

RACHNA

RESILIENT, AFFORDABLE AND COMFORTABLE HOUSING THROUGH NATIONAL ACTION

LIGHT HOUSE PROJECT LUCKNOW UTTAR PRADESH Technology Introduction and Thermal Comfort



Stay in Place Formwork (SIP) System with Pre-Engineered Building (PEB) Structure

VISION BEHIND LHPs

Ministry of Housing and Urban Affairs Under PMAY(U) set up a **Technology Sub-Mission (TSM)** for affordable housing to provide:

- ✓ **Alternative sustainable technological solutions.**
- ✓ **Better, Faster & cost-effective construction methodologies.**
- ✓ **Houses suiting to geo-climatic and hazard conditions of the country.**

TECHNOLOGY INTRODUCTION OF LHP LUCKNOW

Stay in place(SIP) formwork is an advanced *Hybrid Construction Technology* consisting of pre-designed polyvinyl chloride (PVC) based polymer panel, bound with self-compacting concrete infill, installed as partition walls and building envelop.

PROCESS OF SIP FORMWORK INSTALLATION



BENEFITS OF SIP FORMWORK

- ✓ Good alternative for EWS and low-cost affordable housing.
- ✓ Waterproof, corrosion resistant, does not need any finishing work.
- ✓ Light weight, light and easy to dismantle, safe and reliable construction, operation and handling,
- ✓ Eco-friendly as 55% recycled PVC content used and further recyclable.



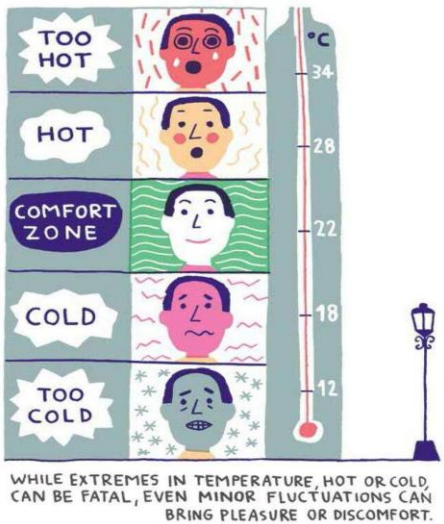
Polyvinyl Chloride(PVC) based polymer components serve as a permanent stay-in-place formwork with infilled **concrete** for building walls.

Self-Compacting Concrete is being poured in SIP formwork as an infill to make it more rigid and thermally sound.

Hot rolled Pre Engineered Building (PEB) sections act as a structural framework of the building whereas SIP(Stay-in-Place) formwork works as a partition wall.

0.09mm deck sheet used as slab support component over which concrete is casted for enhancing strength. It reduces casting time, propping, and shuttering and centering support.

WHAT IS THERMAL COMFORT?

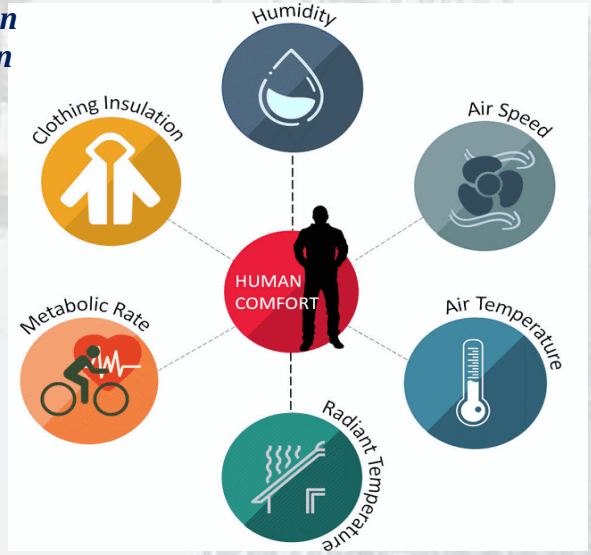


Thermal Comfort is “the state of mind that expresses satisfaction within the thermal environment” and is generally assessed subjectively (ASHRAE, 2004).

What Affects The Thermal Indoor Environment?

The heat exchange between the human body and its environment occurs mainly in three ways, namely through:

- **Conduction**
- **Convection**
- **Radiation**



FACTORS AFFECTING THERMAL COMFORT

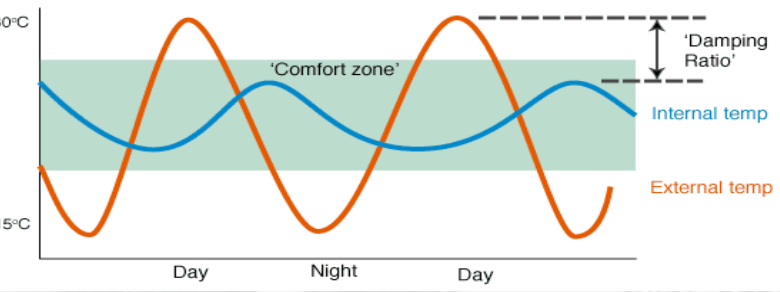
Environmental Parameters/Factors

- **Air Temperature**
- **Mean Radiant Temperature**
- **Air Velocity**
- **Humidity**

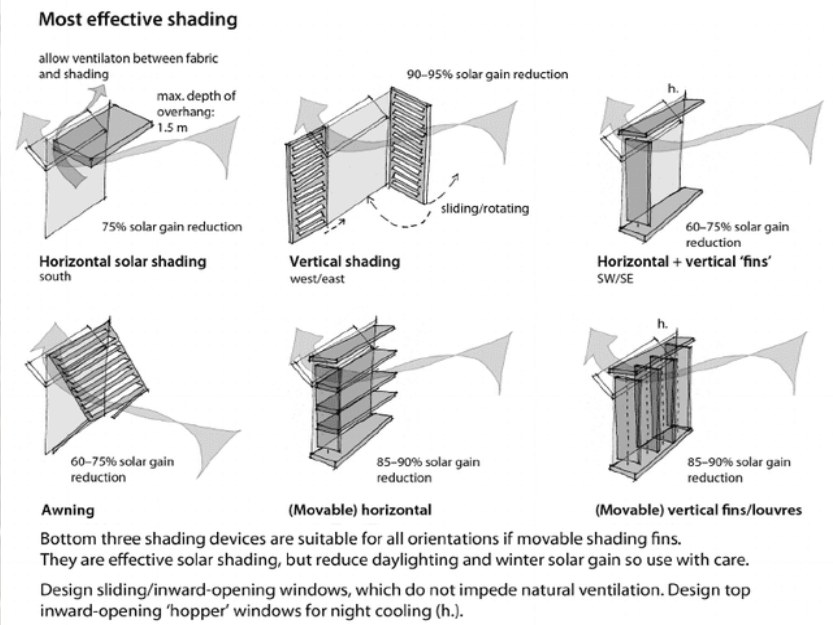
Personal Parameters/Factors

- **Physical Activity**
- **Clothing Level**

PASSIVE STRATEGIES TO ACHIEVE THERMAL COMFORT



- Orientation Of Building**
- Thermal Mass**
- Shading**



MoHUA & GIZ Collaboration under Indo German Energy Program

The Ministry of Housing and Urban Affairs (MoHUA) through its flagship mission **Pradhan Mantri Awas Yojna-Urban (PMAY-U)** ensures a pucca house to all eligible urban households by the year 2022. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH for over 60 years has been working jointly with partners in India for sustainable economic, ecological, and social development. The Government of the Republic of India and the Federal Republic of Germany have, under the Indo-German Technical Cooperation, agreed to jointly promote the “Indo-German Energy Programme” (IGEN) with the aim to foster sustainability in the built environment.

CSB: Climate-Smart Building Cell - Lucknow

Through **IGEN’s** programme, **Climate Smart Buildings (CSB)** Cluster cells are established in each of the six states where pilot affordable housing projects are being built under **PMAY-U** utilizing innovative construction technologies known as Light House Project . The CSB Cell aims to extend technical assistance in developing thermal comfort action plan for climate resilient buildings for mass scale application in selected states for affordable housing, and to provide technical support in implementation of **Global Housing Technology Challenge- India (GHTC-India)**.

GHTC-India & LHP: Light House Project

MoHUA initiated the **Global Housing Technology Challenge (GHTC)-India to identify and mainstream a basket of innovative housing technologies across the globe.** **LHPs** are model housing projects with approximately 1,000 houses getting constructed at six different locations in six states built with alternate technologies shortlisted through GHTC-India, which are suitable to geoclimatic and hazard conditions of the region. The technology used in LHP Lucknow is the '**PVC Stay-In-Place Formwork System**'.

For Further Details, Please Contact:
GIZ, India B-5/5 Safdarjung
Enclave, New Delhi 110029
Email Id: vikash.ranjan@giz.de