THE INNOVATION PARK AT BRE
– A collection of housing exemplars

Last month we had a look at BRE, where the letters originally stood for the Building Research Establishment. On their site in Watford they have an Innovation Park, where there are examples of innovative design and technology applied to housing. Members of the public are invited to visit, either for an Open Day (£12), or for a Guided Tour (£30) – booking in advance is necessary.

On the Park at present are seven buildings (detached houses or pairs of semis) plus a healthcare centre which serves as an exemplar of a non-domestic building. Two more houses are to be built shortly.

I made a visit there on a sunny day in August. Fine weather allows visitors to enjoy the setting – BRE have spacious and attractive grounds which resemble a university campus rather than a commercial site. You can, for example, wander into an area of woodland with a brook, where you can see the Möhne dam model that was built (and breached) in World War 2.

On an Open Day, visitors are supplied with an audio guide. This gives an introduction for each building, with options to listen to detailed accounts of the design, sustainability and construction. In addition, notice boards both outside and inside the buildings display key information. An advantage of visiting on an Open Day is that you can take a break whenever you wish, availing yourself of the free coffee in the Visitors' Centre or the food in the BRE restaurant – or you could even have your own picnic.

The overriding brief for the architects of the buildings has been to make them exemplars of sustainability. Within this brief, the architects have been given much more design freedom than they usually have, and they have taken the opportunity to incorporate some wacky design ideas, as well as leading edge eco technology. Almost by definition, wacky ideas are not going to appeal to everyone, but at the very least they give food for thought. If you visit, take a camera to record the features that appeal to you.

THE HOUSES

The Affordable Home
By Osborne, built 2006.

Osborne is a business conglomerate based in Reigate. Amongst other things they build affordable housing, and they have set up a subsidiary, Innovaré Systems, to promote the Jabhouse SIP system. (SIP = Structural Insulated Panel.)

This house is a showcase for the Jabhouse system. It took only a day and a half to erect the shell. (The total build time was 12 weeks.) The design includes an attic – SIP roofs make it easy to incorporate rooms into the roof space.

Vencil Resil manufacture the Jabhouse SIP panels, which are composed of polystyrene sandwiched between OSB (Oriented Strand Board). There is a BBA certificate for the system (which also includes floor cassettes incorporating I beams). U-values for the Affordable Home – walls: 0.14 $W/m^2.ºC$, roof: 0.10, ground floor: 0.16. Triple glazed windows from Swedish Timber Products have a U-value of 0.8.

The house incorporates a prefabricated bathroom pod, and the roof is clad with zinc. A gas boiler supplies the heat for UFH, and there is a MVHR system (by Greenwood).

Architect's impression of the Osborne Affordable House

A feature of the house is its whole house entertainment/data system. This has been based on EIB cabling throughout, where EIB = European Installation Bus. ('Bus' is a computer wiring term.) However, readers who want a smart home should be aware that EIB has been subsumed into a new standard, KNX, created by the Konnex Association.

A KNX system uses an open (non-proprietary) standard which is suitable for:

- Control of heating, ventilation, lighting, etc.
- Control of white goods.
- Security and monitoring systems, including the monitoring of gas and electricity meters in the future.
- Audio visual control and distribution.

The house is promoted as affordable, with a build cost which is "comparable to traditional methods of construction".

The EcoHouse

By Hanson, built 2007.

This detached house extols the advantages of heavyweight construction in reducing temperature fluctuations. Hanson say that carbon emissions for heating and cooling are reduced. (However, this is a controversial and complex issue, influenced by the occupancy pattern – is the house unoccupied during the working day?) Heavyweight construction is also good for reducing sound transmission.

The external cavity walls are made of QuikBuild panels, which have an outer leaf of brick and an inner leaf of Thermalite block. The cavity contains 10 cm of rigid insulation, leaving 5 cm clear. (U-value of wall – 0.18.) The factory-made panels, which can be up to 9 metre in length, are transported to site and then craned into position. However, I doubt if the appearance of the stack bonding for the brickwork will endear the panels to a conservative public. Hanson perhaps recognise this. In a refurbishment, some of the walls have been coated in white insulating render (Structherm).

Hanson's EcoHouse

The floors are also heavyweight. For the ground floor, the Jetfloor system incorporates polystyrene infill blocks. (U-value – 0.16.) The upper floor is composed of Hollowcore concrete panels. Factory-made blockwork panels were used for the partition walls, and the concrete stairs, too, were prefabricated.

The roof has a U-value of 0.14, and, like the roof of the Affordable House, it is clad with zinc. At the top of the roof is a lantern with a dual purpose. It lets in light to the stair well below, and it lets out air under automatic control to allow ventilation by the stack effect. An evacuated-tube solar collector heats a thermal store supplying DHW (Domestic Hot Water).

Bedrooms are usually cooler than living rooms, so in this naturally-vented house the architect has put the bedrooms on the ground storey, with the open-plan living room and kitchen above. (Cool, fresh air entering the bedrooms rises under the influence of the stack effect to the second storey.)

As there is no MVHR, airtightness is not a priority. ($q50 = 4.8\ m^3/h.m^2$.)

As with most of the houses in the Park, there is a rain harvesting system, but for the Ecohouse the water comes not from the roof but from paving, such as could be used for a driveway. Hanson's Formpave allows rainwater to percolate past the concrete paving blocks to be collected in a subterranean tanking area.

That is the rainwater harvesting aspect of the system. But in this case, heat as well as water is collected. Hanson have used the Thermapave variation on Formpave. The pipework for a Ground Source Heat Pump is incorporated into the sub-base of the paved area. The GSHP supplies heat for both UFH and DHW. That's the theory, anyway. On the Hanson website, there is some (unconvincing) information about the performance of the system, based on data in 2008. Why not later data, too? I suspect that the figures have been too disappointing.

The Sigma Homes
By the Stewart Milne Group.

This is a pair of semis, though the design can be readily adapted for a terrace. The layout of a semi is interesting. As I ascended the central staircase in one of the semis, there appeared to be six storeys, which was a puzzle as the house hadn't appeared to be so very tall from the outside. In fact, there are four storeys at the back of the house, and two storeys plus sun terrace at the front – but they are displaced by half a storey from each other. So to go from a room at the front to one at the back you go up (or down) a half flight of stairs. There are no corridors in the house.

Stewart Milne's Sigma Homes (two semis)

The Stewart Milne Group is unusual in that they not only build housing estates but they also manufacture timber frames. So the Sigma semis incorporate Stewart

Milne's closed, timber panel walls and their timber floor cassettes. A pre-insulated cassette is used for the flat roof. These prefabricated components conform with the Modern Methods of Construction approach. (MMC has been in vogue following the 1998 Egan Report, Rethinking Construction, and the 2004 Review of Housing Supply by Kate Barker. The MMC approach is probably more applicable to repetitive commercial housebuilding than to one-off selfbuilds.)

Some other noteworthy features:

- Modular foundation system.
  Roger Bullivant's SystemFirst utilises precast piles and beams for fast foundations and minimal site excavation.
- Nordan triple glazed windows.
- Finnforest Thermowood rain-screen cladding, with a service life of 30 years – no need for periodic painting.
- Solar stack. A vent at the top of the stack is opened or closed automatically by a heat sensor to prevent summer overheating. The house has a MVHR system, too. (Are the two ventilation methods compatible?)
- Solar thermal panels, and an Air Source Heat Pump.
- Swift wind turbines on the roof. (These turbines have the distinctive circular ring outside the blades to reduce noise.)
- Prefabricated bathroom pods that are craned into position.
- Both rainwater harvesting and grey water recycling.
- Fire sprinkler system.

Continued next month.

FURTHER INFO:

BRE
Follow the Innovation Park link at the bottom of the home page.
www.bre.co.uk.

The Osborne Affordable Home:

Innovaré Systems
SIP building system.
www.innovaresystems.co.uk

KNX standard
For smart wiring.
www.knx.org.

The Hanson Ecohouse:

Hanson
www.heidelbergcement.com/uk/en/hanson/home.htm.
Ecoplay
Micro grey water recycling system.

www.ecoplay-systems.com.

The Sigma Homes by the Stewart Milne Group:

Stewart Milne Timber Systems
http://timbersystems.stewartmilne.com.

Offsite Solutions
Bathroom pods.
www.offsitesolutions.biz.

Words: 1573.