



PROJECT	University of Bedfordshire – Offices and Lecture Theatre
LOCATION	Luton, Bedfordshire
SECTOR	Higher Education
FEATURES	Design and implementation of a low-energy ventilation system
HISTORY	Initial plans were revealed in 2008 Campus Centre opened in 2010



Overview

The new £34 million University of Bedfordshire Campus is a catalyst for the University's future growth. Breathing Buildings played a crucial part in establishing the University's environmentally friendly credentials, by delivering a low-carbon natural ventilation solution to the offices and lecture theatre.

Breathing Buildings was approached by RMJM due to their expertise in designing and implementing low-energy ventilation solutions, particularly to those areas traditionally considered 'no-go' for natural ventilation.

The Challenge

In line with the University's Strategic Carbon Management Programme, the design and build of the centre not only had to minimise impact on the environment and reduce energy bills, but also deliver a temperate and quiet work and study environment. This was a particular challenge in the lecture hall due to the potential fluctuation of occupancy levels.

Introduction

The new Campus Centre plays a pivotal role in the academic, social and daily life of students, staff and the wider community. The centre was designed to deliver an architecturally inspiring, sustainable and innovative facility that people would enjoy visiting and working in.



Breathing Buildings Managing Director Shaun Fitzgerald says:

“The location of the campus, under the Luton Airport flight path, meant the project presented a high degree of acoustic challenge. In addition, the lecture theatre does not have direct access to the building’s façade. This means that traditionally the lecture theatre might have been viewed as a ‘no-go’ area for natural ventilation. However, our approach enabled us to overcome these challenges, successfully satisfying BB101 summertime overheating criteria and BB93, the acoustic requirement for the lecture theatre.”

The Solution

Energy and overheating assessments were carried-out to determine the most appropriate solution for each area.

In the offices 11 R-Series e-stack units were used and these were positioned at the back of the offices.

In summertime, fresh air is brought in through the windows, passing across the floor plate and exhausted via the e-stacks to outside. A control panel uses a visual indicator system to identify when windows need to be opened and closed. This helps avoid both overheating and cold draughts.

The lecture theatre can seat up to 240 people but numbers will generally be lower than this. The acoustically attenuated system was therefore designed and implemented based on occupancy of 120 people, with a back-up mechanical system to meet the demand of higher occupancy levels when necessary. This is a far more efficient solution than sizing the natural ventilation system to cope with the maximum occupancy levels.

Grilles were built into each level of the raised, stepped lecture hall seating which is effectively suspended with a void underneath. In summertime, air is brought into the lecture theatre via a pathway through the building and passes into this area under the seating. Four R-Series e-stack units are then used to exhaust the hot air to the roof and the façade. An acoustic attenuator was also housed in the ceiling void of the lecture theatre to ensure that lectures are delivered undisturbed, despite aircraft passing over head.

In winter, high level vents are used to bring in air from outside. This is then mixed with the warm, internal air before it reaches the occupants. This ensures a consistent temperature and avoids the need to pre-heat the incoming air.

Natural Ventilation Delivered

Breathing Buildings takes a holistic view on how best to improve energy efficiency and make cost savings. In the case of the Campus Centre separate summertime and wintertime strategies were used for the offices and the lecture theatre in order to provide the optimum solution. Mechanical ventilation was used alongside

natural ventilation in the lecture theatre whilst in the offices only natural ventilation was needed.

Partnership

Breathing Buildings worked in partnership with the main contractor the Kier Group, the mechanical and electrical contractor Kershaw Group in Cambridge, design clients Couch, Perry & Wilkes, as well as the architects RMJM in Cambridge.

Breathing Buildings’ Consulting Engineer, David Hamlyn says: “The University of Bedfordshire was essentially two projects – the offices and the lecture theatre – each with its own specific requirements. Whilst the offices lent themselves to a wholly natural ventilation solution, a more pragmatic approach was needed for the lecture theatre, resulting in a hybrid solution.

Robin Dyer, RMJM Project Associate said:

“The design team consulted widely with university staff and students to create a vibrant and inspiring contemporary campus centred on a single location for the University of Bedfordshire. We took great care to design a sustainable, low energy building that is naturally ventilated and sensitive to the local townscape.”

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