PUSHING THE “ENVELOPE”

Thermal Comfort in a naturally ventilated building in Hot-Humid climate in India

Session 01 – Building India with GRIHA
The GRIHA Summit
12-13th March 2015
India Habitat Centre
Lodhi Road
New Delhi

Passive Design
• Orientation
• Envelope
• Shading
• Zoning
• Natural Ventilation
In a climate chamber study, subjects accepted the wind speed, m/s, 3.04 with air movement shifting the comfort temperature up by 0.85. Fan use increases the comfort temperature by about 0.53. They further observed that the use of additional Night Purge and ventilation with high thermal mass.

Thermal comfort being achieved with personally maintained up to 30 deg C and 80% RH, without controlled air movement, up to 30 deg C and 80% RH, and acceptable perceived air quality being maintained by up to 30 deg C and 80% RH.

Forced ventilation System

- Enhanced Daytime
- Air changes
- Night Purge ventilation with high thermal mass

TABLE 1 Desirable wind speeds for thermal comfort conditions

System: Forced ventilation

<table>
<thead>
<tr>
<th>Wind Speed, m/s</th>
<th>28</th>
<th>30</th>
<th>35</th>
<th>42</th>
<th>60</th>
<th>80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Temperature</td>
<td>29.3</td>
<td>31.3</td>
<td>33.3</td>
<td>35.3</td>
<td>37.3</td>
<td>39.3</td>
</tr>
</tbody>
</table>

Adaptive comfort

• Orientation
• Envelope
• Shading
• Zoning
• Natural Ventilation

Comfort calculation system

• SP41 and other Adaptive comfort studies
• Threshold comfort for Indian climates 30°C 80%RH | 32°C 60%RH | 34°C 40%RH |
The Team

Architects
- Lotus Design [www.lotuslink.in](http://www.lotuslink.in)
  - Ambarish Arora
  - Sid Tolwara
  - Aniket Shukla

Landscape Architects
- Rayston, Hanamoto, Alley & Abey (RHAA) New Delhi
  - Aditya Advani
  - Riyaz Mohamed

Structural Consultants
- NNC Consultants
  - Marquise Nazar

MEP Consultants
- Sterling India Consulting Engineers
  - Mr. G.C. Modgil
  - Khushboo Modgil

GRIHA Consultants
- PSI Energy
  - Nishad Jain
  - Ranajit Jagat
  - Gaaron Storey
THANK YOU FOR YOUR LISTENING

All contents of this presentation constitute the intellectual property of the project team. No use permitted without the prior permission of psi energy.

ln.psi.de@gmail.com

THANK YOU FOR YOUR LISTENING