

LIGHTING FOR OUTDOOR PRODUCTIONS

Lighting for outdoor productions can be quite a challenge and can become quite expensive if you are having to rent equipment. The important thing to remember is that the participants must be seen by the audience as well as heard by the audience.

The lighting equipment required and eventually used in a production will depend on several things, such as:

1. The size of the production stage area
2. The money available in the budget
3. The equipment on hand
4. What is available to rent
5. What is absolutely necessary and what would be nice to have (i.e., "fluff")
6. If purchases are being considered, will it be needed again frequently

SMALL COUNCIL FIRES

Some of the best and cheapest lights available are the 300-watt and 500-watt quartz halide flood lamps available at your local hardware or home repair center. For less than \$10 you can often get the 300-watt quartz floods. If these are used in close proximity to the stage area they can be mounted on 10' high pieces of conduit (1/2" thin wall, 1/2" rigid, or 3/4" thin wall) set over 30" steel stakes driven into the ground vertically. It is important that the steel stakes be plumb, or vertical, so that the tall lamps don't lean over.

These lamps should be within 25 to 30 ft. of the action in order to get good illumination. They are not very focused so there will be a lot of "spillover" of light onto areas not necessarily needing to be lighted. Color gels can be used over these lamps, but no accommodation has been made on the lamps to do so. The gels must not touch the hot pyrex lens or else the gel will burn. Air circulation space of at least 1" - 1 1/2" must be maintained between the gel and the lamp.

A simple 600-watt dimmer can be used to control each 300-500 watt lamp. Several of these dimmer switches can be mounted in one 12 x 12 x 4 box with cords running to each lamp. This box needs a very heavy power source such as 10 gauge, 120 v. circuit or 30 amp, 120/240 v. range-type cable as a supply. Switches may be substituted for the dimmers or you may prefer some switches and some dimmers.

LARGER STAGE PRODUCTIONS

For larger productions one must go to larger lighting systems that no doubt will include ellipsoidal flood lamps and Par 64 types of lights on light trees or towers. Some 300-watt to 500-watt quartz floods may be used in addition to these. The ellipsoidal and Par 64 can be used with color gels and have a more focused light output and can throw

greater distances. They are not particularly suited for area lighting as their beam diameter is usually about one-half of the distance to the subject.

Ellipsoidals require different lens sets for different or tighter beam diameters, while the Par 64 cans use a different hull for longer throws or different beam diameters (See Figs. 3 & 4).

With wattages of 500 to 1000 watts per lamp, a stiff power source is required if very many lamps are to be used. 24 lamps at 1000 watts each would require at least a 12-channel dimmer (assuming you are to use a dimming system) fed by 100 amp, 240 v. breakers.

Dimmer systems now often use digital signals from the control board to the dimmer packs. Some still use the zero to -10 v. DC signal. There are computer controlled dimmer boards which allow all scenes to be preset. These are hard to justify, expense-wise, when the production may be different each night.

Spotlights are often desired to help light important scenes or performers. Very few cheap spotlights put out adequate light intensity for outdoor use at distances of 50-100 ft. There are "short path tungsten enclosed arc lamps" that will do an excellent job. These are ones using a HMI 575-watt lamp or HTI 400-watt lamp. Some "follow spot photometric data" is attached as Fig. 5.

Lighting for a large production can present a challenge. You will need to get catalogs from Altman Stage Lighting, Inc. or visit your theatrical supply house when needing to rent or buy for your larger productions.

Don Bixler

Lighting Basics

Types of Lighting

Key Lighting:

Key lights are the main lights that light up the subject on stage. These are usually the brightest light and can be an ellipsoidal, a fresnel, or even a par.

Ellipsoidal (lieko): Ellipsoidal is a type of focusable spot light in the lieko family. They are specified in the diameter of the lense and the focal length. A 6x9 will throw a larger circle at the same distance than a 6x12 or 6x16. It is important to understand that these lights will focus to a sharp circle.

Fresnel: The fresnel is probably the most popular and versatile general purpose light. It is a soft focus devise. This means that it will not focus to a sharp circle. Adjusting the fresnel results in a bright center and soft edge, or soft even lighting across the beam.

Par: Parabolic reflector lights look like a tin can with a headlight in them. The light is not focusable. Bulbs are bought in pattern you plan on using them anywhere from very very narrow to flood.



Fill Lighting

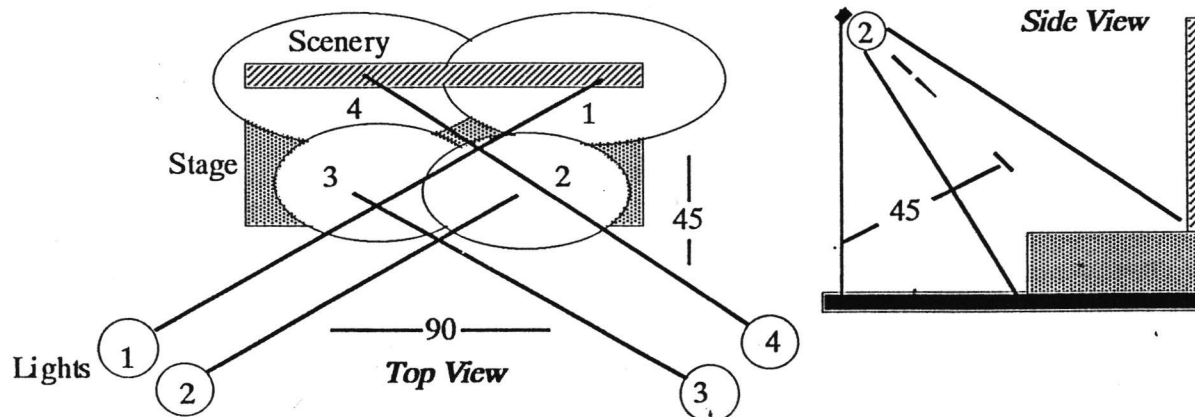
Fill lighting covers a broad term. Generally, fill lighting is the lighting that is used to "Fill" in the shadows. Scoops, fresnels, and pars can be used.

Scoop (flood): The scoop is a flood light, that is it floods light in a very general direction and is a non focusing fixture.



How to Light the Basic Set

Place your key lights first to Key the main acting areas. These lights ideally are at a 45 degree angle above and a 45 degree angle to each side. Next fill in the stage and set removing as many shadows as possible. A small set can get by with as little as 4 lights, but usually it will take much more.



Sound Reenforcement Basics

It doesn't matter how good the pageant or show is, if you can't hear it, you can't communicate it. Getting the most from your sound system is not as hard as you might think.

Proper Microphone selection and placement:

Cardiod Microphone: The cardiod microphone is a unidirectional mike. this means that it picks up the sound from one basic direction, the end you speak into. This is the mainstay of mikes you should use.

Omnidirectional: This means just what it says. It picks up sound from all directions, including behind it. Although this might work to cover a very large part of stage, it will usually result in feedback, (that annoying squeel), much faster than a unidirectional mike.

Wireless: This again means just what it says. A wireless mike has no wire, but relies on a small radio transmitter to transmit the speakers voice to the receiver and the pa system. This is ideal and should be used as much as possible for your lead actors.

Place your microphones on stage at about chest height pointing into the acting area. The actors should speak towards a mike and as close as is reasonable for the scene. Placing numerous mikes on stage will cover a larger area, but will result in feedback sooner than if only one mike was used. A good soundman will set his mikes across the stage at the main locations. During the performance he will only turn up those mikes that are nearest the action. The fewer the mikes on, the more volume you will get before feedback.

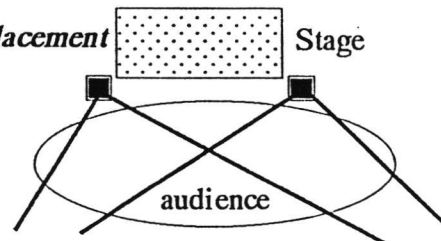
Speaker placement

Your speakers should be placed so that together they cover the entire seating area. They should be as far forward of the stage as possible without restricting view, or being placed too far to the sides.

If you are having large crowds, get your speakers off ground and onto a stand. People absorb a lot of sound, and if the speakers are too close to the ground, the people up front will go deaf, and the people in the back will be straining to hear.

Don't place your speakers behind the stage, or if possible along side. These things almost guarantee feedback.

Speaker Placement



E-Q the system

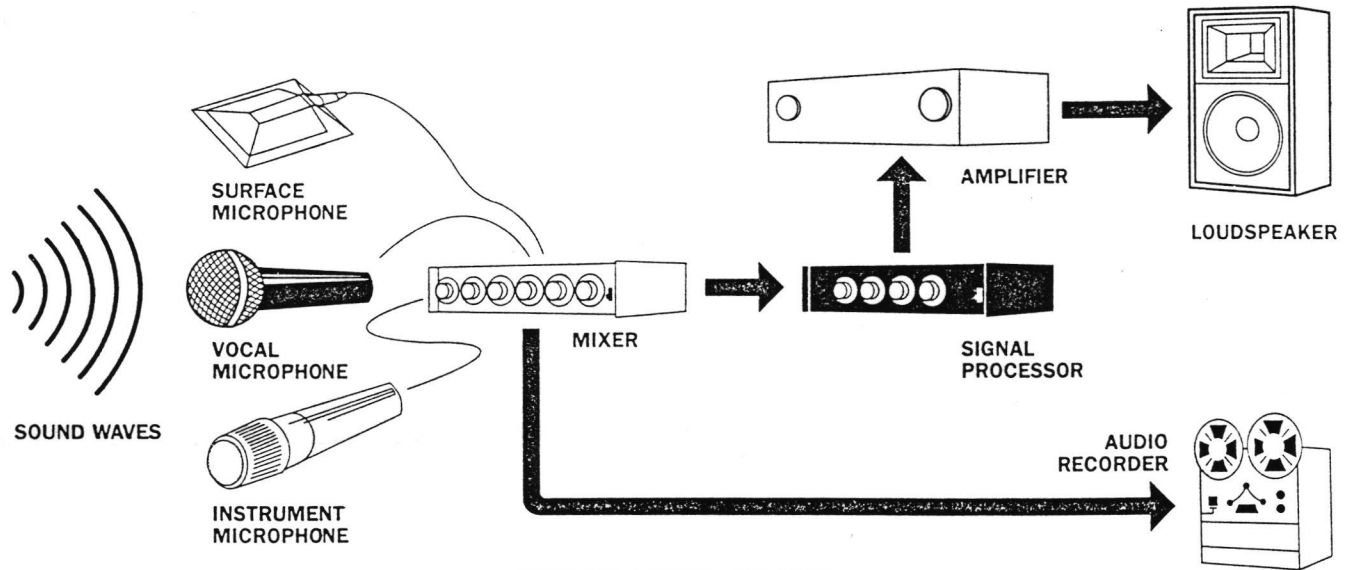
Proper equalization of the system will result in a more understandable sound. The human voice speaking uses the frequencies from about 200 to 6K (6000) cycles. Since you will probably be using your Public Address system for speaking, it is best to limit the low end. Adjust the bass controls so the sound is not boomy. The midrange tends to control the nasal sound frequencies. Too much mid and you will sound like a 1930's record. Too little and your voice will sound thin. The high control on some systems will cause feedback if too much is used. Here's the bottom line, adjust the EQ so that a person speaking can be clearly understood.

THE SOUND SYSTEM

A basic sound reinforcement system consists of an *input device* (microphone), a *control device* (mixer), an *amplification device* (power amplifier), and an *output device* (loudspeaker). This arrangement of components is sometimes referred to as the audio chain: each device is linked to the next in a specific order. The primary goal of the sound system in church sound applications is to deliver clear, intelligible *speech*, and, usually, high-quality *musical sound*, to the entire congregation. The overall design, and each component of it, must be carefully thought out, installed, and operated to accomplish this goal.

Electronic signal processors, such as equalizers, limiters or time delays, are inserted into the audio chain, usually between the mixer and the power amplifier, or often within the mixer itself. They operate at line level. The general function of these processors is to enhance the sound in some way or to correct certain deficiencies in the sound sources or in the room acoustics.

In addition to feeding loudspeakers, an output of the system may be sent simultaneously to recording devices or even used for broadcast. It is also possible to deliver



TYPICAL SOUND SYSTEM

There are three levels of electrical signals in a sound system: microphone level (a few thousands of a Volt), line level (approximately one Volt), and speaker level (ten Volts or higher).

Sound is picked up and converted into an electrical signal by the microphone. This microphone level signal is amplified to line level and possibly combined with signals from other microphones by the mixer. The power amplifier then boosts the line level signal to speaker level to drive the loudspeakers, which convert the electrical signal back into sound.

sound to multiple rooms, such as vestibules and cry rooms, by using additional power amplifiers and loudspeakers.

Finally, it may be useful to consider the room acoustics as part of the sound system: acoustics act as a "signal processor" that affects sound both before it is picked up by the microphone and after it is produced by the loudspeakers. Good acoustics may enhance the sound, while poor acoustics may severely degrade it, sometimes beyond the corrective capabilities of the equipment. In any case, the role of room acoustics in sound system performance cannot be ignored.

SOUND SYSTEM BASICS FOR OUTDOOR PRODUCTIONS

The subject I am addressing is so enormous that books are written about it and catalogs from numerous sources list equipment to satisfy all preferences and needs. I can only mention a few things that might help the less experienced production coordinator to start assembling the components to meet some of his needs. The equipment you will end up using for a production will depend upon a variety of factors. Some of these are:

1. size of the audience
2. number of people in the production
3. how mobile the characters need to be
4. how well they project their voices
5. type and complexity of the music and special effects required
6. budget constraints
7. whether you rent, buy, borrow or just "get by"
8. how demanding you are for quality

The one thing to remember is that no event is a success unless the audience is able to hear the message that you are presenting.

I am going to discuss three or four basic systems that may be used for different audiences.

SMALL BASIC SOUND SYSTEM for smaller groups. This is a minimum sound system that could be used even for an outpost council fire if you are going to have music, stunts, singing and a speaker. It is a portable 20-watt, 120 volt AC or 12 volt DC amplifier with 2 microphones that can be carried in a very small suitcase along with speaker cords, etc. It uses two PA/paging speakers of 30-watt capacity, a small AC/DC cassette and/or CD player and a small 12 v. battery for a garden tractor. This is a complete, yet effective system; you will be surprised how far away you can hear this system. (See Figs. 1 & 1A)

MEDIUM SIZE BASIC SOUND SYSTEM for audiences of 1000 or fewer. This is another simple but effective system for a sectional Pow-wow or even a District Pow-wow. It may not have all of the "bells and whistles" that some think they need, but the audience can hear with this system.

It includes 4 mics, 2 Fiberglas outdoor 30-50 watt CDP (compound diffraction projector) speakers, a 100 watt amplifier for 120 v. AC operation. Optional equipment are the tape/CD player and graphic equalizer. A monitor amplifier and speaker can be added if necessary. (See Figs. 1 & 2A)

The microphone I use a lot is one of Radio Shack's better cardioid hi/low impedance dynamic mics with on/off switch (#33-984). It appears to have the Shure SM-58

characteristics, although considerably less expensive (\$59.99). It comes with a 1/4" plug on the cable; however, a standard XLR mic cable can be substituted in its place when you need to plug into an XLR-equipped amplifier (See Fig. 3).

Two of the 100-watt amplifiers can be slaved together to provide 8 inputs if necessary. You simply take an RCA-style jumper between the two mix busses.

The CDP horn, the paging horn, and a high output Atlas horn are shown along with their characteristics in Fig. 4.


More complex powered mixers may be needed if you need condenser mics requiring phantom 48 v. power, more inputs, better equalization on each channel or more power out. One of these is shown in Fig. 5. The cost on these units can be from \$700 (used) to \$2,000 or more.

LARGER SOUND SYSTEMS to cover larger audiences and have more microphone inputs. The logical solution is to go to a system that would be similar to that shown in Fig. 6. It uses a mixer board of 8 - 32 channels in, possibly a graphic equalizer, crossover network to separate the high and low frequencies, a power amplifier for each one; then two bass woofers for the low frequencies and two horns with drivers for the high frequencies. To get enough power and wide area coverage you may have to have multiples of these woofers and horns. The interconning of this type setup does require a more experienced sound engineer to insure that the polarities on amps and speakers is observed; else sound cancellation can cause severe problems.

Microphones for the more complex productions can require some extra thought. You may need area mics where you have several performers who do not have their own mics. These will sometimes require super-cardioid condenser mics with batteries of phantom power.

Other productions may require wireless mics on each performer. Forget about the cheapie Radio Shack versions of wireless mics. The cost of acceptable wireless mics with diversity antenna (i.e., two receiving circuits per transmitter to avoid dead spots) is coming down each year. So do yourself a favor and buy the better mics. It's cheaper in the long run.

These few words about sound systems can barely scratch the surface of what one needs to know to become a good sound man, but the thing to do is get some catalogs, books, etc. and start comparing prices, quality and capabilities of the components. Then talk to others who have experience to see how they do it.


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