Building Performance Evaluation

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Support of KTN – BSRIA, ARUP, BRE & CIRIA
Why Evaluate Performance?

- Energy, energy, energy!
- 80% reduction in carbon emissions by 2050

- Large gap between Real performance and Virtual performance
  - BREEAM ‘Excellent’
  - EPC Asset Rating ‘A’
  - Average DEC

- Feedback loop:
  - needs to be closed
  - Acted upon results

Design better

Build

Learn

Normal Use

Monitor

Improvement cycle

Finish
Credibility Gap between Virtual Performance & Real Performance

Data from a winner of a Green Building of the Year Award 2004

![Graph showing annual carbon dioxide emissions (kg/m² treated floor area) for various benchmarks: BREEAM estimate, Design estimate, ECON 19 "Good Practice" benchmark, Actual two years after completion, ECON 19 "Typical" benchmark.]

What is Building Performance Evaluation?

- Evaluation of a building in use

- 3 Areas:
  - Forensic Walkthrough – inspection of building’s operation, and whether there are any emerging problems or wasteful operational practices
  - Energy Survey – breakdown of energy use in building by type of consumption e.g. heating, air conditioning, lighting etc.
  - Assessment of occupant satisfaction – survey and interviews of building users
1. Forensic Walkthrough
Common Lighting Problems

What is wrong with this picture?

Lighting could not be turned off
We have Automatic Lighting Controls

- Can waste energy if not set up properly
- Automatic presence detection means lights come on even when daylight is OK
- Daylight-linking technology - are light levels set correctly?
- What is timer set to? 5 mins to 2 hours
Metering

- What is metering strategy?
- Are heavy use areas sub-metered – Server rooms, catering facilities
- Find the meters – difficult to read
- Sub-meters not reconciled with main meter
- If not measuring and monitoring – how ACT?
Building Management System

- Too complex?
  - May require outside BMS engineer to adjust
  - Poor handover - not enough training

- How useful is it as an energy reporting or monitoring tool?
  - If not monitoring, how act?
User Interfaces

“An intelligent building is one that doesn’t make its occupants feel stupid”… Adrian Leaman

- What are these controls for?
- Do users understand lighting or mechanical strategy?
- Underperforming controls
Biomass Boilers

- Seen more off than on – typically used as lead boiler
- Difficult to clean, clean frequently
- Issues with fuel delivery systems
- Expensive to service
- More trouble than its worth? Where is the energy saving?
- Is design team thinking of end-users or design credits?

The designers dream… A maintenance nightmare…
Server Rooms

- What is room set point?
- Check air distribution strategy
- Rooms conditioned 24/7/365
2. Energy Survey

- Measurement of HARD data
- Conducted at several levels:
  - Quick assessments from energy bills and meter readings
  - Extensive monitoring

CIBSE TM22:
Energy assessment and reporting method

- TM22 can be used as tool
  - Review individual component loads
  - Find out run-times of loads
  - Build a load profile
3. Occupancy Satisfaction

- Soft data - Collect feedback from building users about how well buildings work

- Structured interviews, surveys and questionnaires
  - Have user expectations been met
  - Are users comfortable
  - Insight into user behaviour
  - Do they understand the controls
  - Are they using them effectively
Building Performance Evaluation - Funding

- £8m Technology Strategy Board funding – total four year programme
- Looking for applications from building developer or owner
- Competition open from May 2010
  - Assessment of applications at approx. quarterly intervals
  - Next deadline 12 January
  - 41 Non-Domestic applications
- Any building that you might have available?
  - New build or major renovation
  - Within 9 months of completion
  - 3 years maximum post completion
  - 2 years energy data
Summary

- Look to provide better buildings
  - In use and design
- With evaluation we can make informed changes
- Make feedback routine
- To embed a culture of building performance evaluation in the construction industry
  - More transparent
Building Performance Evaluation

- Thank you for listening

- For independent building assessment
  
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