

## Case Study

# Combined solutions for both natural and smoke ventilation systems



### The City Academy

The City Academy, Hackney is a high quality education facility for the young people of Hackney, in a secure, supportive environment, raising their aspirations and standards of educational achievement, and building positive partnerships with local people and organisations.

Opened in September 2009, the Academy caters for 900 eleven to sixteen year old boys and girls of all abilities and faiths, as well as offering 240 sixth-form places. Here traditional values of good behaviour and attendance, high expectation and achievement are combined with a dynamic curriculum, state-of-the-art facilities and innovative teaching program, so students can enjoy learning and achieve the highest standards both academically and personally.

The academy specialises in teaching business and financial services with sponsors KPMG and The City of London Corporation.

The City Academy is a striking building using bold colours and an extensive facade of aluminium and glass in an acoustic twin facade design.

“Students learn in optimum natural light and comfortable, well ventilated, quiet spaces. It’s a good environment to learn in. A ground source heat pump underneath the sports field supplies 75% of the energy needed for heating and 130 photovoltaic panels on the roof deliver enough electricity to light 50 classrooms. All insulation material used in the provision of building services has zero ozone depletion potential. The school community was involved from the outset of the project.”

Max Fordham LLP

#### Name:

The City Academy

#### Location:

Hackney, London

#### Title:

Providing a combined solution of natural ventilation and smoke ventilation system by automating windows, louvred vents and roof lights.

#### Challenge:

To design, manufacture, supply, install and commission a combined natural and smoke ventilation system to provide a low energy solution to improve the indoor air quality and thermal comfort for pupils and staff.

#### Products:

A combination of 24V & 230V actuators were selected to operate the windows and roof lights to improve the internal air quality and thermal comfort of the learning spaces. Bespoke battery backed SHEVs control panels operated the actuators to clear escape routes for safe occupant exist in the event of a fire.

#### Experience:

From conception, design, manufacture, supply through installation, commissioning and maintenance from the UK's leading smoke and natural ventilation provider – SE Controls.





## A Sustainable Solution

In order to keep running costs of the building to a minimum and to ensure safety in the event of fire, a combined natural ventilation and smoke control system was designed and installed. SE Controls were specified on the project and supplied equipment to various sub-contractors which included the envelope glazing and roof system. Final installation and commissioning was undertaken by SE Controls' own engineers.

Designed by Max Fordham Consulting Engineers and Studio E Architects for the City Academy Trust, the project cost in the region of £30 million to complete and is one of the areas most outstanding sustainable education building projects.

The project is also used by the community and contributes to the regeneration of the Hackney area.

## The Solution

1054 actuators were supplied and fitted in various combinations to achieve the required ventilation rate. Vent configuration included both 'top hung open out' and 'bottom hung open in' casement windows. Various methods of

actuation was specified depending on the location and window design within each space.

Classroom ventilation consists of linked tandem pairs of actuators fitted to each window which are operated by the teacher via a single switch when ventilation is required. In circulation and communal spaces actuators are wired back to a total of 10 control panels operating 17 zones for the entire building. The 1054 actuators are grouped into 110 separate groups, either switch or BMS operated.

Classrooms are fitted with 230V AC actuators which are operated on a classroom by classroom basis by the teaching staff. This ensures local control over ventilation requirements.

Circulation and communal spaces are fitted with 24V DC actuators which provide a dual function. Linked to the Building Management System (BMS), automatic opening ventilators provide day to day ventilation. Linked to the fire alarm system these actuators override the BMS and open fully for effective ventilation. Each BMS controlled zone provides manual override for the teaching staff.

In case of a fire and an electricity supply failure, all 24V actuators are backed up by battery to ensure operation in the event of a fire. This independent and battery backed system will open all the windows to full-stroke of the actuator should a fire alarm and power supply failure occur.

For natural ventilation a total of 9 control panels are linked into the BMS to offer day to day comfort ventilation. When the fire alarm is reset, the automatic opening smoke vents will return to their previous positions and will be under control of the BMS again.

## Optimal Design

Where there are areas of possible entrapment in automated areas, for example where actuators are placed within 2.5m from finished floor level, SE Controls TGCO 24 20 ED and TGCO 24 30 ED programmable chain actuators have been implemented within the window system. These actuators are fitted with sensors to detect obstruction and have been reduced in both closing force and speed in order to protect against injury should an entrapment occur.







At third floor ceiling level there are 101 louvres at the top of the external glazing façade which allows outside air to enter attenuated ducts – these are sealed with bulkhead hatch covers to the inside. Hatch covers are operated by SE Controls SECO 15 230V AC 380mm stroke chain actuators with pivot brackets and bespoke trunnion brackets controlled by the teaching staff with a single switch.

To attain cross ventilation exhaust for air entering via the high level louvre ventilators, the third floor roof accommodates 18 roof lights which are operated locally to ensure a throughput of natural ventilation. Each roof light is fitted with a pair of SE Controls SELA S 230V AC linear actuators.

Hackney Academy is a typical example of how easily dual purpose smoke and natural ventilation systems can work together to provide both comfort and safety in case of a fire. SE Controls have recently produced a new document entitled 'Natural Ventilation in Education Buildings', which guides the specifier through the current legislation and the systems that can be specified.

The windows and actuators on the project were installed by Parry Bowen Limited who worked closely with SE Controls to complete the project.

### Project Management

Installation co-ordination of specific site stages is a key element of SE Controls' effective and proven project management service. All of SE Controls' contract customers have a single point of contact (the Project Leader) throughout the entire project duration. Each project team has dedicated project administration, co-ordination and installation resources at its disposal to ensure the client receives consistency and the highest levels of customer service and delivery management. SE Controls worked closely in conjunction with Willmott Dixon and their electrical subcontractor to ensure installation of the system went smoothly, to time and to budget.

### Commissioning and Handover

It is essential that all smoke ventilation systems are tested via cause and effect analysis to demonstrate that they actually operate correctly in an emergency. With almost 30 years of installing smoke ventilation systems, SE Controls have refined this process and hugely experienced commissioning engineers are able to "get a result" on site, saving time, money and the need for return visits.

### Service & Maintenance

Smoke ventilation systems are life saving systems and it is therefore essential that regular preventative maintenance is carried out to the required standards by competent personnel, who are familiar with the specification and strategy for the particular application. Under the Regulatory Reform (Fire Safety) Order 2005 legislation this is the responsibility of the Management Company or owner of the premises. SE Controls maintenance

division are able to provide 24 hour support for 365 days of the year to its maintenance clients to ensure that their installations are always ready to perform their life safety function whenever they are called upon to do so.

### The Service

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.





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