BSEEP’s Passive Design Guideline

CK Tang
Veritas Environment Sdn Bhd
Tropicalized Guideline to Malaysian Climate

1. Fundamentals
2. Climate Analysis
3. Building Form & Orientation
4. Daylight Harvesting
5. Glazing Properties
6. External & Internal Shades
7. Wall Insulation
8. Roof Insulation
9. Atrium Ventilation
10. Zoning
11. Infiltration
Issues yet to be addressed...
Roof Insulations
Low-E foil on Roof

- Very low U-value computation.
  - Static based computation.
- How effective is it vs. thick insulation in our climate?

How to model this correctly?

Infiltration rate?

Need to verify the model is correct....
Cool Roof?

- Monier
Overall Thermal Transmission Value (OTTV)

\[ \text{OTTV}_i = 15\alpha (1 - \text{WWR}) Uw + 6(\text{WWR}) Uf + (194 \times \text{CF} \times \text{WWR} \times \text{SC}) \]
Average Vertical Solar Factor

- Current OTTV based on Penang Measured
- Subang TRY: 0.0%
- Subang 95: 1.5%
- Spore ETTV: 31.7%
- Spore TM2: -0.6%
OTTV External Shading Coefficient

- Current shading coefficient only addressed direct shading. It ignored diffuse shading.

- Need to re-compute all the shading coefficient incorporating diffuse shading.
May need to develop easier guideline on OTTV

- Provide a table for different Windows-to-Wall ratio for each
Daylight Harvesting
How far can we push the boundary?

- **Glare**
  - Acceptable Luminance Intensity for various lighting levels.

- **Uniformity**
  - Acceptable daylight uniformity

- **Lux**
  - Minimum acceptable lux level or daylight factor.
Roof Daylight Harvesting

- More Solutions should be provided.
  - Skylight
  - Light scope
  - Jack Roof
Wall Insulation
Thermal Mass not Addressed!

- Traditional Malay Kampung House
  - Very low thermal mass

- Traditional Chinese Shoplots & Colonial Buildings
  - High thermal mass

Different for Air-Conditioned Building vs. Naturally Ventilated Building?
- How about both?
Atrium Ventilation & Infiltration
Atrium Ventilation Design

- Medium-rise Centrally located Atrium addressed.
- What if Atrium located on East, West, North, South?
- Impact of glazing on atrium?
- Thermal mass?
- Low-rise?
- Very tall building?
Infiltration

- How good are we now?
  - What is the quality of existing building stock?
  - What is the quality of newly completed buildings?

- Do we need to improve?
The End.