Effects of poor ventilation (the lack of ability to reject heat)

Mich Swainson
BRE HVAC Engineering
swainsonm@bre.co.uk

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Ventilation and overheating

- Is there a link between IAQ and overheating?

- Why do we have an overheating problem in modern dwellings?
  Fabric insulation – Airtightness – Glazing, all getting better

- The causes of overheating:
  - Heat balance:
    - Heat gains
      - Internal
      - External
    - Heat losses
      - Heat storage
      - Heat rejection

Overheating – why?

– The heat balance:

Heat gains = heat losses + heat rejected

But how do we ***reject*** heat from dwellings and most UK buildings?

Ventilation – natural or mechanically driven

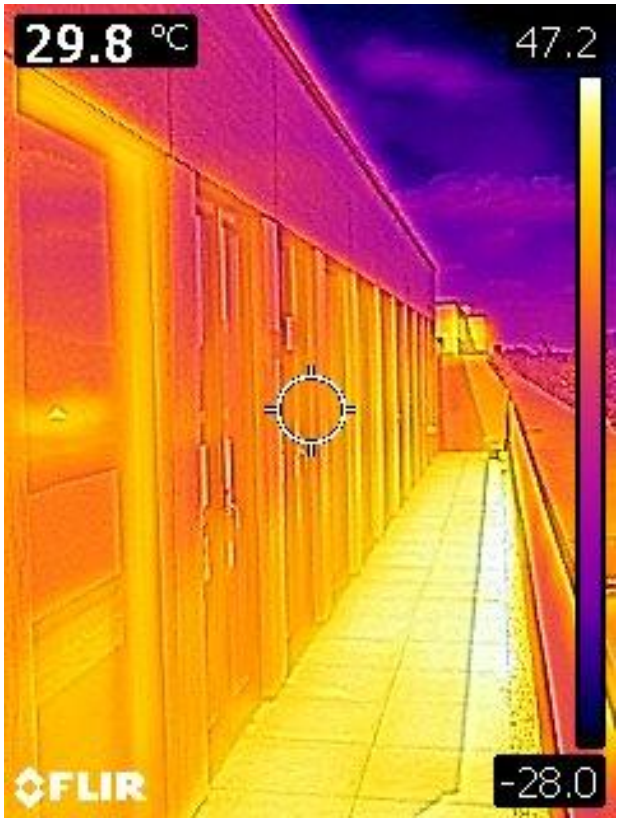
Ventilation of buildings is for the provision of fresh air and removal of pollutants; moisture, odours, etc.

AD-F 2010 states:

Purge ventilation is intermittent, i.e. required only when such occasional activities occur. ***Purge ventilation*** provisions may also be used to improve thermal comfort, although this is not controlled under the Building Regulations.

Overheating – why?

- Ventilation as a means of heat rejection
  - Type of windows
  - Ability to achieve purge ventilation overnight



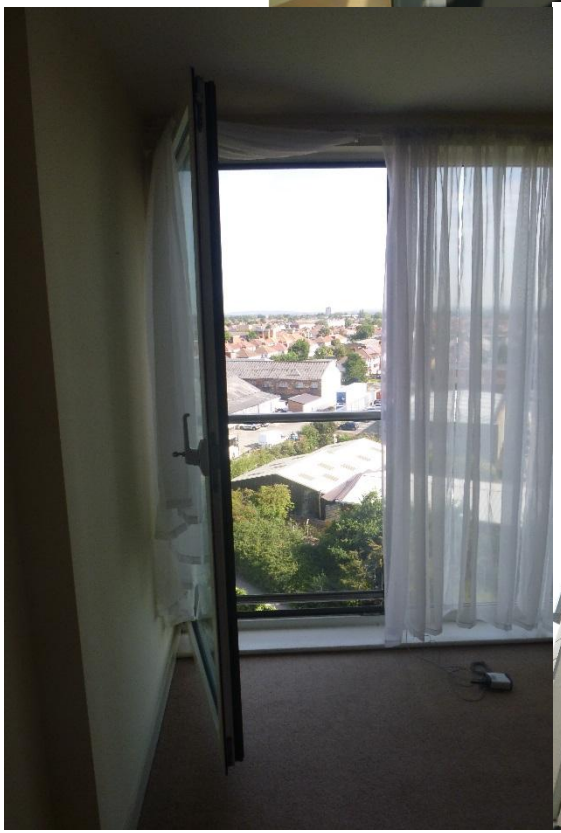
Overheating – why?

HOME IS WHERE
THE HEAT IS

> We've forgotten how to design for natural ventilation in dwellings – we've lost the art
> **Michael Swainson**

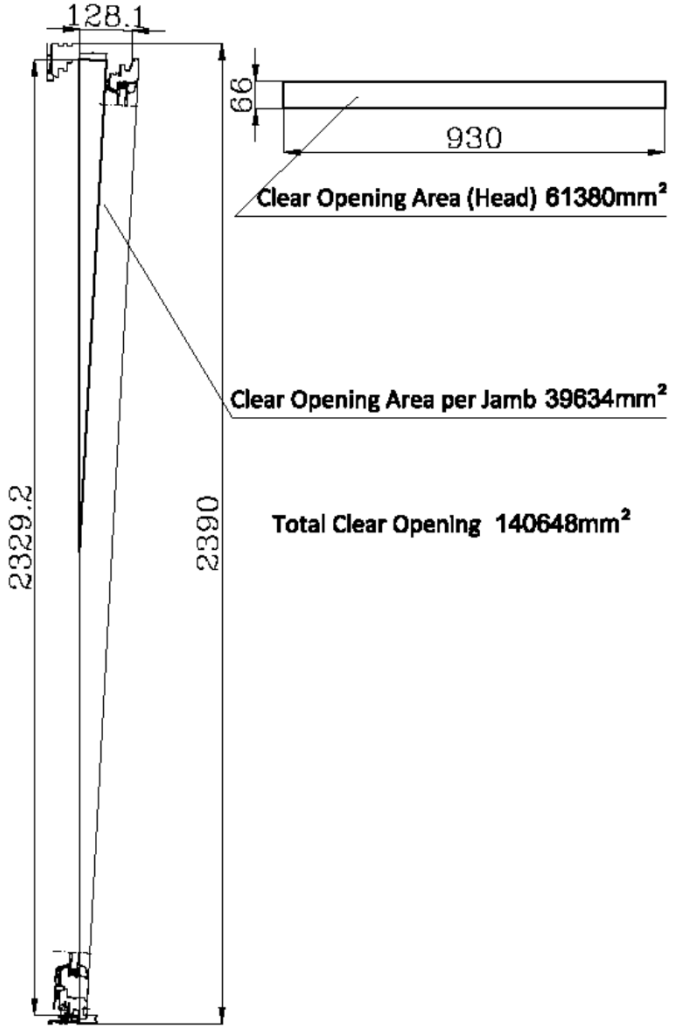
CIBSE Journal August 2014

Is this really good design?

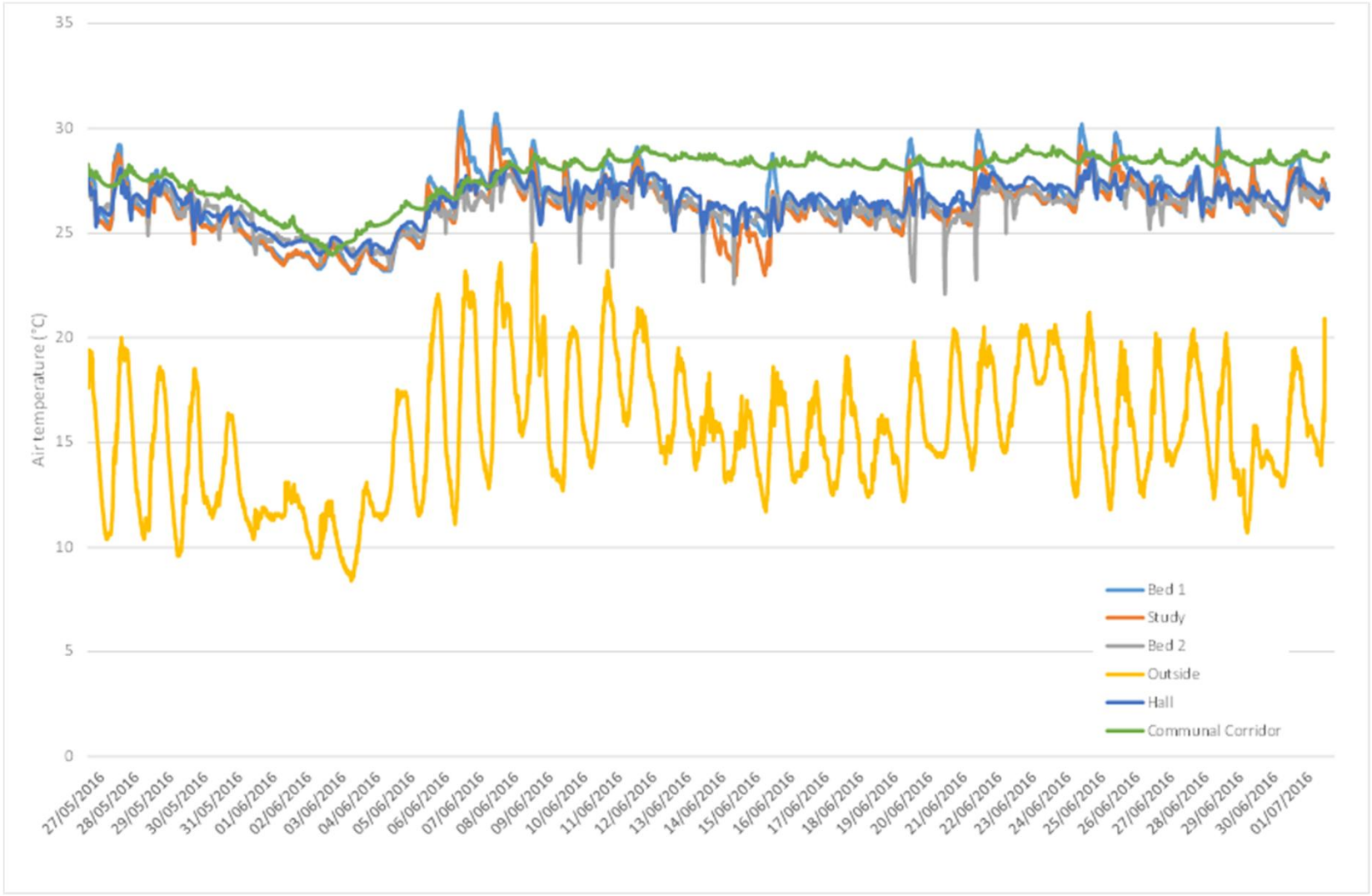


Overheating – why?

Is this really good design?



Overheating – is it really a problem?



Ventilation the key to good IAQ and comfort

- Is there a link between IAQ and overheating?
  - AD-F background ventilation rates are minimum, not the value to just achieve with a fan running flat out.
  - AD-F works for design conditions – cold and relatively low absolute moisture content, but what about warmer/wetter periods?
  - Purge ventilation – designers/developers see in only in terms of AD-F, but occupants see it in terms of thermal comfort. There is a serious problem with windows not viewed as part of ‘comfort provision’ i.e. building services.

Ventilation the key to good IAQ and comfort – what do we still need to know/do?

- What are the effects of long term increased indoor temperatures on IAQ – off-gassing, mites, etc?
- What are the effects of long term exposure to increased indoor temperature directly on health (not heat waves, prolonged heat)?
- How do we move the design/developer industries away from seeing ventilation as an add-on, an inconvenience? It is vital to health and wellbeing and should be seen as being as dangerous to health as electricity and gas if it is designed/installed/maintained poorly.
- Can the health costs of poor IAQ be quantified in a way that focusses the minds of policy makers to resist lobbies and regulate?
  Note difference between domestic and non-domestic regulations.