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up to date guidance on  
operational energy ratings,  
energy certification, occupant  
surveys, and project feedback techniques

## Handover, O&M Manuals, and Project Feedback



A toolkit for designers and contractors

By Paddy Hastings, Kevin Pennycook and Roderic Bunn

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BG 1/2007

# Preface



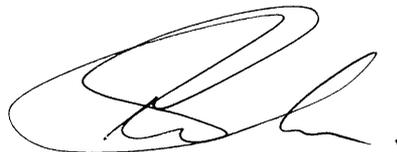
Barry Nealon, Chairman,  
Reliance Facilities Management Services

The publication of *Handover, O&M Manuals and Project Feedback* is a welcome addition to the library of practical BSRIA guides.

Historically, the construction and management phases of a building have been founded on discrete activities. Individual pieces of the jigsaw have been delivered without reference to the complete picture. BSRIA has been a driving force in encouraging the industry to adopt a more joined-up approach; forging stronger links between the different disciplines and promoting a whole-life cycle approach to building. Reliance Facilities Management Services is pleased to offer its full support to this initiative.

Focus on the performance of buildings is gathering momentum, not just in terms of use, but also of a reduced impact on the environment. Reliance Facilities Management Services has taken a leading role, working with our fellow professionals in the property industry, to help occupiers reduce their use of energy and improve their total carbon footprint. We need to assess the impact of our activities, not only in the context of our individual disciplines, but also in terms of the total utilisation and life expectancy of buildings and systems. Understanding the building life-cycle is critical to the creation of safer, more productive, and energy efficient buildings.

This BSRIA guide provides an essential basis for common understanding, which as practitioners we must all embrace if we are to make a difference.

A handwritten signature in black ink, appearing to read 'Barry Nealon'.

Barry Nealon  
Chairman  
Reliance Facilities Management Services

# Acknowledgements

BSRIA acknowledges the help of the following people and organisations who helped in the revision of this guide:

- William Bordass Associates (for energy information)
- Adrian Leaman, Building Use Studies (for the occupancy survey methodology)

BSRIA would also like to thank Jo Harris of BSRIA for facilities management and maintenance information, and John Armstrong, author of the forthcoming revised publication *CIBSE Guide M: Ownership, Operation and Maintenance of Building Services* for his assistance in ensuring that the BSRIA and CIBSE guides are complementary.

The authors have sought to ensure that the contents of this guide were relevant and up-to-date at the time of publication. However, readers should be aware that legislation, standards and codes of practice change regularly. Readers should satisfy themselves that their actions informed by this guide conform to all relevant legislation prevailing at the time of use.

## Electronic toolkit

This guide is also available for purchase as an electronic toolkit. The toolkit contains MS Word versions of the tables, pro-formas and other supporting documentation which can be used on company intranets. For details and pricing contact the BSRIA Bookshop on 01344 465529.

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Handover, O&M Manuals, and Project Feedback  
– a toolkit for designers and contractors

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# Introduction

The construction industry is unique in the way that million-pound products can change hands with very little in the way of formal handover and customer care. Even the humble £5000 hatchback is subject to a stringent pre-delivery inspection followed by a free, five-year manufacturer's warranty. The £20 million office, on the other hand, can last ten times longer, is arguably far more complex and fragile, and can rarely be counted on to work first time. Cars come with well-written and scrupulously illustrated owners' manuals. Buildings come with a hotch-potch of drawings, product literature and jargon-rich technical documents packed into ring binders.

The unflattering comparison between buildings and cars is not one in which the construction industry can take much pride, particularly considering that buildings are more like ships than cars. Like buildings, ships are rarely identical, usually customised, made on site, and often subject to changes during their assembly. As a result they need onerous sea trials before they can be considered seaworthy. In stark contrast, buildings are often pressed into use during the final stages of their fit-out.

Even when a building has been accepted as completed and the certificates signed, it is essential that project teams do not disappear. Understandably, clients and/or occupiers want to get their businesses up and running as quickly as possible, but this should not be a signal for a design and construction team to disband. It is essential – to meet the requirements of environmental legislation, if nothing else – for designers to hold their clients' hands during the critical first few months of occupation.

BSRIA's 2006 Key Performance Indicators revealed that the poor quality of O&M manuals remained a major problem for clients. BSRIA has collected data on the quality and timeliness of delivery of O&M manuals since 2001. During that time the quality of O&M manuals has declined rather than improved. There is clearly huge room for improvement.

*BG1/2007 Handover, O&M Manuals, and Project Feedback* is a significant update and amalgamation of two previous guides: *TN 15/95 Handover Information for Building Services* and *AG 1/87.1 Operating and Maintenance Manuals*. In tying together these two established guides, BSRIA is giving a strong steer to the industry to make a strategic link between the process of handing over a building, the subsequent education of its users, and the fine-tuning of a building's environmental systems.

The new guide also reflects the significant shift towards improving the operational performance of buildings. The 2006 update to *Part L2A* of the *Building Regulations* now demands that buildings have a logbook. The EU's *Energy Performance of Buildings Directive* has also pushed building legislation towards energy efficiency certification, and the regular inspection of boilers and air conditioning systems. From 6 April 2008, public sector occupiers of buildings with a treated floor area greater than 1000 m<sup>2</sup> will need to display a Display Energy Certificate (DEC), based on actual, measured energy consumption. Skilled assessors will be needed for this to happen.

For these reasons, this guide includes guidance on carrying out energy performance analysis, and ways to benchmark the results. Reflecting the increasing use of post-occupancy surveys, this guide also includes a new section on measuring occupant satisfaction using the results to inform design decisions. When used in conjunction with energy analysis, occupant satisfaction surveys

can be very powerful tools for understanding how a building is working.

Given the expanded content of the combined guidance, the publication has been sub-divided into five distinct parts. These parts preserve the layout of the two superseded guides, with the addition of two new sections on energy certification and feedback tools:

- Part 1: Building handover information
- Part 2: Operating and maintenance manuals
- Part 3: A model specification for O&M manuals
- Part 4: Logbooks, energy certification and condition surveys
- Part 5: Design and project feedback tools.

## Part

1

### **Building handover information**

The first section of this guide is a heavily revised and updated edition of TN 15/95 *Handover Information for Building Services*. The section contains guidance on the steps a design and construction team should take to achieve a smooth handover.

Since TN 15/95 *Handover Information for Building Services* was last updated, the 2002 *Building Regulations* introduced the requirement for building logbooks. The logbook must provide enough details of installed building services plant and controls, their method of operation and maintenance, and other details that enable energy consumption to be monitored and controlled. Owners and occupiers are obliged to keep control of the content and quality of their logbook.

## Part

2

### **Operating and maintenance manuals**

Part 2 of this guide explains the best approach to creating and delivering operation and maintenance manuals for buildings. The section heavily updates the content in AG 1/87.1 *Operating and Maintenance Manuals* in respect of prevailing legislation, standards and codes of practice. This guide also reflects the requirements of the 2007 *Construction (Design and Management) Regulations*, which spell out the specification requirements for a building's health and safety file.

Generic pro-formas have been provided for designers and contractors to use freely. A CD containing electronic versions of these pro-formas is also available for purchase. These can be used on personal computers and company intranets. For more information contact the BSRIA Bookshop on 01344 465529. While these electronic pro-formas can be easily altered, BSRIA takes no responsibility for the consequences of any changes.

## Part

3

### **A model specification for O&M manuals**

This section updates the model specification for technical documentation originally published in AG 1/87.1 *Operating and Maintenance Manuals*. It takes into account the requirements of updated legislation, and British and European Standards and codes of practice.

The model specification contains generic pro-formas that designers and contractors are free to use. A CD containing electronic versions of the

specification pro-forma (and other pro-formas in this guide) is also available for purchase. For more information contact the BSRIA Bookshop on 01344 465529. Again, while these pro-formas can be easily altered according to need, BSRIA will take no responsibility for the consequences of any changes.

## Part 4

### Logbooks, energy certification and condition surveys

Energy certification is a concept new to the UK, although the principles of energy targeting and monitoring have been around for years. Energy certification has come about due to the wide disparity between design expectation and actual performance. In many cases, the more a designer attempts to optimise energy efficiency, the greater the risk that the energy targets won't be met. Post-occupancy studies, from the PROBE studies onwards, regularly report discrepancies between expectation and outcomes.

In 2004, the EU's *Energy Performance of Buildings Directive* placed an obligation on the UK government to adopt energy certification. In June 2006, the government committed itself to the adoption of operational rating certificates based on actual energy use. In early 2007, the government issued *Statutory Instrument 2007/991*, which describes the requirements for mandatory building energy labelling. These will initially apply to some dwellings and public buildings, but in time will inevitably be extended to the commercial sector.

Part 4 includes the background to the energy analysis tools, certification methodology and the energy labelling system to be adopted by the government. The methods of energy analysis, such as *CIBSE TM22: Energy Analysis and Reporting Methodology*, are well-established, and the approach to energy benchmarking and reporting very similar to that applied to domestic appliances. Clients and designers should familiarise themselves with the methods and become proficient in their use.

## Part 5

### Design and project feedback tools

Part 5 is a new section covering tools for understanding how systems are working and to what extent occupants are satisfied or dissatisfied with their building. These tools have been assessed and brought together into a portfolio by the Usable Buildings Trust (UBT). The tools will be regularly updated on the UBT website: [www.usablebuildings.co.uk/fp/index.html](http://www.usablebuildings.co.uk/fp/index.html)

Note that the term post-occupancy evaluation (POE) has become a euphemism for a wide range of analytical tools. In its strict sense, POE is certainly useful for researchers who want to find out what worked and what went wrong in a building. For building designers, a post-occupancy evaluation is more a case of shutting the stable door after the horse has bolted. Some improvements and fine-tuning might be possible, but it may be too late for major changes.

This guide prefers the term feedback tools, which describes those methods suitable for use at any stage in a project, but most usefully at the pre-design stage. Their use can provide valuable insight into what clients and building users want from their buildings, and identify the aspects of design most important to them. Results of occupant surveys might show, for example, that the users of a particular building may be willing to put up with traffic noise in order to have openable windows, when established design guidance might suggest otherwise.

The same tools can be used for reality-checking during design iterations, and to close the loop between client, end-user and designer expectation and the

performance of the finished building. In general, the more empirical the feedback method, the more likely that all stakeholders will find it adds value to the process of designing, building and running a building.

This guide does not instruct readers in how to use feedback tools. Instead, it describes the more established methodologies and gives guidance on selection criteria. Rather than attempt to understand their inner workings, it is more important for designers to appreciate the value that feedback tools can bring to a design process and their usefulness for fine-tuning buildings. The most important message for the construction industry is that feedback studies need to become routine, rather than the exception.

The fact that you reading this guide is evidence that you and your company understand the industry's shortcomings in its approach to handover and operation and maintenance, and are keen to do better. If you follow the guidance and use the tools described in this guide, you should be able to deliver better performing buildings, significantly more usable O&M manuals, less energy-hungry building services, and happier occupants. If nothing else, that's a good recipe for repeat business.

*Roderic Bunn  
September 2007*

## How to use this guide

This guide to handover and O&M manuals has been designed to make it easy to read and for ease of navigation between different sections.

The book has been divided into five parts:

- Part 1: Building handover information
- Part 2: Operating and maintenance manuals
- Part 3: A model specification for O&M manuals
- Part 4: Logbooks, energy certification and condition surveys
- Part 5: Design and project feedback tools.

Each Part has a colour-coded flag in the top corner of every page to make it easy to find.

Any supporting guidance, weblinks, and quotes from standards and regulations will be shown separately in the outer column, with page links shown in the outer column thus **12**

Go to **12**

O&M manual and record drawing specification