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CONTROLS
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Ventilation is a critical factor in determining the environmental performance of buildings, from energy use to the health and comfort of occupants. With buildings currently consuming some 50% of all commercial energy and producing 50% of global carbon emissions, natural ventilation systems are leading the way for an eco-friendly and sustainable future.

At SE Controls, we develop tailored natural ventilation strategies using window automation and façade technology to ensure that low energy design and built-in natural ventilation principles are incorporated into projects from the outset.

Adaptive Natural Ventilation provides the following advantages

- Clean fresh air at a comfortable temperature helps to promote a stimulating and improved learning environment for children
- Control of CO₂ levels optimises indoor air quality
- Lower running costs through lower energy consumption maximises the free benefit of natural daylight and ventilation
- Decreased capital costs
- Decreased maintenance costs
- Reduced energy use by fans to transport the air
- Fewer problems from plant noise.

DfES Building Bulletin 101 – Ventilation In School Buildings

Building Bulletin 101 provides the regulatory framework in support of the Building Regulations for the adequate provision of ventilation in schools. It deals with the design of school buildings to meet the ventilation requirements of both The School Premises Regulations and the Building Regulations Part F (Ventilation).

The recommendations for ventilation schools (Building Bulletin 101) states that:

- The average concentration of carbon dioxide should not exceed 1500 parts per million (ppm), during the continuous period between the start to the finish of the teaching day, measured at head height.
- Any controlled devices that are purposely designed to provide supply air to and extract from a building, should provide external air supply of:
 - A minimum of 3 l/s per person (litres per second per person), and
 - A minimum daily average of 5 l/s per person, and
- The capability of achieving a minimum of 8 l/s per person at any occupied time
- The internal temperature should never exceed 32°C and that there should be a maximum of only 120 hours a year where the temperature exceeds 28°C. There is also a need to hold internal temperatures to no more than 5°C above the external temperature.

Building Schools for the Future (BSF)

Building Schools for the Future (BSF) is the largest single capital investment programme in 50 years and aims to rebuild and renew all of England's 3,500 secondary schools. It is a programme that will transform existing schools into world-class learning environments that will enable generations of young people to reach their full potential.

The internal environments of schools are even more important. The places that will educate and nurture our next generation are, apart from the home, the most important and influential surroundings that our children will ever come in contact with, and the places where good ventilation and indoor air quality control is paramount. BSF schools, whether rebuilt or refurbished, will be designed not only for this decade but for the needs of the next, with sustainability, flexibility and adaptability in mind.

The environment that we educate and nurture our next generation in is fundamental to the child's performance, productivity and behaviour within the learning environment

What is Natural Ventilation?

Natural ventilation strategies allow air movement through buildings without the need for energy-hungry fans to drive the flow. Such solutions have proven benefits in that they reduce greenhouse gas emissions; cut energy costs for buildings, and avoid health problems often associated with air-conditioning.

Controlled natural ventilation offers a real alternative to traditional forms of mechanical ventilation – air-conditioning, chillers and fan assisted – through the intelligent use of natural forces to displace stale air or excessive heat.

Harnessing the freely available elements of wind and thermal buoyancy to move air through a building and generate increased thermal comfort, natural ventilation can be used within any building – from small schools to universities and larger academies; offices buildings to residential properties, and local healthcare centres to hospital estates.

To create and enhance interior environments all year round, such solutions keep buildings fresh by regulating natural air movement through controlling the opening and closing of specific windows. By proportionally opening specific windows when temperature variances are greatest, natural ventilation can be achieved – and with dramatic benefits.

As well as complying with Building Regulations Part L to deliver air tightness and thermal efficiency, natural ventilation solutions deliver improved and invigorating indoor air quality at a fraction of the capital, space and running costs of conventional cooling systems.

This can increase thermal comfort and drastically cut the risk of sick building syndrome, leading to a 25 per cent reduction in health complaints from occupants, a proven increase in productivity and reduced absenteeism.

A well designed and implemented natural ventilation strategy can therefore:

- Use less than half the energy of air conditioned buildings
- Allow for the design of light, airy and spacious buildings
- Lower heating and cooling costs
- Provide a healthy indoor climate
- Increase productivity
- Reduce health issues and absenteeism
- Cut harmful emissions.

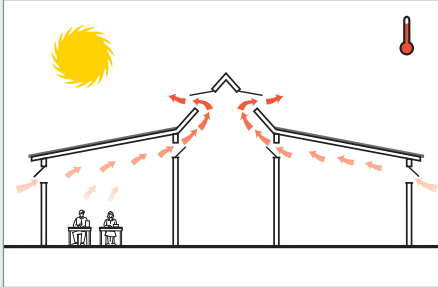
Natural Ventilation Principles

SE Controls, Natural Ventilation strategies are based on six standalone principles, which function differently depending on the building shape, internal heat loads and location of openings. Common ways of capitalising on ‘free’ air movement is through the stack effect, cross ventilation and passive night time cooling using opening windows to facilitate the natural ventilation.

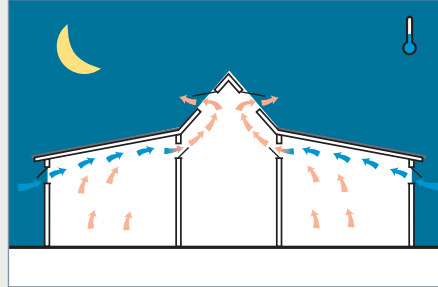
RIGHT: Capital City Academy
LONDON

FAR RIGHT: Bexley Business Academy
LONDON

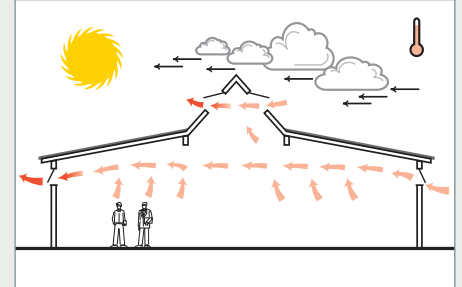




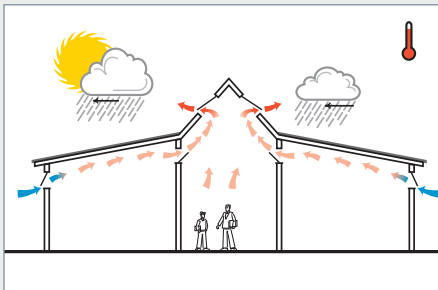
Stack Ventilation



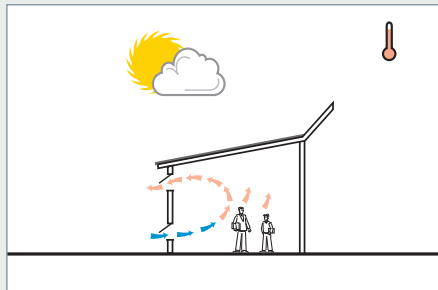
Night or Passive Cooling Ventilation



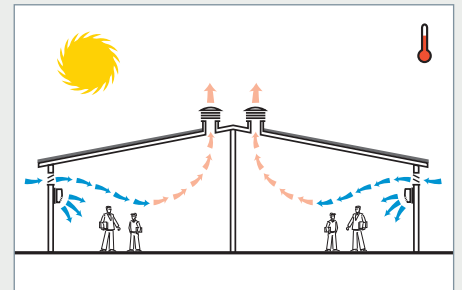
Cross Ventilation



Trickle Ventilation



Single Sided Ventilation



Mixed Mode Ventilation



What SE Controls can do for you

At SE Controls, we provide tailored natural ventilation systems, designed to fit both client needs and building requirements. With our fresh approach, combined with an energetic and dynamic feel for design, every bespoke natural ventilation solution, from SE Controls, delivers impressive – yet wholly practical – end results.

Our complete turnkey solutions evolve from advisory, design and planning services to implementation, project management, training and maintenance.

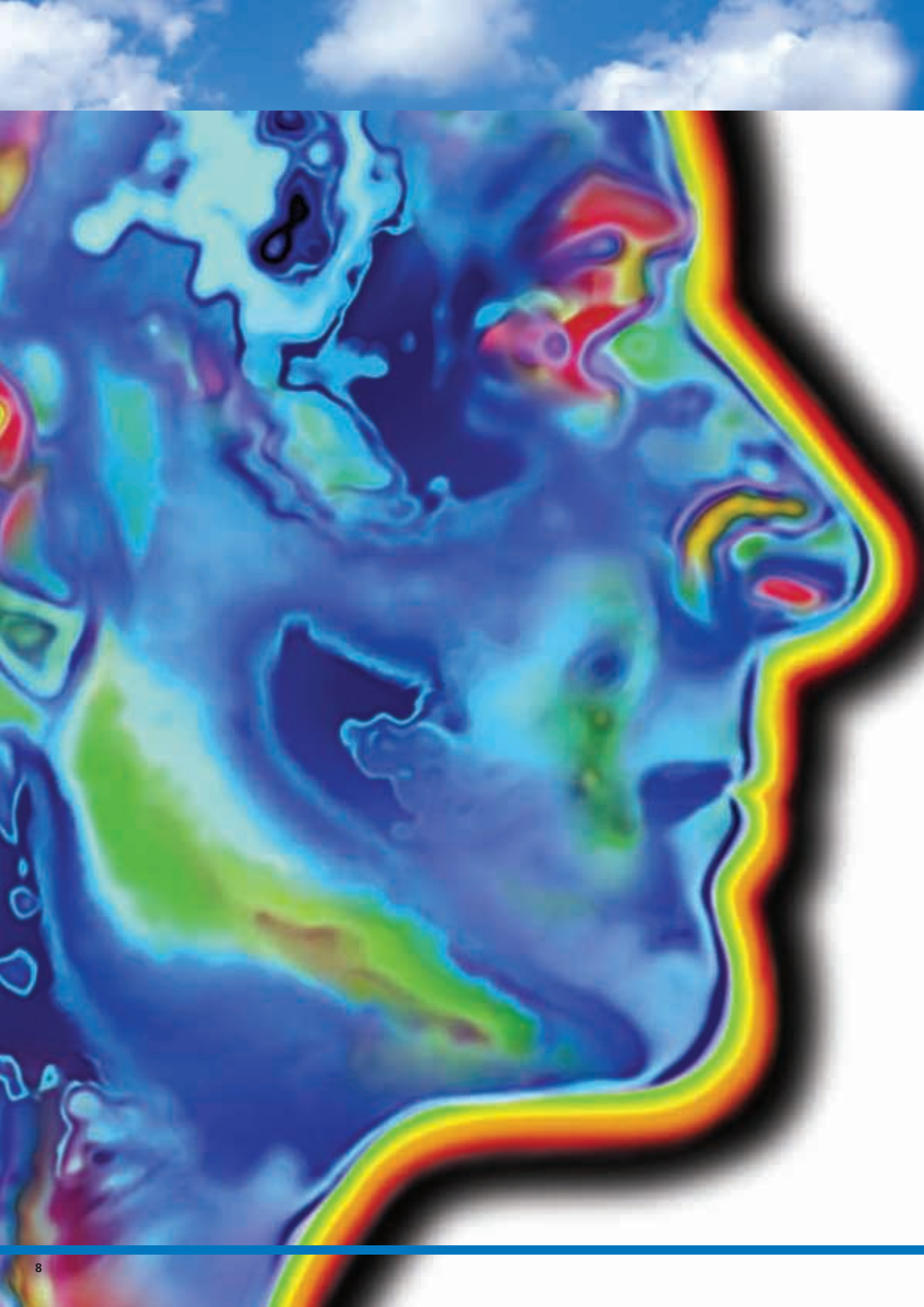
SE Controls natural ventilation strategies concentrate on the automatic opening and closing of windows, rooflights and ventilators in a controlled manner. They can range from a simple open and close switch to a fully integrated energy management system, including elements like CO₂ measuring, internal and external temperature monitoring, weather and rain sensors and interfaces with other building plants.

We then have a team of highly experienced and professional project managers to take the project through every step of the construction process to coordinate the design, specification, installation and commissioning. Performance is guaranteed through the proven SE Controls policy of appointing a single project leader from start to finish.

By getting involved in projects from the very beginning, and partnering closely with you, we ensure all your criteria are met with precision, accuracy and – above all – creative flair.



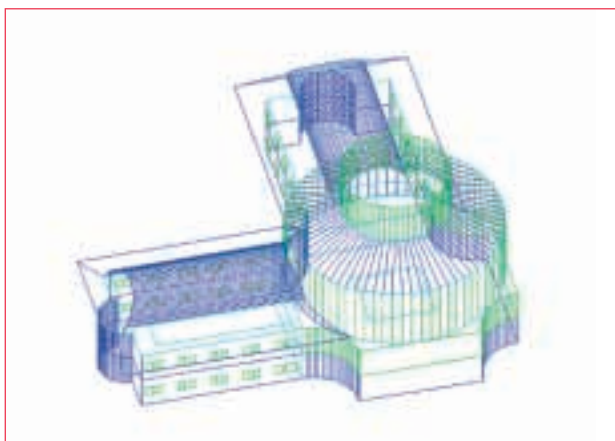




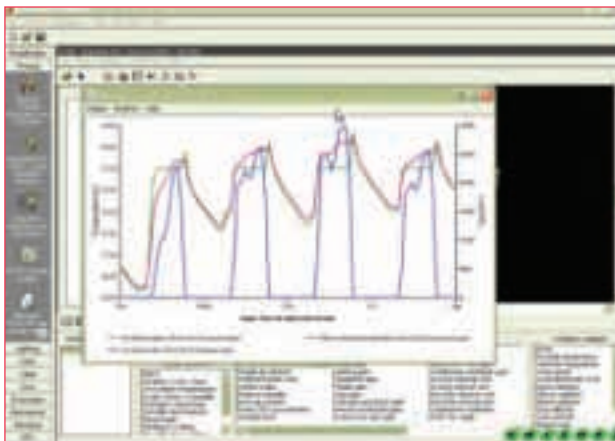
Our Specialist Expertise

SE Controls' team of design engineers are able to offer detailed simulation and analysis of both existing and proposed new buildings to assess how effective a natural ventilation system can be.

Using the latest software modelling packages, for thermal modelling and CFD analysis, vents, sensors and air flows can be modelled to optimise sizes and locations of apertures to the building envelope to deliver the best results.

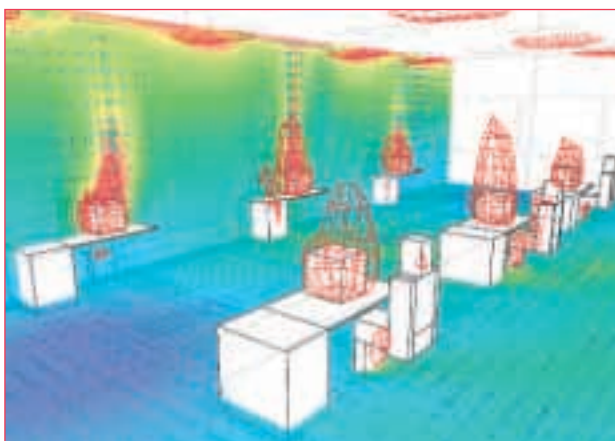


3D modelling and CAD capabilities provide data models for further simulation analysis.



Thermal simulation helps to predict internal temperatures throughout the year – taking into account various heat values such as plant, IT and people.

CFD simulation predicts the air flow in and around a building, enabling the best specification and location of sensors and vents – resulting in optimised design.





Design & Cost Planning

At early design stages SE Controls can assist the client and design team in specifying the most cost efficient and practical solution for natural ventilation.

Considerations

- Building location, orientation and depth on plan
- Glazing requirement
- Thermal mass
- Occupancy patterns

Solutions

- Stack ventilation
- Night or passive cooling ventilation
- Cross ventilation
- Trickle ventilation
- Single sided ventilation
- Mixed mode ventilation.

Approval and Tendering Process

SE Controls offers coordination with the client, the approving body and bidding contractors throughout the tendering process.

- Coordination with approving body
- Production of specification quotations for tendering
- Planning and mid tender meetings.



Stage1 Coordination

At early stages of the project vital information is required by the contractor. AOV openings maybe built into the shell and the core of the building to various elements including, walls, roofs and façades.



Cable Installation

Full wiring schematics are produced for cable installation with all devices located and detailed. This work can be carried out by SE Controls or the contractor who is already on site.



Product Installation

At suitable stages the associated natural ventilation products are installed and connected. SE Controls natural ventilation products are certified and compliant to International standards including CE marking.



Commissioning Handover, Training and Optimisation

During the final completion stages of the project build phase, SE Controls will commission the natural ventilation system. This will typically involve detailed cause and effect testing of all the system components against the design specification. Our trained commissioning engineers will then hand over the system to the client together with detailed operating instructions, and training. After a period of time after occupation the system can be optimised to suit client requirements.

Maintenance – Nationwide

SE Controls maintenance department offer problem solving, advice and alternative solutions to existing systems that require modification or refurbishment, to ensure reliability and peace of mind across multiple sites.

SE Controls' investment in cutting-edge technology allows our products to be optimised to maximise performance of our systems. These improvements can deliver increased efficiency, safety and functionality of our customers' ventilation systems. Our modifications comply with the Buildings Regulations and European and British Standards.



Reference Sites



ABOVE: Langley Academy
SLOUGH

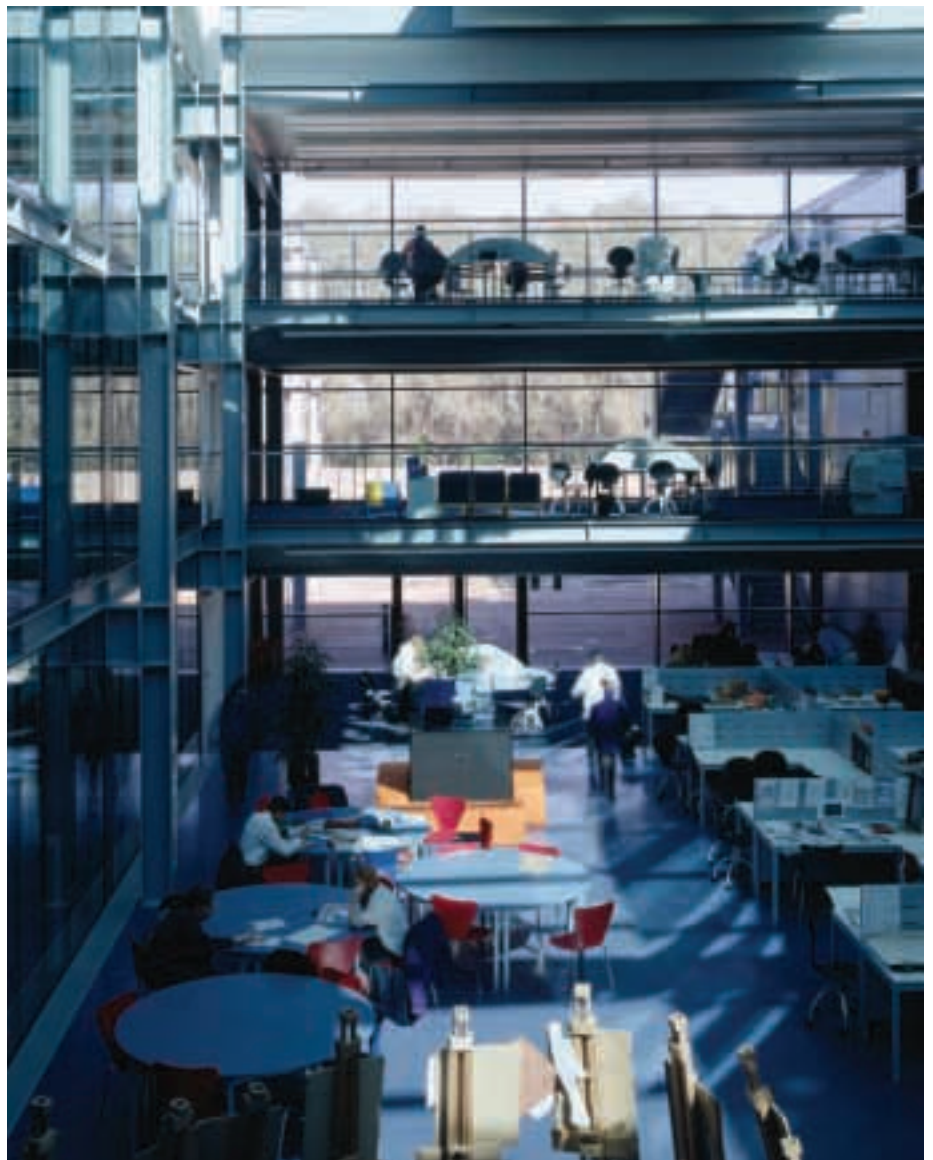
RIGHT: Plymouth University
PLYMOUTH

MIDDLE RIGHT: Capital City Academy
LONDON

FAR RIGHT: Bexley Business Academy
LONDON

TOP RIGHT: Ifield Community College
LONDON





Product Groups

Atria

Central atria are now a common feature in schools and universities, providing natural ventilation and light. The principle of stack ventilation is one of the most effective and reliable methods of driving natural ventilation for atria and adjacent spaces.

Typically atria natural ventilation strategies include high and low level automatic opening vents to provide fresh cool air at low level and exhaust stale overheated air at high level.



Top Hung AOV



Sloping Roof Vent



Aluminium Louvre



Glazed Louvre



Chain Actuators



Linear Actuator



CO₂ & Temperature Sensor



External Temperature Sensor



Rain Sensor



Wind Speed & Direction Sensor



Humidity Sensor



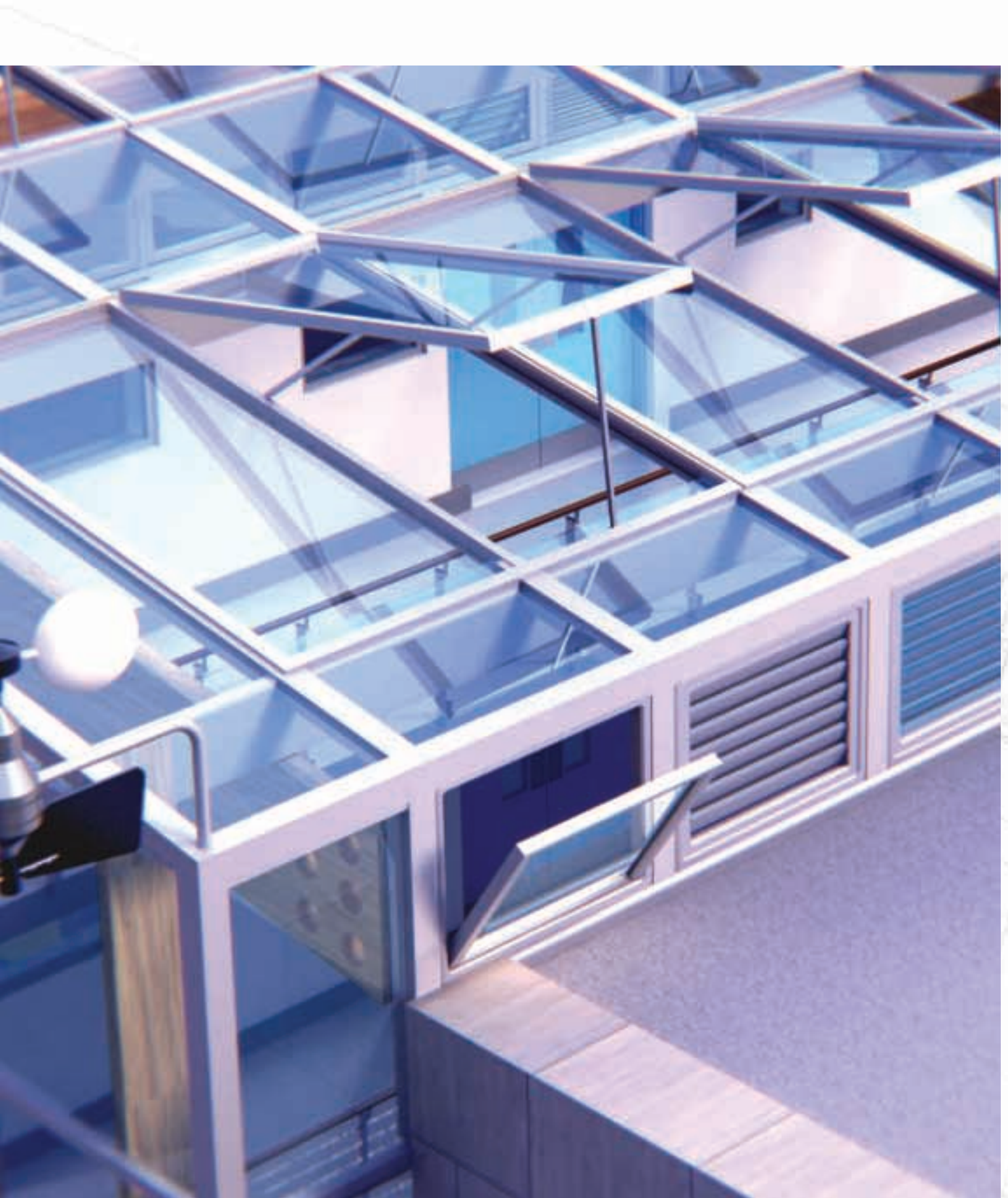
Daylight Sensor



Manual Override Switch/Key Switch



OS2 Controller



Product Groups

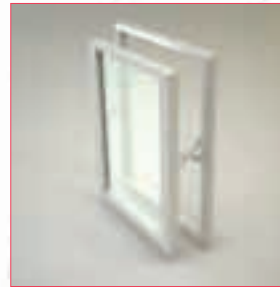
External Façade

External façades are used in a natural ventilation strategy to provide openings for either single sided or cross ventilation. The design process ideally takes account the building location & orientation, the size, occupant density and intended use of each room adjacent to the external façade.

Depending on design strategies, AOVs operate based on predefined zone set points for temperature and air quality control.



Top Hung AOV



Parallel Opening AOV



Glazed Louvre



Acoustic AOV Louvre



Chain Actuators



Linear Actuator



CO₂ & Temperature Sensor



External Temperature Sensor



Rain Sensor



Wind Speed & Direction Sensor



Manual Override Switch/Key Switch



Humidity Sensor



Power Supply



NV Controller



OS2 Control Panel

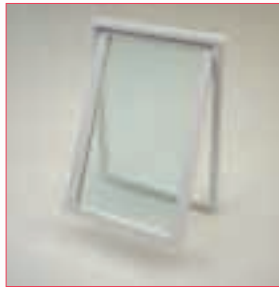


Product Groups

Internal Partition Walls

Natural ventilation strategies can use such screens to allow cross ventilation by simultaneously opening AOVs in the external façade, internal glazed screen and within the roof of adjacent atria to effectively draw fresh air into the relevant space and exhaust hot stale air.

This design uses natural positive and negative air pressures to create a healthy and productive environment.



Top Hung AOV



Bottom Hung AOV



Glazed Louvre



Acoustic AOV Louvre



Chain Actuators



Linear Actuator



CO₂ & Temperature Sensor



External Temperature Sensor



Rain Sensor



Wind Speed & Direction Sensor



Manual Override Switch/Key Switch



Humidity Sensor



Power Supply



NV Controller



O₂ Controller





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