Three Oaks – East Sussex

Principle contractor:
JD Commercial Builders Ltd, The Workshop, Maxfield Lane, Three Oaks TN35 4JN

Client: Private individual

Project:
A three-bedroom detached house: two storey with a room in the roof. The internal layout needed to accommodate family living, including a large kitchen and study. The house had to sit within the footplate of the original structure.

Value:
A budget of £200,000 was allowed for the demolition of the existing building and construction of the new home.

Architects:
Steve Fassey, Pump House Designs, the Green, Seddlescombe, East Sussex, TN33 0QA

Aircrete contractor:
Masonry Frame Systems Middlefield Lodge, Olantigh Road, Wye, Kent, TN25 5EP

Executive summary:
The owner was living in a timber framed house built in the 1930s and wanted more space to accommodate a growing family. No mortgage funding was available to extend the current home as the structure was deemed to be at the end of its useful life. The owner was left with no choice but to demolish the existing property and build a new home. The new home needed to sit mainly within the footplate of the original house, but additional space was provided by adding rooms in the roof, raising the roofline some four feet. Given his experience with the original property, the owner opted for masonry construction, looking for energy efficiency as well as an extended lifespan for the new structure.

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Project description:
An entirely new house was built to accommodate the preferences of the family. An integral office replaced the original garage, a large kitchen provides living space for the family and the rooms in the roof give privacy and space for the daughter of the household.

The client opted for thin-joint construction in order to capitalise to the maximum on the energy efficiency of aircrete construction. The house was built using Passivhaus principles, with a highly airtight structure. An MVHR system provides ventilation and heat recovery for enhanced energy efficiency. The objective was to follow a fabric first principle to energy efficient design and the client stopped short of using renewable energy sources to get to a zero carbon home.

Reason for choosing H+H aircrete products:
Aircrete was an integral element of the original specification from the home owner who was definite on his preference for the robust solidity of a masonry construction. The bad experience encountered with the original timber-frame structure also meant that the priority was to build a home whose durability and long-term value was assured.

Aircrete, with its inherent thermal insulation provides an ideal material for a fabric-first approach to energy efficient design while the thin-joint method of construction with its minimal 3mm joints provides optimal air-tightness.

The choice of H+H aircrete was determined by the householder's confidence in both the thin-joint contractor and the level of technical advice and support available from H+H. The main contractor project-managed the build on site as the owner was working full time throughout the project: it was imperative that he had complete trust in both the build method and the contractor.

"The difference between the 1930s timber frame structure and a modern masonry replacement is huge in terms of the stability of the internal temperature of the house. In winter the house is draught free and consistently warm. Energy bills are now around £70 per month as opposed to the previous £150 – we are effectively heating a house twice the size for half the cost. In summer the MVHR system can be bypassed to allow excess heat to be taken out of the house and inside it never reaches more than around 22 degrees even on the hottest summer day."

House owners

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"We would always choose thin-joint blockwork for this type of building. We choose it for the quality of the build: to build successfully in thin-joint, everything has to be built with complete accuracy. The joints are just 2mm so everything is perfectly level and the structure is very airtight. If I were to build my own house tomorrow there is only one method I would use and that would be thin-joint blockwork."

Contractor

Products used / aircrete specification:

Foundations:
One course of aircrete was used below ground to reduce thermal linear bridging at the floor/wall junction.

External walls:
A cavity wall construction with the inner, load-bearing leaf constructed using 100mm standard 3.6N/mm^2 Jumbo Bloks (630 x 250mm) with Celfix Mortar in a Thin-Joint System. The 150mm cavity is fully filled with Isover High-Cav 32 insulation and finished with a brick outer leaf.

The resulting structure provides a U-value of 1.8W/m^{2}K and an airtightness of 3.8 m^3/h(m^2.hr)@50 Pa. This is considerably in advance of current Building Regulations (U-Value requirement 3.0W/m^{2}K and airtightness of 10 m^3/(m^2.hr)@50Pa).

Roof:
The rooms in the roof provided three bedrooms with en-suite bathrooms. All rooms were fitted with Velux triple glazed windows to reduce heat loss and the roof was insulated with 100mm PIR insulation between rafters and then 40mm PIR insulation as a finishing layer. Heating to all rooms in the roof was provided by radiators fitted with Thermostatic Regulating Valves. The roof structure itself was a standard design using wooden battens on a wooden structure, assembled on site and finished with slate roof tiles.

Floor:
The ground floor comprised a beam and block design using 100mm 3.6N/mm^2 Celcon Blocks Standard Grade with underfloor heating embedded in a wet screed.

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Product benefits:

- Cavity wall construction incorporating inherent thermal efficiency of aircrete contributes to very low U-value for external walls.

- Thin-joint method maximises airtightness for increased energy efficiency.

- Consistent product through foundations, ground floor and external walls minimises number of specialist contractors required on site.

Other benefits included:

- Block-work is highly adaptable, easily allowing for any last minute design changes

- Components for the Thin-Joint system are all readily available off the shelf

- Thin-Joint technology gives a virtually airtight construction

- Fire resistance with a Class 0 rating for surface spread of flame

H+H aircrete applications

- Internal and external leaf in cavity walls
- Solid walls
- Separating / party walls
- Flanking walls
- Partitions
- Multi-storey
- Foundations

The Thin-Joint, Rå Build method of construction enables a fast, weathertight masonry shell to be built, allowing follow-on trades to start work sooner in a weatherproof environment, whilst retaining the flexibility of on-site construction. Thin-Joint is a recognised Modern Method of Construction and has been fully adopted as the preferred method of wall construction throughout most of northern Europe.

Aircrete is an excellent all round commercial and industrial building material. Used in partition and external walls (both solid and cavity), fire walls and as infill to steel and concrete framed buildings it provides durability, fire resistance and superb thermal and acoustic insulation.

H+H aircrete has exceptional sustainability credentials: providing excellent thermal and acoustic insulation and contributes to air-tightness but also being manufactured from up to 80% recycled materials, making it sustainable both in manufacture and in use.

We also have BES 6001:2008 accreditation for responsible resourcing of materials in addition we have an A+ rating in the BRE green guide on both cavity and solid external walls. Couple this with H+H UK's rigorous approach to pursuing the highest environmental standards throughout the whole of its business and it's easy to see why this innovative and award winning system is now firmly established within the UK

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For further information about the subjects covered or the H+H products used in this case study, please visit our website
www.hhcelcon.co.uk

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