



What Makes Buildings Adaptable?

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Workshop Outcomes

What would enable our buildings to perform in the uncertain climatic conditions of the future?

- Whilst we know that a whole range of climatic parameters are changing, we cannot know with certainty what their exact values will be during the lifetimes of the buildings we design, refurbish or operate.
- What if our uncertainty did not remove the requirement design and operate buildings that deliver superior occupant comfort and efficiency?
- If a range of climates could be in any building's future, what does 'climate sensitive design' mean?
- What if the term 'design condition' began to refer to a dynamic condition, introducing a requirement for adaptive capacity, i.e. to design climatically resilient buildings?
- What would characterize high adaptive capacity in buildings?

It seems that in the face of this increasing climatic uncertainty, fewer certain design parameters will be handed to designers. Perhaps what we need are principles that would result in enhanced adaptive capacity within our built environment. These

principles, once understood and applied, could ensure that our built environment is first and foremost safe. Furthermore, they could reduce maintenance and operation costs, deliver superior comfort, minimize life cycle risks and increase property value.

Any climatic parameter, e.g. rainfall, number of hot days or average temperature, could be evaluated to begin developing these principles.

The workshop considered humidity because it clearly illustrated the uncertainty of change our buildings will need to withstand: by 2050 in Brisbane, for example, accounting for uncertainty suggests that humidity may decrease by 1.9% as well as increase by 1.5%.

Workshop Question: What would enable our buildings to perform in the uncertain humidity conditions of the future?

Four groups considered the answer from the perspective of

- Ventilation modes (e.g. natural, hybrid, mixed, fully mechanical)
- Services design
- Building envelope
- Occupant education



Workshop outcomes, as documented by the four groups:

Ventilation Modes

- Ventilation at head level (not above)
- 1st objective: natural (passive) ventilation; exploit all options in passive form before implementing mechanical modes.
- Installing convection features into the building structure to have continual/consistent humidity levels established, encouraging the development of natural currents on hotter days with little/no winds present.

Services design

- Long term items to suit variance (pipe work, structure);
- Chilled beams may be vulnerable
- Flexible design of core structure
- Most services to have life shorter than about 15 years, therefore would use replacement strategy
- Flexibility in design to take changes, i.e. latent heat exhaust and operating theatre supply air.

Envelope

- Scenarios: counters subsidence, cracks, drying materials, condensation
- Solution 1: Improved sealing
- Solution 2: Modular design

Occupant education

- Leakage and air-tightness: current issue
- Education of designers and builders
- Understanding of consequences and operations
- Fans and air movement
- FM awareness of increased maintenance requirements
- Education around perception of comfort

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