

CASE STUDY: CONDOR HOUSE, ST PAUL'S LONDON

Fire Detection and Voice Alarm Upgrade by WFP Fire & Security Completed January 2019



Synopsis

This extensive project involved the complete replacement of all the elements of an integrated Simplex fire detection, voice alarm and fire telephone system with over 900 smoke detectors, 600 interfaces, a bespoke plant control bank of key-switches, a sprinkler indication bank of LEDs, plus more than a thousand speakers; all within a fully-operational, nine-storey, multi-tenanted building, including retail units on the ground floor. The entire project was carried out whilst maintaining the old system throughout, and was completed in January 2019 without incident or activation.

Key Points

The existing system within Condor house was originally supplied from a manufacturer that does not actively have a presence in the UK, impacting the ability of the maintenance organisation to offer complete support. The 'closed¹' nature of the system also meant that the price paid for alterations was higher that the market price of 'open²' systems and over years, our experience indicates that buildings that have 'closed' systems will pay significantly more for alterations and breakdowns that buildings with 'open' systems. The existing maintenance provision (prior to WFP) was not meeting the service level required by the client, partly due to the above, and partly upon service alone.

The existing system was an integrated fire alarm, public address/voice alarm with an integral fire telephone system, and therefore quite a complex system in nature. The replacement fire detection and voice alarm system is made up of an integration of separate systems: a fire detection system, a voice alarm system and a fire telephone system; which, although linked, are separate systems working as one completed fire detection and alarm system.



REPLACING THE FIRE ALARM AT CONDOR HOUSE



Initially, WFP were employed to provide an overview of the technical nature of the replacement of the fire alarm system. This survey was carried out over a weekend, giving our Contracts Manager, Scott Wright, and Chief Technical Officer, Barry Leeds, the time to assess how and if the system could be replaced in a manner that would be acceptable for a multi-tenanted, high-end working building. WFP provided a detailed report which highlighted the issues that we found, an accurate quantification of the job in hand and our recommended solutions, which formed the basis of the following case study.

<u>Tender</u>

WFP were asked to submit a competitive tender for the works and, after various rounds of interviews and appraisals, were awarded the contract to replace the system.

The Program

- 1. Phase One: Off-Site Workshop Phase
 - a. Create new CAD drawings, finalise the physical design and build the new system
 - b. Create basic cause-and-effect programming (off-site) based upon the existing
 - c. In-hours, on-site preparation works
- 2. <u>Phase Two: The On-Site Changeover</u>
 - a. Out-of-hours Voice Alarm change-over
 - b. In-hours Fire Alarm upgrade in the non-tenanted areas
 - c. Out-of-hours Fire Alarm change-over
 - d. Out-of-hours Fire Telephone change-over
- 3. <u>Phase Three: Final Programming, Testing and Commissioning</u>
 - a. Off-site programming of graphics and cause-and-effects
 - b. Final witness test



Phase One - Off-Site Workshop Phase

As part of our proposal, we had agreed to build and program the system off-site. This provided a safe and non-invasive environment to get the technical hard work done and reduce the time on site. As a result, there was little indication of the progress of works for the first two months whilst our specialist team designed and constructed a bespoke replacement fire detection and PA system in the safe environment of our workshop.



The outgoing Simplex system was a single integrated fire alarm, voice alarm, fire

telephone, and sprinkler indication system. It consisted of eight bespoke cabinets; each with a high-level power supply, two cabinets with banks of batteries and four double-sized bespoke cabinets containing amplifiers for the voice alarm system.

The replacement system would be housed inside three mobile racking units with removeable side and rear access panels; one rack dedicated to the voice alarm, and the other two racks containing the six 4-loop fire alarm panels and associated power supplies, 200 zonal indicators, sprinkler indication, bespoke plant with key switch isolation controls.

Our contract manager, Scott Wright, researched and designed the new system racks in-house, with a view to providing:

- \checkmark Easy access for maintenance of the system and room for any future modifications.
- arnothing Flexible containment of the Voice Alarm cabinet for the rack to be moved for the specific and essential maintenance required throughout its working life.

The internal cabling is a work of art in itself, you only need to take a quick look at photographs and you'll see the extreme detail within the wiring room that connects the nodes that make up the Advanced Electronics Network.

As part of the design, Scott created specifically constructed supports for the cable ways made using Unistrut® containment access for batteries and images of the internal cabling.

Level of Detail

- Blacked-out door for the central rack to avoid user confusion with multiple displays
- Bespoke colour-coded fascia spacers on the front of the rack to avoid gaps between parts of the system
- Bespoke etched wording for the plant controls





Phase Two: The On-Site Change-Over

The new system was designed to be built using a racking system, much like the racks that are used for computer systems. This was a big departure from the existing heavy-duty Simplex fire alarm system, which had been custom-built and filled three walls of the control room in the basement of Condor House.

Initially, Scott created a proposed program of works, which included off-site build-up of the replacement system, redrawing the building in computer-aided design (CAD) format, and a mixture of daytime and night-time working to change over the various systems. There were weekly, then fortnightly, meetings to discuss progress and any unexpected issues from the previous week's work, which involved the building owner, manager and facilities team.

The Voice Alarm

The new TOA Corporation Voice Alarm system, has its own dedicated rack. This was the first part of the system to arrive at Condor House and was in Phase One of the system change-over. The recorded messages were key to the continuity of the cover within this busy and complex building. Our Contracts Manager, Scott, recorded these from the old system during a weekend test and created transcripts. The result was that almost identical copies were formulated for the new system. It was interesting to note that, when asked, the building users did not notice any differences. This was a key aspect of the smooth transition to a new system. The building manager took the opportunity to add an additional message to enhance the system's capability.

The Fire Detection

The fire detection chosen to replace the existing Simplex system was made up using a rack mounted version of the 'Advanced Electronics MXPRO 5'⁷ range of control panels, to which we connected the solidly reliable Apollo 'XP95'⁸ range of detectors and interfaces. This was connected to a new Advanced Electronics Graphics package, detailing the building layout to make it easy and straightforward for the security team to control their fire detection system graphically.

The Simplex system was integrated, in other words, it was one system that ran the fire alarm, fire telephones, voice alarm and sprinkler indications, damper control and plant isolations. Given the complex nature of this, the work to replace this took

a great deal of careful and thorough investigation before we began splitting out the individual parts for removal to fit the stages of the program. It was vital that we kept the fire detection working, given the nature of the building and the complete overhaul of detection.







Loop by Loop

Addressable fire alarms are wired-in loops of cabling, and connected to each loop could potentially be over 100 devices. In order for us to change the system, we had to remove one loop at a time and completely change out all of the devices in a single night shift, making sure that the building was covered by the new fire alarm by the morning.



Image 1 - Rewired control room behind the new racks

Plant Controls and Sprinkler Monitoring

The Simplex system was fully integrated within the fire sprinklers and was monitoring the sprinkler flow switches, as well as monitoring for sprinkler isolation. The system was connected using a complex failsafe methodology with interfaces which were constantly powered. This required detailed programming using the cause-and-effects matrix of the Advanced Electronics system to make real use of the systems capability, and underlined why we advised the client to choose this system for the replacement.



Drawings

There were no computer aided drawing (CAD) versions of the site drawings and our CAD operator had to painstakingly re-draw the entire building, copying the layout of the existing fire alarm system in order for us to issue design drawings for the installation.



<u>Phase Three: Final Programming, Testing and</u> <u>Commissioning</u>

Graphics System



The old system had a graphics system which had become out-of-date with the various building changes and required updating with drawings and device layout. By virtue of the upgrade we were able to provide a PC based graphical interface which uses the CAD drawings

to represent the location of the detectors and provides a simple list-based method of controlling the fire alarm system without leaving the security office.



The Completed System

After several months of preparation, day time installation, night shift changes and investigating wiring faults along the way, we completed the change-over of the system without fuss or disruption.

The results are that Condor House now has a fully up-to-date fire detection and voice alarm system ready for the next 10-15 years of continual service. One which will be easy to use, reliable and without the difficulties in managing that the old system had presented. In fact, the system should now do what a fire alarm system should do and monitor the site, ready to react to the detection of smoke and provide inhabitants time to evacuate safely, but only when it is needed.



Benefits from the Installation

- 1. A new set of drawings have been created, giving the building manager improved control over changes.
- 2. A new, up-to-date and powerful fire detection and voice alarm system is now installed with a long product lifespan, providing peace of mind for the next 10-15 years.
- 3. 50% more space in the control room now that two of the walls are free of equipment.
- 4. Ease of use for the client with a simple control panel, which is backed with a PC controlled Graphics system.



Client Testimonial



Steve Robins, Director at Combined Technical Solutions:

"CTS commend WFP and, in particular, the Project Manager, Scott Wright, for the works recently completed at Condor House, St Paul's Churchyard. The project to replace the entire fire alarm and public address systems had many challenges. The way WFP planned the works and then implemented the program meant that the project ran very smoothly. Any issues that arose during the project were addressed very quickly. Information was communicated concisely and promptly, disruption to the building occupiers was minimal, in fact, people hardly noticed the works. **These large building fire alarm replacements are never easy, but Scott & WFP made it look so**."

Q&A with our Contracts Manager, Scott Wright

What was the hardest part of the job?

Ensuring that the existing system was functioning without fail whilst upgrading to the new system. There was a lot of technical knowledge and prowess needed to ensure there were no slips in protection or efficiency.

What have you learnt during this system change over?

How to survive on minimal sleep! Also, just how intricate and enjoyable designing and implementing a new system can be.

What has been the most satisfying aspect of the work? Seeing the completed system all come together! The months of programming and planning are totally worth it.





Explanations

- 1. **Open Systems** This term is also called 'Open Protocol'. Open systems are widely available to fire detection and alarm companies, meaning that the building user has control over the company that maintains and works on the system and, in general terms, will only pay the market price for the products and, more importantly, will be able to choose the company that supports the system on level of service.
- 2. Closed Systems This term is also called 'Closed Protocol'. In essence, a closed system has a restricted route to market, either via a single source manufacturer or via dedicated agents. This has two effects, however both could be summed up as 'lack of choice'. You will pay more for spares and your choice of support is limited, which can have an effect upon the level of service you can expect and means that you will pay between 20% and 100% more for the same work that an open system would have cost, which over the 10-15 year life span of the system could be many thousands of pounds.
- **3.** Fire Detection This is a system that is designed to detect fires using passive 'point type' smoke and heat detectors, active 'Air Sampling' detectors such as VESDA (Very Early Smoke Detecting Apparatus), and manual call points for human intervention.
- 4. Voice Alarm This is a separate system of fire-rated speakers of various types, i.e. wall-mounted speakers, projection speakers and ceiling-mounted speakers. These are used to annunciate messages such as *"there is a fire in the building, please leave by the nearest available exit"*. It is also common to use these systems as Public Address (PA) and are sometimes used for background music.
- 5. Fire Telephone This is a separate system used which is used by fire fighters to communicate across, and up and down floors, in the event of a fire within the building. These systems are basically a dedicated internal telephone system with wired-in, fire rated cables, and are for emergency use only.
- 6. TOA The TOA Corporation is a manufacturer of Voice alarm and PA systems.
- 7. MXPro5 range by Advanced Electronics This UK manufacturing company is part of the Halma group and is widely considered to be the best and most versatile 'Open' system on the market, and is most definitely the engineer's choice of product. The range consists of the MXPro4 and MXPro5.
- 8. XP95 range by Apollo Fire Detectors This UK manufacturing company is part of the Halma group and is widely considered to be the best and most versatile 'Open' detection range on the market, and is most definitely in the engineer's top three choices of product.

<u>Hashtags</u>

#stpauls #london #condorhouse #simplexreplacement #firealarmreplacement #TOAvoicealarm #voicealarmreplacement #apollofiredetectors #advancedelectronics



<u>Pictures</u>

Condor House Exterior:



Bespoke Racking for Panels and Inside the Panels:







Cable Trunking:



Programming:

