

Voice Messages

- Distinguish between audibility and intelligibility.
- Describe when different types of voice messages are appropriate.
- Determine the content of emergency messages.



Requirements

- Provides more information
 - Better response
- Depends on occupancy
 - Number of people
 - Limited abilities



Voice Notification

- Pre-recorded
- Live
 - Message templates
 - Overrides pre-recorded message
- Zoned
 - Acoustically distinguishable spaces
- One-way
- Provides instructions to occupants
 - Message
 - Attention
 - Source
 - Event
 - Actions
 - Actions
 - Evacuation
 - Area of refuge
 - Defend in place



Intelligibility

- Acoustically Distinguishable Spaces (ADS)
- Building environment
- Speaker type and location
 - Fewer, smaller usually better
- Testing
 - Stipa signal http://www.studiosixdigital.com/support/downloads-2/stipa-looplong1pt1_44k.wav
 - Trained listeners
 - Can it be understood



Conducting Tests

- Test when an area is occupied and when ambient sound level is near expected maximum
 - This is preferred
- The choices of testing in occupied areas is based on convenience versus disruption of normal use of the space
- Unlike audibility testing, intelligibility testing is less likely to contribute to the “Cry Wolf syndrome”
 - The test signal is not the same as the evacuation tone which would be sounded throughout the test of a tone signaling system



Intelligibility Requirements

- Intelligibility is first determined by ensuring that all areas have the required level of audibility
- Not required to meet the audibility requirements of tone alarm signals
 - Why?
- Certain areas may not have intelligibility requirements
 - Private bathrooms
 - Mechanical or electrical equipment rooms
 - Kitchens
 - Closets



ADS

- Acoustically Distinguishable Space
 - A notification zone that might be an enclosed or other physically defined space distinguished from other spaces because of different acoustical characteristics such as reverberation or ambient sound levels
 - Areas less than 400 ft.² will simply be defined by the walls
 - In larger areas, change and ceiling height, acoustical finish such as carpet instead of tile would require the area to be defined as a separate ADS
 - Should be an area of consistent size and materials
- Coordinate with other design subject experts to ensure intelligibility can be achieved



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- The quantity and spacing of speakers
- Many system designers design a space using the same number of speakers as they would horns for a basic tone-only fire alarm design. Or they simply use combination speaker-strobes wherever a strobe is required. Neither method addresses the real factors that affect speech intelligibility
- If your ear is close to a sound source, the source does not need a lot of energy to be audible. A good analogy is head phones, which deliver a small amount of sound energy directly to your ear. Even when the volume is turned up to where you perceive it as being loud, those near you might not hear it at all. This analogy works well for most in-building voice system designs: Use more speakers, spaced closer together and driven at lower wattage levels



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- How many speakers are required? And at what spacing and power level? It depends. A good design might start with the goal of having a uniform sound level where the listener never experiences more than about a 6 dB variation as they move about a space. This is a target used by engineers designing sound reinforcement for meeting rooms and some paging systems. An emergency system can usually tolerate a greater variation, provided it overcomes the background noise and provided it is not so loud as to create reverberation off the surfaces.
- The sound pressure level must be enough to overcome most background noises, but not to the point where it's judged "loud." For most occupancies, the level can be based on the ambient noise level measured at about 2000 Hz, a frequency that is an important component for speech intelligibility, particularly for consonants. A loudspeaker's output varies with frequency and also varies as you move off axis—both will affect the required spacing. Additionally, a higher ceiling might actually require fewer speakers than a lower ceiling. However, because the speakers on a high ceiling are farther from the ear, they might require a slightly higher dB output, adjusted by using a higher power tap on the speaker or by using speakers with a different rating. Annexes A and D of NFPA 72 have diagrams and some discussion of these principles.



Notification Systems

- All information provided both audibly and visually
- Standard alerts
- Independent of people present
- No conflict between means of delivery
- Distinct for all emergencies
- Simple messages
 - Vocabulary
 - Number of instructions



Notification Systems

- Most important information at beginning and end
- Repeated frequently at slow pace
- Information readily accessible
- Displayed long enough to comprehend
- Instructions for all populations
- Details provided
- Background noise eliminated



Vulnerable Populations

- Visually impaired
- Hearing impaired
- Cognitive disability
- Elderly
- Children
- Large groups
- Isolation
- Unfamiliar
- Asleep
- Intoxicated
- Non-Native speakers
- Committed to task
- Situationally disabled
- Compounded effects

