Building Energy Efficiency Laboratory

Dept. of Mechanical Engineering, Aliah University

Introduction:

Welcome to the Building Energy Laboratory, a state-of-the-art facility dedicated to advancing sustainable building practices and improving energy conservation. Our lab is equipped with cutting-edge technology, including the Guarded Hot Box apparatus, which allows us to accurately measure the steady-state thermal transmission properties of building components. This essential tool helps us analyze the thermal performance of walls, roofs, fenestrations, and other construction materials by simulating real-world temperature conditions.

In addition to the Guarded Hot Box, our laboratory also focuses on measuring the thermal conductivity of various materials. By understanding the heat transfer characteristics of different construction elements, we can develop innovative solutions to enhance energy efficiency in buildings. Our research aims to provide valuable insights for architects, engineers, and policymakers to design and implement more sustainable and energy-efficient structures, ultimately contributing to a greener and more resilient built environment.

A significant aspect of our work involves the development of sustainable building materials using industrial waste. By repurposing waste products such as fly ash, silica fume, and bottom ash into construction materials, we address the dual challenges of waste management and resource conservation. These materials not only reduce the environmental impact of construction but also improve the durability and performance of the buildings.

Our laboratory plays a critical role in implementing the Bureau of Energy Efficiency (BEE) and Energy Conservation Building Code (ECBC) standards. By rigorously testing and validating the thermal properties of building materials, we ensure that they meet the required energy efficiency criteria. This, in turn, helps in the promotion and adoption of sustainable building practices across the industry.

Join us in our mission to push the boundaries of building science, create a more energy-efficient future, and develop sustainable materials that contribute to a healthier planet for all.

Major Facilities:

1. **GUARDED HOT BOX TEST SETUP-for measuring overall thermal transmittance (U-Value)**

   Temperature Range: -30ºC to 50ºC, Sample size: 1000mm x1000mm for lighter and 500mm x500mm for heavy component

2. **Thermal Conductivity testing apparatus for non-Homogeneous building component/material**

   Sample size: 300mm x 300mm

3. **High Capacity Infrared Camera**

Guarded Hot Box Test Facility Designed & Developed for U-Value measurement

Glass & wall sample under testing

Thermal conductivity Measuring Setup

HIGHLIGHTS OF R& D:

1. **Sponsored project of DST, Govt. of India "Standardisation Of Measurement Protocol For Overall Heat Transfer Co-Efficient (U-Value) For Building Materials & Components For Indian Subcontinent"**

2. **Thermal Transmittance (U-value) evaluation of novel brick made of waste glass powder, by CGCRI, Govt. of India**

3. **Other Construction Farm consultancy and ongoing doctoral research works**

Key Persons:
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