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Performance of exemplar buildings in use

Bridging the performance gap

Edited by Yetunde Abdul and Mindy Hadi

Department for Environment Food & Rural Affairs

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Contents

Executive summary

This report reviews the operational performance of three public-sector office buildings designed to achieve energy and water efficiency over the longer term, based on a study carried out in 2010/12. The study, funded by BRE Trust, the Cabinet Office and the Department for Environment, Food and Rural Affairs (Defra), highlights the benefits and challenges of environmental design in relation to the building handover process and the management of facilities. It reviews the issues faced by designers, clients and building managers in bridging the gap between designed performance and actual operational performance (ie the 'performance gap') over a building's lifetime. While the buildings evaluated are all public sector, many of the lessons learned from this study are equally applicable to the private sector.

Three UK office buildings were reviewed for their energy and water consumption and consumption trends were analysed. Feedback on the buildings' general operational performance was gathered from public-sector staff and their facilities management (FM) teams. All of the buildings were completed between 2005 and 2008 and designed to achieve an Excellent rating based on the version of BREEAM used at the time*.

The case study buildings were assessed using the following BREEAM schemes:

- Case study 1: BREEAM Offices 2003[1]
- Case study 2: BREEAM Offices 2005[2]
- Case study 3: BREEAM Offices 2006[3].

The case study buildings chosen have all been in operation for at least five years, allowing enough time for the systems to bed down and for the building managers and FM teams to become familiar with managing the buildings and their services. As the buildings conform to different versions of the BREEAM Offices scheme†, they represent the development of the BREEAM standard, as well as reflecting changes in UK building regulations, government policy and technology that have occurred over that time.

This publication reports the buildings' environmental performance (energy and water use), reviews consumption trends and concludes with a discussion of the challenges and opportunities for clients and design teams to ensure that buildings are completed, handed over and operated as intended to bridge the performance gap. The results will aid property procurers in understanding the link between predicted and actual performance and help BRE to reinforce BREEAM's ability to measure issues that affect actual building performance.

* In this report, the term 'exemplar' is used to define buildings designed to, measured against and aiming for the highest possible level for a recognised 'green' building rating. At the time that the case study buildings were constructed, a BREEAM Excellent rating was the highest rating possible, representing 'best practice' (ie top 10% of UK new non-domestic buildings) and therefore exemplar buildings. Current versions of BREEAM (at the time of writing) include an additional rating level of Outstanding, representing performance within the top 1% of UK new non-domestic buildings.

† The BREEAM Offices scheme has now been superseded by the BREEAM UK New Construction scheme. Further information about the scheme can be found at www.breeam.com.

Introduction

By 2050, around half of the total carbon dioxide (CO_2) emissions from the UK non-domestic sector are likely to be from buildings that were constructed before 2020[4]. While newbuild stock constitutes only 1% of the total building stock each year, it drives thinking across the sector in terms of physical design features, system design and operational practices, and this thinking has an impact on refurbishment options and the operation of existing buildings. In this context, it is important to understand the following:

- How far exemplar newbuilds (ie buildings designed to, measured against and aiming for the highest possible level for a recognised 'green' building rating) actually deliver the expected operational savings in use.
- How these new buildings are managed and operated to benefit from the environmental features installed.
- How facilities managers and clients can work together to deliver better buildings and ensure that the opportunities created (ie for sustainable management, reduced environmental impact over the operational life of the building and cost savings) are fully exploited.

The study on which this report is based sought to address these questions by reviewing the overall operational performance of three office buildings. All achieved the highest BREEAM design rating available at the time, ie BREEAM Excellent. In each case the client's project brief required the design teams to consider the occupants' needs and to incorporate energy and water efficiency into the design.

While the buildings studied are all in the public sector, many of the lessons learned from this study are equally applicable to the private sector.

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