

# **WHAT FSM NEED KNOW ABOUT SS546 : 2022 *CODE OF PRACTICE FOR EMERGENCY VOICE COMMUNICATION SYSTEMS IN BUILDINGS***

Presenter : **David Goh King Siang**  
Convener of Working Group for SS546 : 2022  
Vice President of Fire Safety Managers' Association Singapore

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**“Towards a Collective Effort for Fire Safety”**

## **TIME LINE FOR SS 546:2022**

- **Launch by Enterprise Singapore (ESG) on 18 May 2022**
- **SCDF Implementation: 1 January 2023** (to be confirmed)

**“Towards a Collective Effort for Fire Safety”**

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- 4.4.7 FCC shall be of **adequate size** to **house** all the terminals and **supervisory/control equipment**, etc. of the building’s fire protection/detection systems and a **free working space** (unobstructed by door swing) of **at least 6 m<sup>2</sup>**.



## 5.4 System design and operational requirements

### 5.4.1 One-way EVC system



#### 5.4.1.3.1 Message **sequence and quality**

c) It should take the **speed of the delivery** into account and provide **proper and adequate pauses** between words and sentences.

#### 5.4.1.3.2 **Language**

**English** shall be used as the **primary language** for all broadcast messages.

The **sequence of repeating messages in other languages** after the broadcast in English should be decided by the **owner or owner's representative**.



## 5.4 System design and operational requirements

### 5.4.1 One-way EVC system

#### 5.4.1.3.3 Live voice messages (Alert / Evacuation / Emergency Standby / Safe-to-Stay / False Alarm)

**d) Live voice messages announcement shall be in line with 5.4.1.3.4, 5.4.1.3.5 and 5.4.1.3.6.**



#### 5.4.1.3.4 Pre-recorded messages

Pre-recorded messages should be made where possible, by an **experienced announcer** in a **recording studio or a room** with a controlled acoustic environment having an **ambient noise level no greater than 30 dBA** and a **reverberation time no greater than 0.5 s** from 150 Hz to 10 kHz. Alternatively, a **synthesised voice** may also be used in place of voice recording provided that the resultant broadcast is **equivalent to that of a human voice**.

Pre-recorded messages shall be stored in **non-volatile memory**. **Message generators shall not use moving mechanical parts.**



## CLAUSE 5 – DESIGN CONSIDERATIONS

### 5.4.1.3.4 Pre-recorded messages



The pre-recorded messages shall be broadcast as follows:

- a) In the event of fire alarm activation in the building, the Alert message shall be broadcast repeatedly with a minimum of 2 cycles until it is superseded by a False Alarm or an Evacuation message or by an Emergency Standby message. Refer to 5.4.1.7 for the requirement of broadcasting the alert message upon fire alarm activation.
- b) In the event of evacuation from the building, the Evacuation message shall be broadcast repeatedly with a minimum of 2 cycles until it is manually silenced.
- c) In the event of small fire and that evacuation is not required from the building, the Emergency Standby message shall be broadcast repeatedly with a minimum of 2 cycles until it is superseded by an Evacuation message or a Safe-to-Stay message.

In general, Emergency Standby message can be broadcast after the first Alert message (on fire alarm investigation) when there is a fire in the building, but it does not warrant an evacuation.

In phase evacuation, this message can be broadcast to the non-evacuating floors while phase evacuation message is broadcast to the evacuating floors (fire floor with two storeys above and two storeys below).



### 5.4.1.3.4 Pre-recorded messages

The pre-recorded messages shall be broadcast as follows:



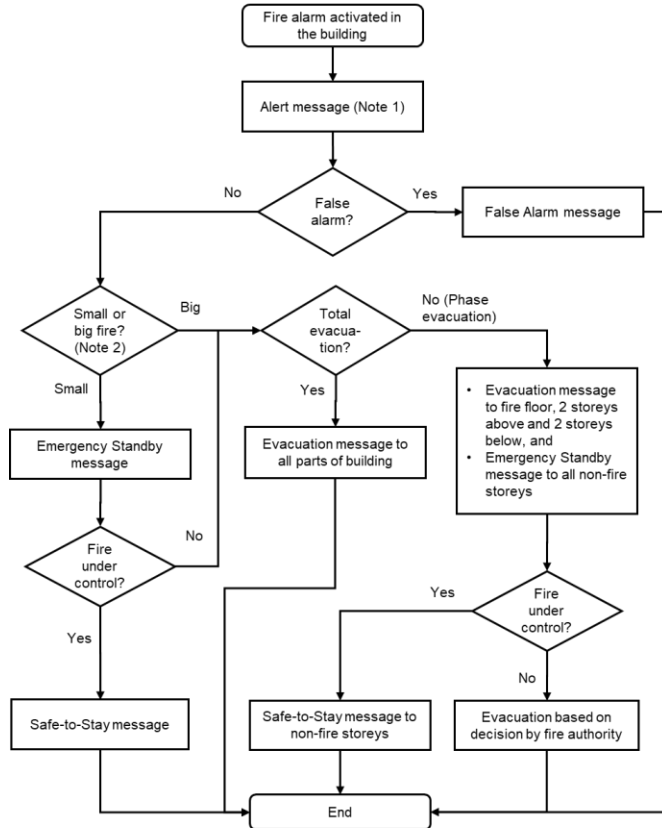
- d) In the event that a fire has been put out and the situation is under control, the Safe-to-Stay message shall be broadcast repeatedly with a minimum of 2 cycles until it is manually silenced.  
Safe-to-Stay message can be broadcast after Evacuation or Emergency Standby messages.
- e) In the event of false alarm after investigation, the False Alarm message shall be broadcast repeatedly with a minimum of 2 cycles until it is manually silenced.

See Annex C for message broadcast flowchart.





# CLAUSE 5 – DESIGN CONSIDERATIONS



Note 1 – In this flow-chart, all messages are broadcast in a minimum of 2 cycles  
 Note 2 – Decision is made by fire safety manager and the building emergency response team



### 5.4.1.3.5 Pre-recorded messages sequence

**Pre-recorded messages** (Alert / Evacuation / Emergency Standby / Safe-to-Stay / False Alarm) shall be made / broadcast in the **following sequence**:

a) **Attention-drawing signal – lasting 2 s to 10 s followed by:**



b) **Brief silence – lasting 1 s to 2 s, followed by:**



c) **Alert / Evacuation / Emergency Standby / Safe-to-Stay / False Alarm messages, followed by:**



d) **Silence – lasting 2 s to 5 s.**



## CLAUSE 5 – DESIGN CONSIDERATIONS

### 5.4.1.3.5 Pre-recorded messages sequence

For **Alert Message**, the sequence shall be repeated as per item a) to d) until it is superseded by, manually or automatically, an **Evacuation message**, an **Emergency Standby message**, or a **False Alarm message**.

For **Emergency Standby message**, the sequence shall be repeated as per item a) to d) until it is superseded by, manually or automatically, an **Evacuation message** or a **Safe-to-Stay message**.

For any **Evacuation, Safe-to-Stay and False Alarm message**, the sequence shall be repeated as per item a) to d) until it is manually silenced.

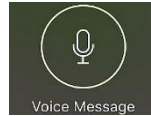
The sequence as per item a) to d) for all messages shall be repeated for at least 2 cycles. Thereafter, it shall be repeated at intervals of not greater than 2 min.

**Note** - The **duration, format and wording** of an emergency message are important. If the message is **too long**, listeners might not take in all the details and may await repeats. If the message is **too short**, it might not convey sufficient information. Also, if the time gaps between repeats of message are **too short**, listeners might not realise that the message has ended; conversely, if the gap is too long, listeners' safety could be put at risk while they await a repeat message for clarification.



## CLAUSE 5 – DESIGN CONSIDERATIONS

### 5.4.1.3.6 Messages format and wording



The **format and wording** of the **pre-recorded** and **live voice messages** (Alert / Evacuation / Emergency Standby / Safe-to-Stay / False Alarm) shall comply with the following:

- a) **Alert message: “Attention. We are investigating the cause of the fire alarm. Please standby for more instructions.”**
- b) **Evacuation message: “Attention. There is a fire in the building. Stay calm and get out using the nearest exits and staircases now.”**
- c) **Emergency Standby message: “Attention, there is a fire in the building. We are handling the situation. Stay calm and wait for further instructions.”**
- d) **Safe-to-Stay message: “Attention, the situation is under control. It is safe to stay in the building. Thank you.”**
- e) **False Alarm message: “Attention, It was a false alarm. It is safe to remain in the building. Thank you.”**

**Note: Standard pre-recorded messages** (Alert / Evacuation / Emergency Standby / Safe-to-Stay / False Alarm) can be **downloaded for use from the relevant authority website to achieve message uniformity for all buildings.**

## CLAUSE 5 – DESIGN CONSIDERATIONS

### 5.4.1.3.7 Emergency microphones

5.4.1.3.7.1 The **emergency microphone** shall be either:



- a) **dedicated to the broadcast of emergency messages, in which case means shall be provided to prevent its use for non-emergency function, for example by enclosing it in a glass-fronted cabinet; or**
- b) **use for both emergency and non-emergency purposes, in which case means shall be provided to prevent non-emergency broadcast from overriding a pre-recorded emergency broadcast.**

5.4.1.3.7.2 The emergency microphones shall include the **following characteristics or capabilities:**

- b) **Means to ensure that emergency microphone(s) override all other audio sources.**
- c) **Means to ensure that only one emergency microphone is active at any one time.**

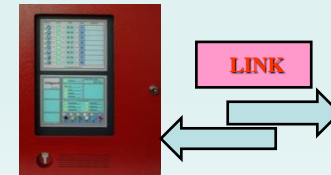


## 5.4.1.7 Interface with the fire alarm system



When the loudspeakers are in use for fire/emergency announcements, a manual or automatic switching facility shall be provided to deactivate all the audio and visual alarm devices in the building, but only after the fire alarms have operated for not less than 15 s. This switching facility shall only deactivate all the audio and visual devices and not affect the other operation of the fire alarm system.

When a fire/emergency announcement is broadcast with audio and visual alarm devices deactivated, any subsequent alarms shall not re-activate the audio and visual alarm devices. The visual devices shall only be re-activated when an evacuation/emergency message is announced.

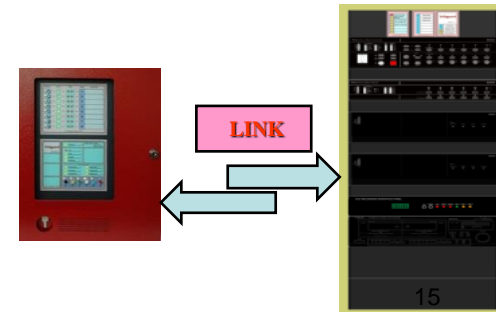


## 5.4.1.7 Interface with the fire alarm system



The fire alarm system and the EVC system should be linked to maintain the integrity of overall operation. It might be desirable for systems with distributed control equipment to provide a link at more than one control equipment location rather than on a central location.

If the fire alarm system and EVC system are linked, pre-recorded messages shall be provided, and the messages which have been initiated by the fire alarm system shall continue to be broadcast even in the event of a subsequent fault in the interconnecting link between the two systems. Removal of the triggering signal(s) from the fire alarm system shall not silence or reset the messages initiated by the fire alarm system.



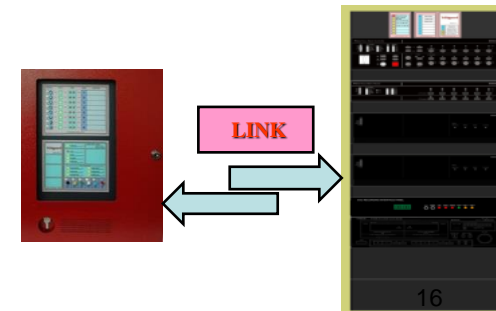
## 5.4.1.7 Interface with the fire alarm system



In the event of subsequent alarms activation from other zone, the Alert message shall be replaced by a higher priority or Evacuation message initiated from the fire alarm system or manually from the EVC system.



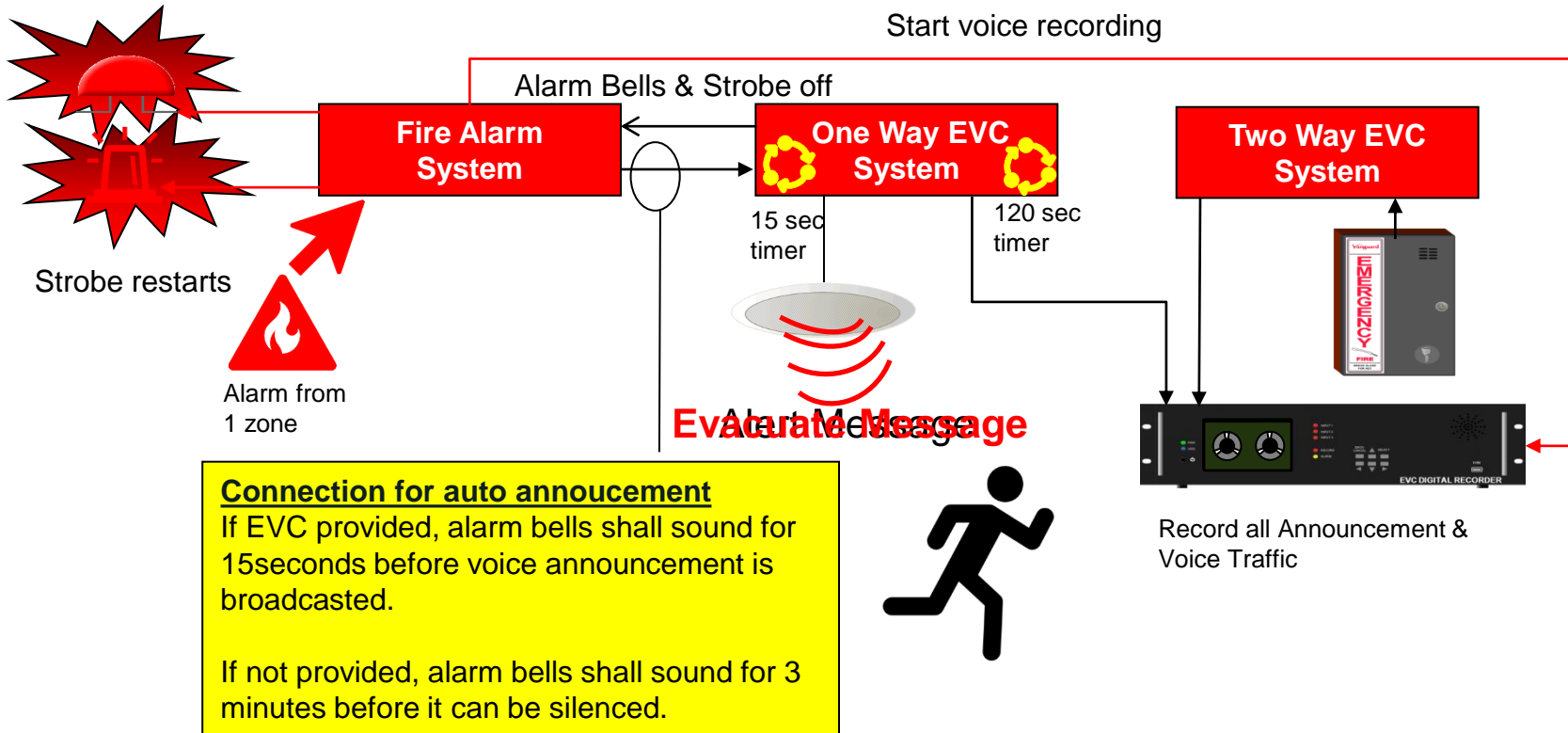
When an Alert message broadcast has been initiated automatically from the fire alarm system, the broadcast shall be replaced by a higher priority message or an Evacuation message from the EVC system if there is no manual acknowledgement by the building operators after 2 min of the Alert message broadcast.





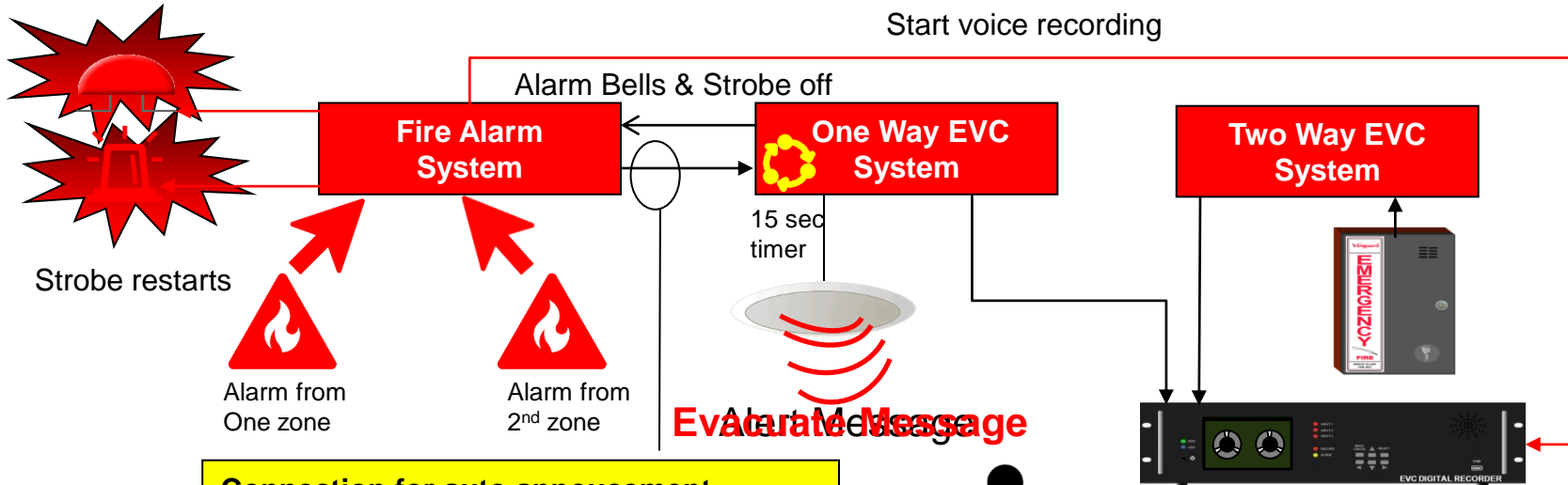
# CLAUSE 5 – DESIGN CONSIDERATIONS

## 5.5.8 Interface with EVC system - Fire Alarm & Messages (Single Zone Alarm)



# CLAUSE 5 – DESIGN CONSIDERATIONS

## 5.5.8 Interface with EVC system - Fire Alarm & Messages (Two Zone Alarm)



### Connection for auto announcement

If EVC provided, alarm bells shall sound for 15seconds before voice announcement is broadcasted.

If not provided, alarm bells shall sound for 3 minutes before it can be silenced.



## CLAUSE 5 – DESIGN CONSIDERATIONS

### 5.5 Power supply

#### 5.5.3 Battery capacity

For **one-way EVC** systems, **standby batteries** that serve any part of the system shall:

- a) have **sufficient capacity** to maintain the system in a **quiescent state** of operation for **at least 24 h**, after which sufficient capacity shall remain to **broadcast an evacuate message** in all loudspeaker zones for **at least 30 min**, unless the building is provided with an auto-start standby generator;
- b) in a building with an **auto-start standby generator** that serves the one-way EVC, have sufficient capacity to maintain the system in a **quiescent state** of operation for **at least 6 h**, after which sufficient capacity shall remain to provide an **evacuate broadcast** in all loudspeaker zones for **at least 30 min**.



### 5.5 Power supply

#### 5.5.3 Battery capacity

For **two-way EVC** systems, **standby batteries** that serve any part of the system shall:

- a) have **sufficient capacity** to maintain the system in a **quiescent state** of operation for **at least 24 h**, after which sufficient capacity shall remain to allow the system to be used for **voice communication** in an emergency situation for **at least 3 h**; unless the building is provided with an auto-start standby generator.
- b) in a building with an **auto-start standby generator** that serves the two-way EVC, have sufficient capacity to maintain the system in a **quiescent state** of operation for **at least 6 h**, after which sufficient capacity shall remain to allow the system to be used for **voice communication** in an emergency situation for **at least 3 h**.



## 6.2 Maintenance and Testing

### 6.2.1 General

The owner or owner's representative should establish an agreement to carry out regular maintenance of the EVC system with the manufacturer, or manufacturer's representative, or a competent contractor.

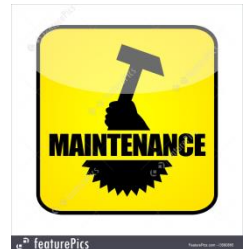
The name and telephone number of the servicing organisation should be prominently displayed at the EVC equipment.

The arrangements for maintenance should be such that a competent person is available on call at all times to provide service in the event of any fault that develops at the EVC system.

The details of any service call shall be entered in the log record, which shall be provided for convenient reference.

### 6.2.2 Regular testing and inspection

All defects observed during the testing and inspection shall be recorded and rectified immediately.



## 6.2 Maintenance and Testing

### 6.2.3 Service plan for one-way and two-way EVC systems

#### 6.2.3.1 Inspection

The system should be inspected in accordance with the following at intervals **not exceeding three months** to ensure:

- a) Access to the EVC equipment is **not obstructed**;
- b) Visible indications remain **readily distinguishable** in ambient light conditions;
- c) There are **no fire hazards** near to the location of the EVC equipment;
- d) Operating **instructions** are available.



## 6.2 Maintenance and Testing

### 6.2.4 Records

A record in the form of **soft copy, printout or logbook** shall be provided in a format which is appropriate for the types of building. The following information shall be recorded:

- a) the **name(s)** of the member(s) of the premises **management** to whom **responsibility** for the EVC system is delegated
- b) the **name and signature** of the person who takes and authorises the **remedial actions**
- c) **brief details** of maintenance arrangements
- d) any **alterations and additions**
- e) **dates and times** of routine / preventive maintenance and testing activities
- f) **dates and times** of the emergency broadcast of the system
- g) **dates, times, and types** of all faults detected
- h) **details** of the fault found and the circumstances of it being found (for example during routine maintenance)
- i) any **remedial actions** taken
- j) the **results of the tests** and the identity of the remote handsets used.



## 6.2 Maintenance and Testing

### 6.2.4 Records

The purpose of records are:

- a) to allow **investigation** of the **incident** when the system **failed to broadcast** in a particular zone.
- b) to allow **maintenance** staff to monitor the pattern of faults arising so as to aid the **diagnosis of the system** problems and the management of preventive maintenance.

For post-investigation purposes, all records shall be kept for a **minimum of 12 months**.





# PRACTICAL APPROACH IN INVESTIGATING/RESPONDING TO FIRE ALARM ACTIVATION

Why **2 minutes** for operator to **acknowledge an Alert message** broadcast upon **Fire Alarm Activation**.

**In-line with DECAM respond not exceeding 2 minutes**

**2 minutes is too short to investigate and report ???**

- Lifts only take 1 minute to any floor (Vertical Travel)
- Horizontal Travel another 1 minute ??



## PRACTICAL APPROACH IN INVESTIGATING/RESPONDING TO FIRE ALARM ACTIVATION

**Some good practice upon alarm activation:**

- Make full use communication equipment / CCTV for quick investigation remotely.**

Remarks: CCTV is solely to be used to complement the verification process.

Physical verification will still have to be conducted

- Identify types of detectors activated**

- Sprinkler, Heat Detectors?

- Never inform DECAM it is a false alarm before any Immediate investigation**
- Never attempt to Isolate any zone in Alarm when first alarm activated**

# Thank you

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