The Osborne Demonstration House
at the BRE Innovation Park

Pushing the Boundaries of Sustainable Housing
The Osborne Demonstration House at the BRE Innovation Park in Watford was completed in July 2006. The house has been constructed as a showcase for our ‘Jabhouse’ SIPS product. It shows that this innovative method of construction, which has been enhanced by other modern building components, demonstrates exceptional sustainability and increased environmental performance.

Key Facts

- Jabhouse construction using Structural Insulated Panel System (SIPS) with roof and floor Cassettes.
- Requires one third of the energy for heating and cooling of a house constructed to 2006 Building Regulation standard.
- Is airtight to one tenth of the new Building Regulation requirement, with a whole house heat recovery/ventilation system.
- Achieves a 40% improvement on target Building Regulation carbon emissions.
- Received an EcoHomes ‘Excellent’ rating.
- Structure erected in 1.5 days.
- Achieves improved acoustic performance.
- Includes Smart technology throughout.
The Osborne Demonstration House started on site in March 2006, with the support of our extensive supply chain. Our suppliers were enthusiastic in helping us to create our vision and were encouraged to contribute innovative products and systems they were developing and using.

The Demonstration House comprises a conventional ground floor layout with a working kitchen, living room and WC. An exhibition space has been created on the first floor and the second floor demonstrates how an extra ‘room in the roof’ can be accommodated by the use of roof cassettes.

The house has generated much press and industry interest, and meets many aspects of the government’s sustainability and affordability agendas for housing.

Jabhouse is Born

Osborne first started working with insulation products manufacturer Vencel Resil in the 1990s, and quickly recognised the advantages of using factory-produced components such as roof cassettes for the affordable housing newbuild market.

Osborne’s research and development team were also introducing other new forms of construction for RSL developments; they recognised the potential of Vencel Resil’s SIPS product for providing an effective Modern Method of Construction and the joint venture that became Jabhouse was born.

Using SIPS, with the panels’ impressive environmental performance, meant housing could be put up more quickly, provide better soundproofing and be more energy efficient.

The resulting ‘Whole House System’ became known as ‘Jabhouse’. Osborne believed so passionately in the future of Jabhouse that in 2005 it created a wholly-owned subsidiary, Innovare Systems, and set up an exclusive supply chain agreement with Vencel Resil for the supply of their Structural Insulated Panels in the UK.

Our first pilot project with Jabhouse was for Southern Housing Group, a terrace of three units erected side by side with a terrace of four in timber frame to compare construction and use. SHG presented Osborne with an award for design innovation, reduced number of defects and high resident satisfaction especially with the ‘excellent thermal insulation’ (one resident’s gas bill for nine months was £60). The merits of our Jabhouse were real and there for all to see on site.

Jabhouse Evolves

During 2005 discussions took place with the BRE, who were interested in how the system could be further adapted to create improved thermal ratings.

A fourth plot at the BRE innovation Park was allocated for the experiment and the idea for the Osborne Demonstration House was created.

The new house was to be the ultimate exercise in Industry Best Practice, applying some of the most modern and exciting construction techniques ever used on a housing site in the UK. We were to push the Jabhouse concept to achieve excellent environmental performance, whilst still striving for an affordable solution that could be utilised on many different social housing projects.

Not just a demonstration project…

Jabhouse is already being used by Osborne’s RSL clients for new affordable housing, for example…

<table>
<thead>
<tr>
<th>The original pilot project – Blacksmiths Crescent, Sompting</th>
<th>James Road, Gosport</th>
<th>Wyphurst Road, Cranleigh</th>
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</thead>
<tbody>
<tr>
<td>Three houses for Southern Housing Group.</td>
<td>18 homes as part of an estate regeneration for Portsmouth HA.</td>
<td>15 houses at Downland HA’s rural development.</td>
</tr>
</tbody>
</table>

The Story Today

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Features and Benefits

- Innovative solution to meet the demands of the house building industry. Improvements in quality using Offsite Manufacture – not just in the main structure but also in a range of other components.
- Demonstrates that SIPS technology offers excellent performance in:
  - Design flexibility
  - Energy efficiency
  - Ease of handling on site
- Other materials used on the house have been chosen to enhance the environmental credentials offered by the Jabhouse system.
- Real Supply Chain Partnering in action.
- One solution to the skills shortages in the industry.
- Offers an affordable solution, both in terms of cost to the client and to the resident.
- Addresses fuel poverty.
- Reduces environmental impact and carbon emissions.
- Reduces global resource depletion.

Sustainable Design
- Contemporary yet simple and economic design.
- Maximises flexibility, adaptability, thermal and energy efficiency, demonstrating the wide range of design options offered by Jabhouse.
- Meets Housing Corporation Scheme Development Standards.
- EcoHomes ‘Excellent’ rating.
- Designed to Lifetime Homes standard.

Jabhouse Benefits to the Client and Contractor
- Speed of construction – envelope completed in one-and-a-half days.
- Integrated, engineered system.
- Flexibility in design and build – adaptable to a wide range of architectural designs.
- Flexibility of internal layout – allows for the modification of internal configurations, including ‘room in the roof’ space.
- Virtually zero waste on site by using OSM and optimising material usage.
- Affordable – at a capital cost which is comparable to traditional methods of construction.
- Full system approval from the BBA.

Jabhouse Benefits to the Resident
- Dryer, warmer home for lower heating costs.
- Reduced noise levels from neighbouring properties.
- Healthy living environment with passive ventilation.
- Environmentally friendly.
- Solid, robust construction.
- Buildings insurance accepted by NHBC, Zurich, Building Lifeplans and others.
Energy Efficiency

The energy strategy is to reduce demand, maximise renewable energy and use fossil fuel as efficiently as possible. We have also considered the whole house and taken a holistic approach looking at each element – thermal insulation, ventilation, cold bridging and heating systems.

- The Osborne Demonstration House requires around one third the energy for space heating and cooling compared with the same house built to 2006 Building Regulations standard.

- Thermal insulation:
  - Walls: 0.14 W/m²K
  - Floor: 0.16 W/m²K
  - Roof: 0.10 W/m²K
  - Windows: 0.8 W/m²K

- Controlled ventilation:
  - Target of 1 m³/m²/hr air leakage.
  - Onethenth the Building Regulation minimum standard. Minimising heat loss.
  - 90-96% efficient whole house heat exchanging ventilation system.

- Cold bridging:
  - Consider each element of structure to minimise cold bridging.
  - SIPS construction minimising structural timbers.

- Efficient heating systems:
  - Efficient condensing gas boiler for backup heating.
  - Low energy lighting throughout.

- Lower than Building Regulations target carbon emission rate:
  - Giving 40% improvement on 2006 Building Regulations.

- Renewable sources of energy:
  - Solar water heating.

- Sustainable materials:
  - All timber used either FSC or PEFC certified.
  - Use of recycled materials.
  - Recyclable materials.
  - Minimising waste.

Thanks to the BRE and The Energy Saving Trust for independently assessing this project.
<table>
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<th>Substructure/Ground Floor:</th>
<th>Main Structure:</th>
<th>External Finishes:</th>
<th>Internal Services:</th>
<th>External:</th>
<th>Water Saving Innovations:</th>
<th>Other adaptations:</th>
</tr>
</thead>
</table>
| Precast ground ‘T’ beams on short piles  
Insulated flooring system | Jabhouse utilising:  
Structural Insulated Panel System  
Prefabricated floor cassettes with Hbeams  
SIPS roof cassettes  
Highly insulated windows and external doors  
Airtight seals | Siberian larch cladding  
Recycled plastic slates  
Zinc  
Render  
Eternit boarding  
Fireborn brickwork | Solar hot water heating  
Heat recovery ventilation system  
Under floor heating  
Skirting board heating  
Condensing boiler  
Pluggable wiring system  
Wireless switching  
Whole house entertainment/data system  
Security  
EIB System | Permeable paving  
– Marshalls Mistral Priora  
Promotion of wildlife | Rainwater disposal system  
Low usage sanitary ware  
Low usage and temperature control taps | Disabled through-floor lift  
Provision for extra door and hoist adaptations in bathroom |
Osborne Demonstration House Supply Chain

**Bullivant:** foundations, ground floor – installation, ground floor – precast concrete products, ground floor – insulation system

**Melton Concrete:** ground floor, insulation system

**Cellecta:** ground floor – insulation system

**Vela:** underfloor heating

**W T Burdens:** drainage – products

**Bullivant:** foundations, ground floor – installation, ground floor – precast concrete products, ground floor – insulation system

**Innovare Systems:** supply Jabhouse complete structure – walls, internal partitions, roof and floor system

**Illbruck Sealant Systems UK:** seals – airtight

**Eleco Timber Frame:** internal partitions

**FinnForest UK:** floor system

**Stramit Industries:** floor system

**Covers Timber Products:** floor system

**All Metal Roofing:** roof system – zinc, cladding – zinc, RWGs – zinc

**W T Eden:** sheet materials

**Swedish Timber Products:** windows – S&F

**Fakro:** rooflight

**Worcester Bosch:** solar panels, boiler

**Offsite Solutions:** 1st floor bathroom pod

**Simpson Strong Tie:** metalwork/brackets/ties

**Ibstock:** cladding – brickwork

**CPi:** cladding – motor

**BRC:** cladding – brick sundries

**Acorn Insulation:** cladding – brick sundries

**Vencel Resil:** SIPS structure (including roof cassettes), SIPS supplied to Innovare Systems, porch unit

**Cellecta:** roof system – precast concrete products

**Velta:** roof system – installation

**Marley Eternit:** roof system – eternity slates, cladding – rainscreen – Eternit

**Smart Home Solutions** – facilitated by CEDIA

The intelligent systems equipment in the house was provided and installed by:

**Digital Plumbers:** network router and hub and entertainment equipment

**Armour:** ceiling speakers and remote controls

**Pioneer via AWE:** plasma screens

**Kef Audio UK:** surround sound system

**Computers Unlimited:** digital multi-room audio

**BT Redcare:** alarm transmission system

**M K Electrical:** network router

**Datwyler (UK) Ltd:** Konnex/EIB controls

**CPI:** remote controls

**Häfele (HAWA):** electric multi-outlet point

**Jackson Fencing:** fencing and decking

**Marshalls:** paving and paviours

**Symphony:** kitchen units

**BSH:** kitchen – appliances

**Wessex Medicare:** lift – between ground and first floors

**Greenwood Airvac:** ventilation, heat recovery

**Cavity Access Systems:** cut out access points

**Twyfords:** sanitary ware

**Residential Approved Inspectors Ltd:** building regulations approval

**Regal Carpentry Contractors:** frame erection, other carpentry

**Trenton Fire Ltd:** fire strategy
The Osborne Demonstration House is the fourth house to join the BRE Innovation Park, which was launched in 2005 to demonstrate how innovative building systems and technologies can deliver higher levels of performance compared with conventional forms of construction.

By trialling and demonstrating new and emerging construction methods and technologies for buildings such as renewables, environmental systems, smart IT systems and sensor technologies, the Innovation Park represent a major new service for the UK construction sector. Alongside the Osborne Demonstration House there are three other housing examples on the park in timber, concrete and steel with a further programme of buildings currently being planned for the site.

The BRE welcomed the opportunity to accommodate the Osborne Demonstration House on the Innovation Park because it very much fits in with our aim – to build a better world. The house is highly innovative, has very impressive sustainability credentials and a striking design. Given the current housing shortage in the UK, the need to cut carbon emissions and the need to provide affordable housing, the Osborne Demonstration House is an outstanding example of how this can be achieved.

Peter Bonfield
Director of Construction Division, BRE

Founded in 1966, Osborne is a respected provider of complete construction solutions, with specialist divisions covering Building, Civil Engineering and Rail, Social Housing, Maintenance and Stonemasonry. After 40 years it remains privately owned, has a turnover of over £225 million and employs some 900 staff and operatives in Chichester, Reigate, London, Redhill, Newport Pagnell, High Wycombe, Basingstoke, the Isle of Wight, on numerous sites across the southern half of England and in shared client offices.

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