







CLIMATE SMART BUILDINGS (CSB)

WEST CLUSTER CSB CELL, RAJKOT

LIGHT HOUSE PROJECT RAJKOT, GUJARAT TECHNOLOGY USED - MONOLITHIC CONCRETE CONSTRUCTION USING TUNNEL FORMWORK

- NO. OF HOUSES 1144
- NO. OF TOWERS 11 (G+13)

Introduction

The Ministry of Housing & Urban Affairs (MoHUA) committed to establish a world-class is infrastructure in the affordable housing sector and the introduction of Climate Smart Buildings is a step in that direction

Climate Smart Buildings (CSB)

The Climate Smart Buildings initiative under the joint collaboration of GIZ-MoHUA aims to use new passive measures, local sustainable and low embodied energy materials, and the best-in-class proven technologies for the construction of affordable housing and thereby improving climate resilience and thermal comfort in buildings.

These houses will be constructed and operated using the cutting-edge technology and adopt ultra-modern designs, resulting in increased building sustainability and reduced carbon emissions.

Major Goals of the Cell

- To introduce thermal comfort into the foray of affordable housing, a critical design & thus usability aspect which unfortunately has been missing from the current nature of affordable housing in the country
- Policy & Advocacy for specific, easy to comprehend provisions which can be mandated & enforced in a steadfast way

West Cluster CSB Cell

The CSB cell has been formed under one such initiative of GIZ, namely the "Indo-German Energy Programme" (IGEN), in collaboration with the Ministry of Housing and Urban Affairs (MoHUA). The cell is working with a goal to improve climate resilience and thermal comfort in buildings by incorporating modern passive measures, locally sustainable and low embodied energy materials and the best available technology in affordable housing projects and buildings in the following Seven states :Gujarat, Rajasthan, Punjab, Haryana, Daman & Diu, Dadra Nagar Haveli, & Chandigarh





What is Thermal Comfort ?

Thermal comfort is the condition of mind that expresses satisfaction with the thermal environment. Thermal neutrality is maintained when the heat generated by human metabolism is allowed to dissipate, thus maintaining thermal equilibrium with the surroundings.



Measures to improve Thermal Comfort



Need for Thermal Comfort and its impact (Qualitative and Quantitative)

The comfort zone is determined by the combinations of the six parameters for which the Predicted Mean Vote (PMV) is within the recommended range (-0.5PMV+0.5), with the PMV equal to zero denoting thermal neutrality. While anticipating a population's thermal feeling is a crucial step in determining what conditions are pleasant, it is more vital to assess whether individuals will be satisfied.



Light House Project (LHP) Rajkot

LHPs are model housing projects with houses built with shortlisted alternate technology suitable to the geo-climatic and hazard conditions of the region. This will demonstrate and deliver ready to live houses with speed, economy and with better quality of construction in a sustainable manner.At Light House Project, Rajkot a total of 1144 affordable houses for the poor and middleclass are being built quickly, serving as incubation centers for planners, architects, engineers, and students to learn about and experiment with new technology. The Technology used is "MONOLITHIC CONCRETE CONSTRUCTION USING TUNNEL FORMWORK". In 'Tunnel

The Technology used is "MONOLITHIC CONCRETE CONSTRUCTION USING TUNNEL FORMWORK". In 'Tunnel FormWORK' technology, concrete walls and slabs are cast in one go at site giving monolithic structure using high-precision, re-usable, room-sized, Steel forms or moulds called 'Tunnel Form'.



An already established System for building construction in many countries, this system intends to replace the conventional RCC Beam-Column structure which uses steel/plywood shuttering. 'Tunnel Form' system uses customised engineered steel formwork consisting of two half shells which are placed together and then concreting is done to form a room size module. Several such modules make an apartment.

Salient Features of LHP Rajkot:



Photo: Aerial view of the LHP Rajkot Site



finishing, is completed in the casting yard

Requirement

- Facilitating rapid construction of multiple/ mass modular units (similar units).
- Making structure durable with low maintenance requirement.
- The precise finishing can be ensured with no plastering requirement.
- The concrete can be designed to use industrial by-products such as Fly Ash, Ground granulated blast furnace slag (GGBS), Micro silica etc. resulting in improved workability & durability, while also conserving natural resource
- Being Box type monolithic structure, it is safe against horizontal forces (earthquake, cyclone etc.)
- The large number of modular units bring economy in construction.



Cost Savings

• The above figures are tentatively computed in comparison to a conventional project of similar size as provided by the construction agency

Existing standards for improving thermal comfort (NBC-IMAC, BEE Star-labelling & ENS Code)



Climate Smart Buildings aims to provide a unique and illuminating viewpoint to achieve the 2030 Sustainable Development Goals in the building sector and aspires to set gold standards for the adoption of newer & innovative technologies to improve thermal comfort in affordable housing. The Cell hopes that the west cluster at Rajkot will not only increase public awareness of the climate catastrophe through the dedicated awareness and training programs, but also encourage stakeholders to take concrete action towards global warming.

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