SOUND REINFORCEMENT SYSTEMS

- to reinforce the sound, which would otherwise be inadequate
- should remain constant
- give the listener the same loudness, quality, directivity, and intelligibility as if the source of sound were immediately adjacent
- required in spaces larger than 50,000 ft3 (≈1400 m3).

COMPONENTS AND SPECIFICATIONS

(a) Input - microphone

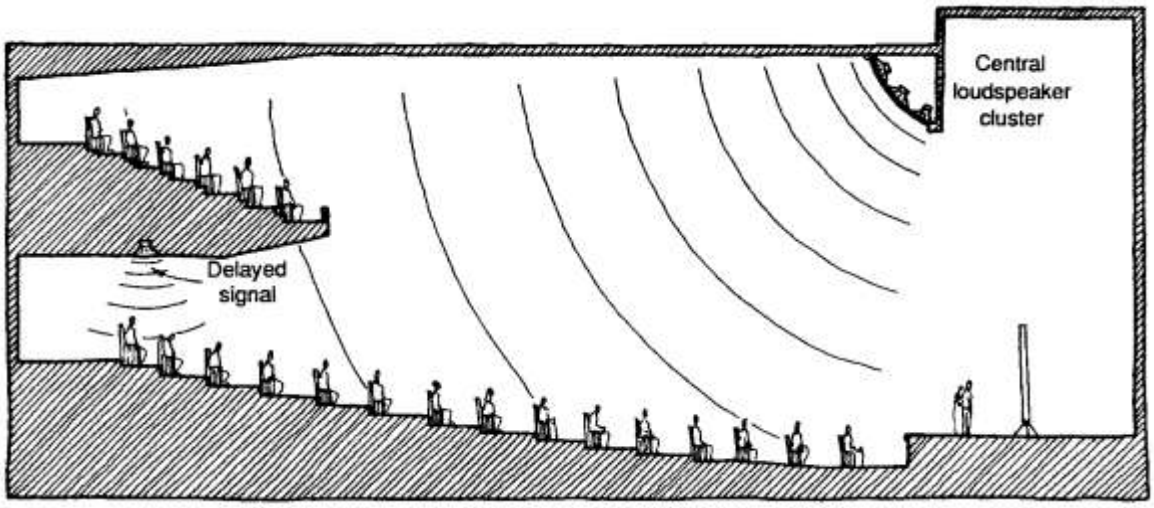
(b) Amplifier and Controls - deliver sufficient power to produce intensity levels of 80 dB for speech, 95 dB for light music, and 105 dB for symphonic music

(c) Loudspeakers - The two principal types of loudspeaker systems are central and distributed.

central system

The loudspeakers in a conventional central system are a carefully designed array of directional high-frequency units combined with less directional low-frequency units placed above and slightly in front of the primary speaking position.

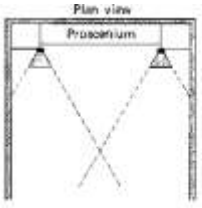
In most theaters, this location is just above the proscenium on the centerline of the room. Located in this position, the system provides directional realism and is simple in its design.



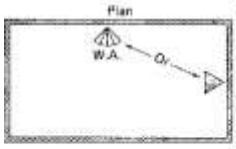
distributed loudspeaker system

- A distributed loudspeaker system consists of a series of low-level loudspeakers located overhead throughout the space. Each loudspeaker covers a small area, in a manner similar to downlights.
- This type of system is used in low-ceiling areas where a central loudspeaker cluster cannot provide proper coverage.
- Particular care must be taken in speaker positioning and volume levels. Failure to do so will result in the unfortunately very common condition of extremely loud yet unintelligible speech

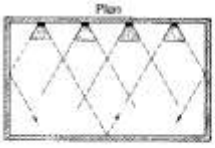
(a)
Proper installation would locate a single high-intensity array at the center of the room above the proscenium, near the ceiling, and angled down into the audience.



(e)
Large, high-level speakers on both sides of a proscenium opening give poor coverage, cancellations, reflections, and no sense of directivity.

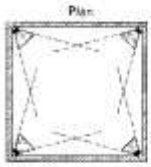


(b)
Proper installation would use a single wide-angle unit facing the long wall or a narrower unit on the short wall. Choice depends on room reverberation and dimensions. Low-level, ceiling-distributed system—is also possible if directivity is not important.

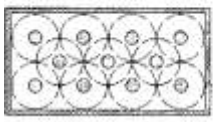


(f)
Small wall-mounted speakers yield confused, garbled sounds, areas of cancellation, and lack of directivity caused principally by strong reflections from opposite walls.

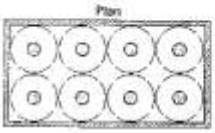
(c)
Proper installation uses a single standard or wide-angle unit, depending on room characteristics. Ceiling system not advisable or necessary.



(g)
Poor coverage at space perimeter; chaotic sound conditions in the center.



(d)
A staggered pattern gives more uniform coverage in that speakers are closer together. Angle of coverage for low-level speakers is approximately 60°. Coverage circles are drawn on the working plane.



(h)
Excessive variations in intensity over the room area.