

LOW IMPACT MATERIALS: CASE STUDIES

STRAW-BALE

Auction Rooms

Developer: G E Sworder & Son
Contractor: Collins & Beckett
Architect: Melville Dunbar
Completion: May 2008
Location: Stansted Mountfitchet, Essex
Interviewee: Mike Beckett
Contractor



Front facade (Collins and Beckett)

The Auction Rooms are located just off the M11 and just north of Mountfitchet in Essex. With an area of 1100m² the single storey fine art auction salesroom includes a 750m² auction room and offices for staff and visitors.

WHY WAS STRAW-BALE CHOSEN?

- Client and local authority wanted to make a clear statement about sustainability
- Client had easy access to local straw supply
- It was cost-effective



Glu-lam roof (Collins and Beckett)

WHAT ISSUES WERE FACED AND OVERCOME?

The three main challenges were: weather-proofing, compaction and integration of services. The first required greater planning and flexibility of on-site coordination around changing weather conditions. The second was overcome through trial and error: calculations in the initial design suggested that the considerable weight of the roof (c. 1200m² of glu-lam timber frame) could be applied via the eaves beam to compact the straw, but then the eaves height couldn't accommodate all seven courses of straw-bale; the solution was to 'manually' compress each section



Six courses of straw bale awaiting seventh course
(Collins and Beckett)

using steel jacks. The third was overcome by fixing wooden spikes into the uppermost course of bales with pattresses (blocks) on the end onto which service conduits were attached.

Insurance was a worry at the start, though the National Farmers' Union agreed to insure the building and the Co-op Bank, which has interest in this area, provided the finance.

WHAT ARE THE PROS AND CONS?

The main issues this material faces are to do with weather-proofing, the speed of curing the lime render and, for higher density developments, the thickness of the walls (450mm straw-bale plus 70mm render) and the width of the eaves overhang.

That said, it is inexpensive, simple to lay and to make on-site adjustments (e.g. no mortar or bonding agent is required), as well as being a high performing insulation and a renewable by-product.

WOULD YOU USE IT AGAIN AND, IF SO, WHAT CHANGES WOULD YOU MAKE?

Yes, though next time we would design in appropriate service solutions from the start and determine the height of the wall first using steel jacks to compress the bales rather than risking miscalculation. Despite the issue of weather-proofing and the slow speed of curing the lime render we would stick with on-site straw-bale unit construction (over using off-site panels) because for our work the costs are outweighed by the benefits: low cost of materials, local supply, reduced transport costs, and ease of build and adjustment.

WHAT WAS THE ELEMENTAL COST?

Overall the material cost came to about £5000. The straw bales were inexpensive at £2600; transport cost about £1500; and labour was free as we were providing basic training on site (though there were some further management costs as a result of that).



Pinning, tying and cutting of end bales (Collins and Beckett)



Render being applied to the neat straw face (Collins and Beckett)

This case study was produced as part of the University of Bath's EPSRC funded Knowledge Transfer Account, a working partnership between BRE and the University of Bath. Further information on straw-bale is provided in a BRE Information Paper that can be purchased in hard copy from www.brebookshop.com and downloaded free from www.bre.co.uk. Four other case studies and Information Papers are also available on unfired clay block, hemp-lime, natural fibre insulation and cross-laminated timber.

Contributors: Andy Sutton & Dan Black (BRE), Pete Walker (University of Bath), Mike Beckett (Collins and Beckett)

Contact: blackd@bre.co.uk, May 2011.