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EKH Children Hospital

Samut Sakhon, Thailand

PROJECTS Medical Facilities
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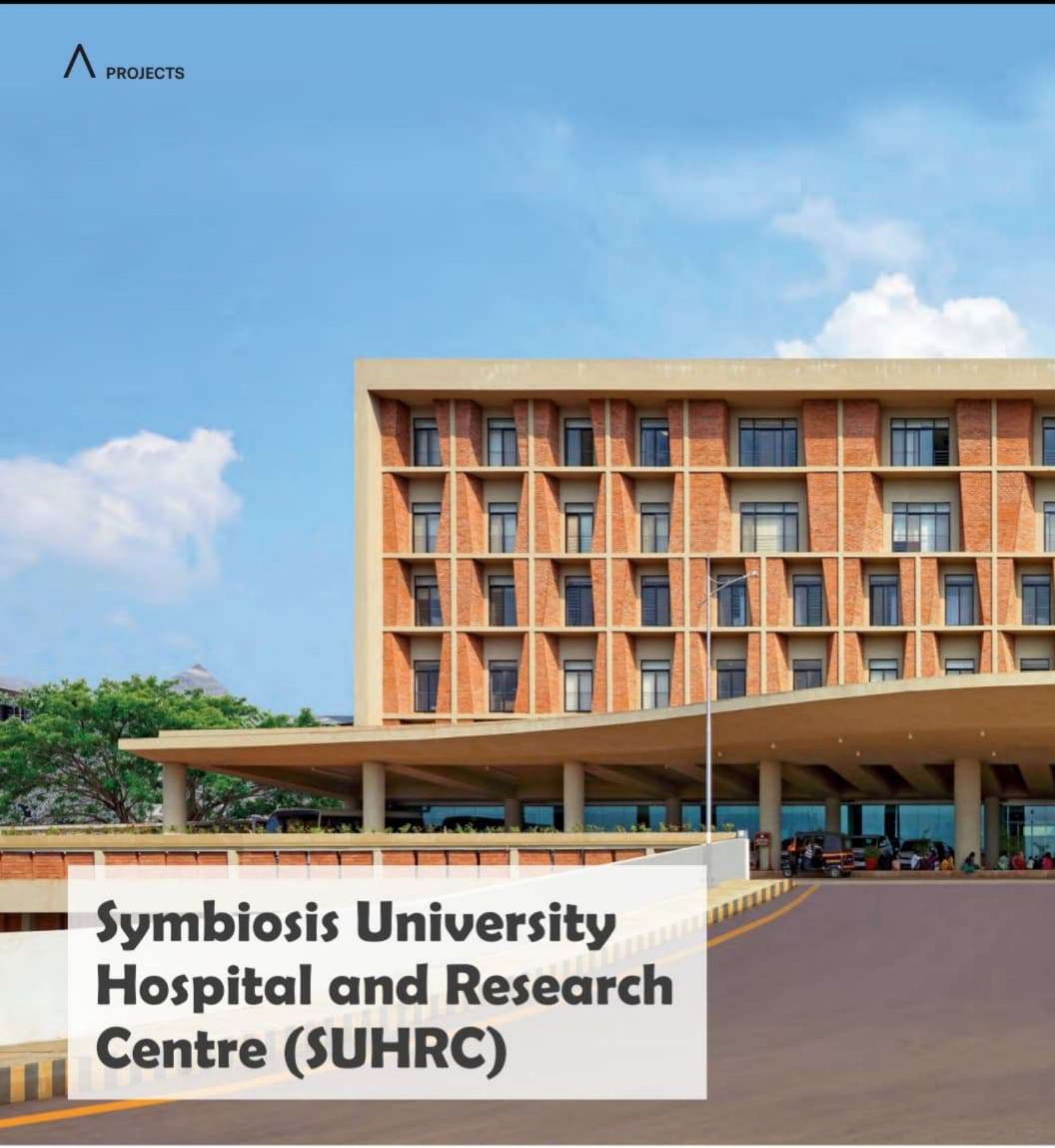


Symbiosis University Hospital and Research Centre (SUHRC)

SUHRC IS AN AWARD-WINNING BUILDING DESIGNED BY **IMK ARCHITECTS** USING LOCALLY-SOURCED AND ECO-FRIENDLY MATERIALS.

Entrance porch at SUHRC.

Occupying the lower slopes of a hill within Symbiosis International University's 260-acre estate in Lavale, Symbiosis University Hospital and Research Centre (SUHRC) is a 41,800-square-metre, 216-bed, multi-specialty hospital that represents a new and progressive face for healthcare infrastructure in India. With its state-of-the-art healthcare facilities and a research centre to enhance skill development, it is firmly anchored today as a COVID-19 quarantine and treatment facility, contributing to Maharashtra's fight against the pandemic.

SUHRC's design draws from the ideas of biophilia (an innate human tendency to seek connections with nature and other forms of life) to promote recovery and rejuvenation for patients and healthcare professionals. Two large courtyards landscaped with flowering shrubs and trees bring in ample daylight and views of the outdoors into the interiors, while creating buffer zones to reduce cross infection. Critical areas such as ICUs are endowed with soft and soothing hues to reduce anxiety; while the OPD has no air conditioning but allows for fresh, natural air – thereby reducing the AC load and power consumption for these areas.

Building facade of SUHRC.

Functionally, the building comprises four sections; three of them belong to the hospital and the last one being the Skill Centre. The hospital is planned across five levels; departments such as the OPD, casualty, radiology, MHC etc. This helps in keeping the departments separate, and thus maintaining the sterility of each floor function-wise.

Carefully and strategically planned, the building attempts to make gestures that are grand, yet local and responsive with attention to details such as the brick-art and the exposed concrete. The project is an exemplar of passive design and sustainability. Naturally-

The entrance canopy for the Skill Centre draws inspiration from stainless steel surgical instruments.

Landscape courtyard at SUHRC.

Nurse's station at SUHRC.

Multi-faceted brick facade at SUHRC.

compressed, sundried earthen bricks (CSEB) were produced on site and are used to create a double-skinned façade with boxed forms and deep shading projections to reduce heat gain. CSEB through its own porosity and its use in elements such as cavity walls and *jaalis* enables the structure to cope with climate of the region by allowing the building to breathe. This reduces the internal heat gain allowing for maximum thermal comfort, reducing energy consumption. The bricks were produced on site using a block-making machine, thus providing additional employment opportunities to the locals as well as ensuring minimal carbon emissions. This is the first time CSEB has been used in a project of such a large scale.

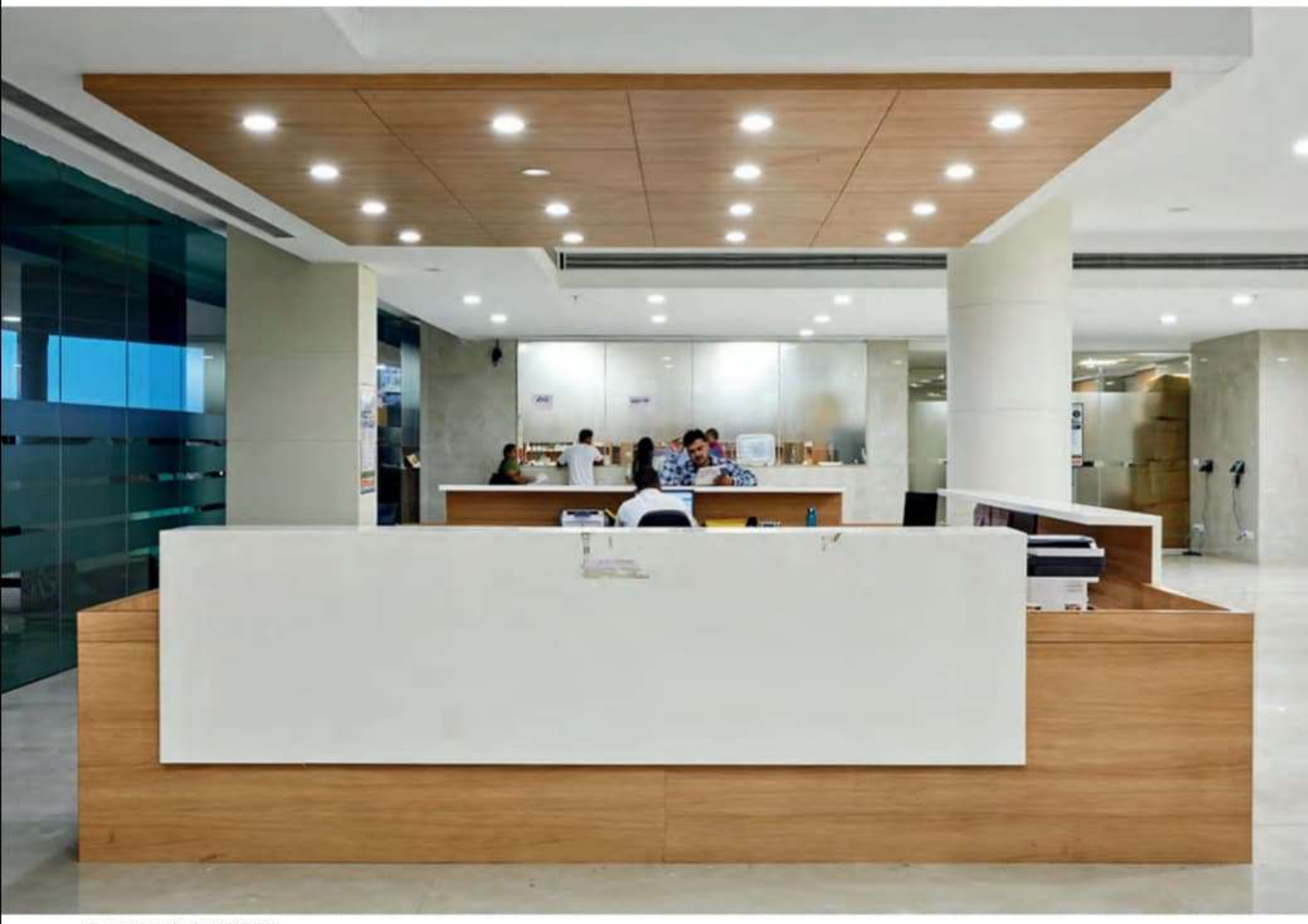
Compressed Stabilised Earth Bricks (CSEB): An alternative low-cost carbon-neutral building material

At IMK Architects, the firm strives to use locally sourced, eco-friendly materials in all its projects. For the Symbiosis University Hospital and Research Centre, Pune, they wanted to design a facade, which required minimum maintenance. This influenced the choice of using Sundried Compressed stabilised Earth Bricks in the project. The bricks were made using a natural mix of different types of locally available soils, stabilised with 5 percent cement, ensuring their durability. They were made on site by using a block-making machine, cutting the emission of carbon. The on-site manufacturing process also reduced the transport costs and the wastage of materials. The bricks were sundried as opposed to kiln fired, making it an extremely environmentally friendly process. CSEB through its own porosity and its use in elements such as cavity walls and *jaalis* enables the structure to cope with climate of the region by allowing the building to breathe. This reduces the internal heat gain allowing for maximum thermal comfort, reducing energy consumption. Masons from the nearby villages were hired to make the bricks, providing additional employment opportunities to the local communities. The flexibility of the bricks allowed for innovation in designing different facade compositions through brick boxing, creating a strong visual identity.

CSEB: innovation and process

CSEB was used for the first time ever on a campus of this scale. Its manufacturing process is a time consuming one as the bricks need to be sundried the monsoon season. This had to be accounted for in the overall project timeline. It was essential to design the soil mix to ensure its stability and durability. After conducting extensive research and experimenting on the natural mix of different types of locally available soils, the perfect blend of – red soil, sand and *murum* was chosen. Through a sustainable process, the bricks were manufactured on site wherein block-making machines were installed and additional masons were hired from the nearby villages to make the bricks. The initial few months were spent in training the local masons in the craft of making the

Interior room at SUHRC.



Reception desk at SUHRC.

Singly-loaded corridor looking into the central courtyard.

Rahul Kadri

bricks for this project - this contributed positively to enhancing the skill set of these masons.

Sustainability statement

Locally available raw materials like red soil, sand and *murum* (local subsoil), were used in manufacturing CSEB. The red soil and *murum* soil were reused from the excavation on site, reducing wastage and the need for transportation. The bricks were made on-site using block-making machines, resulting in no carbon emissions. The flexibility of the material allowed for innovation in designing different façade compositions such as – cladding, boxing, twisted and screen *jaalis*. The bricks' natural porosity creates breathability in the facade and the facade elements act as shading devices for the interiors. This effectively reduces the internal heat gain reducing energy consumption. A building constructed in CSEB requires 80 percent less energy consumption to achieve thermal comfort, significantly reducing the operations costs. Thus, CSEB is an extremely sustainable material providing several environmental and social benefits.

The Initial Embodied Energy of CSEB produced on site with 5 % cement = 548.32 MJ/m^3

The Carbon Emissions of CSEB produced on site with 5 % cement = 49.37 Kg of $CO2/m^3$

The values are as per the research published by Auroville Earth Institute for Compressed stabilised Earth Bricks. Auroville Earth Institute is a non-profit organization specializing in earth-based building technologies for sustainable development. They are representatives of the UNESCO Chair "Earthen Architecture" and also partnered with - ICOMOS-ISCEAH (International Scientific Committee of Earthen Architectural Heritage) and CRATerre (International Centre for Earth Construction, Grenoble).

SUHRC was awarded 'Supreme Winner' at the prestigious 2021 Surface Design Awards in London, UK.

"We wanted to design a hospital that could last around 50-100 years. Driven by this aim, we designed a façade with natural materials that would save on energy. The facade reflects the light from the sun in different ways through its twisted brick-boxed forms, to reduce internal heat gain and create a gleaming effect of light."

Rahul Kadri, Partner & Principal Architect of IMK Architects

PROJECT DATA

Project Name: Symbiosis University Hospital and Research Centre (SUHRC)
Location: Lavale, Pune, India
Client: Symbiosis Society
Architecture Firm: IMK Architects
Square footage: 449,930 square feet (Phase 1)
Completion: May 2020
Photos: © Rajesh Vora