Case Study

Frenchay C of E Primary School, Bristol

LOWFIELD
TIMBER FRAMES

Case Study

Project Name

Frenchay Primary School

Location

Bristol

Project Type

Education

Specification

Passivhaus

The Project

Designed and project managed by South Gloucestershire Council, the new £11 million Frenchay CofE Primary School is the first Passivhaus school in South Gloucestershire. The new school is a two-storey, timber framed Passivhaus certified building which can accommodate up to 420 pupils and is the benchmark for how all new schools should be constructed in the future.

It will have state of the art facilities which are designed to Passivhaus standards of environmental performance, meaning they will have a very low carbon impact on the environment.

Building work began in June 2021 and the construction will deliver new energy efficient, low impact facilities.

Key features of the design include high levels of insulation, triple glazing, low energy LED lighting, heating provided by air-source heat pumps and recycling of heat through a Mechanical Ventilation and Heat Recovery (MVHR) system, which also ensures good air quality throughout the school. The 2500m2 school was opened to staff and pupils in October 2022.

The Details

0.43 ach
Airtightness @50 pascals

0.11
W/m2K
U-Value achieved

360 mm
Larsen Truss frame

2500 m2.
Size of development

Scope of Services

Lowfield Timber Frames specified precision-engineered timber for the design, manufacture and installation of the Larsen Truss system to allow for maximised insulation. Certified timber products minimise carbon footprint (and associated heating costs) when integrated into sustainable building solutions, achieving robust insulation and airtightness. The timber frame designed for this project promotes the council's aim for carbon reduction.

The wall thickness is increased to provide a fabric first approach with increased insulation. This is achieved by using a lightweight external frame with a breathable wood fibreboard attached, this is suspended from the internal structural frame with slim, compressed timber webs to minimise thermal bridging.

The school will use electricity only, require no fossil fuel consumption on site and generate its own zero carbon energy through Photovoltaic solar panels on the roof, with any surplus energy feeding into the national grid.

The school has been designed with curves which are gentler than sharp, straight edges, representing our ethos as a Church school. The incorporation of eco efficient features such as triple glazing and a timber frame as well as solar panels and EV charging points has been included. The building is light and airy, with large doors leading to the outside from each classroom downstairs to allow ease of learning both inside and outside. There is a striking atrium, where the library space is placed and this allows light to stream through the corridors.

Outcome

The fabric first approach involves carefully considering the design and construction of the building envelope to lower the buildings energy consumption. Principles and measurements such as airtightness, U-values and thermal bridging can all be influenced by wall thickness, insulation type and thickness as well as material choice for example, stud size, OSB boarding and airtightness tape.

Measured by monitoring how often the air pressure changes within one hour, Passivhaus standards allow for a maximum of 0.6 air changes per hour. The air tests on the school revealed just 0.43 air changes an hour, which is a great result.

Certified timber products, such as the Larsen Truss system have been designed for optimal insulation and airtightness, as well as to meet low energy targets, therefore reducing the need for heating, and – by extension – heavy costs.

The project achieved U-values of 0.11 W/m2K for the walls, securing optimal airtightness. The compressed timber web reduces thermal bridging, leading to minimised heating costs.

The school will be encouraged to assess their energy use when the building is first occupied and then annually to ensure that they are benefitting from the anticipated recurring savings in energy costs.

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Client

South Gloucestershire Council

Main Contractor

BAM Construction

Architect

Stride Treglown

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