

COLYER-FERGUSSON MUSIC BUILDING BREEM MAN 9 CASE STUDY



A description of the project

The Colyer-Fergusson Music Building provides a performance space that accommodates everything from intimate chamber recitals to large-scale choral and orchestral concerts. Part of the University of Kent's arts complex, this multi-purpose music centre includes practice rooms, offices and social spaces. The hall can also be used for exhibitions and examinations.

The University demanded a building that delivers cost-effective carbon reductions without negative impact on the performance qualities of the venue. To aid in this ambition Max Fordham created heating, lighting and ventilation systems that are effective, simple to use and easy to maintain. To ensure maximum flexibility of use, the mechanical and electrical systems have been sympathetically integrated with the architecture.

Extensive glazing provides abundant natural light throughout the building, including in most corridors. As a result, electric lighting does not have to be used during daytime rehearsals or classes. To provide the full range of light levels in the performance hall, energy-efficient LEDs for general usage complement a grid of tungsten lights that provide warm, even illumination during performances.

The key innovative and low-impact design features of the building

The building is underpinned by the following sustainable technologies and construction techniques:

- **Well-insulated heavyweight construction, naturally ventilated, passively controlled environment where possible**

Our aim was to create a building which is simple to use and easy to maintain, with the aim of low energy consumption rather than trying to use low energy technologies to compensate for an energy intensive building.

The fabric and systems have been engineered to minimise the heating and cooling loads and to make the building, in normal operation, as passive as possible, maintaining internal environmental conditions with minimal use of primary energy.

We established insulation and airtightness standards for the external envelope that exceed the minimum requirements of Part L by 10-20%, and modelled the energy use, thermal loads, daylighting and solar gains using IES dynamic modelling software.

The building is extensively glazed to give good natural light to all occupied spaces, including most corridors. The main hall has a rooflight and large side windows that provide even daylighting with a daylight factor of over 5% across the whole floor, meaning that the electric lighting does not have to be used for rehearsals or classes during the day. The foyer which is a large informal gathering space, as well as practice rooms and offices all achieve 2% daylight factor, in line with BREEAM requirements.

- **Low energy LED lighting for the hall houselights**

The artificial lighting in all spaces except the hall is daylight controlled and has absence detection. When artificial light is required to supplement the daylight, it is dimmed to the minimum needed to maintain the required illumination.

In the hall there are performance controls and a lighting desk to allow for different usage scenarios, however as previously mentioned the lighting should not be needed at all during daylight hours. The hall lighting is a combination of highly efficient longlasting LED lights for practice/rehearsals and other general purposes, with less efficient tungsten lighting used only to provide the high lighting levels on stage, with good colour rendering and dimmability, required for performances.

- **Mechanical ventilation with heat recovery for the concert hall**

The building is naturally ventilated wherever possible. All occupied rooms except the concert hall have openable windows and the large double height foyer has a rooflight with openable vents on actuators. However due to the requirement for acoustic separation the practice rooms and main hall are mechanically ventilated.

The hall air handling unit is variable speed and controlled by temperature and CO₂ sensors in the hall so that it can operate at the minimum rate necessary to keep the air fresh, only ramping up to full speed when there is a full audience and orchestra in the hall. It also has heat recovery so that in winter the heat generated by all the people is not wasted.

Heating is provided by high efficiency (98%) condensing gas boilers with very low NO_x emissions. The building is zoned to allow control of heating only to spaces that are in use. The hall for example has background heating supplied by radiators while the mechanical ventilation supplies warm air only when required.

- **BMS Controls with energy monitoring and data logging**

A Building Management System provides coordinated central control of heating and ventilation to minimise energy use. The system can be monitored and settings changed remotely by the University Estates Management Team from their offices.

- **PV array and solar thermal**

A 4kWp PV array on the hall roof offsets a proportion of the base electrical load. A 25m² solar thermal system was also installed as part of this project to meet a significant proportion of the annual hot water demand of the existing catering facilities provided in the adjacent Gulbenkian Theatre building.

Reducing the environmental impact of the construction process

A requirement of the BREEAM assessment is to publicise to relevant stakeholders information relating to the aspects of the design and procurement which will reduce the building's overall environmental impact. Construction has been planned and executed to minimise the impact of the work on the environment. Steps taken include:

- The contractor and site are registered under the Considerate Contractors Scheme with regular inspection. The contractor is committed to going beyond best practice under this scheme and is aiming to achieve a score of more than 32 points
- The contractor has implemented a construction site waste management plan to maximise the amount of waste that will be recycled and reused
- The contractor is committed to monitoring site energy and water consumption and to implementing best practice procedures to minimise dust (air) pollution and water pollution
- Recycling facilities are provided in the building and onsite
- The construction elements are all Green Guide A or A+ rated

BREEAM Rating and score

The Colyer-Fergusson Music Building has been assessed under the BREEAM Bespoke 2008 scheme. BREEAM Bespoke 2008 assessments can be carried out on both new and existing buildings that are either unoccupied or occupied. The overall rating of the building’s environmental performance is given using terms Pass (25%), Good (40%), Very Good (55%), Excellent (70%) or Outstanding (85%).

Predicted BREEAM rating and score	VERY GOOD – 59%
Basic Building Cost	£1,900/m²
Service Cost	£450/m²
External Works	£200/m²
Gross Floor Area	1953 m²
Total Area of Site	0.4 Hectares
Key Assessed Function Areas	1). Office – 90m² 2). Foyer - 230 m² 3). Auditorium – 416 m² 4). Auditorium Gallery – 169 m² 5). Practice Rooms – 145.5 m²
Area of Circulation	287 m²
Area of Storage	133.5 m²
Predicted electricity Consumption (including equipment)	45.79 kWh/m²
Predicted fossil fuel consumption	53.33 kWh/m²
Predicted renewable energy generation	2 kWh/m²
Predicted water consumption	4.2 m³/person/year
% predicted water use to be provided by rainwater or greywater	0% It has not been deemed feasible to install rainwater or greywater harvesting systems, however areas of biodiversity roofing have been provided