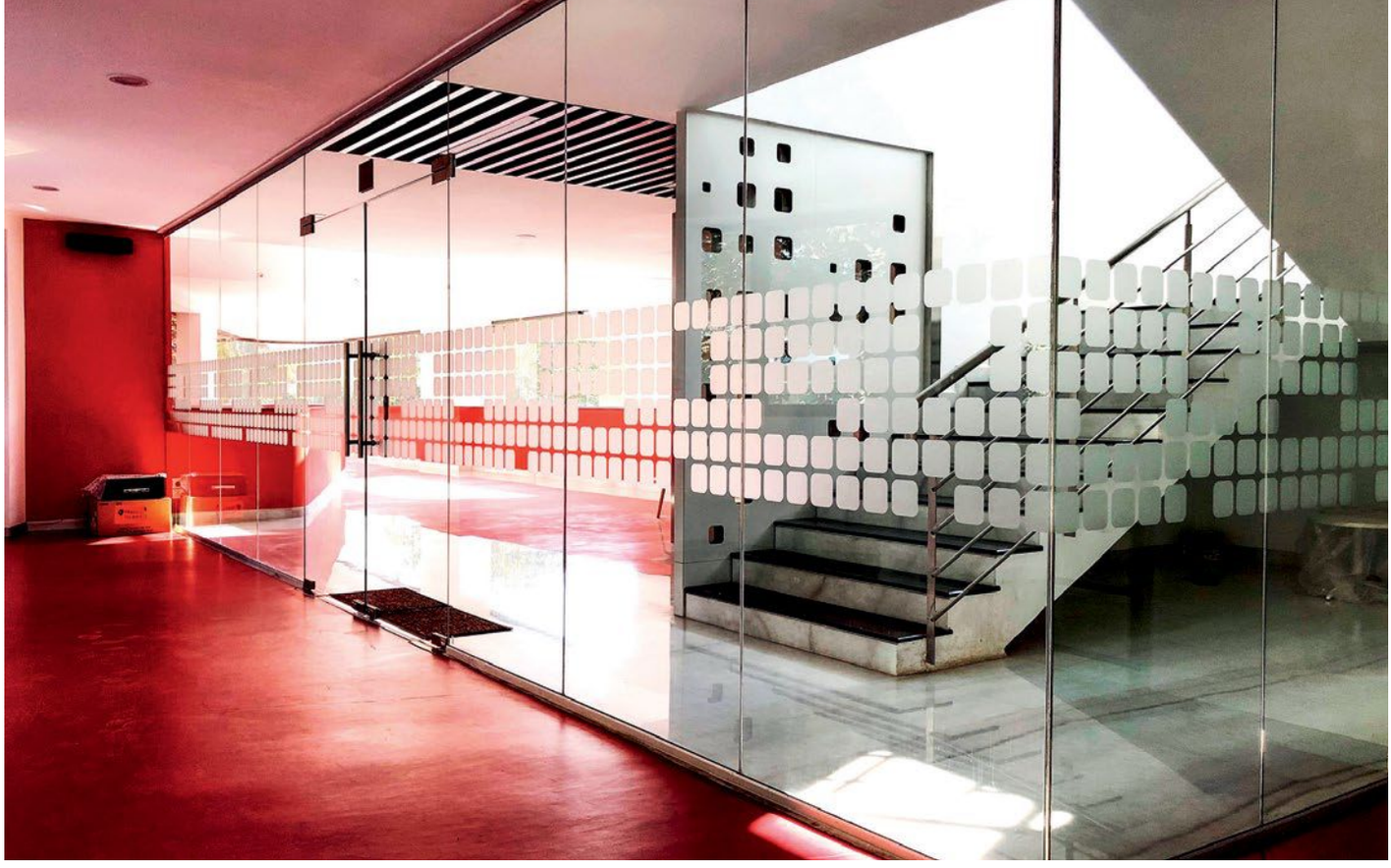

Building Construction and Materiality:

- RCC structure with block masonry in-fill
- Aluminium glazing with perforated aluminium panels
- Steel frame for pergolas and canopies
- Marble and Vitrified tile combination in flooring
- Glass railings
- Internal partitions with Aluminium + Glazing
- Stainless steel railings for open balconies
- False ceiling: combination of Gypsum and Linear Metal l Baffle

Special features:

The perforated panels add a skin onto the building – this is installed not only for the canopy over the amphitheatre, but also in front of the glazing. They enable shading from the harsh sun and become a unifying element in the façade aesthetic. Filleted edges negotiate sharp corners of the site. The amphitheatre, with its overhanging canopy and cantilevered underside creates an iconic view. The relatively flat view from the residential complex is of a smooth composition of balconies, recessed surfaces and inclined non-structural fins.

As the floor plates are compact, every level is assigned a unique program. The ground floor has a multi-purpose hall with a grand entrance lobby and an open stair with a water feature. On the first-floor is an exclusive gymnasium; the second and third floors accommodate indoor games like billiards, table-tennis, squash and board games. A yoga room on the second-floor complements fitness activities in the gym. A small open-air amphitheatre is created over a sloping roof slab on the southern edge, overlooking the pool and landscape beyond. Part of the final terrace is designed for public access, complemented by landscape features at this level.

The design leverages a limited material palette punctuated by brightly coloured highlights. The services are kept simple and muted. The fluid arrangement of the clubhouse provides an architectural foil to the repetitive geometry of the apartments that it engages.

Factfile

Client: Vaishnavi Group

Design team: Urvashi, Prasanna, Praveen

Contractors: L&T (Structure only)

Built-up area: 1618sq m

Cost of project: INR 7.5 Crores

Year of completion: 2017

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Neelam Manjunath

The New Bamboo

Bamboo has been used since time immemorial in Asia, Southeast Asia, Latin and South America, South Africa and some parts of Europe. It has been an integral part of daily life of a large part of the population in areas where bamboo grows abundantly. There are more than 1500 listed uses of bamboo, from buildings to weapons, medicine, food, textiles, paper, energy, furniture, transportation, etc.

Bamboo has been used primarily for structures. One-fifth of the world population, even today, lives in bamboo houses. In many places, expensive wood, steel, concrete, glass and other such materials have replaced bamboo, labelling it as a 'poor man's timber'. Majority of the knowledge of bamboo-building technologies is based on cultural traditions. All these cultures have a rich and diverse tradition of bamboo buildings with various indigenous technologies very much a part of their social scenario.

Bamboo, a giant woody grass, grows extremely fast in tropical, sub-tropical and sub-temperate zones. There are 1750 varieties found globally in several genera. From small bamboo grass to the giant bamboos, from yellow to brown to black, it comes in a variety of colour and sizes. India is the second largest producer of bamboo in the world, next only to China.

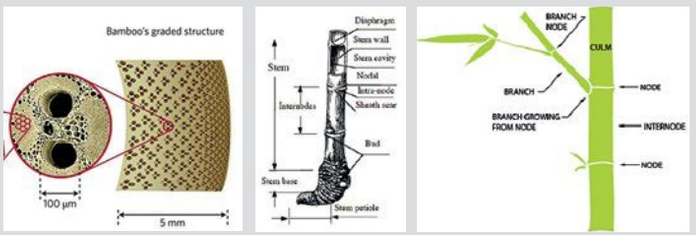
In India, Bambusa bambos and Dendrocalamus strictus are two varieties, widely available across

Bamboo basket –Traditional uses of Bamboo

Bamboo bridge – Traditional uses of Bamboo

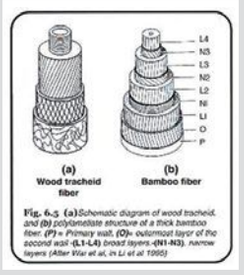
Bamboo house in kerala – Traditional uses of Bamboo in buildings

Types of bamboo

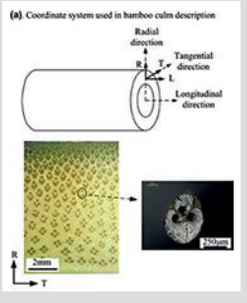


Parts of a bamboo

Human anatomy



Internal structure of bamboo as opposed to wood



Mechanical property of Bamboo

the country and commonly used for construction. Some of the other species of bamboos preferable for construction as specified by BIS 2005 are: Bambusa nutans, Dendrocalamus brandisii, Oxytenanthera stocksii, Melocanna bambusoides, Dendrocalamus strictus, Dendrocalamus hamiltonii, Dendrocalamus giganteus, Bambusa bambos, Bambusa polymorpha, Bambusa balcooa.

All the parts of a bamboo plant have a significant usage. The main parts of a bamboo plant are shown in the diagram: the leaves are used for drinks, bamboo tea, medicines, pigment, juice, fertilizer, fodder etc. The upper part of the culm is used for woven bamboo articles, plywood, chopsticks, mats, crafts etc. The lower part of the culm is used for flooring, bamboo buildings, veneer, packaging and other structural uses. The roots of bamboo plant are like a ginger plant and is used for sculpture, crafts etc. and plays a vital role in soil and water conservation.

Once bamboo culms are processed in various types of components, the waste also finds lots of uses, such as for strand woven boards, bamboo charcoal, bamboo briquettes, active carbon, bamboo pulp for paper and bamboo powder.

Bamboo flowers once in its life time and dies afterwards. Life of bamboo varies from species to species and can vary from few years to even close to 100 years. The seeds are eaten as bamboo rice and are found to be highly nutritious.

Properties of bamboo: The anatomy of bamboo has a great role to play in its physical, mechanical and chemical properties. The fibers in bamboo run along the length of the culm unlike wood. Bamboo in its size, lightness and strength is an extreme product of nature. It is stable, and because of its cavities it is an extremely light and elastic building material. The reinforcement by diaphragms and its physical conditions cause its enormous superiority compared to other building materials.

Physical Properties: Density – The density of bamboo increases from the innermost layers to the peripheral parts of the Culm. This variation could be 20-25 percent in thick-walled bamboos. In thin-walled bamboos, the differences in density are much less. The density also varies along the length of the culm from bottom to top. As for moisture content – bamboos possess a very high moisture content which is influenced by age, season of felling and species. Moisture is at its lowest in the dry season and reaches a maximum during the rainy season. Moisture also varies from the bottom to the top and from the innermost layers to the periphery. Green bamboo may have up to 150% moisture. Moisture content decreases with age. Shrinkage – bamboo shrinks in diameter (10-16%) as well as in wall thickness (15-17%). Such shrinkage is appreciably higher than encountered in wood. In bamboo, shrinkage, which in fresh culms begins linearly, becomes negative or almost zero as moisture content falls between 100 and 70 per cent and this continues until fiber saturation point is reached. Such behaviour in shrinkage and density leads to drying defects, such as collapse and cracking, and affects the behaviour of bamboo when pressure treatments are applied. Splitting – Unlike trees, bamboo has no radial cells which in trees increase their shear strength parallel to the axis. This is the reason why bamboo culms split easily. This could be a disadvantage for nailing bamboo but also it could be a great advantage because it makes easy to split bamboo into fine strips for making baskets of various sorts, framework for umbrellas, window screens, fans and so forth.

Manasaram Architects are committed to fight back climate change by promoting the use of naturally-abundant, easily renewable, low-energy local materials. They have close to 30 years of experience in the field of sustainable development; using what is freely available on the site, i.e. sun, soil, air, water and space and materials that are within the short reach are the determining factors in their designs. Creativity is a mere result of this challenge. Their designs take birth, grow and mature on the site.

They strive towards making the building a living entity, responding and growing like any other living being in different seasons and weather conditions. When this goal is met the built structure becomes a thread in the web of all life – one with nature as well as nature itself.

The firm has won many awards for their remarkable work like WADe Awards 2017 – Category: Sustainability Champion, Rethinking the future awards: Category – Housing (Concept), ARCASIA Awards for Architecture 2017 GOLD (at Jaipur) and many more.

Hardness – The strongest part of the culm wall is the external third, which includes the largest number of fiber bundles, and the least strong is the internal third of the culm wall where the least number of fiber bundles and the largest amount of parenchyma cells are found. Colour – Bamboo generally looks green when fresh and tan/brown when dry or dead. But not all the bamboo culms are green, some are green with yellow stripes. Other culms are yellow or yellow with green stripes. There are species of black, small white and red species. Shape – Most of the bamboo species have round culms in section but there is also a species which has natural square culms. It is important to point out that the culm can he deformed artificially, transversally and longitudinally. Size – The size range for mature bamboo is species dependent, with the smallest bamboos reaching only several inches high at maturity. Some of the largest bamboo can grow over 30 metres (98 ft) tall and be as large as 15–20 cm (6–8 inches) in diameter. A typical height range that would cover many of the common bamboos is 15–40 feet, depending on species. In any bamboo grove, you will usually find bamboo culms of varying sizes. Fire – The fire resistance of bamboo is very good because of the high content of silicate acid. Filled up with water, it can stand a temperature of 400° C while the water cooks inside. Thermal Behaviour – Bamboo like wood is a cellular substance and in the dry state the cell cavities are filled with air, which is one of the poorest conductors known. Because of this fibrous structure and the entrapped air, bamboo has an excellent insulation property.

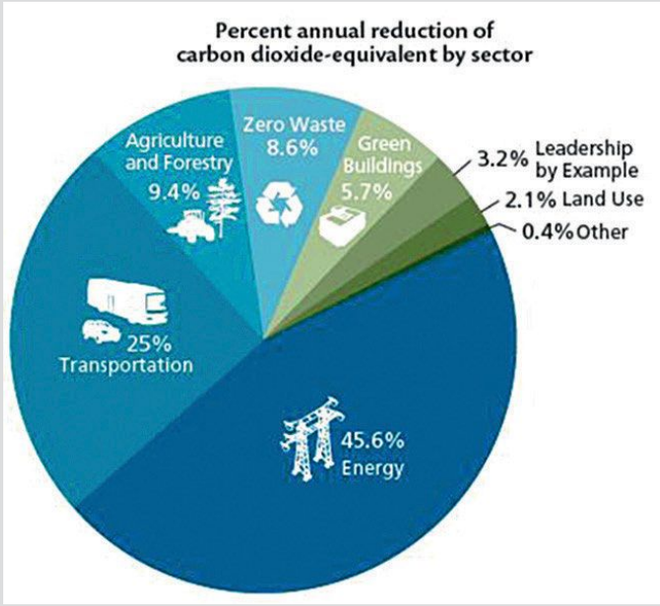
Mechanical Properties: Tensile strength – Bamboo is able to resist more tensile than compression. Inside the silificated outer skin you find axial-parallel extremely elastical fibers with a tensile strength up to 40kN/cm^2. Flexural (Bending) Strength – The cortex or mechanical tissue that is arranged around the outer part of the cylindrical culm performs the function of protecting the culm, so it can resist bending forces. When the Culm in the clump is bent by the wind or by the weight of the snow in winter time, it becomes elliptic in cross section. Shear strength – Bamboo does not have radial cells like those in timber. This is why bamboo has very low shear strength parallel to the axis and the presence of nodes has only a slight significant effect on shear strength. This low shear strength of bamboo is an advantage for some purposes, but it can also be a disadvantage in construction. Bamboo specimens generally break very easily in the direction parallel to the axis. Compressive Strength – Compared to bigger culms, slim culms have higher compressive strength in relation to their cross section, parallel and vertical to their fibber because bigger culms have thinner outer skin, which is resistant in tension. The portion of lignin affects the compressive strength. Whereas the high portion of cellulose influences the buckling and the tension strength, because it represents the building substance of the bamboo fiber.

Chemical Properties: The chemical composition of bamboo is similar to that of wood. Bamboo consists of about 50-70% holocellulose, 30% pentosans and 20-25% lignin, which amount to over 90% of the total mass. The minor constituents of bamboo are resins, tannins, waxes and inorganic salts. Compared with wood, however, bamboo has higher alkaline extractives, ash and silica contents. Bamboo contains other organic composition in addition to cellulose and lignin. It contains about 2-6% starch, 2% deoxidized saccharide, 2-4% fat, and 0.8-6% protein. There are some differences in these main constituents between species, but any influence on technological properties remains uncertain.

The silica content amounts to 0.5-5% according to species and affects their cutting and pulping quality. Most silica appears to be situated in the epidermis, but more knowledge about its location would be useful for processing technologies. Apparent differences of certain species in the natural resistance against fungi cannot be explained so far. Liability for the attack by powder post beetles, especially Dinoderus spp. depends on the amount of starch present. The sugar content of the parenchyma cells can influence the setting of cement for cement-bamboo structures. Since for cement bamboo particle boards pretreatment and chemical additives are needed, seasonal changes of the carbohydrates may be considered.

Drying bamboo poles requires more time than wood of similar density. This is because bamboo possesses hygroscopic materials (compound that easily absorbs moisture) that may contain 50-60% moisture content, depending on the felling season, area of growth and species. When bamboo dries it contracts and shrinks. This shrinkage starts from the moment the bamboo is cut and can reduce the diameter of the bamboo poles with 10% to 16%, and its wall thickness with 15% to 17%. The liability to biological degradation and to deformation owing to excessive shrinkage (which occurs even above the fiber saturation point) necessitates quick drying of bamboo.

Bamboo an ecological building material: With the Global warming issues raging the globe and the construction sector a major contributor, scientists across the globe are looking towards low energy,



Effects of bamboo in day to day use

Traditional Joinery details – bamboo pinning, tying bamboos

Depiction of boot (footing) and hat (roof projection) for bamboo

Finish of bamboo and showing fixing details

Traditional Joinery details – bamboo pinning, tying bamboos

Bamboo treatment – Dip diffusion

Local availability of bamboo – bamboo bazars

resource efficient building materials and technologies for solving the problem of keeping the pace of development without further raising the carbon levels. Bamboo is capable of achieving soil and moisture conservation, repair of degraded lands, ecological, food and nutritional, livelihood and economic security because of its manifold uses and industrial applications rendered possible by recent advances in technology

- Erosion prevention: Bamboo's incredibly thick root system helps maintain soil integrity. Bamboo roots remain in place after harvesting where they prevent erosion and help retain nutrients for the next crop.
- No Fertilizers and Pesticides: Unlike most cash crops, bamboo requires no agricultural chemicals to thrive Bamboo sequesters nitrogen and cultivation does not add chemicals to the environment.
- Renewable resource: Depending on the species, bamboo can be harvested in one to five years. Bamboo's versatility as a substitute for hardwoods offers a chance to drastically reduce that figure and protect the forests that we have left.
- Absorbs greenhouse gases: Bamboo absorbs carbon dioxide and releases 35% more oxygen into the atmosphere than an equivalent stand of hardwood trees. This makes bamboo excellent for absorbing greenhouse gases and producing clean, fresh oxygen.
- Amazing growth rate: some giant culms can grow up to 1.22 meters in 24 hrs. Hence it is a highly resource efficient material. No plant on the planet features a faster growth rate. When it is harvested, it will grow a new shoot from its extensive root system with no need for additional planting or cultivation.
- Bamboo Is Anti-Bacterial: Bamboo contains a natural bio-agent known as bamboo kun, which is naturally anti-bacterial. It is so effective that it eliminates and prevents over 70% of bacteria that attempt to grow on it, whether this be in its natural or fabric form.
- Bamboo a safe material: Tropical and sub-tropical regions have the largest housing and infrastructure deficit and are also the sites of major natural disasters. A sustainable building should be able to perform in both normal and extreme conditions. Safety in a built environment is our fundamental right

Treatment of Bamboo: Bamboo is known to be susceptible to fungal and insect attack. The natural durability of bamboo varies between 1 and 36 months depending on the species and climatic condition.

The presence of large amounts of starch makes bamboo highly susceptible to attack by staining

fungi and powder-post beetles. To increase the durability of bamboo and to protect it from insects and fungal attacks, it is necessary to carry out reliable preservation of every bamboo pole. Treating bamboo with naturally occurring salts of boron (Sodium Borate) which is a safe and environmentally friendly preservation chemical.

To 'load' the bamboo culm with sufficient levels of these salts for wood preservation we, "Horizontally immerse" the bamboo culms in a 2% solution which is a fast and reliable method to ensure our projects use the best material possible. High concentration salts has fire-retardant properties. They are not toxic and can be used for treating bamboo products like baskets, dry containers, etc. which come in contact with food products.

Finishing bamboo elements in buildings: These are the permanent solution to protect bamboo from harsh weather, moisture and noxious insects and to add beauty to the material by means of coating the surface with paints or pigments. Varnish, enamel, paint, Japanese lacquer, lacquer and logwood are used for painting on bamboo. Recently acrylic paints and other new paints made from synthetic resins have been invented, and they have been widely applied on bamboo.

General design principles: Bamboo is naturally designed for strength, thanks to its unique composition.

- Unlike wood, bamboo has no rays or knots, allowing it to withstand more stress throughout the length of each stalk.
- Bamboo's sectional anatomy, both as a cane and on a microscopic fiber level, enhances its structural integrity.
- The high silica content in bamboo fibers means the material cannot be digested by termites.
- Bamboo contains different chemical extractives than hardwood, which make it better suited for gluing.
- As a result, in structural engineering tests bamboo has been shown to have-
- Higher tensile strength than many alloys of steel
- Higher compressive strength than many mixtures of concrete
- Higher strength-to-weight ratio than graphite

With respect to execution of the projects-

- Bamboo is locally available across the world except in Europe (lately many varieties have been introduced there as well). Hence energy required for transportation can be saved.
- Bamboo is called the Vegetal Steel. It is stronger than wood in tension and compression. The tensile strength of the fibres of a vascular bundle could

Working with bamboo in shaded conditions

Contemporary joints of bamboo

Bamboo symphony setting an example of bamboo buildings

Bamboo composites

Bamboo symphony setting an example of bamboo buildings

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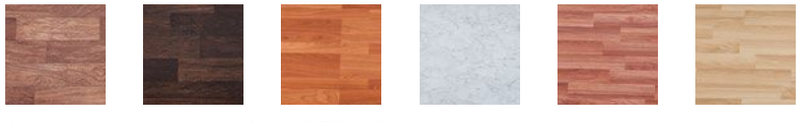

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be upto 12,000 kgs/sq cm, almost twice that of the steel. Hence much less material by weight is needed to be used for the same application.

- Inspite of its strength and hardness of the culm wall, it can be cut very easily for use, with even a stone axe. Hence, very simple tools and labor is required for its processing and usage.
- It is light and hollow, stiffened at the nodes making it highly flexible. This property can be used to make dynamically balanced buildings which can withstand natural forces much more efficiently.

Some common principles to keep in mind while designing with bamboo are:

- Go for local bamboo if there is a tradition of using bamboo in surrounding areas of the project.
- Take cues from traditional usage of the material for the building components and construction methodologies. Build on them.
- Give bamboo a boot and a hat. Give a stone or concrete shoe to avoid bamboo coming in contact with ground. And give a good overhang to prevent direct onslaught from the elements.
- Joints have to be carefully designed, it is one of the most difficult part of designing with bamboo. Try keeping them as simple and straight forward as possible with appropriate jointing system.
- Design some water bodies around to maintain the humidity around the building. This will prevent cracking of the columns after construction and also provide thermal and visual comfort.
- Always keep bamboo in shade after harvesting for slow air drying. It is a hygroscopic material and will pick up and release moisture to find equilibrium. This will cause cracking.
- Treat bamboo well as it is a biodegradable material. After treatment, storage of the treated material has to be done very carefully with proper labelling etc
- All through the construction period, bamboo should not be exposed to direct elements, this may cause leaching of the preservatives rendering the treatment useless.
- Finish the bamboo components well and maintain them as would do to your wood components in the building.
- Very important start with simple buildings and graduate onto larger buildings. Bamboo is not a factory produced material and has a strong mind of its own. It's Nature you see!

There are several traditional ways of joining bamboo poles with ropes, bamboo pins etc. Depending upon the requirement different types of joineries can be used. Some of the common types of traditional joineries are as follows.

Simon Velez, an architect from Bogota, Columbia has developed a jointing system which enhances the strength of the joint immensely and is now being widely used by architects across the world in their buildings with great success. Some of the variations of the joints are shown in the photos:

The New Avatar of Bamboo: The New Bamboo: Bamboo has taken the fancy of architects and designers lately and is finding place in most national and international seminars and competitions heralding a new era for bamboo as a material- it is The New Bamboo!

In the topics, bamboo is primarily used as round poles for columns, beams, roofing, walling and even doors and windows. It is also being experimented to be used as reinforcement in RCC to replace steel at least in small and medium size buildings. This could hugely reduce the carbon emissions from the building sector.

Bamboo composites: Bamboo makes excellent composites with several materials like mud, cement, wood and several types of resins. Due to this a range of composite products are available in the market like BMB, BMCS, Flooring, ply, veneer, cement-based composite, etc. Recently another new product has been developed by IPIRTI, Bengaluru as bamboo wood. It compares in strength to the best hard woods and is extremely low cost in comparison, an excellent substitute for wood. Another new method of using bamboo recently being explored is pre-laminated bamboo beams and the results have been very promising. These products are more commonly used in countries where bamboo doesn't grow abundantly. However, China is promoting them more than that with round pole construction, although they are the largest producers of bamboo in the world.

Photos of our projects with bamboo composites uses along with others

Prefabrication with bamboo: Bamboo lends itself to prefabrication almost naturally. Almost the whole building can be pre-fabricated offsite and assembled in minimal time at the site. This can save lot of onsite execution time, can be deployed in disasters, expeditions, temporary camps, festivals etc. Lunardi's house, Flexisanshell photos

Bamboo is the only natural material perfectly suited for such structures. Architectures and designers across the world from Buckminster fuller to Fri Otto, they have worked with material for various structures. It is used for giant scaffoldings, domes, geodesic, trusses, hyperbolic paraboloids, tensile and tensegrity structures.

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Bamboo is also being used for roads and small bridges, extensively in interiors and product design for living spaces. Due to its high ecological value, bamboo is being used for making oxygen parks and they are hugely popular. Bamboo can also be used by the sides of railroads and highways to mitigate the effects of high pollution. It is a favourite plant for Zen garden and other types of Japanese and other gardens where peace and tranquility are the focus.

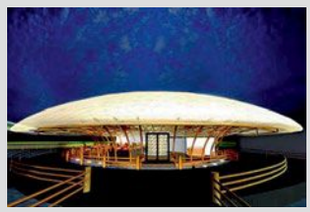
Mainstreaming Bamboo in the building sector: With all these wonderful properties and advantages bamboo has not been able to make it to a major material for construction. Working with bamboo for the last two decades for a variety of projects, we feel some urgent steps could be taken up to mainstream bamboo in the building sector:

- Skill development at all levels for the Building sector from artisans, masons to supervisors and designers is required. Courseware and Content Development is required for this. There are several existing CFC's in the country in each state for bamboo.
  Upgrading these existing CFC's would go a long way in creating the requisite human resource for the sector.
- Integration of Bamboo as a Building Material in the syllabus of Architecture, Engineering and design colleges would equip them and encourage them to use the material in their projects.
- Including Bamboo as a material in the Schedule of rates to facilitate its inclusion in Govt. buildings and developing a comprehensive Bamboo Building code would facilitate its entry in the large public sector buildings and ease in its structural validity.
- Setting up of Bamboo Depots for Graded and Treated Bamboos for easy availability of Bamboo to Architects, Designers and the common man
- India being a Bamboo rich country, to formulate a separate policy for usage of Bamboo in buildings in the Building bylaws in bamboo rich states. The recent announcement of removing bamboo from tree category has initiated lot of movement in the bamboo sector.
- Mandate a percentage of Bamboo usage in all Govt Buildings, forest bungalows, schools etc.

And most of all, respect Bamboo!

Ar Neelam Manjunath is an architect, planner, scientist, activist and theoretician and the founder of Manasaram Architects based in Bengaluru. She is also the founder and Managing Trustee of Centre for Green Building Materials and Technology (CGBMT), Bengaluru

Lunardis residence by Mansaram Architects at Italy



Examples of shell structures with bamboo

Examples of bamboo in interiors

Bamboo bridge at Yamuna Biodiversity Park, Delhi by Mansaram Architects

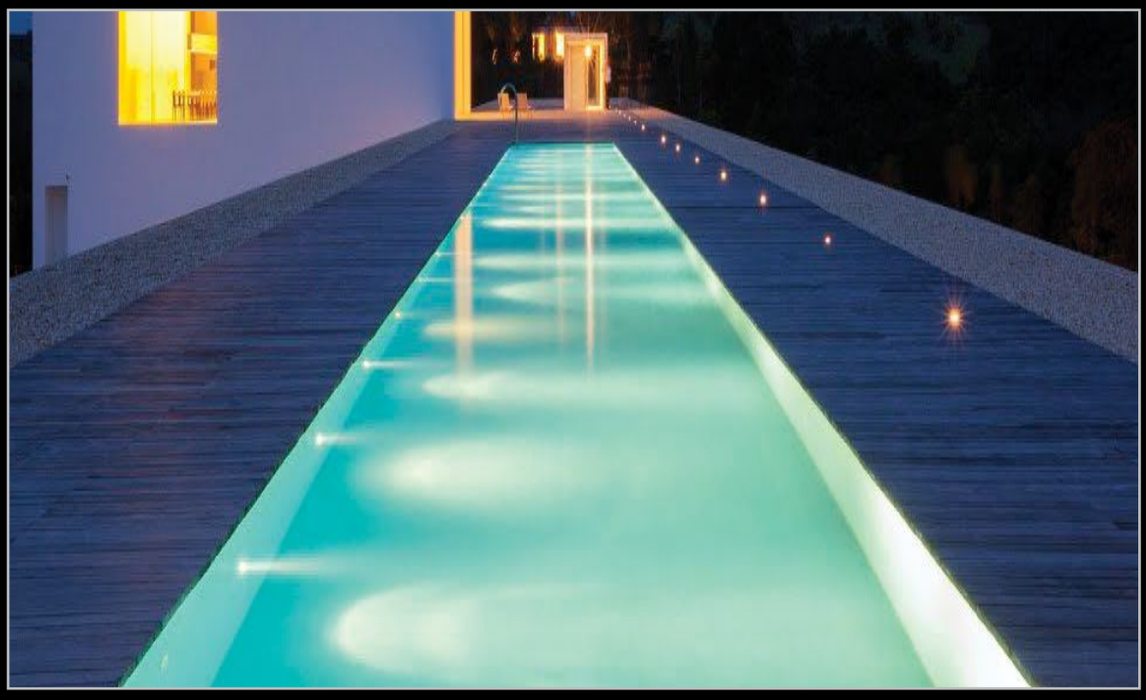
Gazebo at Yamuna Biodiversity Park, Delhi by Mansaram Architects

Skill Development Programs Conducted by CGBMT (Centre for Green Building Materials and Technology)

Government project –Solar Hut by Mansaram Architects

K-LITE

Underwater Luminaires



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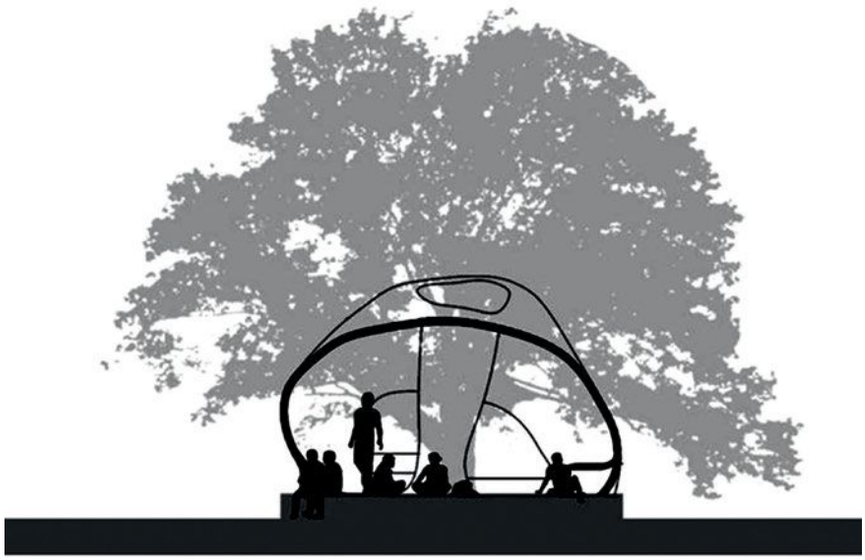
Exploring Architecture

Manasaram Architects

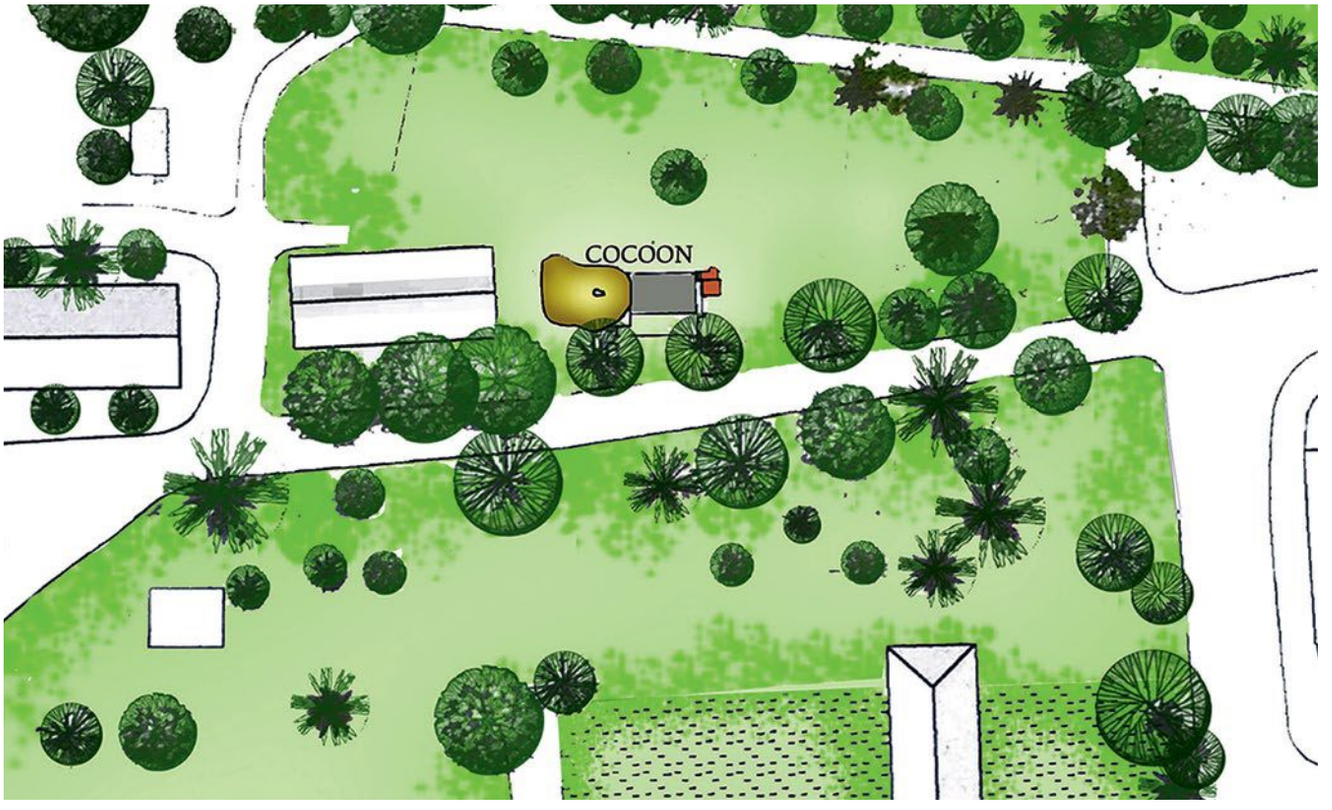


SECTION

Woven Cocoon

Project: Cocoon for Krishi Vigyan Kendra, Trichy, Tamil Nadu
Architects: CGBMT, Manasaram Architects, Aarhus University, Denmark, BCHO Architects, CARE College of Architecture, Trichy

This project was built through a workshop. It's a space to teach and exhibit projects for the visitors of Krishi Vigyan Kendra, Trichy. The architects envisaged it as a community building that could be hand-built by local craftsmen, students and teachers, along with other architects and designers. The aim was to take locally available materials and create a complex structure that is simple to execute. One of the primary concepts behind this was to create an open environment to connect naturally with the existing area while approaching the



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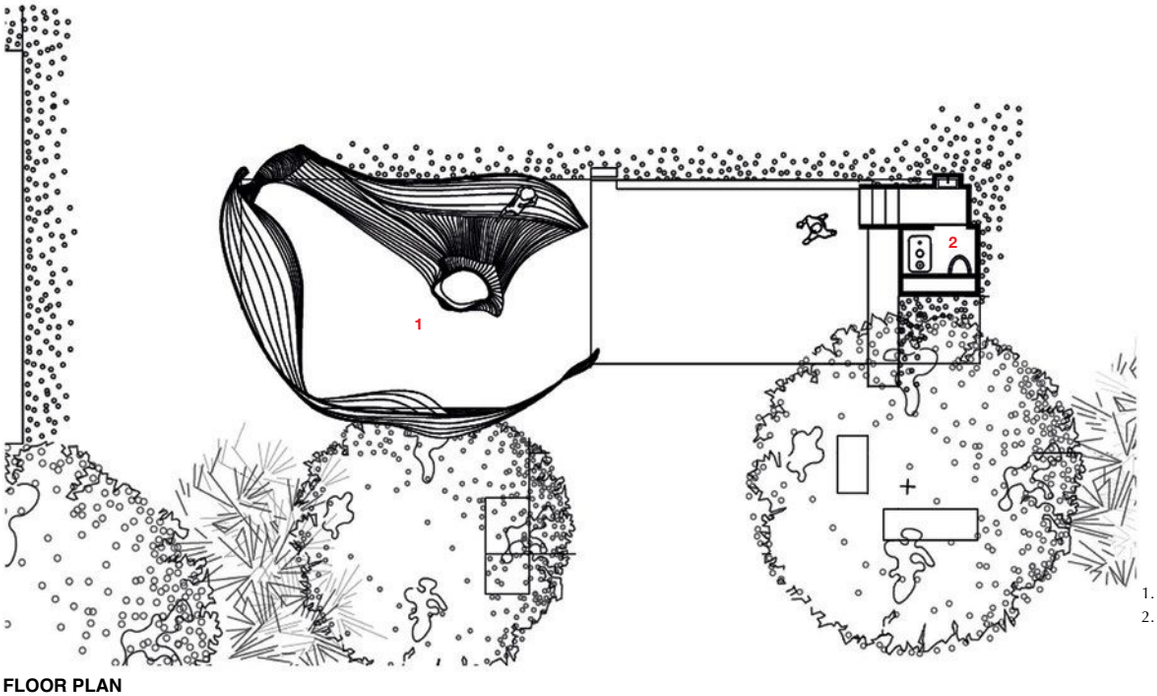
SITE PLAN



1. EXHIBITION
2. HALL

FLOOR PLAN

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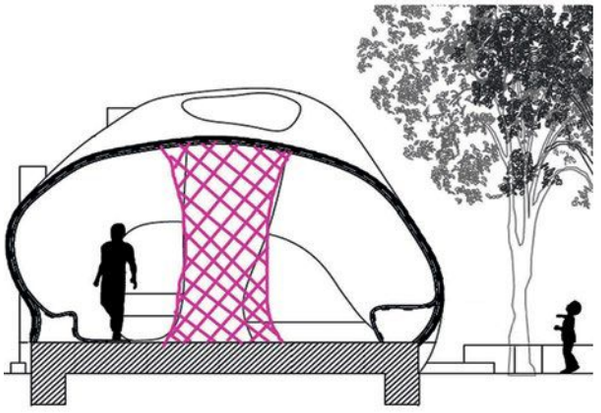
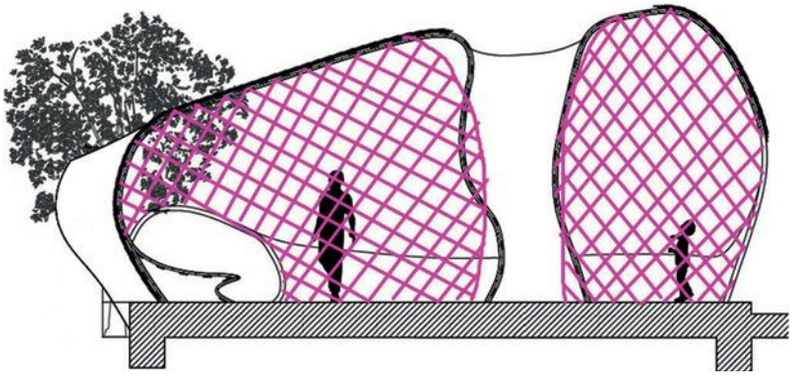
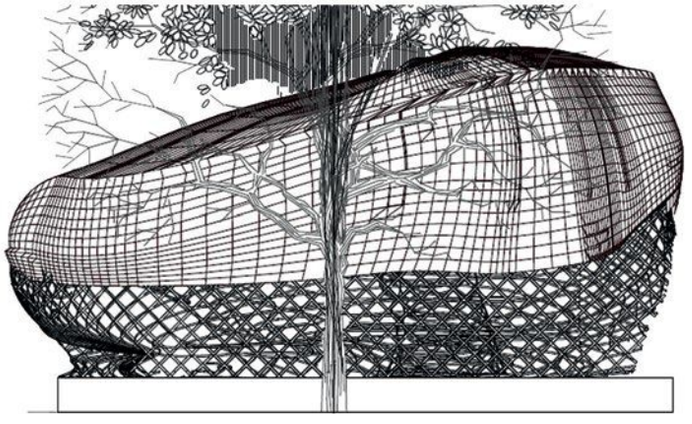
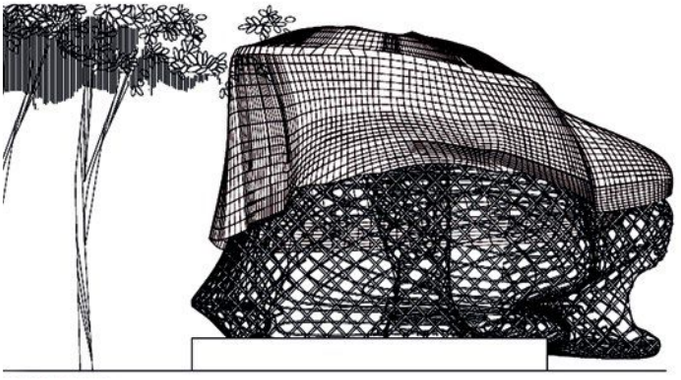




SECTIONS





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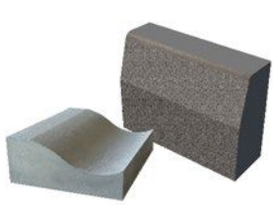

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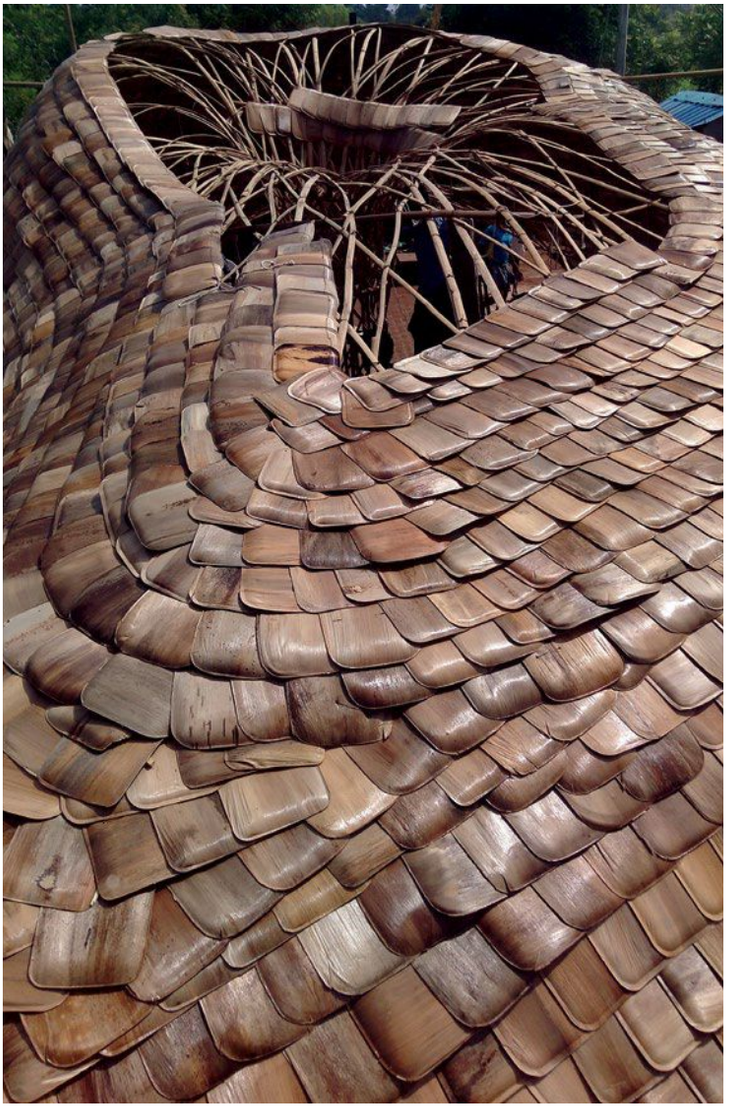

pavilion. The building is open to its surroundings; creating an intended contrast between being outside and under the cocoon. Although the building elements are light, they provide abundant shade, resembling traditional village gatherings under a tree.

Bamboo was therefore chosen as it is an environment-friendly material ingrained in India's social fabric. Traditionally woven bamboo with a canopy-like design created a welcoming, climate-responsive space, while the structure was made entirely with woven bamboo splits originating from a central column, weaving out in three directions. The large entrance was created by opening out the bottom bunched stiffener ring over the entry area, and a ring of bunched splits was attached at the bottom to anchor it to the base. At the column's apex, the members branch out like an umbrella and are cross-woven to form a lattice grid shell structure. These lattice structures are strong and can carry huge weights without collapsing. The building itself is a grid shell structure made of bamboo splits, with the wall and roof incorporating a three-way, continuous weave.

Factfile

Client: Krishi Vigyan Kendra

Consultants: CGBMT (Structural, Landscape)

Contractors: CGBMT, Manasaram Architects, Aarhus University, Denmark, BCHO Architects, CARE College of Architecture, Trichy

Built-up area: 37sq m

Year of completion: 2014

Materials used: Bamboo splits, Bamboo pins; Reinforced concrete and steel – foundations; Steel clamps, rope; Areca Sheaths – façade; Granite, Limestone - plinth

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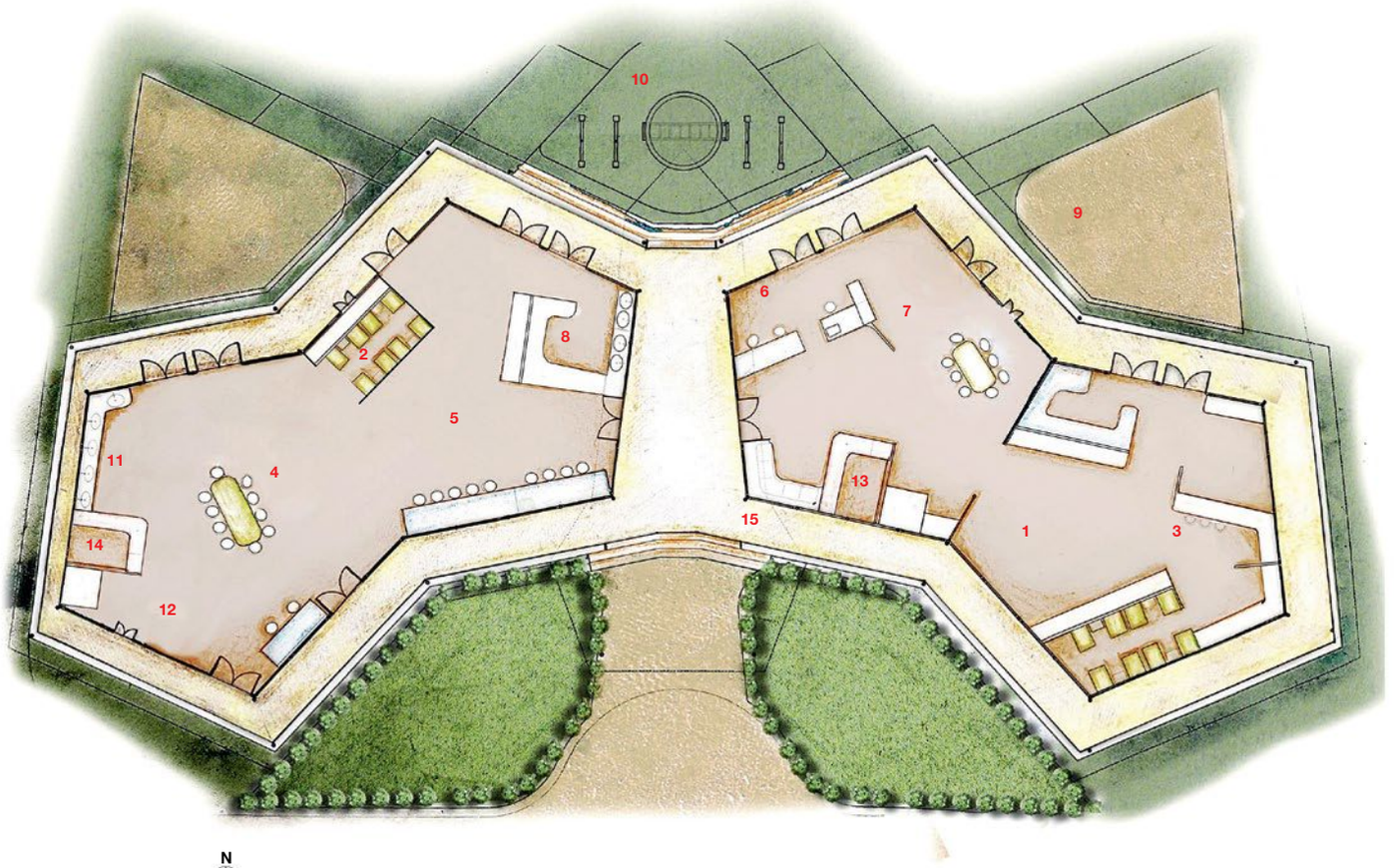
Creating a Stimulating Environment

Project: Creche for DEI (Deemed University), Agra
Architects: CGBMT, Manasaram Architects, Bengaluru

The building, constructed primarily with bamboo, consists of four interconnected pentagonal classrooms, along with an entrance alley. Each room is enclosed in a concentric, spiralling bamboo frame, which extends beyond its perimeter, creating a verandah. The design of the structure with the generous clerestories was a result of a limitation in the available length of local bamboo. Natural thatching was used for the roof with mud coating for protection from fire. The

SECTION



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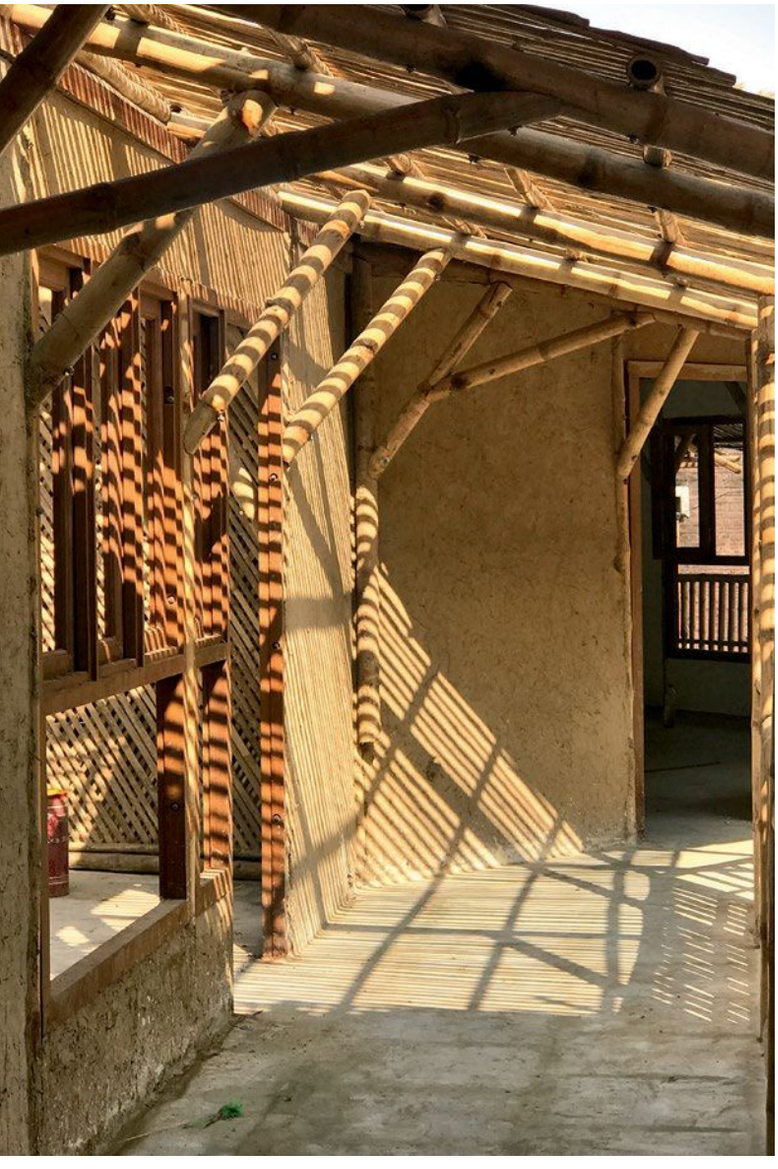
FLOOR PLAN

1. INFANTS
2. SLEEPING AREA
3. DINING
4. PRE SCHOOL
5. TODDLER
6. STAFF
7. PARENT/STAFF CONFERENCE
8. STORAGE
9. SAND AREA
10. PLAY AREA
11. SINK
12. ACTIVITY AREA
13. RECEPTION
14. NURSING
15. VERANDAH



classroom walls are made of a combination of bamboo and mud. Local artisans, students, faculty members and Dayalbagh's Work Department were part of the execution team under the principal architect's guidance. This playful construction created a stimulating environment where children could develop their sensibilities.

Factfile

Client: Client: DEI (Deemed University), Agra

Consultants: CGBMT (Structural, Interior); DI Works Department (MEP)

Contractors: CGBMT

Built-up area: 607sq m

Cost of project: INR 70,00,000

Year of completion: 2018

Materials used: Round Bamboo 3" dia. – structure; Round Bamboo 1", 2" dia. – railing; Bamboo splits, mud-cement plaster - bamboo crete walls; MS tubes – foundation, Oxide Flooring; Wood – Doors, Windows, Thatch with mud coating - Roofing

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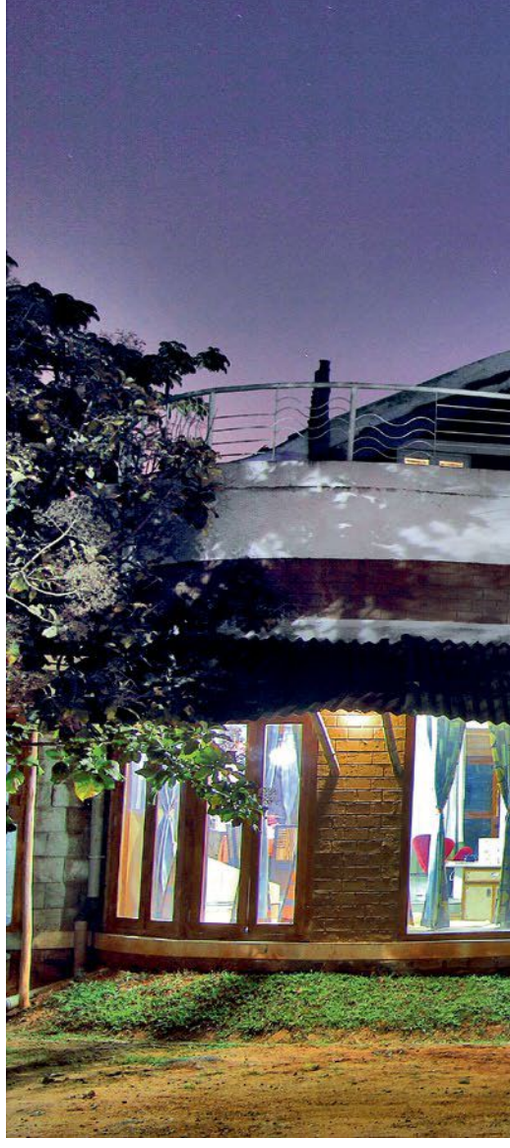
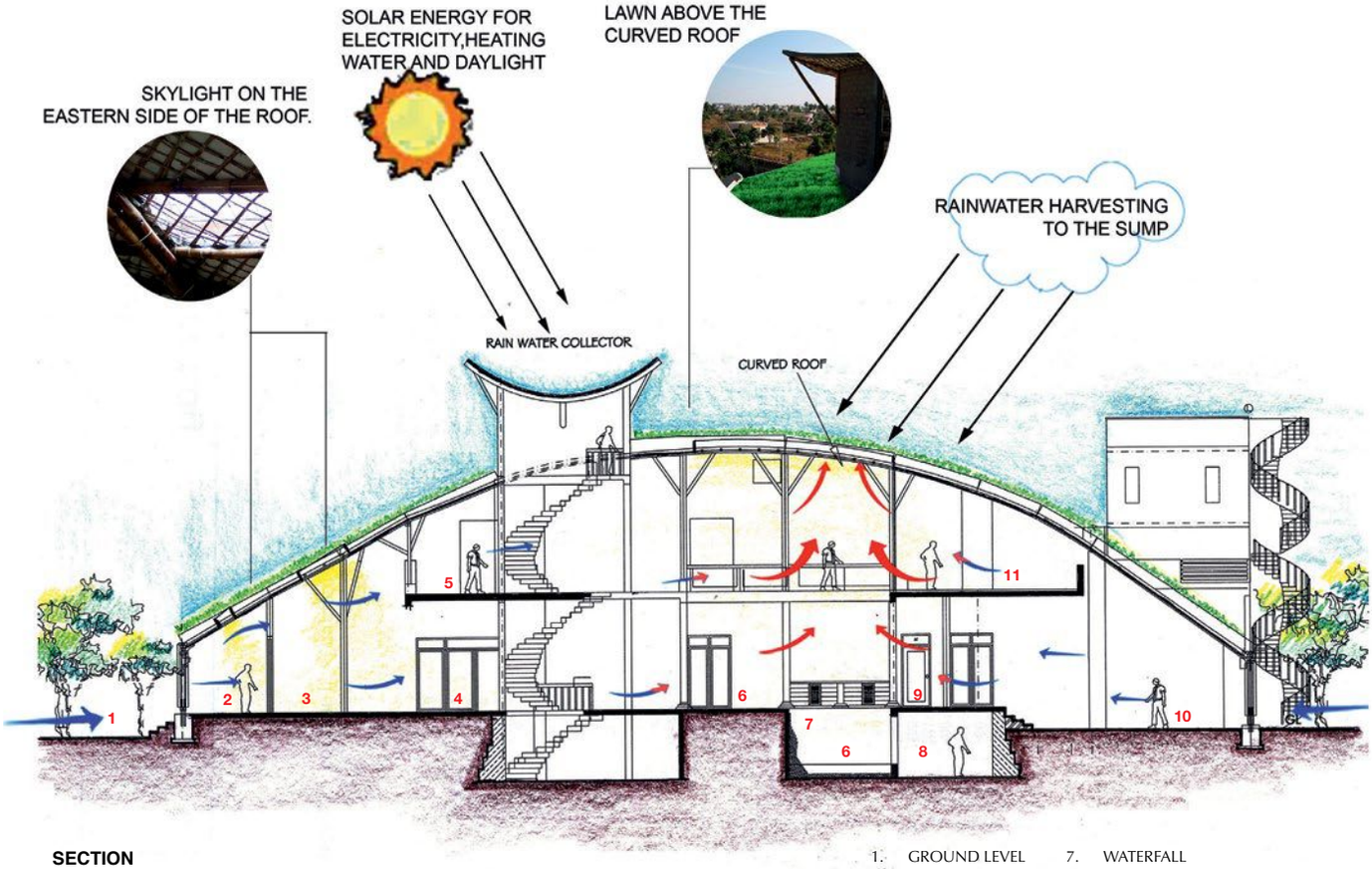
House of Five Elements



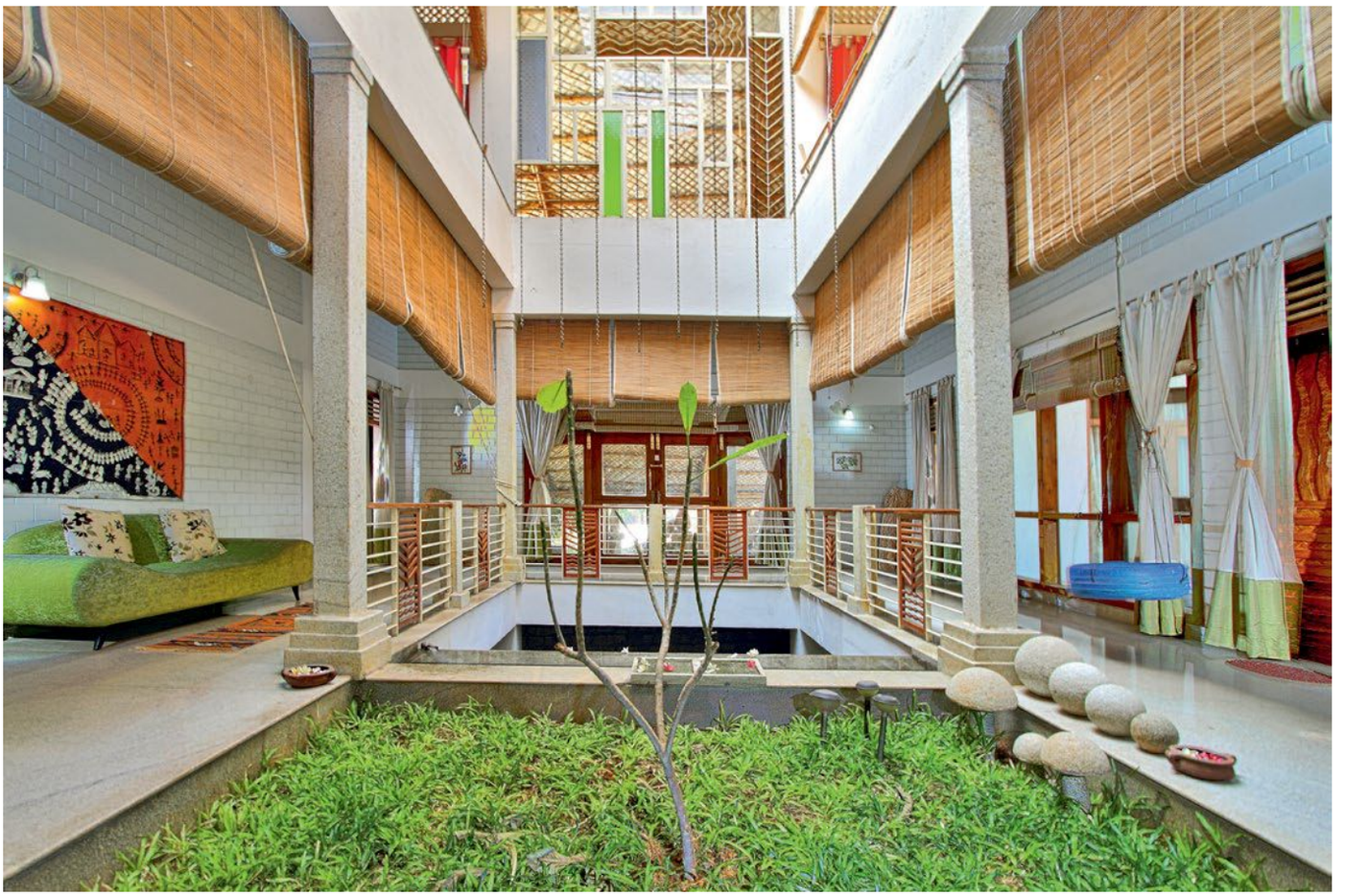
Project: House of Five Elements, Bengaluru, Karnataka
Architects: Manasaram Architects, Bengaluru

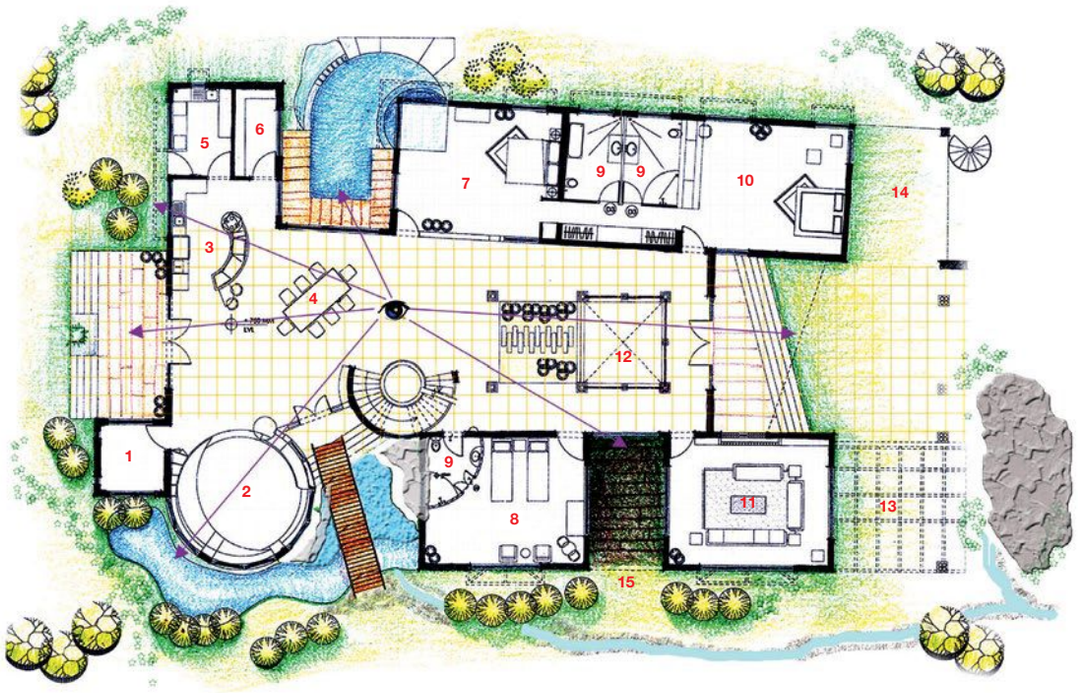
As the name suggests, this house was designed to bring the spirit of nature's five elements — earth, water, fire, air and space — into the building. Water bodies, internal courtyards, large windows and the use of natural materials connect the inhabitants to these elements. The house is a zero-energy development with closed-loop systems for building materials, processes



SECTION

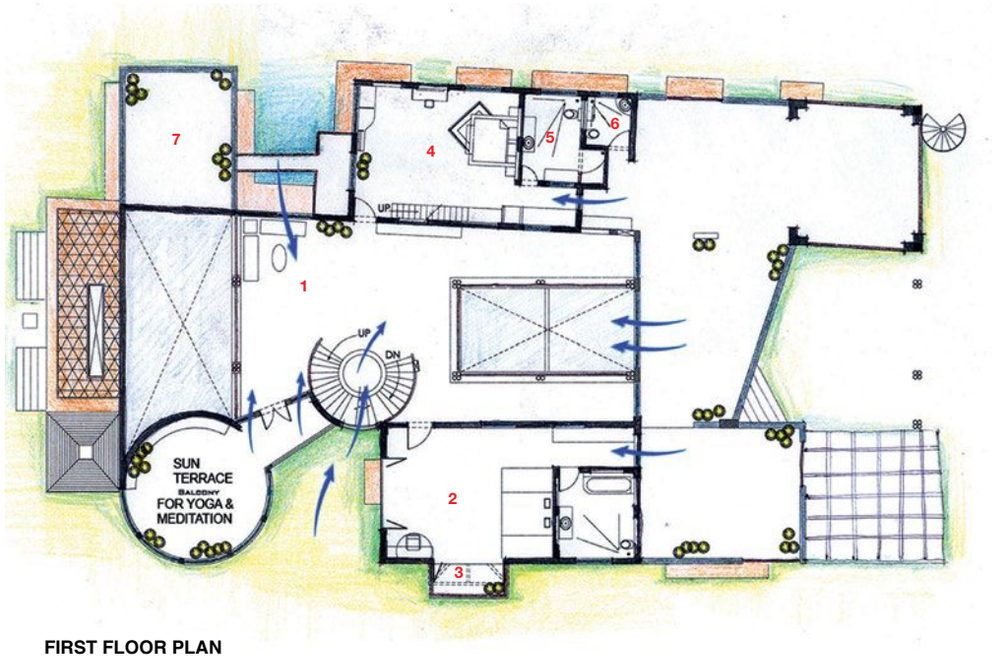
1. GROUND LEVEL
2. VERANDAH
3. KITCHEN
4. DINING
5. LOUNGE
6. COURTYARD
7. WATERFALL
8. HOME THEATRE AND SPA
9. VERANDAH
10. PORCH
11. COVERED TERRACE





GROUND FLOOR PLAN

1. POOJA ROOM
2. LIVING
3. KITCHEN
4. DINING
5. UTILITY
6. STORE
7. BEDROOM
8. GUEST ROOM
9. TOILET
10. MASTER BEDROOM
11. DRAWING
12. COURTYARD
13. PERGOLA
14. CAR SHED
15. DECK



1. LOUNGE
2. SON'S BEDROOM
3. BALCONY
4. DAUGHTER'S BEDROOM
5. TOILET
6. POWDER TOILET
7. TERRACE

FIRST FLOOR PLAN

and technologies — just like in nature. The finished house is an improvised version of the traditional Karnataka 'Thotti Mane' home, where the open courtyard, kitchen and high dining area, create connected spaces which flow into each other. It was primarily constructed out of mud, bamboo and stone, and is designed with multiple green roofs to compensate for its carbon footprint.

One of the roofs is a 3500sq ft double curve roof with a span of 8.5m-10 m. It covers the core area of the house, from east to west, with verandahs on both sides, and a courtyard in between. The light-weight roof (2" RCC slab) is supported by two curved triangular bamboo beams of varying heights. A grid matrix of 1" bamboo splits at 6" (centre to centre) hold the screed concrete in place.

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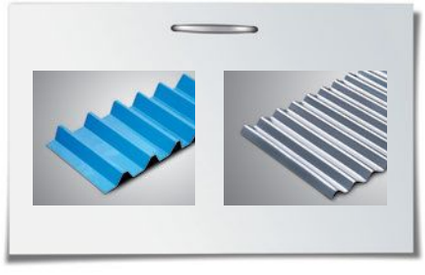

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The curvature is based on the principle that 'a material can bear more loads when it is curved'. Painted tarpaulin has been placed above the split bamboo mat as a bed for the concrete, acting as a waterproofing agent. In this project, bamboo and its derivatives were also used for a wide range of finalities, such as doors, flooring, roofing, ventilators, cupboards, bridges, pergolas, bamboo crete walls on the first floor, etc.

Factfile

Client: Ms Neelam Manjunath

Consultants: CGBMT (Building Materials and Technologies); Prof AR Shivkumar, IISc, Bengaluru (Rainwater Harvesting); CDD Society, DEWATs, Bengaluru (Waste Water Treatment); Dr Yogananda, Mrinmayee, Bengaluru (Compressed Stabilised Earth Blocks); EMDS (MEP)

Contractors: Mr Gurudayal Saran, Aditi Constructions, Bengaluru

Built-up area: 1000sq m

Cost of project: INR 75,00,000

Year of completion: 2009

Materials used: Bamboo (structural round poles 4" dia., splits, bamboo ply, flooring, bamboo chicks); Steel (bamboo joints, reinforcement rods); Wood (teak, rosewood); Bamboo-reinforced concrete; Compressed stabilized mud blocks; Filler slabs; Glass; Oxide flooring; Waste; Waterproof paint; Engineered marble

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Planometric Design

Vignesh Premkumar

The planometric drawing is a combination of plans, sections, elevations and views in a miniature style of art with parallel projections in it, for example, Mughal miniature paintings.

The planometric painting should also be a documentation of the architectural spaces, elements, the connectivity, the ambience, humans and their activities both inside the building as well as surrounding the building, the landscape, the artworks, murals, sculptures, vehicles, furniture and animals in it.

It requires a lot of detailed study and understanding about the building in a different perspective. All the spaces of the building have to be documented as reference and have to be creatively imagined and get converted into painting. It also requires a lot of patience and concentration to do a planometric drawing.

India House Planometric Drawing: India House is the studio as well as the residence of architect Christopher Charles Benninger. India House Planometric painting is done by architect Vignesh Premkumar in a duration of 64 days, with 10 hours of work per day.

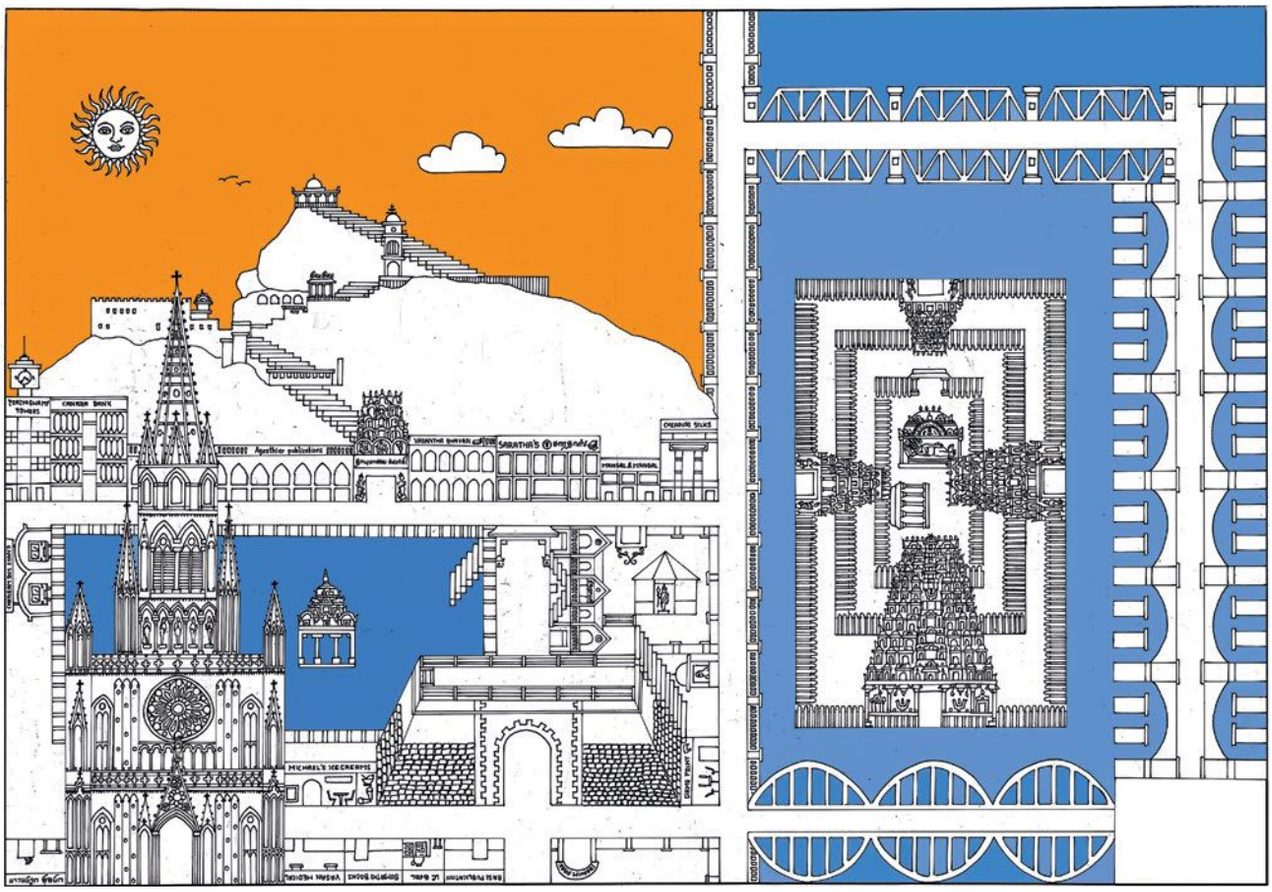
Most of the colours used in the painting were natural fruit colours to give an antique touch to it. The building is divided into two basic segments 'the studio part' (left) and 'the residential part'(right). The background consists of sun and moon interpreting both the parts of the office respectively, and the evening yellow colour is also a mix of daylight and moon light.

The connectivity between the ground floor and the first floor of the residential part of the building is through a cut-out space with a Tangkha painting in it, which is depicted in the planometric painting. In the residential part, there is a hollow shaft which continues from the terrace floor and reaches till the first floor to provide natural ventilation as well as for stack effect purpose which is well interpreted and depicted in the painting. The basement structure opens from the lobby space of the studio part with many murals in it. Few skylight openings are also depicted from the basement to the central courtyard part. The activity of architect Christopher and Mr Ram in India House is well depicted in the painting, as well as the activities of other people inside the house is also depicted. All the vehicles shown in the drawing is exactly the same category of vehicle that is present in there. Both the studio part and residential part are connected by a series of louvers in the terrace, which is also shown in a subtle manner.

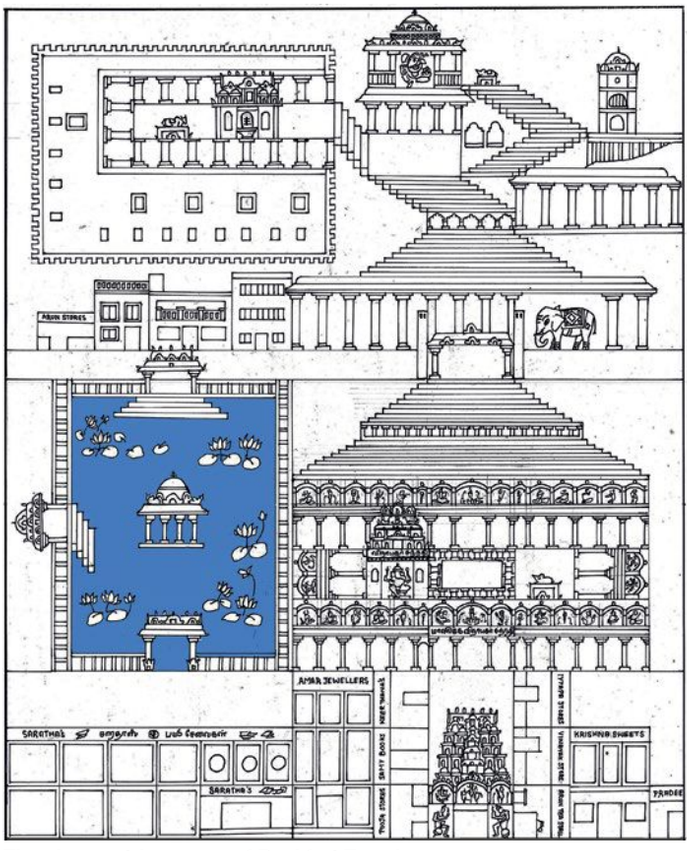
All the painting collections of the India House Art Gallery are documented. Most of the murals are interpreted as lively creatures such as birds, fishes, tortoise, etc. The sculptures are also illustrated and painted digitally. Cats are one of the prominent animals that roam around in the house, so the activities of the cats are also documented well in the painting. The palm trees in the front elevation provide the visual image of India House for the passers-by in the road outside. The central building which extends till first floor behind the courtyard in the background does not belong to be a part of India House but still it belongs to a visual image of its courtyard. The silhouette banana trees and the coconut trees in the background add to the beauty of the landscape in the courtyard. The people's activities outside the house depict the glimpse of culture of Pune city and the variety of people in it.

'The essence of Tiruchirapalli' is a planometric drawing of Tiruchirapalli, which is the hometown of architect Vignesh Premkumar. It depicts the parallel projections of important historical monuments of Tiruchirapalli city such as the Rockfort Temple, the main guard gate, the theppakulam, St Lourde's Church, Srirangam, Cauvery Bridge, Kollidam Bridge, Kallanai Dam, NSB Road, etc, and their connections in a very interesting way.

INDIA HOUSE



The Essence of Tiruchirapalli



The planometric spaces of Rockfort Temple

'The planometric spaces of Rockfort Temple' is about the study of the spaces inside the historical rock cut, Rockfort Temple. It deals with the spaces which we have to cross through to attain the main shrine of Lord Ganesha. It starts its way down from a commercial street moving next to a small mandapam having a tiny Ganesha statue in it, and then the upliftment of gentle stairs leads to a temple street, where most of the Brahmins live. That street further opens into a small temple tank. Then the main path is continuing towards a Lord Shiva shrine called as 'Thayumanavar shrine' in between. Then finally the steps lead upwards to the main shrine of Lord Ganesha. Before reaching Lord Ganesha there is a bell tower in the right side of the painting. All these levels and spaces are well depicted in the planometric drawing of Rockfort Temple.

Vignesh Premkumar is a budding architect from Tiruchirapalli, Tamil Nadu. He is the founder and CEO of Scribble Studios, an art and animation based start-up.

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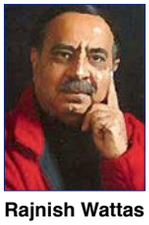
Leaning Tower in Piazza dei Miracoli, Pisa

Voyage to Italy

Mosaic of monuments, piazzas and art

Text by: Rajnish Wattas



Rajnish Wattas

When you step on Italian soil, you step into timelessness. The dreamy city skylines, historic architectural styles, grand piazzas adorned with art are a journey back in time. Overlays of architectural styles suspended in time come together as large, endless mosaics

For years, I yearned to walk along Le Corbusier's epic Le Voyage d' Orient, his coming of age architectural epiphany. Corbusier – then Charles Edourad Jeanneret (without the nom de plume) – as a young man apprenticing in Peter Behren's office in Germany along with his friend August Klipstein,

Monument of Victor Emanuel II in Neoclassical style, Rome

Inner view of Colosseum, Rome

bag-packed to the Balkans, eastern Europe and Turkey. His travels un-locked intense architectural revelations frozen in stones and edifices of Athens, Rome, Florence, Pisa, Venice, Istanbul and other places. His copious notes of the two trips in 1907 and 1911 are very insightful.

The first thing that strikes you about Rome is its blue cerulean Mediterranean skies, unlike the damp grey ones of the colder Western Europe countries. This imparts a different kind of brilliance and luminosity to both its edifices and piazzas. Building textures are sharper and the shadows deeper. Rome transports you simultaneously into a myriad of architectural eras – ranging from the ancient to the Renaissance to neoclassical; all as one architectural mélange rising out powerfully from the seven hills on which the city is built.

One of the symbols of Rome is the Colosseum (70–80 AD), the large amphitheater capable of seating 80,000 spectators used for blood sports. This marvel of architecture and engineering built in brick and Roman concrete exploits the great potential unlocked by the invention of arches and vaults that enabled it to raise tiers of colonnades to create seating for the huge crowds. In the centre is the arena for the gladiators and other blood curdling sports. But most ingenious is the system of basements in many levels below, providing baths, cells for the performers and cages for wild exotic beasts and even chambers for senators who patronised the performers. Such intricate systems of aqueducts for water supply to the heated baths etc. in those primitive times is mind boggling. Similar systems were used for making aqueducts running for miles to bring water into the city from the surrounding hills as well to build bridges over rivers and streams of the empire.

The ancient world of Roman emperors is strewn all over the Palatine hills. The Roman Forum, Imperial forum and ruins of markets, baths and stadiums such as Circus Maximus amaze you.

The other side of the Rome's architecture and art that strikes you are its Renaissance, Baroque and Romanesque edifices as well as the grand concept of urban space by building perfectly balanced piazzas adorned with sculptural fountains and obelisks. The Vatican's art galleries contain the highest treasure by works Michelangelo, Raphael, Sandro Botticelli and many others. The dome over Saint Peter's Basilica was designed by Michelangelo himself. The grand circular cobble-stoned huge Saint Peter's Square with a towering obelisk in the centre to define its core, leaves you pondering over the masterful modulation of space and volumes by the Roman architects.

The Roman popes built many new display fountains to mark their outlets. "The fountains of Rome like classical paintings were expressions of the Baroque art". They were crowded with

External view of Coliseum, Rome

Saint Peters Square, Rome

Cathedral of Santa Maria del Fiore and San Giovanni Baptistery

'allegorical figures and filled with emotion and movement'. Two iconic fountains among hundreds of them in the city are the Spanish Steps at the Piazza di Spagna and the Trevi Fountains. With their great sculptural art, they enthrall visitors to linger on there for hours. Of course, the mouth-watering gelatos available nearby help!

However, the Roman edifices and piazzas experience doesn't end with the classical styles only. Monuments like the Victor Emanuel II are a fascinating transition to neo-classical style, valorising national heroes with glorifying statues and grandiose steps. These almost became inspirational motifs replicated all over the world later, and the Congress building in Washington in America almost seems inspired from such hybrid styles.

Though for Corbusier, the ancient architecture of the city was much more significant than its classical styles built later. "Rome is tiny, and Saint Peter's is a total failure," he wrote rather audaciously! The ancients remained giants in his view and he sketched piazzas, Colosseum copiously. He also looked sharply at silhouettes of building ensembles. "I was crazy about the white colour, the cube, the sphere, the cylinder and the pyramid…they balance, create rhythms…" he wrote.

Florence, just a few hours of train ride from Rome, brings you to one of the most cherished heritage cities of the world. Known for its quaint, cobbled alleys buzzing with Vespa scooters darting through its historic core, boutiques of haute couture lining up narrow streets, Florence leaves visitors gaping at the show windows. The maze of narrow lanes opening suddenly into sun-bathed piazzas dotted with basilicas in Byzantine or Romanesque styles with distinct features topped by magnificent domes, define its spatial experience. Plastered walls painted in warm Mediterranean earth colours topped by sloping clay-tiled roofs, delineate the city's essentially low skyline pierced occasionally by a campanile, bell tower or a magnificent dome. The languid river Aron slicing through the city is dotted by many bridges, most famous of which is Pont Vecchio known for its double-

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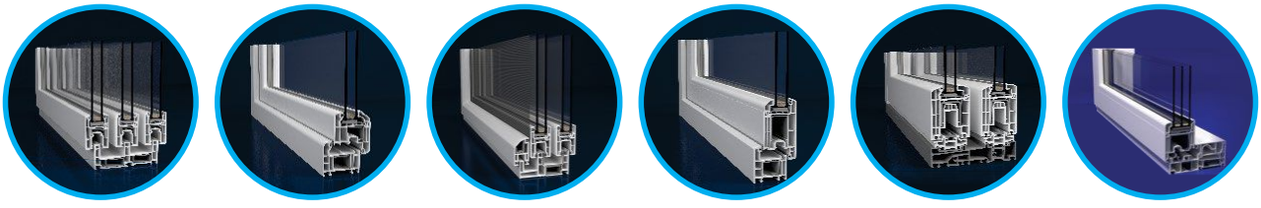

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storied shops. Both the city skyline and the iconic bridge are viewed best from the Michelangelo Hill, where a replica of his masterpiece David is displayed.

There are several famous churches and religious buildings right in the heart of Florence. One of the most significant is the cathedral of Santa Maria del Fiore. The San Giovanni Baptistery located in front of the cathedral is decorated by numerous artists, notably by Lorenzo Ghiberti with the Gates of Paradise. It is marked by its Byzantine and Romanesque features of decorative frames of black lines adorning its white/ grey marble facades. The walk from here to another very significant urban space is a short one quite different in its architectural ambience. Originally called the Palazzo della Signoria, it is marked by the fortress looking, formidable edifice of Palazzo Vecchio, the town hall of Florence and also an art museum. This large Romanesque crenellated fortress-palace overlooks the piazza with its copy of Michelangelo's David statue as well as the gallery of statues in the adjacent Loggia dei Lanzi.

One fleeting view of Florence that will always abide in my heart is the view of the Duomo from my tiny hotel room window, as it looms large over the city with its clay-tiled cladding turning into a burnishing golden hue at sunrise.

Pisa, located close to Florence is where Corbusier found great inspirational moments. The Piazza dei Miracoli (Square of Miracles), formally known as Piazza del Duomo located in the city is a small walled area. The square is dominated by four great religious edifices: the Pisa Cathedral, the Pisa Baptistery, the Campanile and the Camposanto Monumentale (Monumental Cemetery). The whole ensemble of the Baptistery with its solid mass and the sedate Basilica is dramatically juxtaposed by the lean of the closely spaced tower. The other point of architectural interest is the play of colours, light and glow that the three edifices in grey-white marble create in contrast to the green grass of the ground plane.

Writing about the Piazza de Miracali, Corbusier observed "Volumes brought together in light…cylinders, spheres, cones, cubes…" He remained in love with the Duomo whose façade he thought was 'simply marvelous'.

No Italian odyssey can ever be complete without visiting the world's city on water—Venice! It's the most romanticised marvel of the world, and for good reason. Who would dare to build a complete city resting on wooden piles submerged

Skyline of Florence with dome of Cathedral of Santa Maria del Fiore

Basilica of San Marco in Romanesque style

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Campanile and Column in Piazza San Marco, Venice

Trevi fountain, Rome

in ocean. Built on an archipelago Venice's strategic location not only enabled it to have command over sea routes but also grow rich and prosperous through its pivotal location on the trade routes of the merchant ships. For city-dwellers used to only motorised transport; their complete absence here is such a wonderfully amazing experience. The only other means is of course by the large network of canals snaking through the entrails of the city fabric, punctuated by artistic bridges. The ubiquitous 'Gondola' –a uniquely crafted hallmark boat of Venice is built to a purpose to wade through the shallow silt-laden muddy waters as well as to pierce through the massive clogging of the waters by reeds.

Corbusier in a lecture on Venice observed that 'the lives of Venetians were always regulated by the measure of human stride. They had constructed a dense uniform building fabric…with gardens wherever possible and public spaces as "impressive reservoirs for crowds".

However, the most ethereal experience of an almost' perfect urban space lies in the legendry Piazza San Marco flanked by the profusely ornate St Mark's Basilica with its great arches and marble decoration in the Romanesque style. The other components of the piazza are the Doge's Palace in the Gothic style, besides the more sedate arcades of the Museum and Library. But it's the soaring campanile in brick-tiles that punctuates both the configuration of the volumes and the open space with its contrasting brick tiled façade. As the L-shaped plaza opens up into waterfront the space is further punctuated by the two large granite columns carrying symbols of the two patron saints of Venice. Every piece of street furniture be it the street lamp or the railing of the balcony or a door, the detailing is exquisite. Moreover, the constant presence of water provides ample reflections and a special sunrise, twilight and night time experience with the changing quality of light.

Corbusier spent a long time mesmerised by Venice even though it rained during most of his stay. In a letter, he described his nocturnal walks through narrow calli to imbibe 'the charm of faded sounds, the noble and proud harmony of the broad surfaces or the warm cadences of the arches and pinnacles of San Marco'. "Venice, caprice and carnival make for excellent contrast with Rome, brutal and strong symmetry…"

What is so special about an Italian voyage? Perhaps it's the richness of architectural experiences: changing, yet a-changing. Its cities bring together people in glory and in celebration of life.

Rajnish Wattas, former principal of the Chandigarh College of Architecture, is a noted author and critic.

Photo courtesy: Rajnish Wattas

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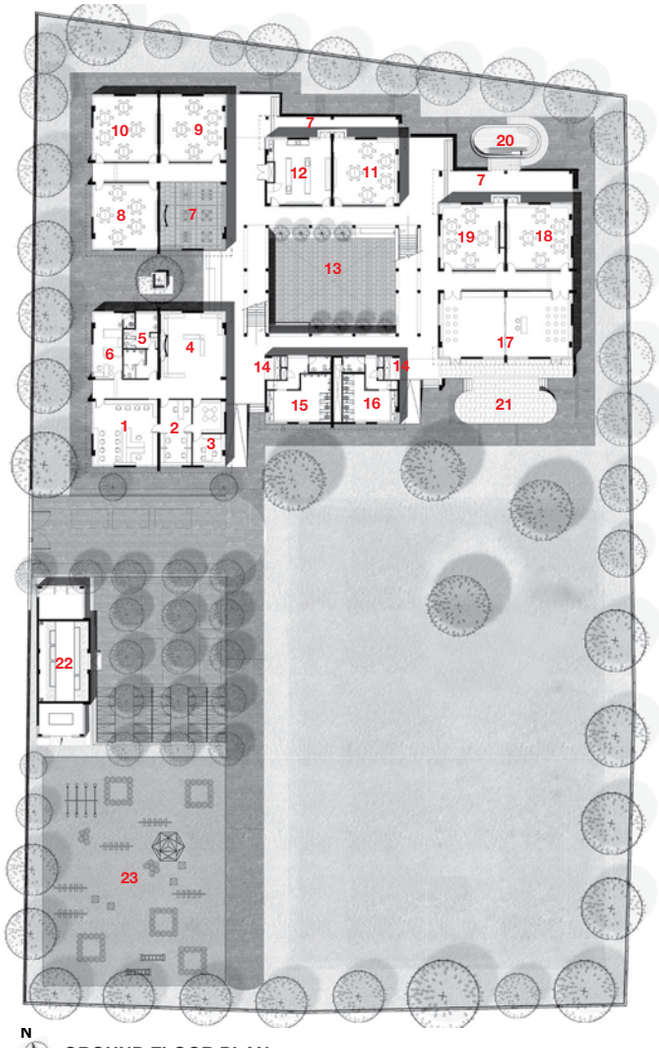
The materials speak for themselves when left bare...

Shaily Gupta

Project: Taksila Roots, Ambedkar Nagar, Uttar Pradesh
Architects: SGA studio

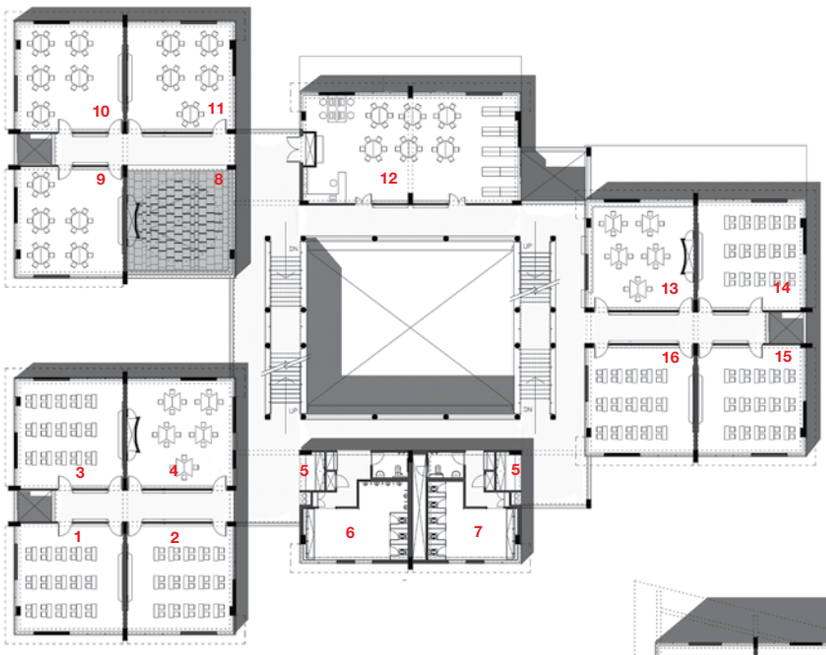
The project is the second school of the group of Taksila academy, across 1-acre campus land plus a sports field. It caters to the primary department of the academy and is built well within the city of Akbarpur for easy access to the young students. Like other under developed cities in India, educational infrastructure in Akbarpur is inadequate with very little improvement and is listed at the top of a list of backward areas. There is nothing significant about this city in terms of urban planning or design/architecture. The client, a young politician, took it upon himself to introduce architectural modernity and development to the city through this project.



1. ADMIN SUPPORT AREA
2. ADMIN OFFICE
3. PRINCIPAL'S OFFICE
4. WAITING AREA
5. ADMIN TOILET
6. INFIRMARY
7. EXTRA SPACE FOR CLASSES
8. NURSERY – C
9. NURSERY – B
10. NURSERY – A
11. LKG – A
12. KITCHEN
13. CENTRAL COURTYARD
14. DRINKING WATER
15. BOYS TOILET
16. GIRLS TOILET
17. MUSIC/DANCE ROOM
18. LKG – C
19. LKG – B
20. SPLASH ROOM
21. STAGE
22. SERVICE BLOCK
23. TYRE PARK

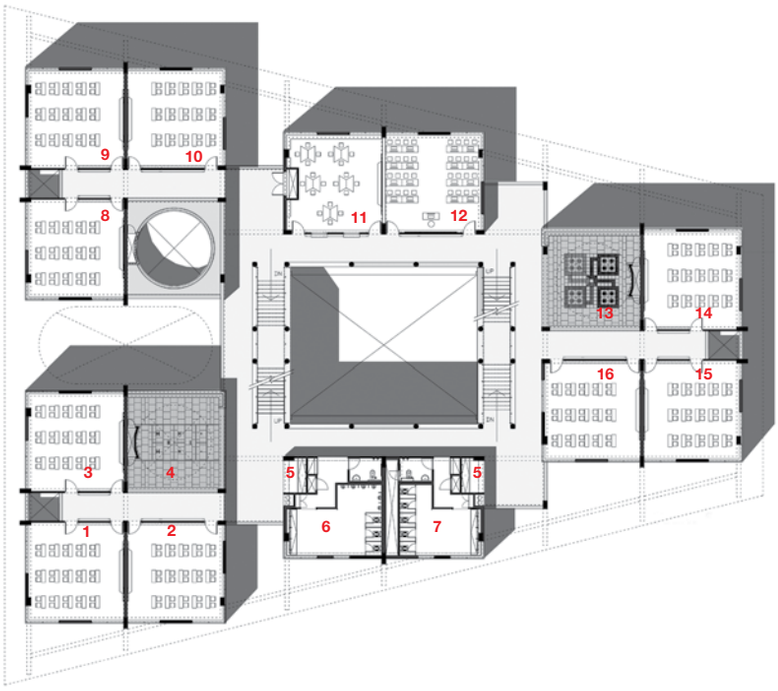
N

GROUND FLOOR PLAN



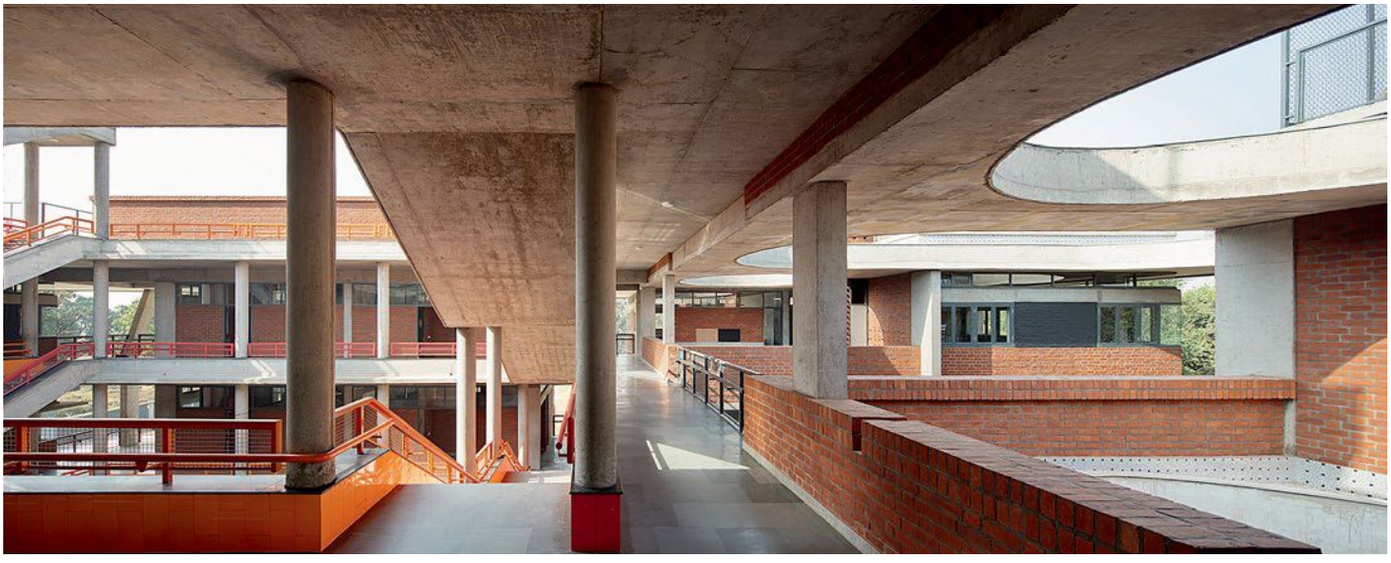
1. CLASS 1 B
2. CLASS 1 C
3. CLASS 1 A
4. ACTIVITY ROOM
5. DRINKING WATER
6. BOYS TOILET
7. GIRLS TOILET
8. EXTRA SPACE FOR CLASSES
9. UKG – C
10. UKG – A
11. UKG – B
12. RESOURCE ROOM
13. ACTIVITY ROOM
14. CLASS 2 – A
15. CLASS 2 – B
16. CLASS 2 – C

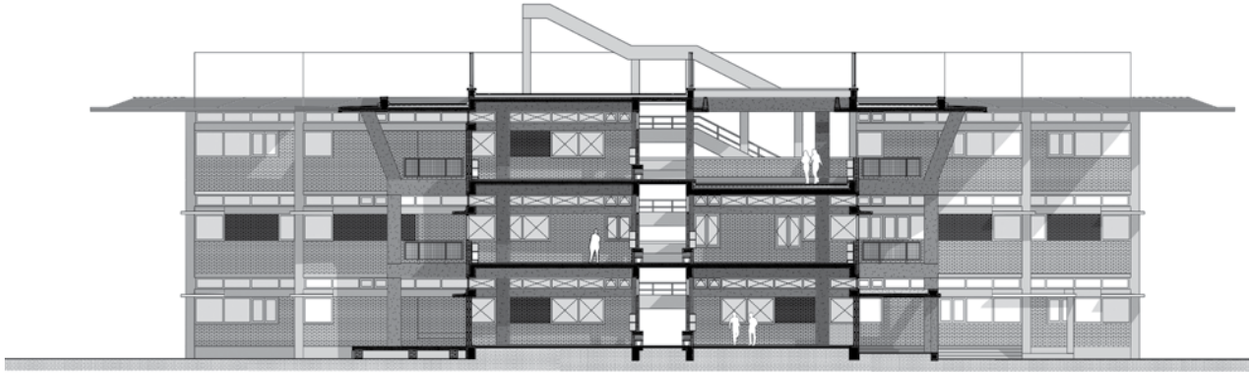
FIRST FLOOR PLAN



1. CLASS 4 B
2. CLASS 4 C
3. CLASS 4 A
4. ACTIVITY ROOM
5. DRINKING WATER
6. BOYS TOILET
7. GIRLS TOILET
8. CLASS 3 C
9. CLASS 3 A
10. CLASS 3 B
11. ACTIVITY ROOM
12. COMPUTER LAB
13. PLAY SPACE
14. CLASS 5 A
15. CLASS 5 C
16. CLASS 5 B

SECOND FLOOR PLAN





SECTION

He considers this project to be the drop in the ocean and hopes to bring about urban transformation in the city.

The functional program called for a primary school with classes from nursery to fifth standard, plus activity spaces, computer room, resource room, admin area, toilets, service block, etc. The building is set on one side of the rectilinear plot, leaving a larger chunk on the south for the playfield, tyre park, service block and the vehicular parking. The building is oriented parallel to the main road, with the longer facade towards the south/south-east.

As a Greenfield project, with no adjacent buildings and no immediate context, the building is designed as a set of cluster blocks connected by a large flying roof and circulation around a courtyard. The school is a ground +2 storey structure in exposed brick and concrete, with an organisational rule to the project. Each floor has three clusters of classrooms with activity spaces always facing the courtyard or a terrace. Outer spaces such as terraces, corridors and court are treated as educational spaces. The plinth of the project is free-flowing with open access from all sides and connects all the external usable spaces like stage, splash pool, the two courtyards and extra activity spaces for the classes.

The courtyard is flanked by two staircases on either side, in a mirrored position. This allows for a dynamic and continuous circulation all around the main courtyard, forming two spirals. Terraces on each floor which are located facing the courtyard widen the field of view from the courtyard and allows for light and ventilation within each cluster. The round cut-outs on each terrace serve the purpose of a simple *chajja* and also add to the play of light and shadow. The juxtaposition of these round cut-outs opens up diagonal

views in the project, adding to the ambience of the inner space. This also enhances the spatial compositions and visual connections within the school.

Each classroom has a continuous horizontal slit acting as a light shelf in addition to the main windows. The horizontal slit adds to the quality of light in the room by reflecting indirect and subdued light onto the ceiling and also used for cross ventilation. The facade wall does not touch the slab anywhere, giving lightness to the overall volume.

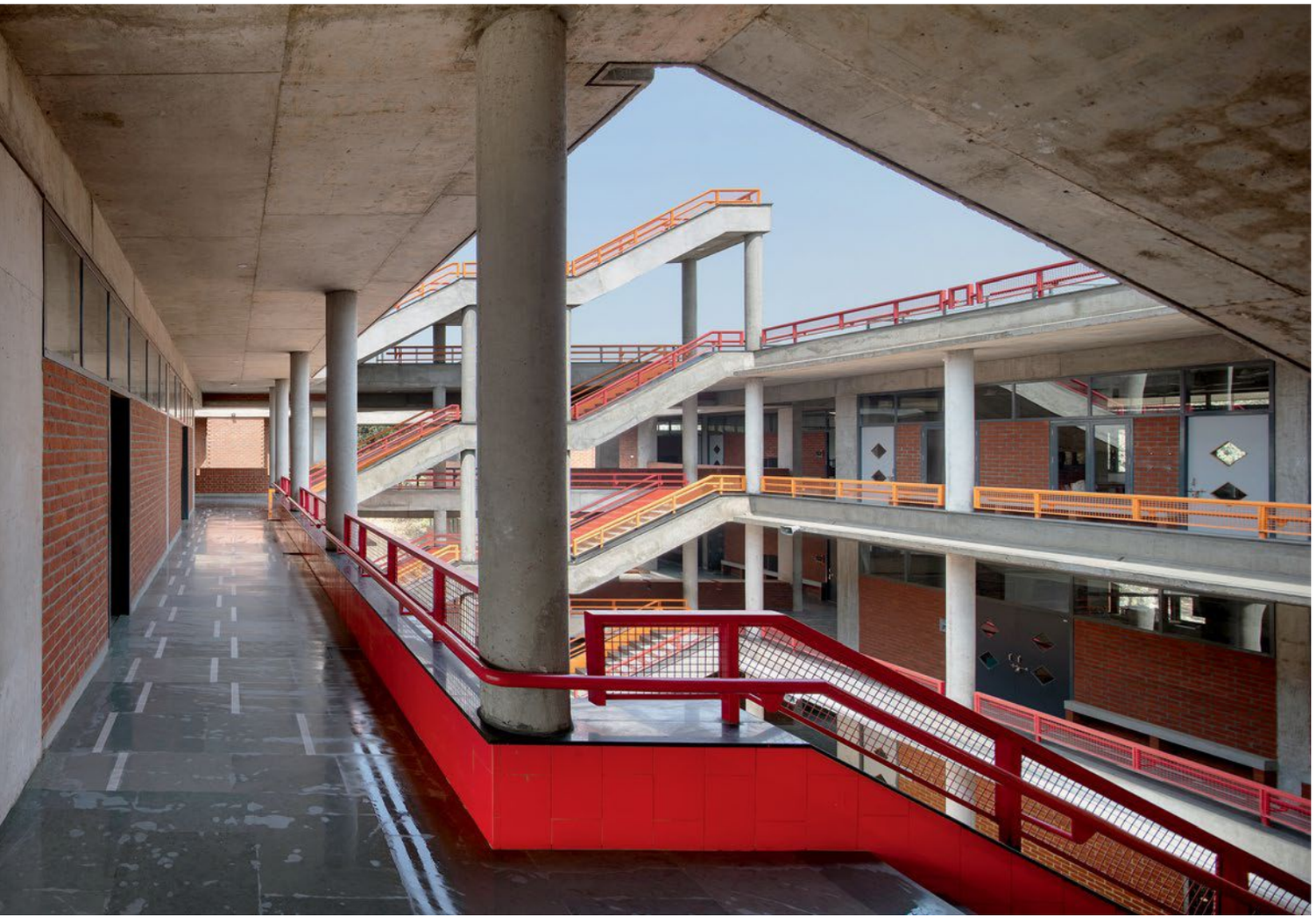
The roof is one the main features of this project; besides connecting all the blocks together, it also gives a floating character to the school. Since the land area was limited, the roof acts as an artificial floor used for playing activities. The roof when experienced from inside, endows a feeling of shade and protection. The almost triangular roof articulates the geometrical juxtaposition of the circular cut-outs and a rectangular court.

The materials speak for themselves when left bare, and also add to the character of the spaces. The horizontality of exposed brickwork and the vertical exposed RCC structure bring a dynamic rhythm and order to the modular project. The project uses locally made bricks for all exposed masonry, giving the precinct a warm character. Tamarind water and linseed oil coating are also used to protect the brick work from salt and dust deposition respectively. Silicon might be done subsequently.

The modularity and the exposed RCC structure play a vital role in the visual aesthetics of the project. Special care has been taken in articulation of structural elements with columns allowing for corner windows in each classroom, round columns around the courtyard adding to the sensitive character and the flying roof.

The school has no air-conditioning. The orientation of the project, cluster formation (thermal mass), courtyard, *chajjas* and the flying roof result in achieving optimum temperature in the classrooms. All the circulation is protected either by the cluster itself or a courtyard.

This project has also integrated BALA elements (Building as a Learning Aid) within the building. Flooring patterns, elements in the walls and corridors have puzzles, games



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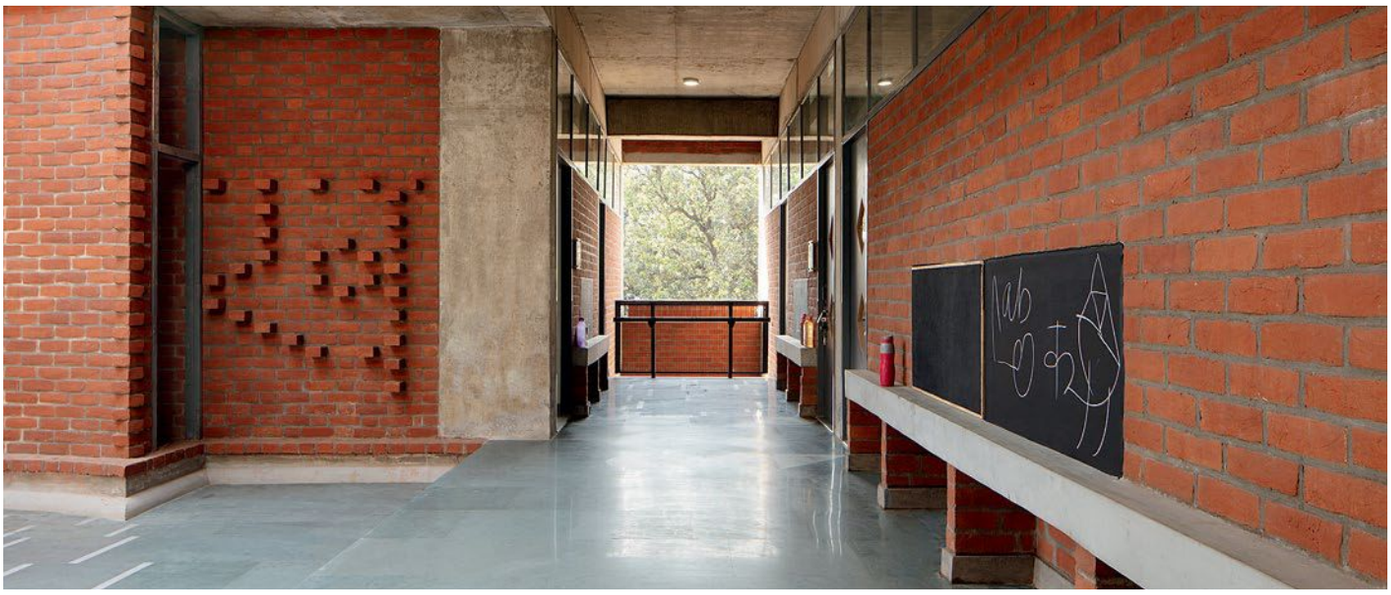

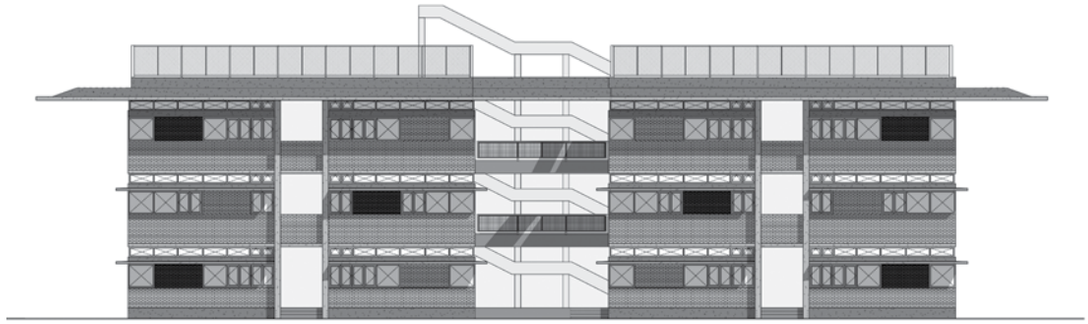

ELEVATION

and theorems to stimulate children's learning environment. These elements instead of being add-ons, are very much integrated in the main civil construction of the project.

This project is important to the city and to the people involved in it. The contractor and labour, who had basic skills had never imagined that they had the capacity to build a modern project, of this nature. They were trained on site (especially for brick work) and convinced to work towards achieving a brilliant quality project. Apart from the development of skills of local labour and facilitation of local craft, the quality was enabled with no special technology, thereby boosting the confidence of the construction community. It aims to be an urban instigator for betterment of the place and contribute in the future of such places.

Indian cities are going through incoherent urban transformations with chaotic growth. Fragmented planning and the lack of an urban vision bring about sheer mediocrity in the overall urban development of the city. India has almost 4000 cities and towns, out of which only 30-35 are under the first-tier category. In the rest of the cities, the problem is even worse, due to a lack of interest of the authoritative bodies. Architecture always takes the last seat, especially in the lower-tiered cities, being considered as extra and extravagant. More so, in the public sector or institutions/educational organisations, the situation is worse.

The project works with this issue and represents the possibility of appropriate architecture in all cities and rural landscapes using simple technology to provide appropriate and relevant solutions. Democratic designing/architecture is about creating good quality space and place.

Photo credit: Andre J Fanthome

Factfile

Client: Raghurajidevi Foundation Trust

Design team: Shaily Gupta (Design Lead), Mayank Jain, Sabika Zaidi

Consultants: Nirman Engineering (Structural); Green Planet (MEP); SGA Studio (Furniture)

Contractor: Udayanchal (Civil)

Built up area: 4500sq m

Year of completion: 2017

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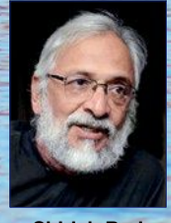
Connecting with Nature

Project: 'Maifal' – The Sapre family lakehouse, Kolhapur
Architects: Architect Shirish Beri & Associates, Kolhapur



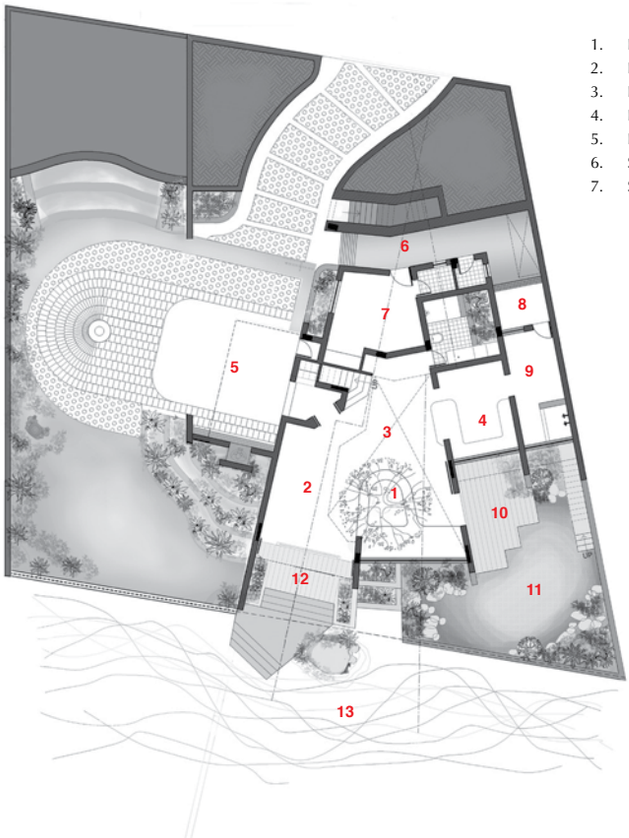
Shirish Beri

The architect's old clients and friends approached him to design a small house for them on a small plot on the edge of the Vesaraf Lake. Being familiar with them and with the natural beauty of that place, the architect immediately agreed. This was kind of a weekend house where the fun loving clients would like to socialise with different sizes and types of groups– sometimes simultaneously.

The metre-wide site sloped down almost 3m towards the lake and had a wild tree on it. The views on three sides were just great.

On returning to the studio, three alternative designs were made for this 500sq m site. One with the full G+1 structure above the ground; second with the full ground floor geomorphic structure under a terrace garden; and the third one with part ground floor structure under terrace garden and part G+1 structure above the ground.

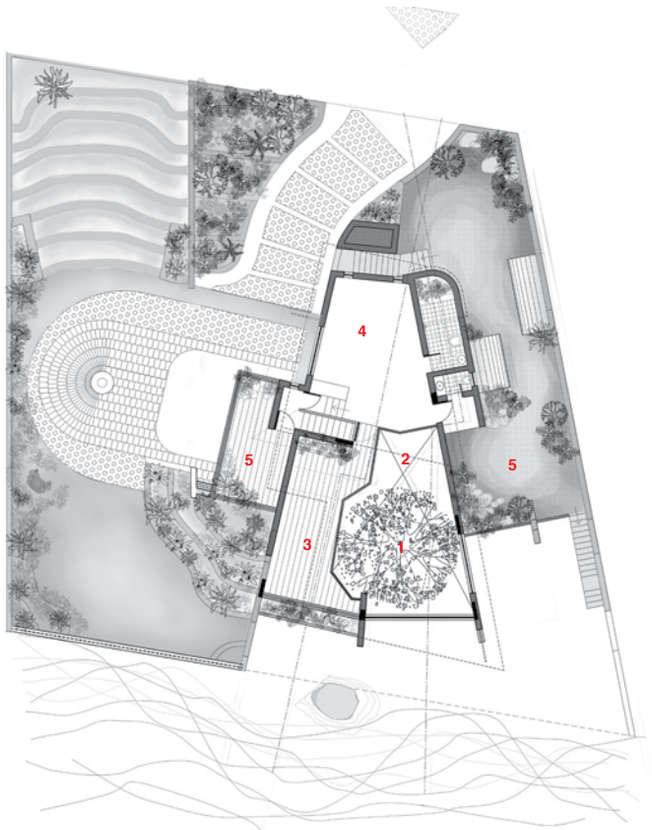
Finally it was decided to go ahead with the third alternative. In this design, the existing tree was taken fully inside the house. The lake was brought in to butt the house and the sit out decks from the living room stretched into the lake. But due to objections by the people and the



1. EXISTING TREE
2. LIVING ROOM
3. DINING
4. KITCHEN
5. PORCH
6. SERVICE CORRIDOR
7. SERVANT'S ROOM
8. SERVANT'S VERANDAH
9. UTILITY
10. SIT OUT
11. GARDEN
12. DECK
13. LAKE

N

GROUND FLOOR PLAN



FIRST FLOOR PLAN

1. EXISTING TREE
2. DINING BELOW
3. DECK
4. BEDROOM
5. TERRACE GARDEN

local bodies, this idea had to be shelved.

Because of the red lateritic soil, laterite stone was chosen as the main building material to harmonize with the environs, along with intermittent courses of wire cut bricks to break the monotony. This material continues for the compound, the paving, planters and the amphitheatre steps, bringing about a sense of unity and cohesiveness in this new environment.

It was only when the house's basic structure was ready, that the neighbouring land owner agreed to sell his 200sq m plot to the client. It was bought immediately. This gave the house more landscaped breathing space, as well as a small amphitheatre and parking space.

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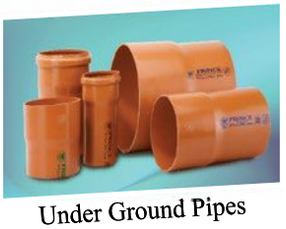

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‘Maifal’ – the Sapre family lakehouse, Vesaraf

A beautiful, pristine lake
with its waters reflecting the changing colours of the sky
and the lovely, lively living green hills around it.

I am standing on a small sloping patch of
five thousand square feet on its shore
with a scraggly wild tree on it and a big rock outside.
I am asked to design on this land,
a second home for the Sapre family from Kolhapur.

I am faced with a major challenge …
whether my design can enhance this ambience
and one’s connection with the lake
instead of blocking it and ruining it ?

Can I borrow this beautiful silence from the lake
and reinstate it in my spaces?

Can that wild tree on site coexist with the humans,
if I give it enough height, light and ventilation.
Can one sit under this tree inside the house…
feel it, talk to it and empathize with it?

Can I help the Sapres in connecting with nature?

Could my spaces encourage and improve
their interaction with family and friends?
Can I create a variety of interactive spaces…
indoor, semi open, on open terraces and sit outs…
each with a different ambience and view
for different age groups and friend groups ?
And then, how about a bigger landscaped open space
for larger gatherings?
and another stepped landscaped amphitheater
for the performances
with the lake as a backdrop?
(another 2000 square feet land was bought on this side)

Wouldn’t the transparency within the house,
the horizontal and vertical flow of spaces
help in creating better interaction and
closeness between the inmates?

Can this home also help in bringing them
closer to their own selves.
Thus I asked, shouldn’t there be places
for the individual to be with oneself –
inside the house as well as outside?
Can one rejuvenate oneself from
the nature’s beauty, energy and silence.

Why can’t the toilets have natural greenery
and the kitchen too have a wonderful view?
Shouldn’t we have playful, interesting,
Interconnecting stairs to negotiate the multiple levels?
Can I create terrace gardens to make up
for the paucity of space on ground?

Wouldn’t natural stone be the appropriate choice for this
kind of a building?
With roof tiles to harmonize with other village roofs ?
Then, glass may not have an alternative to get
uninterrupted views
and also protect from the heavy rains and cold at the
same time.

Now, the spaces in and around this house
have consciously and unconsciously
started casting a kind of magical spell
on the Sapre family and their guests.

They cannot describe this state of mind when they are here.
It is not just the awe and surprise at meeting the tree inside
the house
and the ‘wow’ factor at the sight of the framed views of the
lake and the hills.

It is something more ….
… an immeasurable and indescribable sense of well being
and peace,
created by these spaces where
harmony and empathy unknowingly permeates into
their being.

-Ar. Shirish Beri

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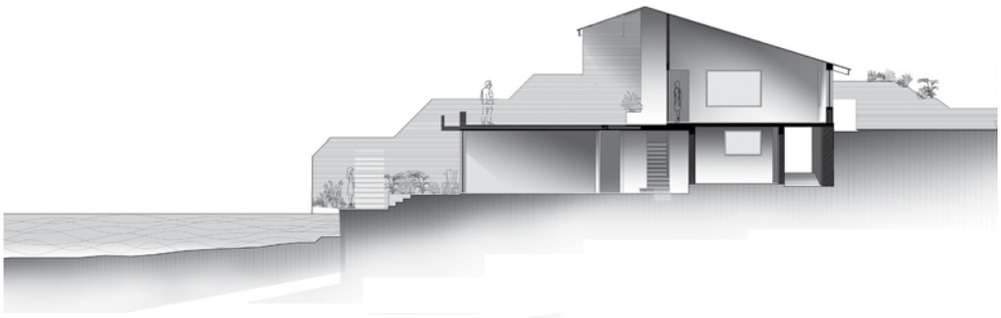
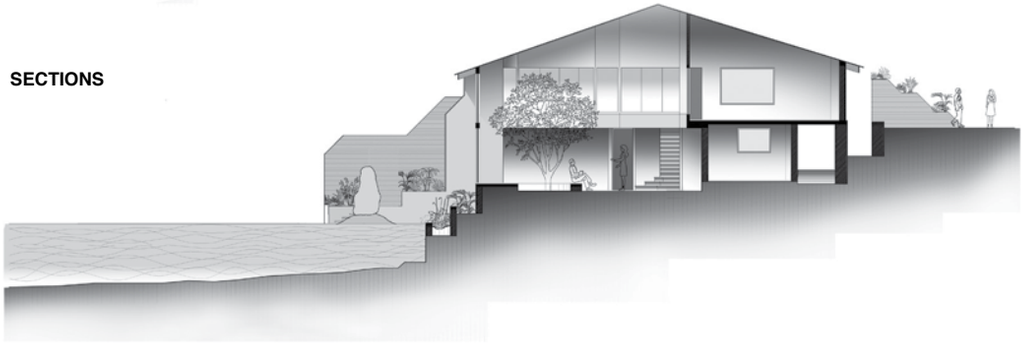


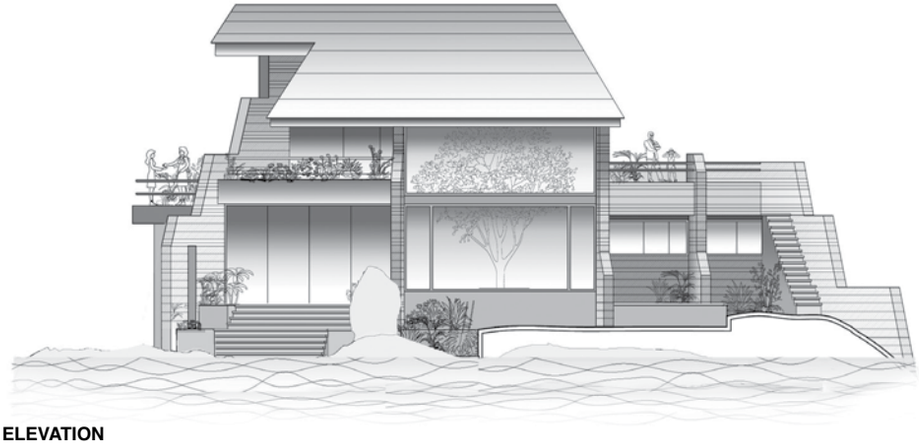


SECTIONS

All spaces in the house were designed to pay their respects to the natural lake and the hills beyond. To cater to their diverse socialising needs, all enclosed spaces open out onto semi open/open extension sit outs with wonderful connectivity with the lake and surrounds. The living opens out on a verandah; the dining space visually opens onto the lake through its double height glazing and physically onto a sit-out in front of the kitchen; the stair landing opens on the terrace garden above the porch; the upper bedroom has a big extension terrace above the living on one side and the terrace garden above the kitchen and utility on the other side; even the kitchen and the utility have good views of the lake.

As soon as one enters through the main door, he/she encounters the big existing tree as a grand surprise as it is not visible from anywhere outside the house. The skylight tiles in the roof above this tree bring in adequate light inside. This tree becomes a wonderful foreground for the lake view from the dining and the upper bedroom. It also allows for hanging of many small light baskets to soothingly illuminate the living and dining space. The platform around the tree doubles as seating and a service counter.

Before we come to the porch is the service alley leading to the caretaker's room, staff toilet, electric meter, inverter and the utility entrance lobby. Just before this alley are a flight of steps leading to the terrace garden. From the porch, the lake is framed in an opening as a backdrop for the sculpture placed there.



ELEVATION

Now, the spaces in and around this house have consciously and unconsciously started casting a kind of magical spell on the family and their guests. They cannot describe this state of mind when they are here. It is not just the awe and surprise at meeting the tree inside the house and the 'wow' factor at the sight of the framed views of the lake and the hills.

It is something more…an immeasurable and indescribable sense of wellbeing and peace created by these spaces where harmony and empathy unknowingly permeates into their being.

Factfile

Clients: Susmita and Shirish Sapre

Architecture/interior, Landscape Design: Shirish Beri, Asher Philip

Structural Design: Amit Kulkarni

Electrical Design: Upendra Deuskar

Built-up area: 2400sq ft

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CELEBRATING
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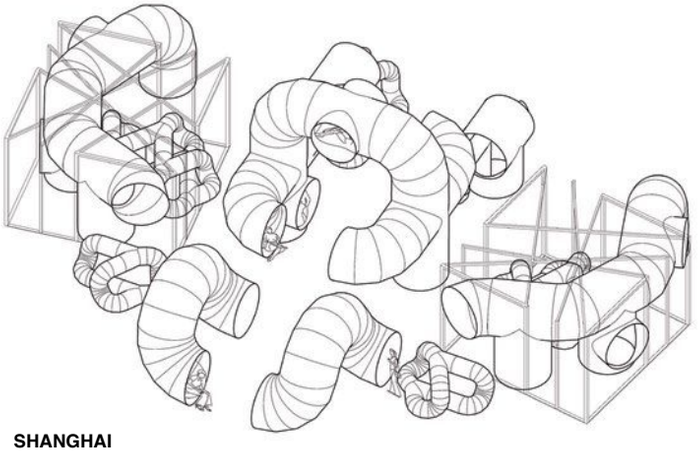
INSIDE OUT
The Future of Modern Living
Beijing-based innovative architecture and
design studio People's Architecture Office
was inspired by the idea of tubular living in
the future. Turning the concept of these
metal structures – which form the internal
foundations of any building – quite literally
inside out, People's Architecture Office has
curated various room sets that feature their
handpicked edit of the most iconic designs
that will last the test of time.

Tubular Living

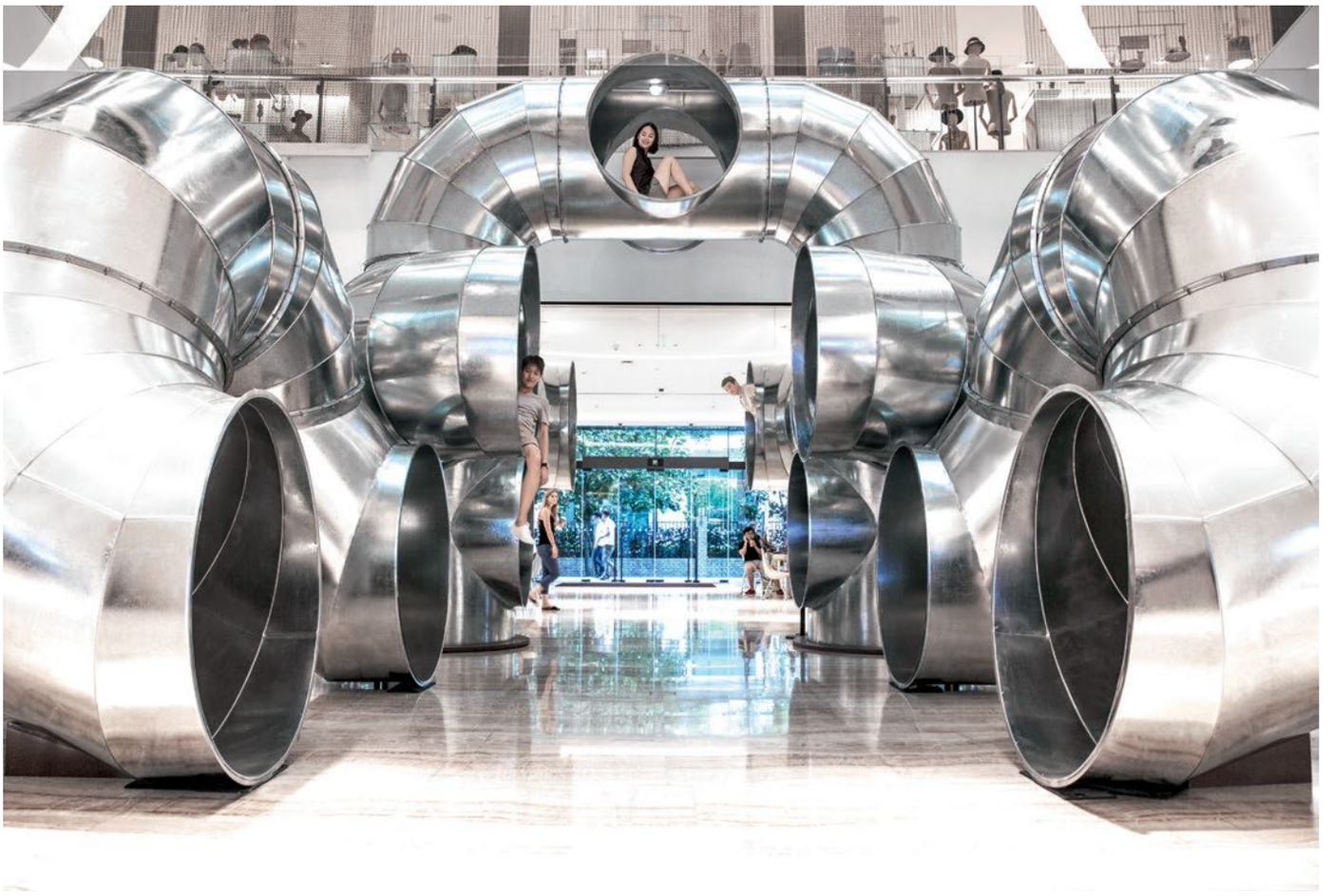
Project: Tubular Living, Beijing, Shanghai, Hong Kong
Architects: People's Architecture Office, China

To celebrate its 165th anniversary, the clients invited the architects to create installations that explore vertical living in the future. Inspired by the hidden ventilation shafts and mechanical structures that support the comforts of modern life, the architects turned the buildings 'inside out', exposing to view the large metal ducts found in the interior of the buildings.

In this imagined tubular living, horizontal spaces are suspended in the air, branching off from vertical towers. The standardized parts are factory-made and assembled on site. Their raw industrial surfaces contrast with the pristine interior of the upscale retail store. Metallic tubes house staircases, become rooms and tunnels with views from above, oversized speakers, and tubular knots that serve as furniture.



SHANGHAI

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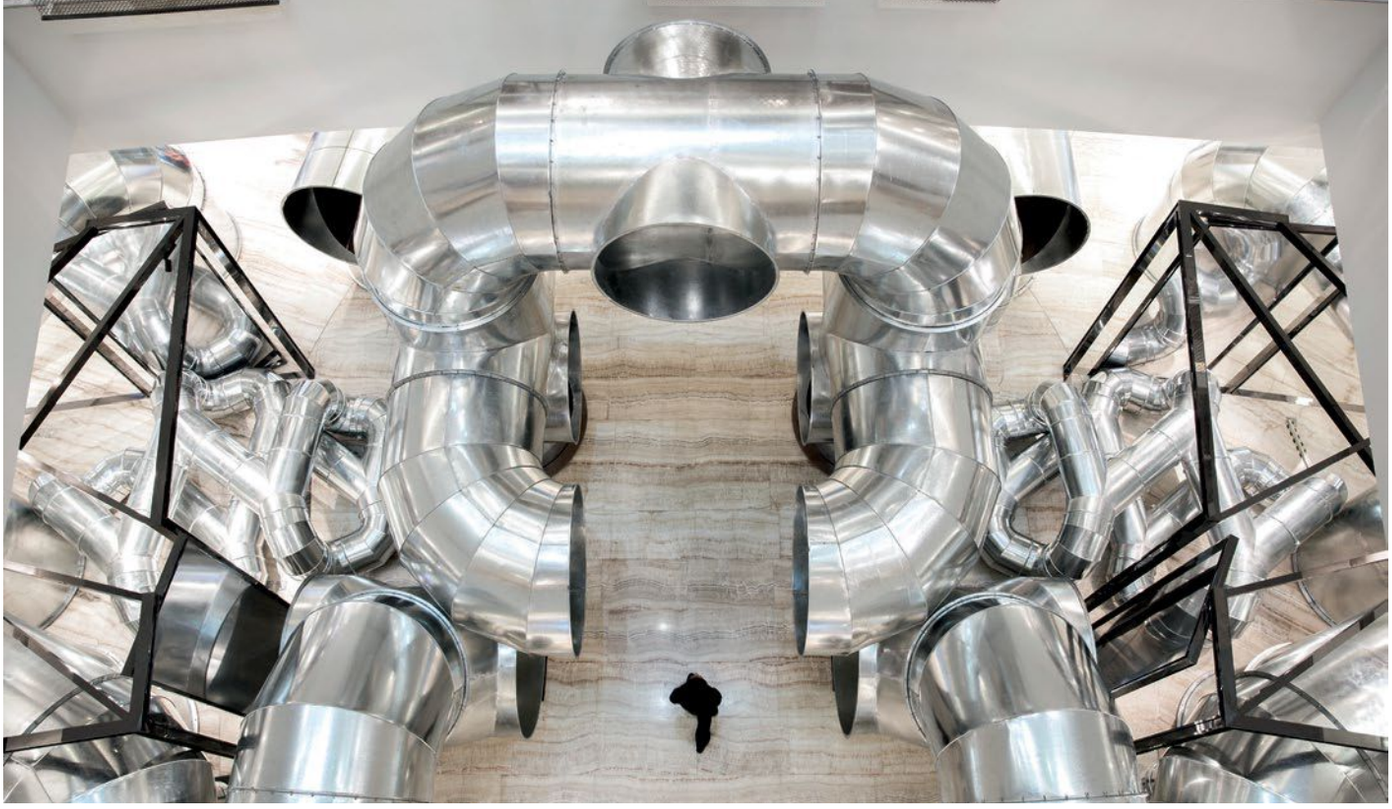
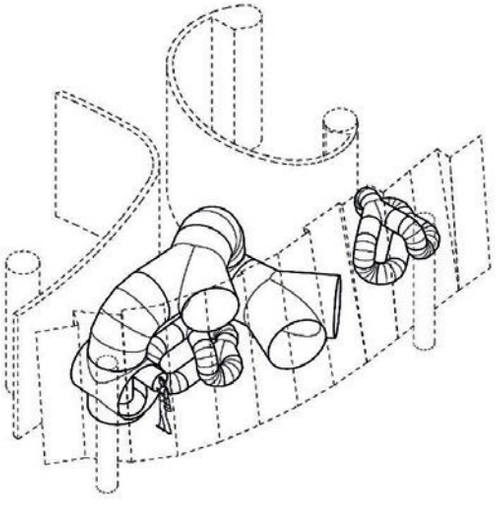
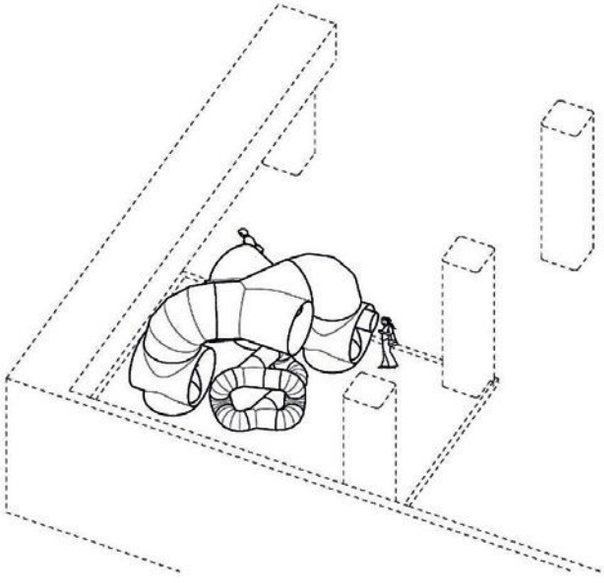




BEIJING



HONG KONG

It was installed in Lane Crawford stores in Beijing, Shanghai and Hong Kong. The installations featured furniture and lighting pieces designed by the architects.

Photo credits: Lanes Crawford and People's Architecture Office

Factfile

Client: Lane Crawford

Project Team: He Zhe, James Shen, Zang Feng (Principal architects), Sean Phillips, Charlotte Yu, Wayne Liu, Gao Tianxia, Leo Chazalon

Material: Galvanized Steel

Project Year: 2015

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Steel mountains

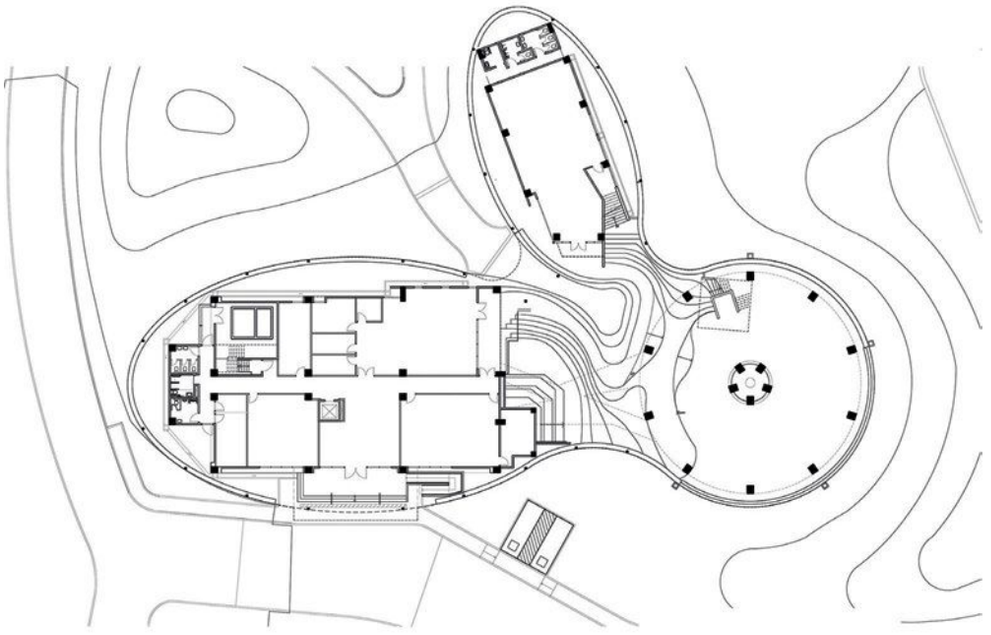
Peichin Hsu

Mark Ongg

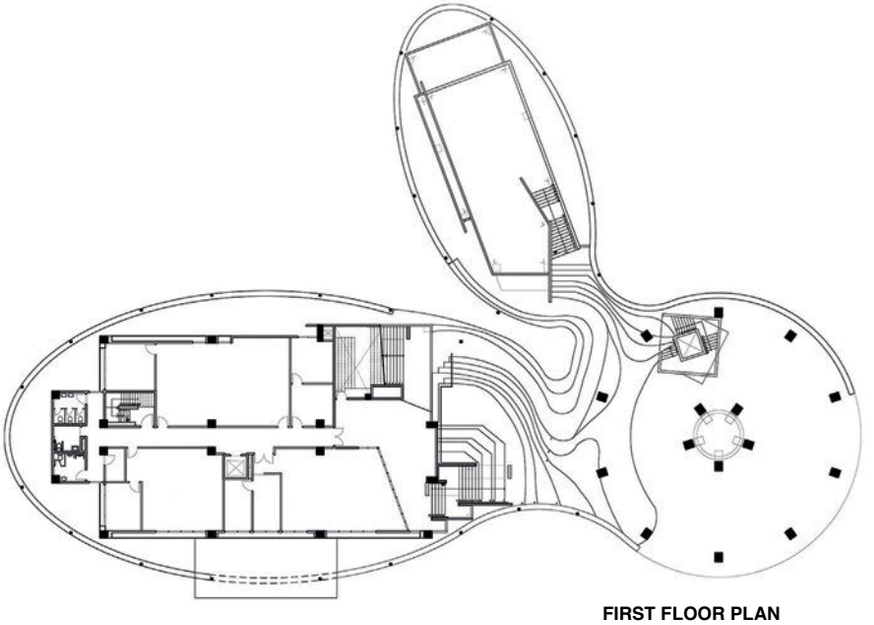
Project: Taoyuan Sewage Treatment Project, Taoyuan, Taiwan
Architects: Habitech Architects, Taiwan

In pursuit of purity in lifestyle, the ancient Chinese poet and literati Yuan Ming Tao had written a fable known as 'The Peach Blossom Spring' to describe his ideal world of Utopia. The mountains surrounded and protected the hidden path leading to the dreamland of Utopia in the story and kept it from being discovered. Like the spirit behind The Peach Blossom Spring, the proposed sewage treatment

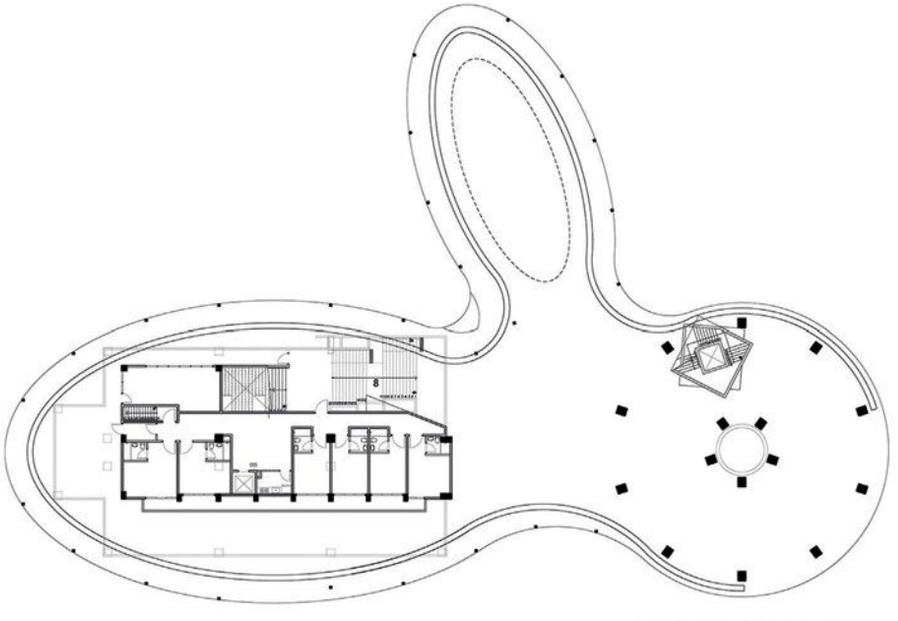
SECTION



N **GROUND FLOOR PLAN**



FIRST FLOOR PLAN



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centre is a cleansing plant that purifies and cleanses water; hence, the architects took the image of mountains portraited in the fable as their main theme and concept for this project.

The double skin structures that imitate the form of mountain chains are made of modular steel frames and aluminium louvers covering for each of the functional buildings. The gaps between the louvers are specially designed to accommodate the hot climate in Taoyuan; it not only provides shelter from the sun, but also brings in the breeze for cooling effects, and at the same time forms an interesting medium interacting with light and shadow between the sun and nature.

The undulating curved form of the double skin façade not only imitates the shape of mountains but also represents the wavy water, which is the ultimate design intention for this project.

The purification pond featuring the treated wastewater is designed to be the focal point of the Ecological Education Centre, while the curved louvered facade forms a mountain dome space that accommodates flower, birds, sunshine, water, breeze, and rain to interact with each other, making it a perfect environment for an ecological educational experience. The pond also features a well with a waterfall flowing through the void of the louvered roof dome level. Visitors can experience the water purification process through the splashing sound of the waterfall, which also contains fish.

Photo credit: HighliteImages

Factfile

Design team: Peichin Hsu and Habitech Architects

Consultants: Structure - Kejian Joint Structure Technician; Electrical water supply and drainage - Xiangyuan International Industrial Co Ltd; Landscape - Old Farmer Landscape Architecture Co; Hundred pages - Dahe Advanced Engineering Consulting Co Ltd - Zhunyang Metal Co Ltd

Built-up area: 3527.69 m²

Year of completion: 2017

Future is this

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Alok Aggarwal,
M.D., Ozone Overseas

Ozone Enterprise acquires 'Wallcam', diversifies into the fast-growing Security and Surveillance business…

Ozone Enterprise Group, an Everstone PE Capital funded company and leading player in the architectural hardware industry, announced its acquisition of 'Wallcam', a company engaged in security and surveillance business in India. The acquisition will make 'Wallcam' a fully owned subsidiary of Ozone. The acquisition process, which is in its final stage, will be completed soon. Ozone sees a lot of synergies in the business with its existing business lines and will accelerate and strengthen Wallcam's model of working through its R&D, manufacturing and reseller partners.

Ozone has a diversified presence in architectural hardware, safes and vaults, locks, fire and safety doors and urban furniture, the brand is among the top three players in safes and locks in the country. The group has been actively exploring options to diversify into new businesses, security and surveillance being one of them.

"The idea behind acquiring WallCam was to give a head-start to our diversification plans, get accesses to Wallcam's existing business, the brand, sales and distribution network. We are excited about this new move as it is in synergy with our growth ambitions and abilities," said Mr Alok Aggarwal, founder and managing director, Ozone Enterprise Group.

Talking about its business aspirations, with its aggressive growth and diversification plans, the group is eyeing Rs 1,000 crore turn over by FY 2021. The company plans to invest over Rs 100 crore in next two years on diversification primarily on building manufacturing capability for CCTV cameras and other security and surveillance products and IoT in India. Ozone Group already has international tie ups for product and software and are also looking at fresh equity influx to fund expansion in electronic security and surveillance business. A significant amount of this equity influx will be dedicated for a greenfield manufacturing unit for electronic security and surveillance under the 'Make in India' initiative of the Government.

"Security and surveillance is one of the fastest growing industry in India, the market size of the industry from the current $1bn is likely to grow 2.5 to 3 folds by the end of 2021. We have been actively exploring options to diversify into this industry and after contemplating both organic and inorganic options, we finally narrowed down on taking the inorganic route with the Wallcam acquisition. We are all geared up to make the most of the market opportunity and will soon be seen as one of the prominent players in the market," added Mr Aggarwal.

Contact details: Corporate Communication at +91 7503010509 or email pr@ozone-india.com

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NATURAL PAVERS

Disha Ecoloc Pavers has unveiled Tuffstone, a collection of pavers with a natural look thanks to its stone texture. It offers a standard colour palette of four shades that comes in brown, dove grey, lilac and Dholapur yellow. The company also offers customisation of colours for orders above 50,000sq ft. The dimension of the paver is 115mm*115mm, whereas the thickness is 60mm. They merge perfectly with natural landscapes and are ideal for landscaped gardens, resorts, clubs, parks, walkways and amphitheatres.

SMART DOORS

Ozone recently introduced Smart Glide Automatic Sliding Door System under its flagship brand, Ozomotion. The doors runs on magnetic linear motor technology which have a noiseless, safe and reliable operating mechanism. Unlike other automatic door operators that run on motor and belts, this product is a low-energy operator. The system comes with a remote control and push button, though other access control devices can be integrated with it, like microwave and handwave sensor. It is offered in 2 variants, Smart Glide 80 for door weight of 30-80 kgs and Smart Glide 150 for door weight of 50-150kgs. Ozone Smart Glide's compact and linear construction offers design flexibility to suit the user's aesthetic and functional needs. It can be applied for single or double sliding door panels of wooden or glass finishes. With its slim linear size and alterable track lengths, the systems can be easily fitted into any space that has access to an electrical point. It is suitable for retrofitting onto existing sliding doorways with easy installation. In spaces where user safety is crucial, the system comes with anti-pinch protection that responds quickly to any obstruction. Its door speed can be adjusted as per user profiles to create safe entrance.

SELF-CLEANING BASINS

VitrA released a range of washbasins, christened AutoClean. The products offer an auto-clean function that makes cleaning fast and easy while contributing to bathroom hygiene. The series of washbasins offer a concealed water outlet which prevents dirt buildup and ensures hygiene. The customers can opt between manual control button and photocell controller sensor. One of the features of this series is that the cleaning agents dispensed from the detergent tank are flushed into the sink with water to clean the washbasin. Each flush not only ensures hygiene but also releases a pleasant scent in the bathroom. The detergent dispenser allows 5-10 ml of detergent to be consumed with each flush.

STURDY BASKETS

Hettich recently presented the Cargo series, a wire basket range that boasts of sturdiness and an innovative design. Armed with Cargo IQ 200, a single pull brings forth the spectrum of the stored bottles, thus changing the landscape of the kitchen experience. The machinery lends a uniformity to the rest of the kitchen landscape by forming a part of the cabinet ensemble, lending a sleek and a unified look. 'Everything at one place' is the message conveyed by the product, which ends up furnishing the user with a haze of comfort allied with exterior aesthetics.

The product is available in chrome-plated finish with 150mm of left, right or 200mm and 300mm of diagonal mounting with thick wire diameter. It is also compatible with Quadro runner of loading capacity 15-20kg and KA Telescopic runner of loading capacity 22.5-30kg. Cargo IQ 200 caters to cabinet width of 150mm, 200mm and 300mm with depth of 472mm and height of 460mm.

WOODEN FLOORS

Span Floors brought forth their new range of sustainable flooring – the Solidwood Floor collection. The floors are sourced from actual trees and are thus fully natural. They come in a wide variety of wood species, colors and specs to allow customisations. The flooring collection is free from any added chemicals from adhesives, which has has a good impact on the indoor air quality.

MODERN SOFAS

Plüsch recently released a line German-based sofas, Pilotis by COR, to the Indian market. The sofas come in various builts, such as large, small, round, rectangular, black, white, and wood — all of them complete with a delicate metal frame. The feet are available in black chrome with a choice of an illustrated, glossy finish or a lacquered finish. One of the key features of the range include the back extension which increases the height of the armrest. The furniture is designed by Italian designers Metrica.

LUXURIOUS CHAIRS

Indo Innovations recently launched a range of luxury seating made of durable, high-quality material. The products come in a variety of colour options as well as cushion styles. The range combines functionality with aesthetics, giving off a practical yet modern appeal. Chairs in this line are low maintenance for easy use and stacking. The collections comprises the following products; Alpine, a high back chair made of leatherette; Youth, a high back chair in leatherette with arms and base in MS Chrome finish; Zen, a chair in leatherette upholstery and Torsion mechanism; Emerald, a chair with a 'syncho-tilt' mechanism which allows the user's feet to remain on the floor as they tilt backwards.

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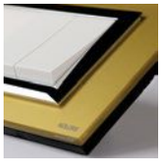


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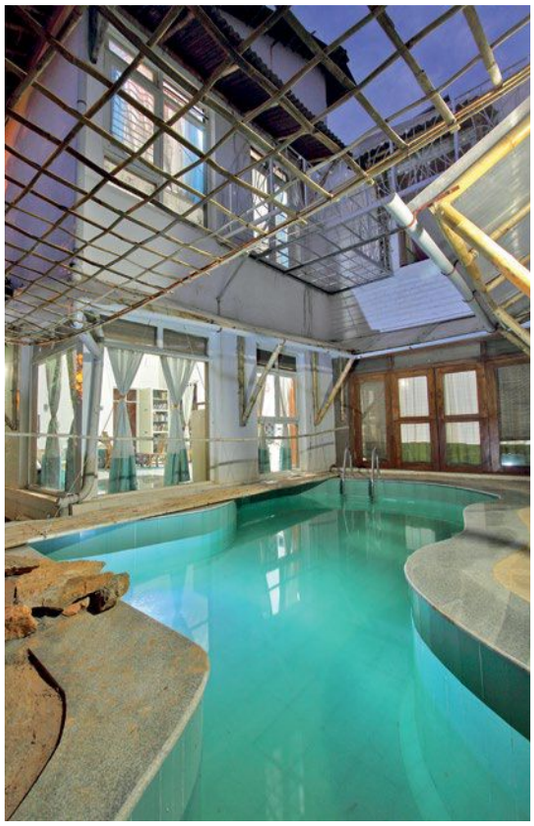
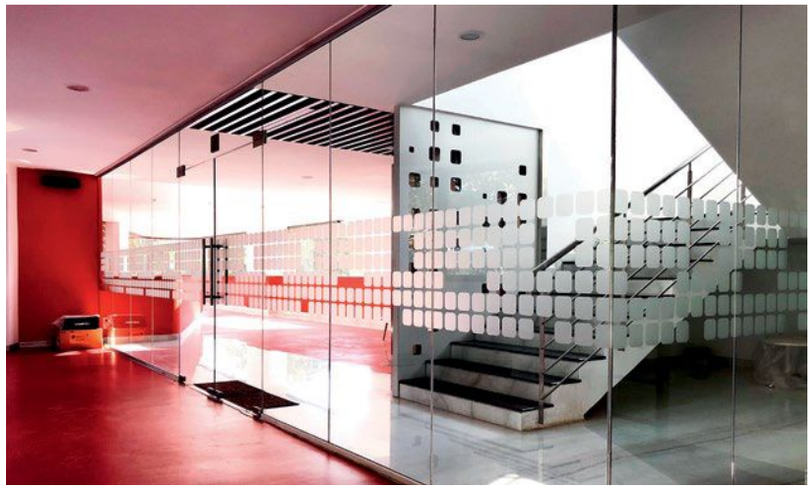
The listing that follows is of the consultants/companies involved in the published projects–





Consultants

38 Design Tree Service
66 CGBMT (Structural, Landscape)
70 CGBMT (Structural, Interior); DI Works Department (MEP)
78 Prof AR Shivkumar, IISc, Bangalore (Rainwater Harvesting); CDD Society, DEWATs, Bangalore (Waste Water Treatment); Dr Yogananda, Mrinmayee, Bangalore (Compressed Stabilised Earth Blocks); EMDS (MEP)
98 Nirman Engineering (Structural); Green Planet (MEP); SGA Studio (Furniture)
120 Kejian Joint Structure Technician (Structure); Xiangyuan International Industrial Co Ltd (Electrical Water Supply and drainage); Old Farmer Landscape Architecture Co. (Landscape)

Contractors

38 Kundur Constructions (Civil); Intex Contracting (Interior); J K Traders (Electrical)
48 L & T (Structural only)
66 CGBMT; Manasaram Architects; CARE college of Architecture; Trichy; Aarhus University
70 CGBMT
78 Mr Gurudayal Saran; Aditi Constructions, Bangalore
98 Udayanchal (Civil)

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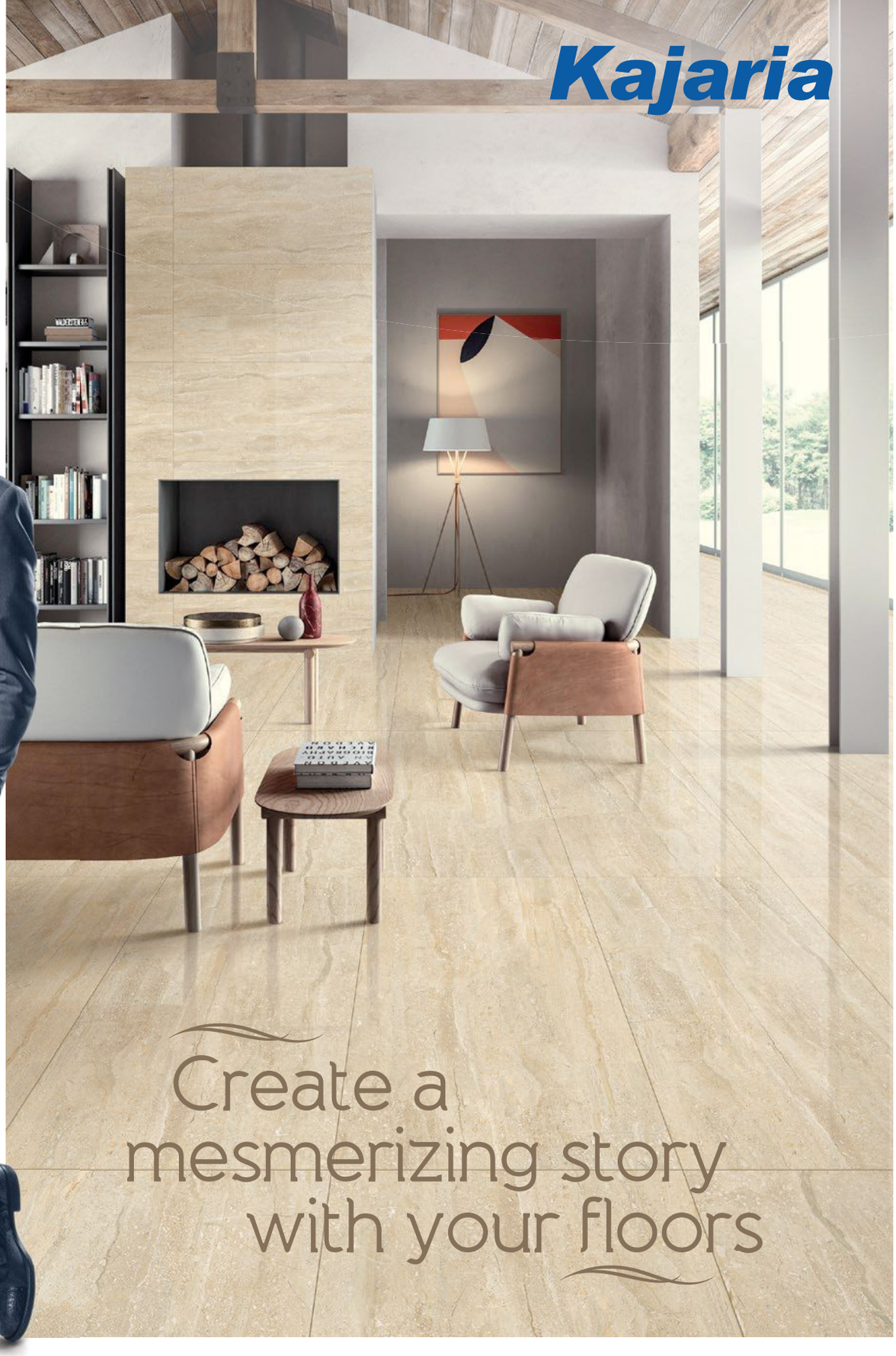

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