Climate Smart Buildings (CSB)

CSB Cell East Cluster
(Tripura, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Sikkim)

LIGHT HOUSE PROJECT, AGARTALA, TRIPURA

- Technology Used: Light Gauge Steel Frame System with Pre-engineered Steel Structural System
- No. of Houses: 1000
- No. of Towers: 07 (G+6)

Introduction

The **Ministry of Housing and Urban Affairs** (MoHUA), Government of India, is committed to establish a world-class infrastructure in the affordable housing sector and the introduction of Climate Smart Buildings (CSB) is a major initiative in that direction.

The aim of this programme is to ameliorate climate resilience and thermal comfort in buildings by adopting innovative passive measures, local sustainable and low embodied energy material coupled with best available technologies in constructions and buildings in affordable housing.

The CSB Cell, East Cluster has been formed in December 2021, covering 8 states, namely, Tripura, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Sikkim.

The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

- An international cooperation enterprise for sustainable development which operates worldwide, on a public benefit basis. For over 60 years, GIZ has been working jointly with partners in India for energy, environment-climate change-bio biodiversity, sustainable urban & industrial development along with sustainable economic development.
- The Government of India has floated numerous key initiatives to address the country's socio-economic and environmental challenges, and GIZ is contributing to some of the most vital ones. For instance: Smart Cities, Clean India, Skill India and CSB Programme.
- GIZ, with support of the Government of India, is playing a key role in the CSB programme by formulating the Cells with prime objective to inculcate thermal comfort measures and climate resilience in the local government bye-laws along with the implementation of Light House Projects (LHPs).

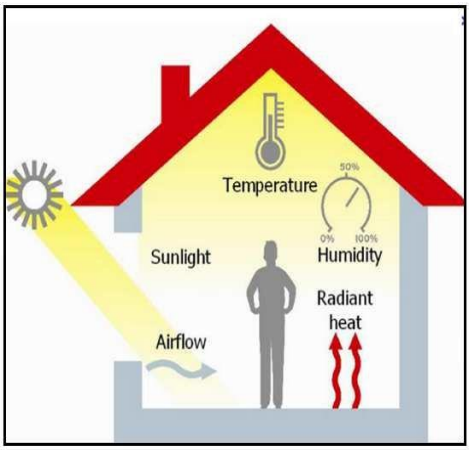
CSB Cell East Cluster and Thermal Comfort

CSB Cell East Cluster intends to inculcate thermal comfort in affordable housing via diverse passive measures, indigenous materials along with innovative construction techniques.

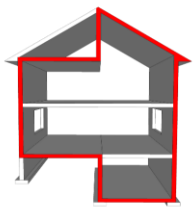
- Thermal Comfort is an individual's psychological state of mind whereby one expresses whether it is too hot or too cold.
- Thermal neutral zone is the range of temperatures in the recent surroundings in which a healthy adult human being can withstand a normal body temperature without any requirement of energy usage beyond its normal basal metabolic rate.

Factors affecting Thermal Comfort in buildings

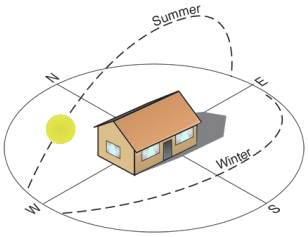
Air Temperature	Radiant Temperature
Metabolic Rate	Clothing
Relative Humidity	Air Velocity



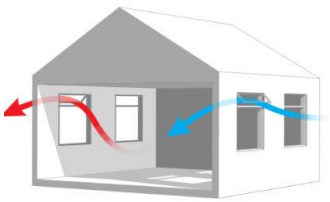
Strategies to enhance Thermal Comfort



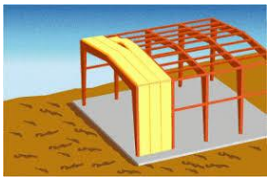
Building Envelope



Building Orientation



Natural Ventilation



Insulation

Daylighting

Shading

Light House Project (LHP), Agartala

- LHPs are model housing projects built with innovative technologies that are appropriate for the geo-climatic and hazardous conditions of the region.
- LHP Agartala has adopted **Light Gauge Steel Frame** (LGSF) technique which applies cold formed steel as the construction material.
- Houses at LHP Agartala are being constructed as an amalgamation of LGSF and Pre-Engineered Steel Structural system.

Light Gauge Steel Structure System

Pre-Engineered Steel Structure System

Image Source: theconstructor.org

A Comparative Study on Coventional Construcion and LHP Tchnology

Parameters	LGSF	RCC
Construction Method	Simpler	Cumbersome
Tensile Strength	More	Less
Resistance to natural calamities	More	Less
Construction Speed	High	Time consuming
Repairing Cost	Less	High
Quality & Accuracy	Easy to control & High	Difficult to control & Low
Construction Cost	Economical	High
Green Features	Energy efficient, waste recycling and lesser amount of CO_2 generation	Not energy efficient and higher amount of CO_2 generation

Reference: miginfra.com

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