**Acoustic sound reinforcement system in conference room**

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It is well known that natural sound sources (such as speech, instrumental performances, and singing) emit very limited sound energy, and their sound pressure levels decay rapidly as the distance travels increases. Due to the influence of environmental noise, the propagation distance of the sound source is reduced to a shorter extent. Therefore, in addition to the formal concert hall, the opera house and the theater, some public places can use the electro-acoustic technology to expand the sound, amplify the sound source signal, improve the sound pressure in the audience area, and ensure that each listener can get the appropriate sound. Pressure level. In recent years, with the rapid development of electronic technology and electro-acoustic technology, the sound quality of the sound reinforcement system has been greatly improved, and in these occasions, people's demand for higher and higher sound quality of the system can be met.

The sound reinforcement system is also known as the professional sound system. There is a misunderstanding in the society that the sound reinforcement system is very simple. Just connect the microphone (and other sound sources), the mixer, the power amplifier and the speaker box together to form a sound reinforcement project. This understanding has caused many owners to invest a lot of money. The sound reinforcement effect of the available language is that the sound is ambiguous. The interference of the feedback whistling makes the sound unable to open, and the sound quality changes during the music playback.

The sound reinforcement system is a systematic project involving various fields such as electronic technology, electroacoustic technology, sound construction technology and acoustic art. It must also be associated with video systems (multimedia projection and camera systems), stage or ballroom lighting systems, fire broadcasts. Close coordination and coordination of subsystems such as systems, paging broadcast systems and security systems. The acoustics of the sound reinforcement system are not only related to the overall performance of the electroacoustic system, but also to the sound propagation environment – architectural acoustics and live tuning. The function and sound effect of the sound reinforcement system involve the correct and reasonable electroacoustic system design and debugging, good sound propagation conditions and the correct on-site tuning technology. The electroacoustic system is like a car driving on a highway. The sound conditions are like roads. The tuner is like a car driver. If the performance of the car is a necessary condition for safe and fast driving, the quality of the road surface is an important basis for balanced and fast driving. The driving skills and experience of the driver are the basic guarantee for ensuring safe driving. The three complement each other and are indispensable.

As a system problem, the sound reinforcement system must comprehensively consider the above various problems in the system design. On the basis of selecting electro-acoustic equipment with good performance, through careful system design, careful system debugging and good sound-building conditions, the sound effect is pleasant and natural.

First, the sound reinforcement system classification

The generalized sound reinforcement system consists of two major categories: sound reinforcement system and sound reproduction system:

1. Sound reinforcement system: The speaker and the microphone are in the same sound field, and there are audible, distortion and oscillation phenomena caused by acoustic feedback and room resonance. To ensure system stability and normal operation, the highest available system gain is 6 dB lower than the critical gain of the acoustic feedback self-excitation.

2. Sound system: There are only sound sources such as tape drives and CD players in the system. There is no microphone, there is no acoustic feedback, and the acoustic feedback coefficient is 0, which is a special case of the sound reinforcement system.

Sound reinforcement audio systems can be divided into the following categories according to their uses:

1) Outdoor sound reinforcement system

The outdoor sound reinforcement system is mainly used in stadiums, stations, parks, art squares, music fountains, etc. It is characterized by large service area, wide space and large background noise; the sound transmission is mainly direct sound; the required sound pressure level is high, if there are acoustic reflection objects such as high-rise buildings, the speaker layout is not reasonable, the sound wave is Multiple reflections and more than 50ms delay will cause double or multiple sounds. In severe cases, echoes and other problems will occur, affecting the clarity and sound image localization of the sound. The acoustics of outdoor systems are also affected by climatic conditions, wind direction and environmental disturbances.

2) Indoor sound reinforcement system

The indoor sound reinforcement system is the most widely used system, including various theaters, stadiums, dance halls and so on. Its professionalism is very strong, it can not only use non-verbal sound reinforcement, but also can be used for all kinds of cultural performances, and has high requirements on sound quality. System design must consider not only electro-acoustic technology issues, but also architectural acoustics. Factors such as the shape of the room have a greater impact on sound quality.

3) Mobile performance system

The sound reinforcement system has a flow system in addition to the fixed installation system. It is commonly used in various large-scale venues [such as stadiums (halls), art broadcasts, and large-scale banquet halls]. The system for temporary installation of non-literary performances is called the mobile performance system. The audio equipment of the mobile performance must be compact, easy to carry, transport and install, highly reliable and adaptable to a variety of demanding environments. Large-scale mobile systems are heavily invested and are usually leased to professional audio companies.

4) Public address system

The public address system provides background music and radio programs for hotels, commercial buildings, ports, airports, subways, and schools. In recent years, the public broadcasting system has also served as an emergency broadcast, which can be linked with the fire alarm system. The public address system has many control functions, such as the selection broadcast and full call broadcast function, the forced switching function, and the priority broadcast right function. The speaker has a large load and is dispersed, and the transmission line is long. In order to reduce the transmission line loss, 70V or 100V constant voltage and high impedance transmission are generally adopted. Sound pressure level requirements are not high, and the sound quality is dominated by midrange and mid-high.

5) Conference system

With the increase of domestic and international exchanges, teleconferences, video conferences and digital conference systems (DCN) have developed rapidly in recent years. Conference systems are widely used in conference centers, hotels, groups, and government agencies. The conference system includes a conference discussion system, a voting system, a simultaneous interpretation system, and a video teleconferencing system. The audio and video (image) systems are required to be synchronized, and all computer controlled and stored conference materials are used.

Second, the sound reinforcement system design

Sound reinforcement systems are usually designed from the sound field and then pushed back to the power amplifier, sound processing system, mixer, to the microphone and other sound sources. This step-by-step design step is very inevitable. Because the sound field design is the basis for the system function and sound effects, it involves the selection of the speaker system, the sound supply scheme and the signal path. Only by determining the speaker system can the power amplifier drive power calculation and the drive signal path be determined, and then the signal processing scheme and the selection of the mixer can be further determined according to the drive power allocation scheme.

The sound field design is the basis of the sound reinforcement system, which involves the final sound effect of the system, but it is also very complicated and tedious work. Due to the rapid development of computer technology, the acoustic software tools of EASE 3.0 and above can now be used for calculation, and finally the sound field design report [1], [2] meeting the expected requirements can be obtained. The sound field design process may need to be repeated several times to meet the requirements.

According to the needs of different conferences, a conference system with voting or a simultaneous interpretation system can be configured.

At the time of voting, the delegate simply presses the voting button on the device in front of him and the result of the voting will be displayed on the LCD screen of the chairman's machine or displayed on the other large-screen display devices in the conference room through the CCU and DCN software.

Simultaneous interpretation usually uses at least 1+3 (one native and three translated languages) interpreters, and in addition to the official representatives, additional seats can be added as needed.

Language assignments can be made by wired or wireless means:

Wired language distribution uses the cable trunk of the DCN system to distribute the translated language to the conference participants. The official representative listens to the translated language by receiving the headset on the speaking device equipped with the channel selector, and the representative delegate listens to the translation by receiving the earphone on the channel selector. Language

Wireless language distribution using infrared system for wireless transmission

A typical infrared system consists of an infrared transmitter, a radiator, and an infrared personal receiver:

- Infrared transmitter: generates a carrier for each language channel

- Infrared radiator: used to distribute infrared signals to the entire venue.

They can be embedded in a wall or ceiling when installing radiators. Correctly adjust the installation position of the radiator to achieve the best site infrared signal coverage.

- Infrared receiver: Up to 16 language channels can be received, with high-speed shifting channel selection, LED display and voice amplification.