

Case Study

# SHEVTEC® Extended Travel Distance System for Chettles Yard, Nottingham



Name: Chettles Yard, Nottingham

Main Contractors: Ocon Construction

Background: Chettles Yard student accommodation is a typical example of modern high specification secure living demanded by modern students. As with any multi occupancy dwelling, the occupants need to be able to escape safely from the building in the event of a fire and the installation of smoke and heat exhaust ventilation system assists in the delivery of this.

Challenge: The challenge facing SE Controls was to match the client's requirements by stepping outside of Approved Document B and into the realms of a fire engineered solution. The client wanted to maximise the space available on each floor for accommodation and minimise the amount given over to services. This meant limiting the escape route to a single escape stair whilst at the same time ensuring extended occupant travel distances which would guarantee safe passage to the still fully protected escape stair. The system components had to be fully CE marked and robust enough to stand the rigours of a student environment.

Products: SE Controls proposed a full turnkey solution to their client. Their SHEVTEC® Extended Travel Distance System satisfied all of the stringent client requirements and was installed, commissioned and handed over by SE Controls Midlands project team. The SHEVTEC® Extended Travel Distance System installed at Chettles Yard comprised of nearly all the SHEVTEC® range of products and included:

- OSLoop Control System
- SHEVTEC® Manual Control Point (MCP)
- SHEVTEC® Single Phase Powered Extract Fan
- SHEVTEC® Louvre
- SHEVTEC® Repeater Panel
- SHEVTEC® Smoke Shaft Door and Actuator
- OS2 Control Panel
- SHEVTEC® Smoke Detectors

Benefits: The SHEVTEC® Extended Travel Distance System enabled the designers to achieve their goals and save significant costs. The system enabled escape travel distances to be increased to over twelve meters without the need for additional protected stairwells.

Importantly the SHEVTEC® EXTENDED TRAVEL DISTANCE SYSTEM's offered further cost savings in both plant and installation costs by using its unique single phase single fan smoke shaft. The fan mounted within the shaft thereby alleviating the need for the installation of roof mounted hefty, three phase fan sets which require specialist access both for installation and maintenance.

All SHEVTEC® maintenance can be performed from the INSIDE of the building.

‘The SHEVTEC® EXTENDED TRAVEL DISTANCE SYSTEM installed at Chettles Yard takes smoke ventilation to a new level, offering robust, cost effective and innovative turnkey solutions to designers, regulators, occupants and fire fighters alike.’

## The Chettles Yard development of student accommodation consists of several blocks in a secure gated village.

The striking design of the accommodation is fitting for a project which pushed the boundaries of accepted practice. Two of the accommodation buildings fell within the realms of Approved Document B into which SE Controls installed their SHEVTEC® Natural Shaft Corridor Ventilation System. However Building F didn't fit the same prescriptive solution and so SE Controls' SHEVTEC® Extended Travel Distance System was installed.

Modern student accommodation generally comprises high quality studio style apartment with either private or shared cooking facilities. Specifications and build quality are high to meet their customer's expectations.

Students from several institutions and nationalities can live alongside each other in these comfortable surroundings. But as students are renowned for their high spirits, any system that is installed must be robust enough to withstand the rigours of their tenants.

Building F at Chettles Yard comprises six stories of apartments, common areas and communal kitchens, with the ground floor being used for secure storage for bikes and belongings.

Each floor has typically fourteen apartments on the floor served by a central protected staircase with maximum travel distance of twelve metres (Excluding cluster apartments) in a single direction.

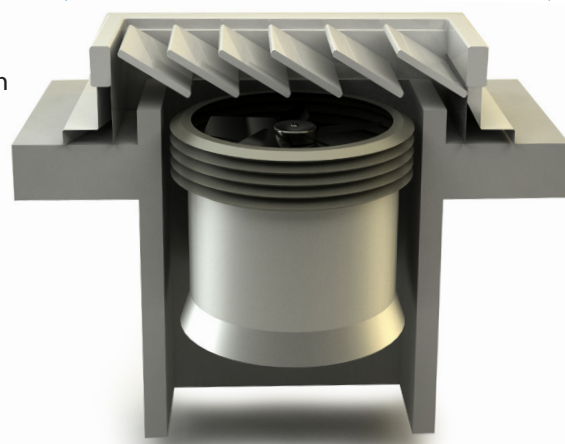
Under the Building Regulations Approved Document B, smoke ventilation is required to protect the escape stair from smoke infiltration in order to assist in the safe escape of occupants. However Approved Document B limits the maximum escape travel distance to 7.5m when there is only one escape stair.

The client therefore needed a fire engineered solution to enable them to achieve the extended travel distances but satisfy themselves that any solution would perform at least as well if not better than a code compliant system. Furthermore the client wanted to use the smoke ventilation system to naturally and automatically ventilate the escape stair to keep the central route thermally comfortable whilst minimising energy consumption. SE Controls' SHEVTEC® Extended Travel Distance System was the natural and obvious solution as it offered the client a fully CE marked, CFD modelled, robust off the shelf system from SE Controls who offered them a full turnkey solution including project management, liaison with approving inspectors and a full test and demonstration service.

**SHEVTEC®**  
Extended Travel Distance System

### The Solution

The SHEVTEC® Extended Travel Distance System enabled designers to save significant costs in a number of ways. The system enabled escape travel distances to be increased above the ADB compliant maximum 7.5m without the need for additional stairwells creating an opportunity for significantly more accommodation. Furthermore, the SHEVTEC® Extended Travel Distance System used smoke shafts less than half the area required by a conventional 1.5m<sup>2</sup> shaft demanded under a typical natural ventilation system as set out in Approved Document B of the Building Regulations. This was achieved using fans tested to EN12101-3 and suitable for smoke ventilation to increase the efficiency of smoke extraction when called on to do so in an emergency.



**SHEVTEC®**  
Single Phase Powered Extract Fan



**SHEVTEC®**  
Natural Smoke Shaft

#### The SHEVTEC® EXTENDED TRAVEL DISTANCE SYSTEM's OSLoop Control system

intelligently monitors the system such that if one extract shaft fan fails to operate it will automatically bring alternative shafts into extract mode. This creates significant cost savings as each shaft only requires one single phase fan served by an independent supply, which can be neatly housed in the top of the shaft alleviating the need for the installation of roof mounted hefty, three phase fan sets requiring specialist access both for installation. Maintenance of all of the SHEVTEC® system can be performed from the INSIDE of the building.

#### The Control System

The brains behind the SHEVTEC® EXTENDED TRAVEL DISTANCE SYSTEM lies in the patented OSLoop control system, a looped power and data system, which constantly monitors all inputs and outputs including all cabling and the position of smoke vents – all in accordance with EN12101 part 9.



**SHEVTEC®**  
OSLoop and MCP



**SHEVTEC®**  
Smoke Detector

to the system's effectiveness. Should a fire occur, SHEVTEC® smoke detectors placed in the corridor will determine which smoke shaft is closest to the fire and initiate that shaft as the extract shaft. Both SHEVTEC® Smoke Shaft Doors on the corridor will automatically open and the extract fan on the extract shaft will operate. The OSLoop system will ensure that all other smoke shaft doors remain closed within the building, so that smoke shafts work efficiently and keeps smoke from entering other corridors served by them.



**SHEVTEC®**  
Louvre

Document B the OSLoop system will initiate the automatic opening of the SHEVTEC® Louvre at the top of the staircase during any system activation. This will ventilate any smoke that may enter the staircase as fire doors to the escape stair are opened.

The OSLoop system continues to monitor the entire process during activation. Built into the system there are safety features - should an

extract fan fail during operation, or fail to start, the system will initiate a control sequence, changing the natural inlet shaft to an extract shaft by running its extract fan and the former extract shaft will revert to a natural inlet shaft.



**SHEVTEC®**  
Repeater Panel

It was beneficial to further extend the capability of the smoke ventilation system at Chettles Yard by installing the SHEVTEC® Repeater Panel. This elegant and slimline Panel is no bigger than an IPAD and is located at the designated fire fighters entrance. It displays the current status of the system in simple easy and quick to understand representation of the building. Furthermore fire fighting crews can place the system into a 'fire fighting phase' by initiating a manual override, activated by key switches on the SHEVTEC® Repeater Panel. This fire fighting phase initiates both smoke shafts into extract mode and runs both.

#### System monitoring and status

Importantly, the OSLoop system has full data logging capability which can be interrogated to provide valuable historic evidence of activations. This is particularly useful for post event analysis – especially in light of recent well documented fires in high rise accommodation. Where nuisance operation is an issue (a common occurrence in student accommodation) SE Controls can provide their new



**SHEVTEC®**  
Tamper Proof MCP

Tamper Proof MCP (Manual Control Point). SE Controls' feature rich MCPs are fully compliant with the imminent EN12101-9 product standard. The orange (RAL 2011) MCP displays system and vent status both audibly and visibly through three LEDs, "power, fault and activated" (all requirements of the EN standard), all of which are also displayed on the SHEVTEC® Repeater Panel.

Inappropriate operation of the manual control points (MCP) can not only cause activation of a system, if a fire does occur once an MCP has been operated, initiation of vents on fire floors can be locked out and fail to operate as a direct result. Most residential smoke ventilation systems are designed to be fully automatic, opening specific automatic opening vents (AOVs) when smoke is detected and generally only on the floor of fire origin. Manual Control Points are frequently the highest priority in a smoke ventilation system (commonly referred to as "Fireman's Override Switches") and as such are designed to disable the smoke detection system.

With the use of automatic smoke shaft doors there is always risk of entrapment when resetting the doors to a closed position. The MCP's are always located close to the smoke shaft door and operate via a 'dead man's handle' when operating the doors, to mitigate any potential risk of entrapment.

#### System Validation and Research

The system is the culmination of over two years' research using extensive Computational Fluid Dynamic (CFD) modelling to simulate literally hundreds of scenarios.

The SHEVTEC® EXTENDED TRAVEL DISTANCE SYSTEM has been designed to provide developers with much more flexibility to achieve ever increasing commercial pressures but without the need to compromise occupant or fire fighter safety.

Following SE Controls' successful and smooth delivery of their turnkey solution in Nottingham, including the installation, commissioning and demonstration, SE Controls now know that their SHEVTEC® EXTENDED TRAVEL DISTANCE SYSTEM system is a major step forward for both them and their clients.

SE Controls drew on 30 years of experience of designing, installing and maintaining smoke and heat exhaust ventilation systems (SHEVs) when they designed LABC REGISTERED SHEVTEC® EXTENDED TRAVEL DISTANCE SYSTEM. System flexibility, repeatability and ease of installation were central to meeting the cost constraints demanded by current market conditions.

But importantly this was achieved through innovation which has enhanced the quality of the system, with all components being CE marked to the current EN12101 SHEVs standards or in the case of the OSLoop control system, fully compliant with the imminent EN 12101 parts 9 & 10.



#### SE Controls can offer

Various options for smoke shaft AOVs including their SHEVTEC® Smoke Shaft Door and Actuator, tested to BS 476-22:1987, BS 1634-1:2000, BSEN 1363-1:1999, BSEN 1364-2:2000 and to the principles of EN12101-2:2003 Annex G, giving designers the ability to match the AOV to other doors in the development.

Alternatively SE Controls can deliver their SHEVTEC® damper which can be concealed behind a neat grill. Other Automatic Opening Vents are available in SE Controls SHEVTEC® range including glazed louvres for end of corridor applications, casement smoke vents, 90 degree and 140 degree opening vents and smoke louvres for top of stair or smoke shaft applications.

The SHEVTEC® EXTENDED TRAVEL DISTANCE SYSTEM installed at Chettles Yard takes smoke ventilation to a new level, offering

safer residential buildings due to a combination of SE Controls 30 years experience, newly developed products and their understanding of the needs of building designers, regulators and fire fighters alike.

#### Commissioning and handover

SE Controls' installation and commissioning engineers are hugely experienced and were instrumental in the successful implementation of the SHEVTEC® Extended Travel Distance System. It was essential that the system was set up and proven to meet the design criteria. The testing regime employed by SE Controls' team included measurement of volume flow rates through the shafts, force readings taken on the doors into the escape stairs to make sure they remained with acceptable limits and several other critical criteria. All of this data was compiled and recorded against very detailed cause and effect matrices which were then validated against the design criteria.



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