



Affordable Smoke Control Systems Testing.

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## Xxxx Apartments, Xxxxxxx Xxxx, London. EXX XXX Smoke Control Systems. Inspection and Test Report.

### Report Summary.

I visited this property on Tuesday 12<sup>th</sup> April 2022 and am grateful for the assistance of Ms Xxxx Xxxxxx for making the arrangements.

The building is a Residential Apartments Tower Block near to Xxxxxxx Xxxx Railway Station. It has sixteen levels above Ground and two Storeys of underground Car Park. Critically, the building only has one Staircase which must therefore serve as a “Means of Escape” for all Residents. The building is part of a larger complex, with the Fire Alarm System of another building, known as Xxxxxxxx Xxxxx, being linked together with this.

I carried out an Inspection and Test of the Smoke Control Systems with mainly satisfactory results; apart from a problem with a motorized damper on Floor Thirteen which must be repaired. A “Fire Alarm to Smoke Extraction System Cause and Effect” verification was also carried out with satisfactory results.

Ongoing “Maintenance” as demanded by the Regulatory Reform (Fire Safety) Order, must continue. Please find our report below.

### Smoke Control Systems Description.

The building is a modern construction which is believed to have opened in 2017. In accordance with Regulations, Smoke Control measures are provided by:

- **Corridor Smoke Flushing System.** Two vertical concrete Risers that serve most floor levels, designated Left and Right with respect to the Lift Shafts. Smoke Extraction Fan Sets are positioned at roof level, at the top of the Risers.

In normal, “No Fire” Mode the Smoke Flushing System runs in “Environmental Mode” and provides cross ventilation to all Residential Corridors. The Right-Side Fan Set runs at a slow speed of 20 Hertz and serves as extract; the Left Side Fan Set does not run but allows fresh air to enter all the Residential Corridors via the Motorized Dampers, described below.

In “Fire” Mode the system may change over. The vertical Riser nearest to the activated Smoke Detector becomes the “Smoke Extract” and the Fan runs at a speed of 25 Hertz. The “other” Fan Set idles, whilst its associated Riser serves as an *inlet* and provides “Make up Air”, thus creating a “Smoke Flushing System” for the Residential Corridor of Fire *only*.

- **Motorized Dampers.** Associated with the vertical Risers described above, each Residential Floor has two Automatically Opening Smoke Ventilation Grilles, designated Left and Right with respect to the Lifts. All grilles are 1000mm high and 500mm wide and have 24 Volt D.C. Motorized Dampers within.

In Environmental Mode: All Left Side Dampers are wide open to allow air inlet. Right Side Dampers are partially open to allow a trickle of air extraction from Residential Corridors, thus providing cross ventilation.

In "Fire Mode": Both Dampers on the "Floor of Fire" fully open to allow fresh make-up air to enter the Residential Corridor, which is then extracted as described above, thus creating a "Smoke Flushing" effect. Dampers on all other Floors will Close.

**Fireman's Override Key-Switch.** A Fireman's Override Key-Switch is fitted on the Staircase Landing of most levels of the building. This is for use at the discretion of the Fire Officer attending and there are three options:

Auto. This is the default position for the key-switch. The Smoke Flushing System automatically activates in response to a Fire Alarm Signal.

Off. The Smoke Extraction Fan Sets stop running and the motorized Dampers Close on all Levels. Environmental Ventilation and Smoke Flushing stops.

Boost. When in "Fire" Mode, putting the Fireman's Override Key-Switch to "Boost" causes the Smoke Extraction Fan speed to increase to its maximum of 50 Hertz with a dramatic increase in the Smoke Flushing rate.

- **Top of Staircase AOV.** An Automatically Opening Smoke Ventilation Louvre is fitted at the very top of the single Staircase as demanded by the Regulations. This ventilates the Staircase AND provides an air velocity through the Staircase to Residential Corridor door when it is open: a technique for reducing the possibility of the Escape Stair filling with Smoke.
- **Fireman's Override Panel.** A Fireman's Override / Maintenance Test Panel is installed in the Ground Floor Foyer Area. All Smoke Extraction Dampers, but not the Top of Stairs Vent, can be operated or tested using this Control Panel. The Top of Stairs Vent opened when the flushing system was tested from every level.

### **Design Standard.**

The Smoke Flushing Systems will have been designed to comply with BS EN12101-3:2015. The design Standard includes the following requirements:

**Two Electricity Supplies.** For reasons of robustness, two electricity supplies are required by the design standard. Failure of the Primary Electrical Supply will cause the Secondary Supply to be automatically connected. The supplies are visible and Metered in a room marked “Life Safety” in the Basement level of the Staircase.

**Two Smoke Extraction Fans.** For reasons of robustness, two Smoke Extraction Fans per Riser System are required by the design standard. The extraction fans are arranged as “Duty” and “Standby”, complete with an automatic change over system in the event of a “Duty Fan failure to perform” situation, detected by Fan Motor Current Sensors.

**System Electrical Control Panel.** The Electrical Control Panel for the Environmental Ventilation / Smoke Flushing System is located within a Riser cupboard on Level 15, near to Apartment 131. It conforms to both BS EN12101 part 9 and part 10.

**Inspection and Test Report.**

Please find below the results of the Inspection, Test and “Cause & Effect” visit of 12<sup>th</sup> April 2022. The tables below attempt to describe the physical layout of the Smoke Flushing System:

	<b>Top of Staircase.</b> Automatically Opening Smoke Ventilation Louvre.	
<b>LEFT RISER SHAFT.</b>  <b>Plant Room.</b> Two Smoke Extraction Fans (also serve as Air Inlets) external to the Plant Room.	<b>Roof Top Terrace.</b>	<b>RIGHT RISER SHAFT.</b>  <b>Plant Room.</b> Two Smoke Extraction Fans (also serve as Air Inlets) within the Plant Room.
LEFT RISER SHAFT	Staircase.	RIGHT RISER SHAFT
Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 133. Satisfactory.	<b>Level 15.</b>  Off / Auto / Boost Fireman’s Switch within the Stairwell.  <b>Smoke Extract System Control Panel is in a Service Cupboard near to Apartment 131.</b>	Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 126. Satisfactory.
	Staircase.	
Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 123. Satisfactory.	<b>Level 14.</b>  Off / Auto / Boost Fireman’s Switch within the Stairwell.	Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 116. Satisfactory.
	Staircase.	
Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 113. Satisfactory.	<b>Level 13.</b>  Off / Auto / Boost Fireman’s Switch within the Stairwell.	Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 106. <b>Note 1.</b>
	Staircase.	
Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 103. Satisfactory.	<b>Level 12.</b>  Off / Auto / Boost Fireman’s Switch within the Stairwell.	Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 96. Satisfactory.
	Staircase.	
Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 93. Satisfactory.	<b>Level 11.</b>  Off / Auto / Boost Fireman’s Switch within the Stairwell.	Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 86. Satisfactory.

	Staircase.	
Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 83. Satisfactory.	<b>Level 10.</b>  Off / Auto / Boost Fireman's Switch within the Stairwell.	Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 76. Satisfactory.
	Staircase.	
Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 73. Satisfactory.	<b>Level 9.</b>  Off / Auto / Boost Fireman's Switch within the Stairwell.	Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 66. Satisfactory.
	Staircase.	
Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 63. Satisfactory.	<b>Level 8.</b>  Off / Auto / Boost Fireman's Switch within the Stairwell.	Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 56. Satisfactory.
	Staircase.	
Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 53. Satisfactory.	<b>Level 7.</b>  Off / Auto / Boost Fireman's Switch within the Stairwell.	Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 46. Satisfactory.
	Staircase.	
Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 43. Satisfactory.	<b>Level 6.</b>  Off / Auto / Boost Fireman's Switch within the Stairwell.	Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 36. Satisfactory.
	Staircase.	
Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 33. Satisfactory.	<b>Level 5.</b>  Off / Auto / Boost Fireman's Switch within the Stairwell.	Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 26. Satisfactory.
	Staircase.	
Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment	<b>Level 4.</b>  Off / Auto / Boost Fireman's Switch within the Stairwell.	Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment

23. Satisfactory.		16. Satisfactory.
	Staircase.	
Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 13. Satisfactory.	<b>Level 3.</b>  Off / Auto / Boost Fireman's Switch within the Stairwell.	Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 6. Satisfactory.
	Staircase.	
Riser Shaft.  Motorized Automatically Opening Smoke Vent. Wall mounted, next to Apartment 2. Satisfactory.	<b>Level 2.</b> <b>Concierge / Reception Area.</b>  Off / Auto / Boost Fireman's Switch within the Stairwell.	Gym Area / Back of House Corridor.
	Staircase.	
	<b>Level 1.</b> Residents Hub.	
	Staircase.	
	<b>Ground Floor Foyer.</b> Fire Alarm Control Panel x2.  Fireman's Override Panel.  <b>Final Exit door from Staircase to Pavement Level.</b>	
	Staircase.	
Car Park.	<b>Basement BA1.</b>	Car Park.
	Staircase.	
Car Park.	<b>Basement BA2.</b>  Room marked "Life Safety". Contains Electrical Power Supplies for the Smoke Extraction System and the Fire Fighting Lift.	Car Park.

**Note 1.** The damper on the Thirteenth Floor, near to Apartment 106, did not open when tested. An investigation and repair is needed; it may simply be a blown fuse or a complete failure of the actuator.

**Recommendations.**

Apart from our concern about the damper on the Thirteenth Floor, all other aspects of the Smoke Control System worked properly when tested on 12<sup>th</sup> April 2022.

Since the Staircase forms the only “Means of Escape” from all upper levels, we recommend that periodic “Maintenance” as demanded by the Regulatory Reform (Fire Safety) Order be carried out *every six months*, or even more frequently, if recommended in the building Fire Risk Assessment Document.

Please contact me if more information is needed or questions are raised.

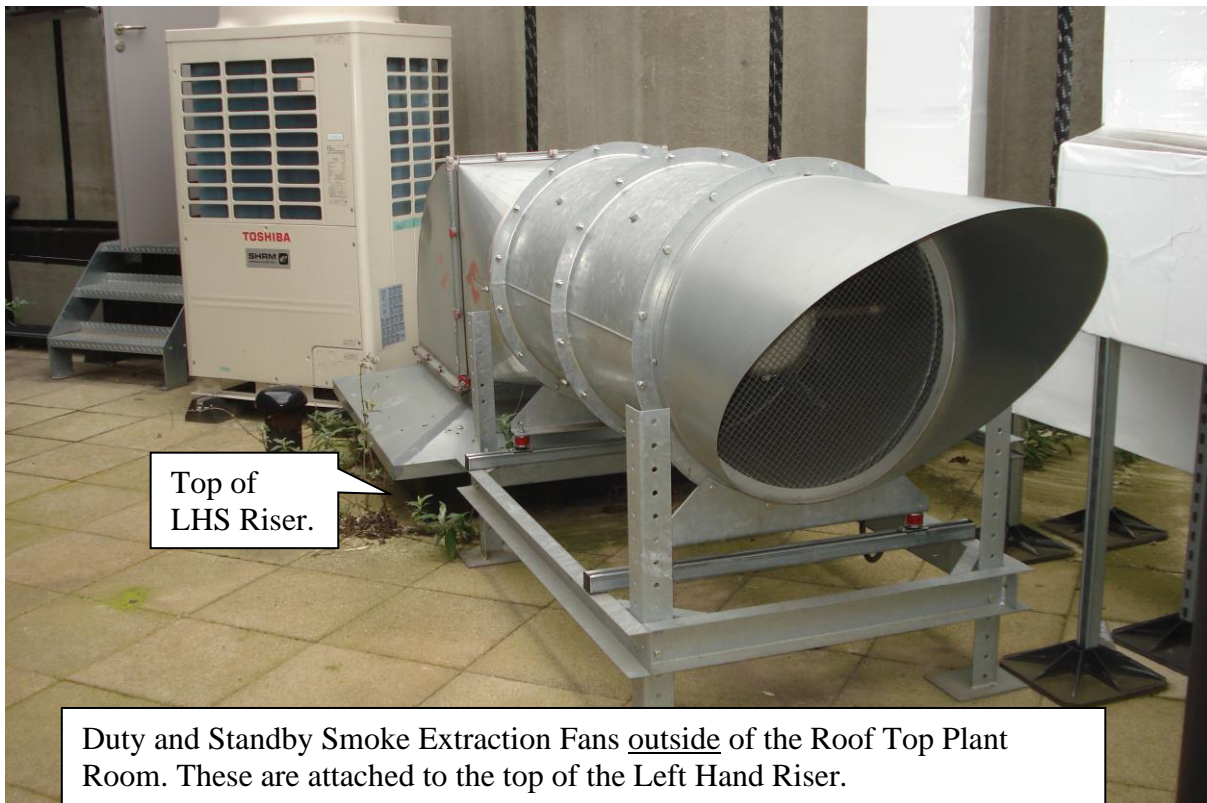
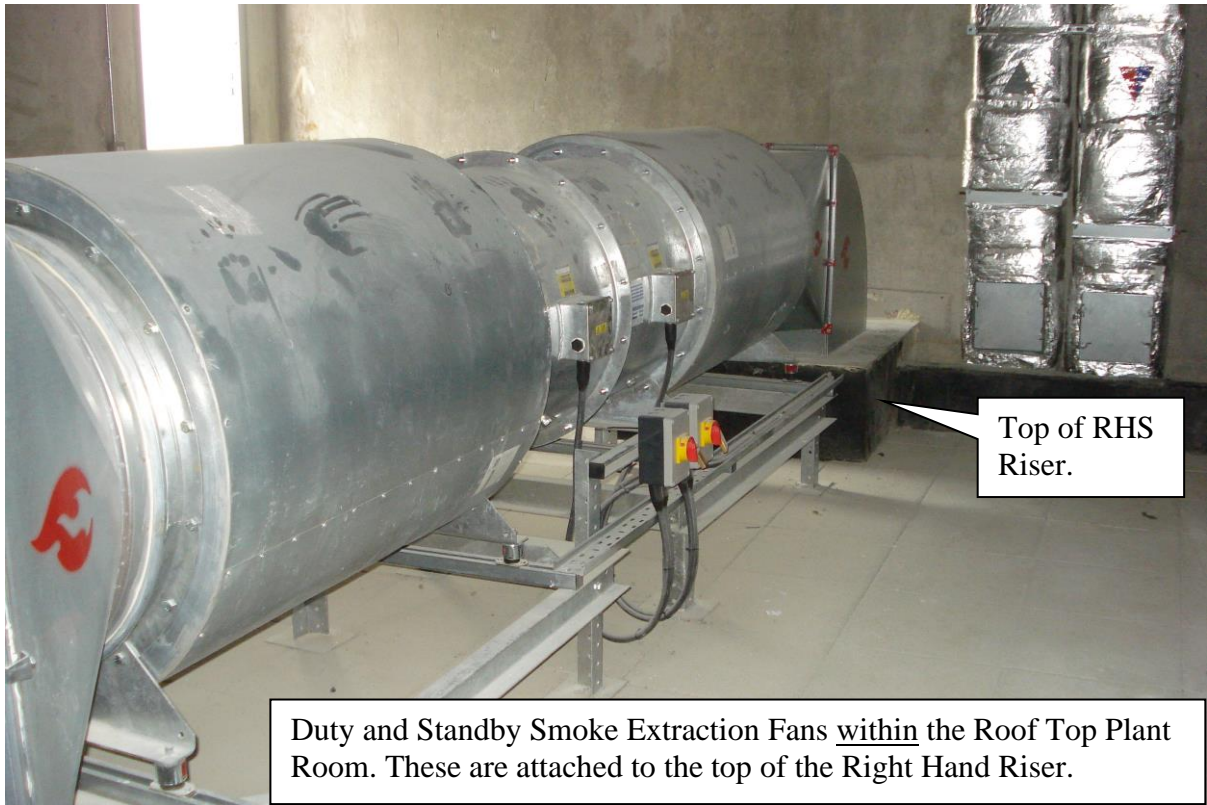
Yours sincerely,

*Christopher Fletcher.*

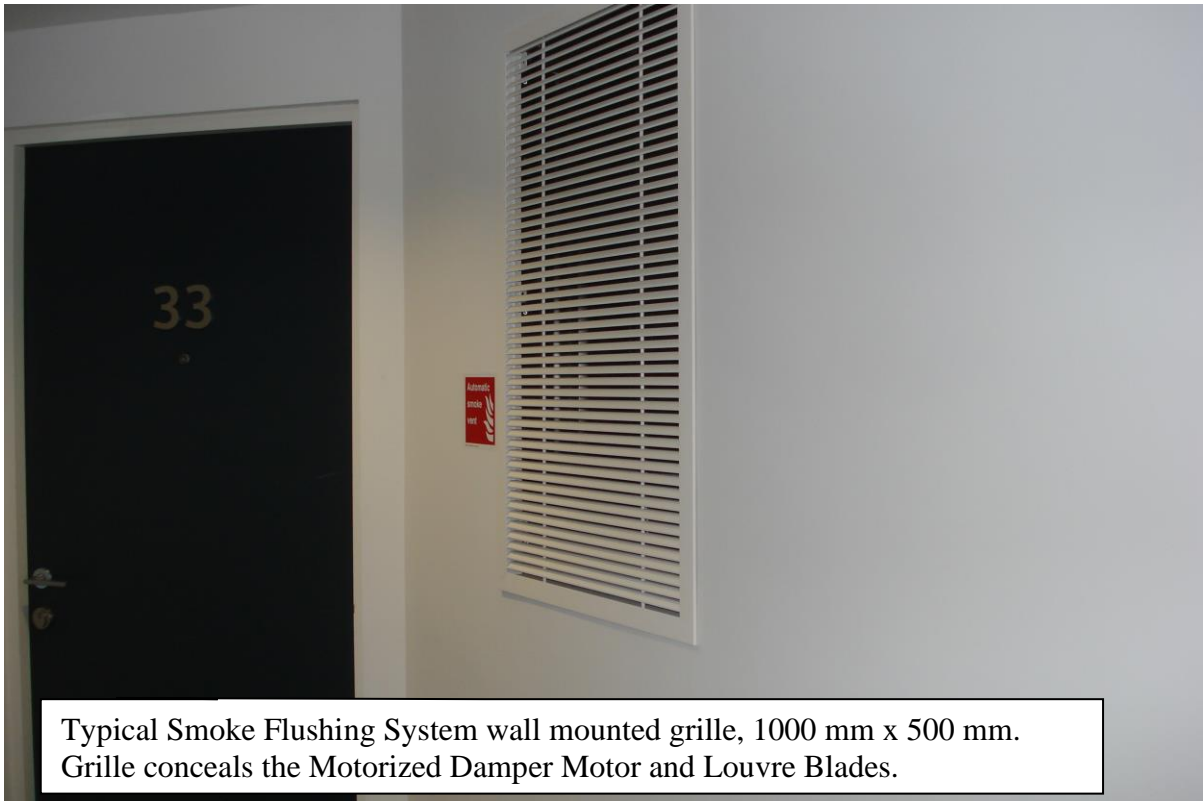
Christopher Fletcher B.Eng. (Hons.) C.Eng. M.I.E.T.  
Engineering Manager for SmokeTec Limited.  
14<sup>th</sup> April 2022.

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Photographs below.







Typical Smoke Flushing System wall mounted grille, 1000 mm x 500 mm.  
Grille conceals the Motorized Damper Motor and Louvre Blades.



Fireman's Override Key-Switch. One on every appropriate Staircase Landing.  
OFF which disables the complete Smoke Flushing System.  
AUTO which is the normal default position.  
BOOST which makes the Smoke Flushing System run at full speed / extract rate.



At Roof Level. Automatically Opening Smoke Ventilation / Air Inlet Louvre at the very top of the single “Means of Escape” Staircase.



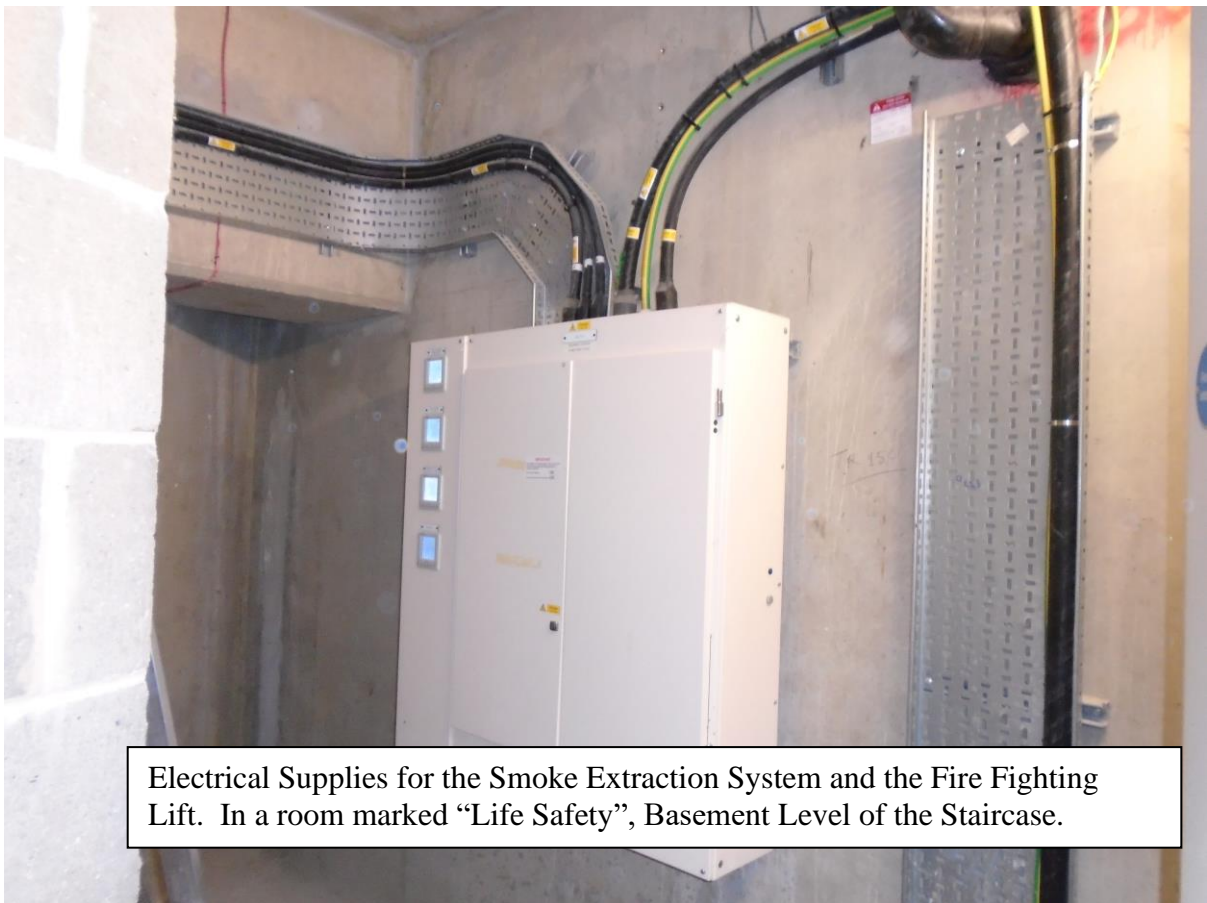
Top of Staircase Automatically Opening Vent. Wide “Open” whilst being tested. Blue Sky visible.

Cables to two  
Smoke Extract  
Fans.

Fire Alarm  
Interface Units.

Primary &  
Secondary  
Power  
Supplies.

System Control Panel in a Riser by Apartment 131.





This Smoke Extraction Grille does not work at all. Consequently, the Smoke Extraction in this corridor does not work. Further investigation is required.