Performance Gap: From Modelling to Post Occupancy Evaluation

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Overview

The Gap

Whole-Life Performance Cycle

Real-Life Examples

Discussion – Any Solutions?
The Gap

- **Performance Gap: TM54** – ...difference between expected (design?) and realised energy performance...
- Major risk to government, industry and consumers – may lead to increased costs

- **TM54**:
  - Accurate Estimates
  - Guidance on where excessive energy might be in practice

- **ZCH** – Closing the Gap Between Design & As-Built Performance:
  - Systematic review and Priority actions on design issues, calculation methodologies, PC testing / evidence gathering etc...
  - *sets out a clear set of recommendations for both government and industry*

- Several other Research Work by Universities, BRE etc...
Design Modelling

- **What Purpose?**
  - Compliance – Energy modelling
  - Actual Design Loads
  - Thermal Comfort & Ventilation
  - Daylighting

- **Performance Gap**
  - Comparing like for like?
  - EPC v DEC?
  - Gap in Performance or in Calculation Methodology?
  - or Both?
  - TM54 & ZCH...
Whole-Life Performance Cycle

If calculation methodologies were accurate, would there not have been a performance gap?
The GapS!

- Lean Design
- Energy efficiency services
- Modelling
- Local renewables
- Daylighting

- MEP Design
- Specification & Drawings
- Building fabric performance advice
- Specialist lighting

- Contractor briefing
- MEP Inspections
- Fabric Performance
- Change Control

- Performance optimisation
- Diagnosis
- Facilities Management Support
- Monitoring
- DEC

- Handover and induction
- EPC
- User Training
- Energy Log Book
- Completion Check

- PLANNING PERMISSION
- TENDER
- COMMISSIONING
- FEEDBACK
- NEW CONTRACT OPTION

- Building concept design
Reality – The GapS!

- Concept Design – Performance & Aesthetic Focus
- Detailed Design – Value is often engineered out
Reality – The GapS!

- **Tender Stage:**
  - Design Altered
  - Derogations
  - Capital Cost v Operational Cost

  Capital Cost usually wins the duel!

- **Construction Stage:**
  - Most Things Altered!
  - Specs not always followed
  - Capital costs up and performance down
Reality – The GapS!

- Construction Stage – Observed Issues:
  - Lack of Performance Awareness
  - Numerous Envelope Issues, e.g. Insulation not Continuous
  - Glazing Specs Ignored
  - Pressure Testing not Carried Out
  - HVAC System Components from Previous Project
  - HVAC & Lighting Zoning messed up
Reality – The GapS!

- Construction Stage
  - Observed Issues:
    - CO$_2$ Sensors per Floor per Wing rather than per Room
    - Actuators causing windows to flap continuously
    - TRV’s by opened windows
    - Where does the list actually stop???
Reality – The GapS!

- Controls?
- Commissioning?
- Soft Landings?

- Occupancy Patterns
- Occupant “Interference”
- Are POE’s Carried Out?
Reality – The GapS!

The Vicious circle

modelling → practical engineering

concept → understanding construction

data collection + feedback → commissioning + user induction

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Any Solutions?

- Is it Really That Hard???
- Forget Metrics!
- Keep design simple
- Focus on Zoning before BMS
- Clear Communication Lines
- Consider Feedback – TM54
- Value out VE?
- Iron Out Construction Issues – ZCH
- Construction-Side Performance-Awareness - ZCH

Perhaps if we ALL did our jobs sensibly / responsibly, any Gap would have been insignificant?
THANK YOU!
Multisector/business/closing slide example
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