

# PROBE 19: designer feedback

With the conclusion of the PROBE series of post-occupancy building studies, Building Services Journal invited a group of engineers and architects to report on how PROBE is influencing building design and operation.

BUILDING SERVICES REPORTS

The knowledge gained from the second series of PROBE post-occupancy surveys was designed to equip designers with ways to make more energy efficient and productive buildings.

That was the objective. But does PROBE benefit the design professions, or simply cast aspersions on engineering systems? Is it a cathartic exercise, or does it inhibit innovation?

To find out, *Building Services Journal* invited key engineers and architects to explain how PROBE has influenced their approach to building design. We invited **Jim Elsdon** from Marks & Spencer's engineering division, **Andy Ford** from Fulcrum Consulting, **Glen Irwin**, a senior design engineer from Ove Arup & Partners in Birmingham, **David Lloyd Jones**, an architect with Studio E Architects, building physicist **Duncan Price** from Whitby Bird & Partners, and **Brian Ford**, an architect specialising in environmentally sensitive building design.

The PROBE Team was represented by building physicists **Bill Bordass** and **Robert Cohen**, and behavioural scientist **Adrian Leaman**. **Dr Helen Sutcliffe** of FBE Management represented the DETR. The meeting was chaired by PROBE Team leader **Paul Ruysevelt** and *BSJ* editor **Roderic Bunn**.

Who reads PROBE, and why?

Warts and all building investigations make good reading, but to be ultimately useful to the design professions the findings have to be reported in such a way that clients, designers and building managers can apply the results. So who is benefiting from the PROBE research?

**Glen Irwin:** The PROBE reports are generally very well read. Most people read most of it, particularly the key design lessons. The 'what went wrong' bits. You do learn a lot from other people's mistakes, particularly the junior engineers who are avid readers.

**Duncan Price:** Yes, young engineers don't have a lot of experience to draw upon. The buildings [investigated] are often recent buildings using current technology, so it's a very

important part of their early learning experience.

**David Lloyd Jones:** I don't think architects read PROBE, but my feeling is that the studies are just as relevant to architects as building services engineers. But are buildings getting better as a result of these studies? Can you demonstrate that some of the messages are being incorporated as standard in buildings?

**Paul Ruysevelt:** It's difficult to say, but are you able to download the findings and incorporate them in your design?

**Duncan Price:** When we [at Whitby Bird] are doing our energy studies on energy use,

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Glen Irwin



we go back to buildings to find a benchmark. For example we're doing some Termodeck buildings, and being able to show an architect how Termodeck performs is very useful. It gives us a lot of clout.

**Glen Irwin:** When you're faced with a wavering architect or client, showing an example of how systems work calms them down. I've used PROBE reports in that way.

**Robert Cohen:** Does the converse apply?

**Glen Irwin:** It can do, we have to be careful. PROBE can put them off if it shows that a system wasn't put together very well. It may not have been a fundamental problem with the system, but if there's not the attention to detail then systems can get a bad name. Maybe we're guilty of shielding our clients from that information, when it should be in our interest to alert them to it.

**Jim Elsdon:** The PROBE Team has to be very careful when it's being critical...

**Glen Irwin:** Yes, engineers are very nervous. It can be a baptism of fire. Engineers are very precious about their designs, whereas architects accept criticism more readily.

**Adrian Leaman:** The PROBE review may not match what the press says about it. That's when it gets difficult.

**Bill Bordass:** But PROBE doesn't set out to be blame-attributing or a beauty contest, just a way of identifying generic things which need to be done.

*Editor's note: Arup's Glen Irwin used the findings of a PROBE study of the Anglia Polytechnic University learning resource centre (also by Ove Arup) to improve the design of a similar building being built for Selly Oak Colleges<sup>1</sup> in Birmingham.*

**Roderic Bunn:** Was it easy to import PROBE findings into your design for the learning resources centre at Selly Oak Colleges?

**Glen Irwin:** We used the Anglia Polytechnic University building<sup>2,3</sup> as a learning vehicle, what went wrong with it, whether

ing hard to do. But what we're really doing is going ahead with the red flag and saying "there are problems here, take care". What you're suggesting might be a pioneering piece of technology but there are bits wrong with it that might need sorting out. Controls in advanced naturally ventilated buildings fall into that category. If you stick them in an advanced, naturally ventilated building, you start sweating them, and they may not be loaded with the algorithms the designer wanted.

There's also a pretence that buildings are finished at practical completion, which is a major issue for services engineers at a time when the architect thinks that things are completed. We must use PROBE to lever that up without shooting the pioneers in the process.

pers down. We need a mechanism for attracting the interest of architects in a way that cuts across the professional and institutional barriers.

**Bill Bordass:** If the professional institutions could subscribe to the use of post-occupancy feedback, there's a reservoir of PROBE research which could be useful to them. The information could be placed on a web site which the institutions could recommend that members access at a certain stage in doing a job.

Currently it is just sitting in a ghetto of building services engineers and enlightened architects.

**David Lloyd Jones:** I think clients would be interested in PROBE if they knew about it further upstream, in the same way that BREEAM is regarded. If they thought that they'd come off well from a PROBE study, it could be a useful marketing tool.

**Andy Ford:** There does seem to be a missing link between BREEAM and PROBE.

Keeping it simple

**Bill Bordass:** Where I think the PROBE Team can contribute usefully is at the strategic level – the simplicity arguments and design for manageability and things like that. We can also contribute on the pitfalls to avoid.

Designers, rightly so, tend to talk up the upsides and not necessarily talk about the downsides. For example, occupancy-sensed lighting where the lights are off when you're out of the room but are always on when you're in the room, irrespective of whether they're needed.

One building studied by the PROBE Team scored an own goal by using more electricity through occupancy sensors because the system couldn't make good use of daylight. To avoid that designers should be able to do some reality checks.

**Glen Irwin:** We know from PROBE surveys that it doesn't pay to make it complex. Lighting systems should be designed to make it easy to switch off. If you can achieve that the users will actually use the system.

**Roderic Bunn:** There's a misunderstanding still, about what the kit promises it will do and what it actually does. But the feedback loop that PROBE is trying to close is between what the occupants think of the building, and what the designers think.

**Duncan Price:** Something I find useful from PROBE is understanding occupants' behaviour, such as their reaction to partitioning systems that cut out daylight, or the way people interact with the perimeter zone.

**David Lloyd Jones:** That's an important issue. Architects are concerned with how the whole building goes together, and the worth of the building as an entity. Often you find that a building that feels good gets over some of its detailed shortcomings.



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Jim Elsdon

problems were caused by innovations and so on. But we didn't have APU's problems. In working for a design and build contractor, money was king. Sometimes I hit a brick wall, for example on airtightness, and that brick wall was the builder. It then came down to substantiating the arguments.

**Duncan Price:** I can echo that. I've raised airtightness with a developer and showed him the PROBE article on the Elizabeth Fry Building, and someone made an off-the-cuff remark, saying "doesn't it cost a lot of money and delay the programme?" We didn't have enough information on that to answer. At that point the developer lost faith in the philosophy of airtightness.

**Glen Irwin:** There are all sorts of problems which make it difficult to build the perfect building. Sometimes things happen that are outside your control and which are very frustrating. I think those issues could do with being expanded in PROBE reports. Designers must be able to explain in PROBE reports about all the problems they had during the project.

**Bill Bordass:** We can be accused by designers of trashing things that they're find-

Getting through to architects

**Paul Ruysevelt:** Getting PROBE findings over to architects is difficult. I mentioned PROBE to an architectural editor and he said that the buildings would have to be lot more sexy than the ones being reported on.

**David Lloyd Jones:** Well, the exotic species of architect has actually been looking at the more humdrum areas, and incorporating into their designs. But they're often dressed up as something else, and also misapplied.

**Brian Ford:** There's huge interest in the schools of architecture in these issues, but the hype about certain architectural practices is misleading a whole new generation of designers. Young impressionable architectural students read things in the architectural magazines which are highly suspect.

**Adrian Leaman:** The trouble with exotic buildings is that they tend to be linked into corporate myth-making. If we get into shattering any of those myths we could be in deep trouble. There are some buildings that have had PROBE type studies done of them which aren't in the public domain because they would shatter the myths.

**Roderic Bunn:** The tyranny of architectural media marketing is total, from the newspa-

**Adrian Leaman:** One of the fascinating things about Marston Book Services<sup>4,5</sup> [designed by David Lloyd Jones] was that the occupants were quite comfortable in the building. And Marston was one of the few buildings where the architect explained to all the staff, before they moved in, how everything worked. So there was a relationship between the management (the company mission) the people, the designers, and the design intent.

**Bill Bordass:** So often in PROBE's we find that clients haven't spent their money wisely. They should do the things they really need to do, or as well as they can, and if they've a bit of money left at the end, to do the icing on the cake. What we often find is too much icing and not enough cake.

Glitzy buildings tend to be feature-packed, but often the features don't sit on top of a functional core. This can be heat recovery on a poor heating system, or architectural solar panels sitting on top of boiler plant which, if the solar panels had been left out, could have been made more intrinsically efficient.

#### Getting to clients

**Bill Bordass:** Experience on the PROBE studies shows that building owners tend to be more committed than the average client. But the property industry – developers, investors and letting agents – aren't like that, and increasingly clients are at the mercy of these people.

The developer market is completely opaque to the benefits of spending £10 000 on a controls upgrade rather than marketing. How do we deal with that?

**Jim Elsdon:** It's about changing perception. My experience is that consultants and architects tend to drive clients down particular routes. Letting agents can do the same thing. And they're choosing the systems that we put in, which is ridiculous.

**Duncan Price:** A lot of these issues are not to do with engineering systems, but how users use buildings. Surely that's tangible for clients and architects?

**Glen Irwin:** Many clients have a different agenda. They're buying a product, and a lot of that is to do with the image that architects generate.

**Roderic Bunn:** Owner occupiers understand the relationship between occupant satisfaction and the built environment, but letting agents don't at all. It doesn't enter into the equation, although if it did it could enhance the lettable of their buildings.

**Jim Elsdon:** Lettability means you can't take risks.

**Roderic Bunn:** But they do by default.

**Robert Cohen:** What you're suggesting goes a long way beyond where we are at the moment. Right now we're just presenting the evidence and giving maps. Coming up with solutions is new territory.



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#### Future PROBE studies

*Editor's note: If funding is forthcoming, future PROBE investigations will attempt to demonstrate that the research findings can be successfully imported into real design and building management situations. This will involve intervention studies at three key phases in the life of a building: the briefing stage, the design specification stage and the long-term management of a building.*

**Glen Irwin:** I think people are generally happy with PROBE, but there are a number of issues that are not covered, such as cost.

**Bill Bordass:** Costs tend to slip through your fingers. You're faced with not knowing whether they're tender costs, or the final account and exactly what is and is not included. Either way getting reliable figures is very difficult.

**Roderic Bunn:** It might be possible to get the client's quantity surveyor to make a simple low, medium or high assessment against a benchmark.

**Glen Irwin:** CDM is another big issue. Some buildings are almost criminal in their flaunt-

ing of the CDM regulations. Air handling units accessed from a cat ladder is ludicrous. You can't expect a maintenance engineer to lug armfuls of filters vertically up a cat ladder.

**Duncan Price:** It's a question of packaging. There's merit in going into more detail on some issues like CDM and maintenance, without losing the holistic analysis.

**Andy Ford:** I think you should cover a bit more on the procurement process – a bit of background about how the building got to be designed and built the way it was. What was the contractual route, and how was it established?

**Duncan Price:** You also need to bring some context into the reports, like site influences and so on. It would also be good to see some more green materials being addressed. I'd also like to see feedback on modelling predictions versus monitored results.

I get very frustrated that the technical data on building performance is not rigorous. It would be good to know whether there was a broad match between predicted and actual performance.

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Duncan Price



**Briefing**

**Glen Irwin:** It's not easy to make a design inherently robust when you have areas of design that are nebulous. Often the client's assumptions are rash, and the client decides that he doesn't want something. That can be a very expensive iterative process. Sometimes that can be as difficult as a client who hasn't developed a brief at all. The most frustrating thing is where you have a client who really should be informed and isn't, and blames the designer when things screw up.

**Bill Bordass:** Things can snap vicious very rapidly in the design process if some benchmarks or features are absent from the brief.

**Robert Cohen:** Do we need a BREEAM version of a briefing document?

**Andy Ford:** Yes, a PROBE briefing dictionary, a plain English brief against which you can compare your brief.

**Glen Irwin:** It should be a series of questions and answers on issues which are key to the client, like a series of tick-box criteria or flow charts to rank the important issues like net lettable area and sustainability. If the designer can show that the client has ended up at a place he didn't want to be, the differences

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**David Lloyd Jones**



between the brief and the designers' product would be clear.

**Andy Ford:** It's handing over from the people who are making the building to the people who are using the building. That's as important a process as the actual handover. PROBE could assist designers and constructors by explaining to the imminent users how the building might be used, which would assist designers to provide that information.

*Building Services Journal* would like to thank all those who took part in this PROBE workshop.

<sup>1</sup>Bunn R, 'Book review', *Building Services Journal*, 7/97.

<sup>2</sup>Bunn R, 'Making light work', *Building Services Journal*, 11/94.

<sup>3</sup>PROBE 8: Queens Building, Anglia Polytechnic University, *Building Services Journal*, 12/96.

<sup>4</sup>Brister A, 'Read all about it', *Building Services Journal*, 12/95.

<sup>5</sup>PROBE 16: Marston Book Services, *Building Services Journal*, 8/98.

**Designing for manageability**

		Technological complexity	
		More	Less
Building management input	More	<b>Type A</b> Effective, but often costly	<b>Type D</b> Rare
	Less	<b>Type C</b> Risky with performance penalties	<b>Type B</b> Effective, but often small-scale

This diagram crystallises many of the issues discussed at the PROBE workshop. One of the main strategic messages to be reinforced by the PROBE investigations is the relationship between building complexity and available management skills *writes Bill Bordass and Adrian Leaman.*

Essentially you can have a more or less complicated building which has more or less management. Type A buildings are the prestige, technologically demanding buildings which the management has taken ownership of and is resourcing in management and maintenance terms.

However, many buildings can be Type C buildings: technologically complex but with less than average management. These often innovative buildings can also suffer from an inappropriate procurement route, such as design and build with novated design responsibilities where lowest cost is of prime concern. There is an illusion among clients (possibly reinforced by design teams) that certain systems are natural and simple, and don't need to be worried about. Sadly, this is often not the case.

Type C buildings can also benefit from advanced technologies, as long as they are locked away in black boxes. Too often such technology gets smeared around the building, so rather than being packaged in a way which can be taken for granted on maintained by industry support, it ends up taxing the brains of the occupants.

Service rules in type A buildings, where energy management takes second billing to managing the occupants.

Type D buildings are relatively rare, and characterised by designers in their own buildings. They can actually tweak their systems in the way they were designed to do simply because of the underlying understanding of how the systems are meant to work. The management understand the building and are committed to obtain good performance. Unfortunately it is often not replicable, as anyone other than the designers don't have that level of insight.

Type B buildings are not necessarily the cheap low fee type buildings, because it can be argued that the ultimate in sophistication is simplicity, even if it doesn't come cheap in designer brain-power.

The speculative market tends to produce type C buildings as they are less risky for developers. Unfortunately they are more risky for occupants.

**History of the PROBE project**

For those unfamiliar with PROBE (Post-occupancy Review Of Buildings and their Engineering), its origins go back to 1994 when the editorial panel of *Building Services Journal* wanted to know how well new buildings reported in the magazine performed two years down the line.

Paul Ruyssevelt and the *BSJ* Editor Roderic Bunn teamed up with building physicist Bill Bordass and behavioural scientist Adrian Leaman to create a whole building assessment procedure. Funding was provided under the DETR's Partners in Technology (latterly Innovation) funding scheme.