

Fruit Factory, Stanmer Park, BN1 9PZ



OVERVIEW

Owners: Brighton Permaculture Trust

Type: Barn

Age: New build (within shell)

Walls: Straw bale

Area: 40m²

FEATURES

- + Double glazing (high performance)
- + Low energy appliances
- + Low energy lighting
- + Natural materials
- + Straw bale construction
- + Superinsulation

Introduction and approach

The Fruit Factory is a demonstration of how a practical working building can be made from an underused sustainable material, straw bales. Straw is produced in great quantities as agricultural waste and could be utilised to making superinsulated buildings that are also powerful carbon sinks.

Brighton Permaculture Trust undertook this project following a successful crowdfunding exercise, with volunteer and skilled labour under the direction of straw bale expert Ian Brown. Part of the construction took place on Brighton Permaculture Trust's straw bale building courses. Being within the curtilage of a listed building, there was strict design scrutiny from South Downs National Park, to ensure the appearance was harmonious with Stanmer village.

Brighton Permaculture Trust will be using this attractive new venue for juicing fruit and making jams and chutneys, as well as for courses and educational workshops.

Energy efficiency measures

Heating and hot water

As the building is super-insulated and has the advantage of sheltering within a surrounding shed, heat loss is extremely low. This is a practical workspace, where the heat generated from the activity of the occupants is expected to keep it warm, with the possible installation of electric radiant heaters to briefly provide heat at start up.

Structural detail and Insulation

The Fruit Factory is an interesting concept in that it is a building within a building. Because of the undecided long term usage of the Stanmer site, Brighton Permaculture Trust could only get a short five-year lease for this former tractor shed. Although a full renovation would have been ideal, they have instead gone for a straw bale structure that stands independently within the shell, that can be dismantled and rebuilt elsewhere, if their tenure is not extended.

Straw buildings are still rare, yet they have compelling advantages, such as high insulation values and the ability to use a waste product

to fix carbon into a substantial and potentially long lasting structure. The construction was led by Ian Brown of TimberBale, who regularly runs the popular straw bale building courses organised by Brighton Permaculture Trust and the Low Carbon Trust.

This project was successfully crowdfunded, with £14,450 raised in 2015. A number of organisations also donated materials or supplied at preferential rates.

Walls – Walls are made of 500mm thick straw bales, built under compression using ratchet straps, as a Nebraska-style, load-bearing structure. As the name suggests, this system has been used traditionally in Nebraska over the last hundred years and has proved long lasting and stable. This differs from the more common straw bale 'infill' system, by not requiring an expensive timber frame and it also insulates more efficiently. The two end walls are finished in plywood, to form practical splashbacks for the work surfaces. The main back wall is plastered with a breathable lime finish. Anticipated U-value is very low at around 0.10.

Windows and doors – These are double glazed, ex-demonstration units kindly donated by local company, Westgate Joinery. U-values are in the region of 1.8. This is the one weak point in insulation terms, but the relative area occupied is quite small.

Roof – Joists are 200 x 45mm, infilled with 200mm mineral wool and over-boarded internally with plasterboard laminated onto 20mm PIR insulation, to prevent thermal bridging. Again, the expected U-value is very low at about 0.16.

Floor - Two layers of blocks were laid on the existing concrete floor to mark out the perimeter of the new structure and very sturdy (220 x 70mm) joists were laid on top. 200mm of high performance rigid PIR foam insulation, arranged as two overlapping 100mm layers, is suspended in between. This is very highly insulated, with a U-value of approximately 0.12.

Renewables and Low carbon technology

There are no renewables installed, primarily because tenure is not secure and they are not really required, due to low energy use.

Electricity

Low energy lighting – all lighting will be low energy, but ample glazing at the front lets in lots of natural light as well.

Appliances – where possible, low energy appliances will be fitted.

Carbon emissions

No in-use energy figures are currently available, but it is anticipated that electricity use will be very small, due to the excellent insulation values.

Professionals

Architect – Jen Rawlings
www.jenrawlings.com

Builder – Ian Brown of TimberBale
www.timberbale.co.uk

Doors and windows - Westgate Joinery, Ringmer.
www.westgatejoinery.co.uk

Fittings – Sterling-Power-Tools-And-Fixings.
www.facebook.com/pages/Sterling-Power-Tools-And-Fixings/162703157079428

Plumbing – DH Solar.
www.dh-solarengineering.co.uk

Structural Surveyor – Kevin Trott

Timber – Wenban Smith, Lewes.
www.wenbans.com