



BUILDING CONTROL, PUBLIC ADDRESS AND VOICE ALARM
TALL BUILDINGS



Voice Alarm for Tall Building Evacuation

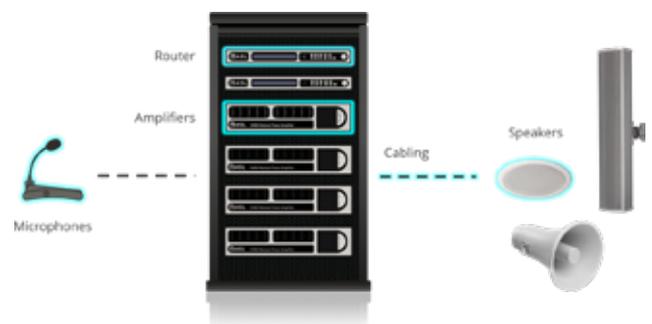
Studies show that the amount of time that passes between an alarm being raised and occupants of a building mobilising for evacuation is drastically reduced when a speech message is broadcast and heard if compared to the amount of time that passes before evacuation for a standard fire-alarm tone.

Widespread use of spoken voice alarm messages led to revisions of the British Standard i.e. BS5839-pt8 Voice Alarm and the EU Construction Products Regulation for fire products with the introduction of the EN54 equipment standard.

Whilst very efficient on rules and guidelines for equipment standards and cabling types the standards do not provide guidelines on the philosophy of deployment of fire safety systems or instructions on how systems should be used.

Systems & Technology

- System components might include microphones, an audio router (or number of routers), amplifiers and speakers
- All components should include monitoring, so that you know the system is working and will work in the event of an incident
- The system should include a secondary power supply, normally a battery back up
- The system should include pre-recorded messages and the ability for live messages from a nominated responsible person i.e. a fireman's microphone
- Speakers should have back cans for protection and be fed from two cables per zone
- All cabling should be fire-retardant.



Example System Deployment

This system example highlights a traditional deployment in a multi-use building combining retail and commercial use at lower levels and residential use on higher levels. There are car-parking levels below the building and two staircases, one to each side of the building.



Loudspeakers are installed on each floor with separate zones for the staircases, all connected to a single Fire Panel and VACIE on the ground floor.



In this example of a traditional system it appears to work well, unless the system becomes compromised by the fire and the higher floors become isolated from the VACIE system messaging.



By deploying a distributed system with redundancy i.e. double cabling, multiple fire panels and VACIE systems, the system becomes much more flexible and resilient to stress / building damage.



We can utilise 'live' or pre-recorded messages. Experience shows that when a real human voice tells you there is an emergency, it is instantly credible and mobilisation begins sooner.



We can use live messaging to direct occupants to correct exit routes. In the event of other threats we can also direct building occupants accordingly.



And in the event of natural disasters we can also direct building occupants accordingly.



When examining these scenarios another important consideration are the points from where live voice announcements are made i.e. do they cause the nominated person to have to get to a central point or are there multiple locations from where live announcements can be made.

We should also consider cable routes for live transmission points and whether cable routes for these should be hardened.

Voice Alarm is part of the solution.

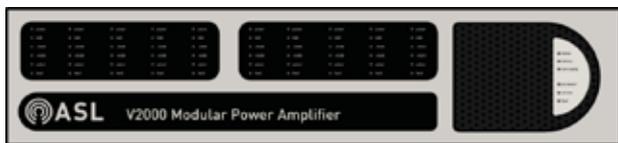
There are many mass notification techniques, including text and phone messaging, directional signage etc that can be deployed. By using a range of systems rather than single systems we are more likely to achieve good and safe outcomes.

The future will no doubt include mobile devices forming part of the solution, possibly guiding building apps or browsers to evacuation strategy pages / notifications, providing enhancements to communications, however for now we recommend:

- Flexible zoning
- Live messaging
- Accurate and considered messaging
- De-centralisation (for larger buildings)
- Intelligible loudspeaker coverage
- Regular evacuation training for staff
- Plan to succeed
- Consider the risks
- Be part of the solution
- Use technology
- Consider how else we can safely evacuate

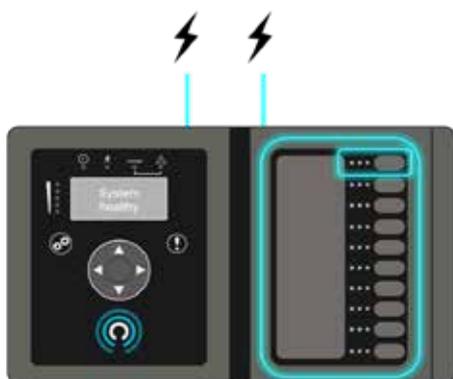
How Does it Work?

- The LCD display shows status information on the health of the system. Indicators meet regulated standards, designed to ensure all equipment manufacturers use the same colours and messages for conveying important information.
- Dual connectivity allows for two power inputs from a PSU and from 24VDC battery backup – ensuring no loss of power should one input fail.
- The router connects microphones to amplifiers, links to the fire detection system and stores pre-recorded messages.



- D-series amplifiers are housed in the frame. A standby amplifier automatically takes over from any failed amplifier.
- The frame also includes monitoring cards for loudspeaker lines. These are split into A&B outputs, meaning cable failure in a loudspeaker zone doesn't disable the evacuation in that area.
- Amplifiers can be easily replaced without losing power, and has two power inlets – the mains and a 24VDC battery. The frame includes a monitored charger to keep the batteries ready for use.

- Ceiling speakers are fitted with rear cover domes, often made from tough material such as steel.
- This prevents damage from debris or from forming a 'chimney' through a false ceiling, allowing oxygen into the void.
- All speakers are fitted with ceramic terminal blocks, which prevents melting and leading to cable failures in the circuit.
- An inbuilt thermal fuse disconnects the loudspeaker should there become a short circuit, so that the rest of the circuit is left unaffected.
- Voice alarm speakers are engineered for reliable use, most form types are available.



- Can be connected to twin redundant routers by diverse cabling routes for additional security.
- Inbuilt keypad for triggering pre-recorded digital voice messages.
- Shows if each zone is 'ready', 'at fault', or 'in emergency' and the associated message playing.

- All field cabling – fire microphones, loudspeakers and networks - should be fire retardant.
- There are two grades: Standard and Enhanced.
- All necessary types of cable, including CAT6 and Fibre-Optic, are available in fire retardant sheaths.

