



Theatre Virtual Learning

Theatre Design & Production

Advanced Theatre Design & Production

April 14, 2020



Theatre Design and Advanced Theatre Design Sound

Lesson: [April 14, 2020]

Objective/Learning Target:

The student will understand different microphones and their qualities.

Bell Ringer/Let's Get Started

Reflect on the following questions:

Why are microphones important for a theatre?

Does the type of show make a difference?



Lesson:

Go through these slides to understand what microphone types are available and why they are used.

See if your bellwork answers are correct.

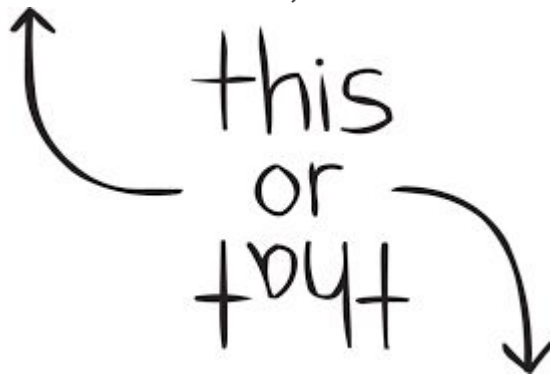


Microphone usage is an important part of sound

- There are 5 types of microphones we will cover today.
 1. Beta
 2. PZM Boundary
 3. Acoustic Voice tracker Boundary
 4. Lavalier/lapel
 5. Choir
- All have positive and negative characteristics, as well as a varying degree of theatrical application.

WHICH
ONE?

this
or
that

Handwritten text "this or that" in black ink. Two curved arrows originate from the text: one points from "this" to the first item in the list (Beta), and the other points from "that" to the last item in the list (Choir).

Beta

Purpose: This type of microphone is designed for the speaker to hold the microphone in their hand or have the microphone on a stand. It can be corded or cordless.

This a great for soloists who do not need a great deal of mobility and the visibility of the microphone is not a problem.

Theatrical application: This mic could be hidden on stage, if necessary.

Placing it in a flower arrangement or behind furniture or tall props could be done. The sound designer must be aware of the cable that must be secured for version that is not wireless. It has very limited use on stage because of the close proximity necessary for the actor to be heard.



Problems with Beta microphones

The speaker needs to be relatively close (within 3 feet MAXIMUM-and that is for someone who projects very well) to the microphone for best results.

If it is the corded type, the cord must be secured, so it is not a tripping hazard for actors.

If it is wireless, issues with dropout and interference can occur. This happens when the antennae on the receiver is unable to pick up the signal and the sound appears to disappear for a moment.

PZM (Pressure Zone Microphone) Boundary Mic



Purpose: Boundary microphones are an alternative to each individual performer a microphone, and an overheads.

These mics are designed to be laid flat on an acoustically reflective surface. They can be placed along the apron of the stage aiming back at the action on stage. They could be placed on tables or furniture on stage, as well. They pick up sound in a zone that extends much further than a beta microphone.

Theatrical application: Small boundary microphones can be hidden in permanent scenery, such as on a table in the center of a room scene. Overhead and boundary microphones work best with actors whose voices project well.

Problems with PZMs

They are powerful, so they pick up stage noise from the actors' feet, scenery movements... (You can alleviate some stage noise by placing a soft felt or foam pad in between the mic and the stage, and decreasing the low frequencies on the EQ.)

People with softer voices and children do not have the ability to project their voices enough for boundary microphones.

In many cases with boundary mics you may be tempted to turn up the system volume to compensate for the increased distance from the actors, but this can push the system into feedback. The proximity to the loudspeakers can also cause feedback.

There is also a cord to secure to make sure actors do not trip.

PZM's require phantom power be turned on the board. Depending on the board type, this can cause issues with the power damaging other devices, unless your board can turn phantom power on by individual channel.

Acoustic Voice Tracker Boundary Mic

- Description: This microphone works very much like the PZM, but it is more difficult to hide. (These were given to the theatre with the newest version of the sound system, so they are shown on here.)
- Problems: There are 2 cords necessary to run these mics, so the sound designer must be aware of keeping the actors safe from trip hazards. These tend to have a “tinny” sound and are difficult to EQ.
- Theatrical application is much like a PZM, but harder to hide.



Lavalier/lapel mic

Purpose: This type of microphone is designed primarily for individual use when mobility is important or when actors need help projecting. Lavaliers can be hidden on the actor.

The lavalier microphone has 3 parts:

1. The receiver, which is plugged into the sound system.
2. The belt pack, which is worn on the actor.
3. The microphone which is plugged into the belt pack and can be clipped to clothing (lapel) or attached over the ear or through the hair.



Lavalier Problems and Usage Tips

- A wireless receiver on any given frequency can only receive a signal from one transmitter on that frequency.
- If there are two signals present on the same frequency, the stronger of the two may block out the other, or the output of the receiver will be unusable noise.
- RF signal can be blocked and reflected by metallic surfaces. This can include any costuming that has metal threading or metal plating, (the extreme case being your knight in shining armor). Wearing a bodypack under this material will severely degrade RF performance. Random dropout of the signal can occur while using the lavalier due to blocked signal.

Lavalier Problems and Usage tips, cont.

- Antennas on bodypacks should always be kept as clear as possible from obstructive surfaces or materials. As stated earlier, an antenna should never be curled up and stuffed into pockets.
- Allow for strain relief on the mic connector and antenna, so that movement of the actor will not crimp the cable or antenna with their movements. Repetitive strain on the cable will cause failure sooner rather than later. Remember to check cables thoroughly before each performance.
- Make sure to leave the battery as accessible as possible, as you may need to do a quick change unexpectedly.

Lavalier Problems and Usage tips, cont.

- The human body, because of its composition, can cause some RF transmission issues with bodypack transmitters. In certain cases, the body of the actor can potentially inhibit RF transmission. Repositioning the bodypack or the receiving antennas (or both) can overcome this occurrence.
- Sweat can be potentially harmful to the electronics of a bodypack transmitter. There are many methods sound designers have created to protect bodypacks from sweat. A simple solution is to wear a Neoprene transmitter pouch when practical. While not completely waterproof, it will protect the bodypack from low-level sweat and moisture. An un-powdered, dry surgical glove can also be used. Remember that there are people allergic to latex or other materials, so check with the talent ahead of time before using any method of covering a bodypack next to skin.

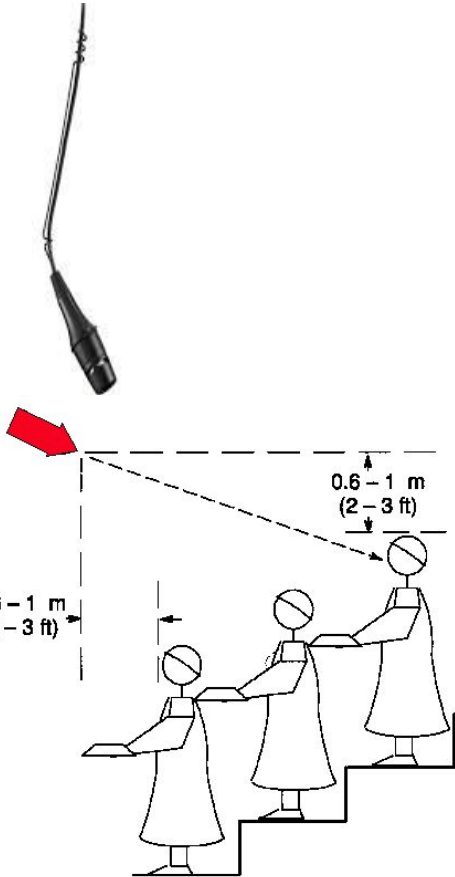
Lavalier Problems and Usage tips, cont.

- If the microphone cable is run inside of clothing, tape the cable to the fabric to prevent contact noise, which is caused by cable and clothing rubbing together. Consider sewing a "channel" or "tube" of fabric on the inside of the costume to prevent excess rubbing against the cable.
- Noise from materials in costuming rubbing together can be difficult to prevent. Synthetic materials make more noise than other materials. Consult with wardrobe to see if there is a practical way to isolate the mic and cable from noise.
- If using a unidirectional lavalier mic in the chest area, remember that those types of microphones exhibit proximity effect. Because it is much closer to a resonating chest cavity, it may sound boomy. You can compensate for this by using equalization to decrease the low frequencies.

Lavalier Problems and Usage tips, cont.

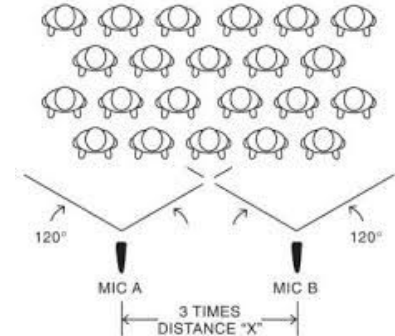
- Keep spare mics on hand. Lavalier mics may eventually need replacement in an abusive environment like theater. Sweat, makeup, and constant tugging on cables and connectors can take their toll on lavaliers. Inspect your mics on a regular basis by plugging them in and listening for odd noises, crackling, or degradation of frequency response. Wiggle the cables and connectors to check for loose connections. Remember that some damage may not be covered by the manufacturer's warranty so exercise care and instruct your actors accordingly.

Choir Mic/Hanging condenser mic



Purpose: A choir mic is designed for the inconspicuous sound amplification of a choir, orchestra or full stage of performers. It will pick up sound in a larger radius better than the beta or a boundary microphone. These microphones hang above the stage.

Theatrical Application: Theatre can use these for any show. They especially work well with musicals when the voice must be heard over the pit orchestra.



Choir mic problems

- Using overhead microphones to capture sound from above can provide decent sound reinforcement, but you should be realistic as to what to expect. These microphones are further away from the sound source than even a microphone on a floor stand would be, and will pick up more ambient sound than preferred. This, in addition to the possibility of these mics actually being closer to loudspeakers than to the sound source, can lead to significantly reduced gain before feedback.
- Another factor contributing to feedback is the number of open microphones being used. The more open microphones in a sound reinforcement system, the less potential gain before feedback. Therefore, the idea to put in more mics to cover the area better or to "make it louder" will in fact worsen the situation. It is a must to use as few overhead microphones as necessary.

Choir mic problems, cont.

- Remember that most actors project their voice to the audience. An overhead microphone, if pointed straight down, is pointed at the top of someone's head. Speech is not as intelligible from that vantage point as the high frequency content is lost.
- At the same time, the microphone can be picking up both the reflected sound off the surface of the stage, as well as mechanical or air handling noise from above. When combined with direct sound, this will provide poor audio quality.

Practice

1. Which microphone do you think is the most useful for a concert with a lot of performers?
2. Which microphone do you think is the most useful for hiding on stage?
3. Which microphone do you think is the most useful for a character that has to move around a lot and be heard over instruments?
4. Look on line at the prices of various microphones. Find the cheapest and the most expensive you can locate. What are the prices of each and what kind of mic is it?
5. You are the sound designer, what tips would you give your sound crew and actors on handling lavalier microphones.

**WHICH ONE IS
BETTER?**

Practice Answers

**WHICH ONE IS
BETTER?**

1. Which microphone do you think is the most useful for a concert with a lot of performers? (Choir Mic)
2. Which microphone do you think is the most useful for hiding on stage? (Boundary Mic)
3. Which microphone do you think is the most useful for a character that has to move around a lot and be heard over instruments? (Lavalier)
4. Look on line at the prices of various microphones. Find the cheapest and the most expensive you can locate. What are the prices of each and what kind of mic is it? (Answers will vary)
5. You are the sound designer, what tips would you give your sound crew and actors on handling lavalier microphones. (Answers will vary but should include tips on protecting the hardware and placement of body packs and microphones.)