

## **WHAT MAKES A BUILDING SUCCESSFUL FOR THE PEOPLE WHO USE IT?**

*Outline of paper to DMA/BMIB Construction Group Business Seminar, 5 February 1992, by Bill Bordass, William Bordass Associates and Adrian Leaman, Building Use Studies Ltd*

### **INTRODUCTION**

The Roman architect and theorist Vitruvius gave a famous three-word specification for a successful piece of architecture "*commodity, firmness, and delight*". Over two millennia this never really seems to have been bettered.

Many problems of twentieth century building can perhaps be ascribed to the neglect or shallow interpretation of these principles, for instance:

- A money-making *commodity* rather than something serviceable, comfortable, accommodating and convenient.
- Something that is not *firm*, but instead rigid, flimsy or irresolute (and sometimes all three at once!).
- *Delight* is often regarded as an unaffordable luxury. However, hindsight suggests that this could well be a shortsighted view. Buildings of quality and humanity are more likely to be looked after and their faults corrected or forgiven, while unlovely buildings can fall out of favour rapidly, even though they may conform to all the required standards.

But isn't that a lot of old hat? Isn't building an out-of-date industry which has resisted the 20th Century and in its closing decade now needs a technological shot-in-the arm (or perhaps in the head?). Well, yes and no: while one can point out many areas in which buildings fall short, the solutions may be less obvious than one would at first think - it seems to be much easier to shunt problems around than to get rid of them. For instance, BUS frequently finds the root cause of adverse user reaction is that technological advances, corporate dogma, or inappropriate management has de-humanised the working environment. Similarly, WBA frequently finds that elaborate attempts to reduce a building's energy consumption have largely redistributed it, and greatly increased operation and maintenance requirements and costs into the bargain!

### **WHAT DO PEOPLE WANT?**

Many people in the building industry just want to do their job well and to make money - or at least enough money to survive and preferably to flourish. For example a builder would probably like a building that goes up quickly, reliably and profitably; doesn't create any fuss during the defects liability ("warranty?") period; and doesn't suffer from latent defects. However, if it happens to be difficult to alter and maintain and needs to be demolished before its time, well - that's good business!

Our studies suggest that what occupants and users would *really* like is buildings they don't have to think about (except possibly with pride!), buildings that don't get in the way, neutral support systems for what they do, but which at the same time make them feel good. After all, since we now spend about 90% of our time inside buildings of one kind or other, why shouldn't we be happy in them?

But often occupiers are disappointed: the buildings don't work too well, are frequently seen as too expensive to buy, to rent and to run, inhibit organisational aspirations, and may even be "sick". Buildings are also beginning to be seen as an environmental nuisance: they absorb large quantities of resources, create large quantities of waste, and their energy consumption in use accounts for about 50% of greenhouse gas emissions and associated air pollutants. Low energy consumption is particularly important: over five years or less a typical house or office building tends to consume a similar amount of energy in use as was expended in its construction and in extracting, manufacturing and transporting everything that went into it.

## THE ROLE OF TECHNOLOGY

Technology has an vital role to play in solving these problems and addressing user needs, but it needs to be applied with care and sensitivity. We need to consider what technology can reasonably do: many building-related problems are not innate properties of their design and construction, but symptoms of misfits between the building and its occupancy, maintenance and management. Would local authority estates be in the trouble they are now if they been properly staffed and maintained, and if occupants' requirements had been better understood? Probably not, but was it unrealistic to expect that they ever would have been that well looked after: were they too exact a solution to too incomplete a set of problems?

Social studies by BUS and technical studies by WBA suggest that an underlying issue in the success or otherwise of a building is often *the management of complexity*. In principle this can be attacked from two directions: reducing the complexity or improving the management. The danger often seems to be that in removing the complexity from one area - for example in the quest for totally-flexible space or standardised, easily-constructed buildings - it surfaces somewhere else, often greatly increasing the minimum management input necessary to make the building work, while at the same time making the management task more complicated and difficult. Time and again we discover that *building management is the really scarce resource*: if the commissioners, providers and occupiers of buildings do not understand and address this, things may well go wrong, particularly as people often expect that a new building will automatically be easier to look after! *Keep it simple* is a good working rule: don't make a building - or at least the bits the occupiers have to think about - any more complex than absolutely necessary. And complexity usually seems to work best in self-contained, well-proven, packages, not scattered about the place.

## SOME FALSE - OR CERTAINLY UNRELIABLE - GODS

Attempts to make buildings better often seem to end up making similar types of mistakes, partly because the amount of research into how buildings actually work is very limited and the feedback loop very poorly-developed. Below we list a few possible danger areas, in which pursuing laudable objectives can lead to unanticipated problems, for the user if not for the provider.

### *MAINTENANCE-FREE PRODUCTS*

Do they turn out instead to be impossible to maintain, as the architect Sir Bernard Feilden has said?

### *STANDARDISED, PREFABRICATED ASSEMBLIES*

They may be easy to build but they can be impossible - or at best difficult and expensive - to alter, particularly if the systems or parts are no longer in production! It can also be difficult to obtain the level of repetition which makes the solutions reliable and economic.

### *"FLEXIBILITY"*

This can often turn into a nightmare: a lot of money is spent on things that are never used and may even get in the way of unanticipated change, creating bottlenecks over time. Simple, robust adaptability is often preferable: if in doubt, leave it out (*but try not to stop somebody putting something else in if they find they need it*).

### *AVOIDING SPATIAL CONSTRAINTS*

Often large, column-free areas are advocated, again in a quest for flexibility. The resulting *carte blanche* space usually needs to be serviced in technologically more sophisticated ways, usually incurring higher energy and maintenance costs, requiring more careful - and more labour-intensive - management of space, furnishings, services and people, and to a higher standard of performance generally.

### *CLOSELY-CONTROLLED ENVIRONMENTS*

As a general rule, people do not seem to like living and working in entirely artificial, automatically-controlled environments, particularly if there seems to be no good reason for them. A perverse rule seems to be *the less you really need air-conditioning, the better it has to perform!* Naturally-ventilated buildings often have objectively worse environments than air-conditioned ones but many people seem to be happier in them and there is a lower incidence of building sickness. Recent BUS studies also indicate that - even in a sealed air-conditioned building - perceptions of comfort are raised more effectively by a window seat and good, responsive management than by advanced control technology.

### *ADVANCED AUTOMATIC CONTROLS*

Adverse occupant reactions to automatically-controlled lighting and solar screening systems can be vociferous and in some cases has led to systems being abandoned or downgraded. Thermostats, light switches and more advanced controls are often of the wrong kind and in the wrong place. Human factors and ergonomics are important but widely neglected: by clients, designers, managers and the industry generally.

### *INTELLIGENT BUILDINGS*

Over the last few years "building intelligence" has been hyped by some people as the answer to the maiden's prayer. The penny is now dropping that building intelligence is not an end in itself: it is only desirable if it does things better or more cheaply than the alternatives. Functionality is the really important issue: advanced and computerised systems being important tools, but only when they are the right tools for the right job in the right hands!

### SOME SUGGESTIONS FOR THE FUTURE

- Better, performing, more cost-effective buildings, components and sub-systems.
- "No-frills", adaptable buildings, which are nice to be in, make effective, controllable, use of natural light and ventilation when and where appropriate, but can easily accommodate more advanced servicing systems where required.
- "Drop-in" supplementary services for the above, which can readily be installed, controlled and reconfigured, preferably by anyone.
- Improved window systems for the above, perhaps with both manual and automatic (or semi-automatic) controls.
- Improved understanding of building and control ergonomics - and the related individual and management needs - so that building control systems can be more effective and user-friendly.
- A common language, enabling clients and users to discuss their needs with designers clearly and unambiguously.

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### THE SPEAKERS

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After PhD research in the physical chemistry of surfaces, Bill Bordass pursued an interest in buildings and joined the multi-skilled design practice RMJM in 1970. He first worked in technical and computer support services but soon moved over into architectural, engineering and planning project teams. In 1975 he became Associate responsible for developing RMJM's building services engineering skill, promoting integrated and energy-efficient design of new buildings, and undertaking energy conservation and monitoring work in existing ones.

In 1983 he set up William Bordass Associates (WBA), which works largely on design briefs and on undertaking or helping to manage field and desk studies of building performance, and in particular environmental control, energy efficiency, new technology and physical and chemical deterioration in existing, proposed and historic buildings. Bill Bordass' main interest at present is in understanding how buildings - and especially their engineering and control systems - actually perform and how they can be made to serve the user better and more efficiently.

Recent projects include case studies of energy use in offices; causes of metal roof corrosion; advice to people wishing to design or commission "greener" buildings, and a theme paper *Building Performance: The User Perspective* to the recent *Responsible Workplace* study. Bill Bordass is at present assisting the Building Research Establishment in managing part of the Department of the Environment's programme to help reduce greenhouse gas emissions. His principal involvement is in better-integrated design and management of buildings; user-friendly controls; and more systematic ways of understanding and comparing buildings' energy use.

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Building Use Studies (BUS) is a research and consultancy company which helps organisations improve the quality of their buildings and, by so doing, raises the performance and well-being of the people who use them and work in them. BUS undertakes surveys, post-occupancy studies, briefs for buildings and products, and specialist support services such as research project management and technical writing. BUS produces facts about how buildings perform and how users respond. This information is then used in the design process to create higher quality buildings and in everyday management to get the best out of people.

Recent and current projects include continued research into "sick building syndrome" - investigations which BUS pioneered and for which it has a large body of survey data; studies of the utilisation of controls in buildings; brief-writing for office buildings and furnishings; vandalism prevention in schools; workspace ergonomics and task organisation for stress reduction; and evaluation of completed buildings and developments.