

Press Release
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New Naturally Ventilated Wing to Kew's Herbarium

Researchers at a new wing at the Herbarium at the Royal Botanic Gardens, Kew, will be able to work in well ventilated, light, surroundings thanks to natural ventilation specialist SE Controls.

The 5,000m² extension built during the United Nation's International Year of Biodiversity will enable Kew to reorganise its collection of plant specimens to conform to the DNA-based Angiosperm Phylogeny Group (APG) system of classification.

Designed by Edward Cullinan Architects, the new wing was carefully designed to complement the existing building and go on to say: "The concept for the building is generated by juxtaposing the vault-like, climate-controlled archive (that keeps the specimens at a constant 15 degrees) with airy, day-lit research spaces. These glass and timber research areas undulate around the three-storey, brick-clad archive enabling scientists to work in close proximity to the collection."



To ensure that the research spaces within the new wing are kept well ventilated, adaptive natural ventilation specialist SE Controls was specified to provide automation to the windows and roof vents.

Adaptive natural ventilation is a solution offering the best air circulation with much lower energy input compared to mechanical ventilation plant. In its basic form, it involves the installation of windows or vents in a building envelope that open and shut automatically according to set parameters for the space within the building. These parameters are usually based on indoor air quality and temperatures, correct levels being essential to maximise concentration levels and thus productivity of occupants.

Adaptive natural ventilation is often coupled with smoke detection systems in modern buildings using the same vents and windows offering a positive saving on building costs. Natural ventilation systems are not just for new buildings. Many existing buildings can easily be automated with little modification, offering huge savings in energy costs whilst improving building comfort.

There are two main principles of naturally driven ventilation in buildings: the wind effect and the buoyancy or stack effect. Wind driven ventilation utilises wind pressures on an external elevation of a building to push fresh air inside. The buoyancy or stack effect is that of warm air rising drawing with it stale air and leaving a low pressure zone which in turn draws in fresh air through low level open windows and dampers. Adaptive natural ventilation responds to internal and external conditions of a building using sensors and controls, and adjusting vent positions accordingly to maintain optimum conditions, thus adding value to the building by improving the productivity of the occupants, which in real terms means a higher return on labour. Further interfaces with other building systems such as heating ensure energy losses are minimised, also giving cost savings during the life of the building.

Opening windows are designed into buildings to provide light, offer ventilation and give occupants a view out of buildings, as well as maybe providing smoke ventilation in the event of a fire. Windows may also be hard to reach or in a larger quantities too impractical to operate by hand. By motorising each window, a bank of windows can easily be operated from one place at one time.

To get the best possible natural ventilation solution, it is best to design window automation during the facade design, either as a full natural ventilation system or as a combined smoke and natural ventilation system. Well planned natural ventilation designs can offer significant energy savings and therefore reduce a client's carbon footprint.

The importance of getting a specialist on board at an early design stage cannot be over-stressed. By careful design at the early stages of building design, adaptive natural ventilation solutions will be more effective in use and more cost efficient overall, at contracting and operational stages.

Natural smoke ventilation utilises the inherent buoyancy of hot smoke, letting it rise and escape from the building whilst allowing cooler, heavier air, to enter at low level into escape routes to allow safe exit for occupants or to aid in the fire services entry into the building to the possible effected area. This is achieved by introducing automatic vents at high level that open upon detection of smoke, allowing the smoke to escape into the atmosphere.

Automatic opening inlet vents and windows at low level maintain the smoke reservoir at a safe level above head height to increase occupant's visibility and ensure sufficient fresh air to survive during escape from a building.

On the new wing at Kew, SE Controls worked in partnership with the glazing specialist, Melayway Glass Assemblies Ltd. Schüco AWS systems were specified for the windows and doors, with FW60+ Curtain wall. All external finishes were specified and anodised by LHT to Uncol Anolok 541 'Pale Umber'. Internal finishes were specified in RAL 8080 matt powder coating.

For the roof lights, 24 'TGCO 24 20', 250 mm stroke, chain actuators were fitted on bespoke brackets to provide both smoke control and natural ventilation. Operated by a 24-volt supply, these actuators are provided with a battery backed controller connected to a fireman's override switch and to the fire alarm system, as well as the BMS.

Opening vents in the windows and curtain wall areas were fitted with SCCO 24 30 concealed actuators, approved for use with Schüco's AWS 102 SK windows tested to EN12101-2 smoke ventilation regulations, again offering both smoke control and natural ventilation via the fire alarm and BMS. In order to provide manual override, each zone of actuators has been provided with local open/close switches.



By working closely with the installer, SE Controls has ensured that all power supply cables have been neatly concealed inside the aluminium curtain wall transoms and mullions. Cables are then gathered under the suspended floor void and then follow cable ducts to the control units. In total 24 independently controlled zones, or banks of automatic opening windows, are served by SE Controls equipment and are operated by a single control panel, complete with battery back-up.

Once installed, checked and commissioned, the installed system needs little maintenance, unlike mechanical air conditioning systems. Preventative maintenance is recommended at six-monthly intervals to ensure that smoke control systems are fully operable in case of emergency, and can be combined with the glazing manufacturers' recommended maintenance visits for windows, thus reducing overall maintenance costs. SE Controls Maintenance Division has been providing building owners with such services for nearly 30 years.

The original Kew Herbarium building has been extended six times, starting in 1877. The new wing extends the capacity of the Herbarium, Library, Art and Archives by about 40 years, providing climate-controlled storage and adjacent research areas. As well as housing hundreds of thousands of plant specimens, it provides new, state-of-the-art space for the Royal Botanic Gardens, Kew's outstanding Library, Art and Archives Collection. Scientists from other institutions and amateur botanists will get greater access to the collections when the new wing opens as part of the Royal Botanic Gardens, Kew's year-long celebrations to mark the UN's International Year of Biodiversity.

The project engineers on the new Herbarium wing are Buro Happold and construction services were provided by Willmot Dixon.

SE Controls offers a complete service of design, installation, commissioning and maintenance of smoke and adaptive natural ventilation control systems for any building. Visit the website at www.secontrols.com for further information. To discuss a requirement with SE Controls, or request literature, please call the head office in Lichfield on 01543 443060.

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