

Functions of Light

- **Visibility:** The full range of seeing (considered the primary function of light).
- **Reinforcement:** giving reason to the scene (must justify & support desired effect). If the goal is realism a designer might define a light source.
 - For example: The sun, moon, wall or ceiling fixtures.

Functions of Light (continued)

- **Composition:** defining objects or areas in relation to their importance (center of action should be the focus of the lighting).
- **Mood:** feeling conveyed within the scene (dark stage in blues set up a feeling of mystery or threat)
 - Remember our emotional response is determined by the total context and not merely by lighting.

(controllable)Qualities of Light

- **Intensity:** the range of brightness used in a scene.
 - Can be controlled (increased or decreased) in many ways.

Intensity (continued)

- The number of lamps/lighting instruments used.
- The distance from the object/area of stage being lighted. (brightness diminishes with distance)

Intensity (continued)

- The number of dimmers used to control lights
- The use or absence of color filters (gels)

Qualities of Light (continued)

- **Color:** Range of hues and tints chosen to modify the light projected.
- **Form:** The variety & contrasts in both intensity & color used throughout a scene.

Qualities of Light (continued)

- Movement: any change in intensity, color, or form directing attention to a desired place.

Qualities of Light (Continued)

- Means for creating the “Qualities of Light”
 - Position: The location of the lighting instruments in relation to the objects being lit.
 - Equipment: the types of lighting instruments, lamps, color media, control, & cabling required to achieve the desired effects.

How the Eye Works

- Dark adaptation: adjusting from bright to dark (can take up to ½ hour)
- Light adaptation: adjusting from dark to light (takes few moments)
- Transient adaptation: viewer is forced to look from an area of one light level to one of a higher or lower level. (eye will generally adjust to brightest area)

Lighting Design

- Practical Content
- 1st determine the literal requirements of the piece (morning light, sunset, moonlight, etc.)
 - Main function is to light the stage so the actor can be seen.

Lighting Design

- Emotional Content
 - Enhancing set and costumes
 - Highlighting drama
 - Cool stage (blues, greens, violets) can create a calm feeling.
 - Warm stage (ambers, yellows, reds) has excitement & energy.

Lighting Design

- Once you determine the basic feel you want determine what or who is going to be highlighted on stage (either by spotlight or more intense light).

Lighting Design

- After each picture is created, determine how to connect these moments.
 - If moments jump one right after another, then the lights should also
 - If the moments meld into the other, lights should fade from one to the next.

Lighting Design

- **Color**
 - Impact
 - Can be dramatic or catastrophic to a show
 - Warm colors - excitement/energy
 - Cool colors - reflective/calming

Lighting Design

- Primary Colors of Light
 - Red
 - Blue
 - GreenCombining all three gives white light.

Lighting Design

- Combining Primary colors creates secondary colors
 - Red/green – yellow
 - Green/blue – cyan
 - Blue/red – magenta
 - If you combine primary color with secondary color you make white light.
 - 1000's of hues and tints can be created by these combinations.

Lighting Design

- Gels : Gelatin
 - Lee sheets: 21" X 24"
 - Roscolux & Roscolene: 20" X 24"
 - You can cut out up to 6 pieces (7 ½" X 7 ½")
 - Or you can cut out 4 @ 10" X 10"
 - Other brands GamColor,

Lighting Design

- The greater amount of primary color the more saturated it is.
- Cannot use very saturated colors for visibility only for washes.

Lighting Positions

- Where light comes from plays an important part in what is done for the picture you wish to create on stage.

Lighting Positions

- The Five Basic Lighting Positions
 - Front: for visibility & color washes.
 - Gelled in pale colors
 - 30 to 50 deg. off horiz. (above 50 deg. Harsh shadows, below 30 deg. flatten out features.

The Front Lighting Position (continued)

- Coming from low angle create an eerie feeling.
- General front lighting comes from 45 deg. Angles to give a sense of depth.

The Front Lighting Position (continued)

- Fixtures Used: ellipsoidals, fresnels, and PAR's

Lighting Positions (continued)

- Side:
 - Generally used for effect lighting
 - Accents arm & leg movement

The Side Lighting Position (continued)

- Dramatic when used w/ bold colors w/ contrasting colors coming from opposite sides of the stage.

The Side Lighting Position
(continued)

–Ellipsoidals or PAR’s used commonly. Though occasionally fresnels & striplights used too.

Lighting Positions
(continued)

- Back:
 - Effect lighting
 - Popular concert lighting
 - Creates halo effect on performers heads & shoulders

The Back Lighting Position
(continued)

–Helps create a sense of depth
–At low angle creates beautiful silhouette
–Strong colors often used
–PAR’s, fresnels, & occasionally ellipsoidals are used

Lighting Positions
(continued)

- Down:
 - Good for highlighting specials or color fills
 - Used to draw attention to one person or to a particular action

The Down Lighting Position
(continued)

–Down light wash separates one person from the others on stage
–PAR’s, fresnels, & sometimes ellipsoidals

Lighting Positions
(continued)

- Background (Cyc lighting)
 - If brighter & bolder than rest of stage, it can overpower rest of scene

Background Lighting
(continued)

- Accents foreground w/ deeper colors & lower intensities
- Can create extremely beautiful & dramatic silhouettes

Background Lighting
(continued)

- Striplights and sometimes scoops

Lighting Equipment

- Primary concern is safety
 - Hazards
 - Things falling (personal injury)
 - Things burning (burn/fire hazards)
 - Things frying (electrical shock)
- “things” = items and people

Safety Tips Continued:

- Don't assume things are hung safely. Use secondary safety chains.

Safety Tips Continued:

- Burns & fires can be prevented by making sure hot instruments are kept safely away from body parts & other materials (drapes & wood) wear insulated gloves to prevent burns

Safety Tips Continued:

- A worn piece of insulation or broken wire can expose people to potentially lethal shock hazards.
- Don't touch anything w/out making sure it's not energized.

Safety Tips Continued:

- Unplug fixtures before opening them up or putting your hand in them for any reason.

Lighting Equipment

- Light Beam
 - Beam Angle: the angle at which you have 50% of full intensity at the edges of the beam.
 - Field angle: angle at which you have 10% of full intensity at the edges of the beam.

Light Beam (continued)

- Throw distance: distance from lighting instrument to subject being lit.

Mounting Instruments

- Most Common is stage C-Clamp.
 - Attached to yoke using a ½" – 13 hex bolt; then attached to a batten using hex bolt on c-clamp. Do not over tighten!

Mounting Instruments

- Other types of clamps: S-clamps & U-clamps.

Mounting Instruments

- Sliding Tee: used w/ sidearm; slides on sidearm
 - Allows fixture to be mounted in proper hanging position off a vertical pipe.

Mounting Instruments

- Always put safety cable on instruments
- Reminder: Stage lights get very hot. Do not touch w/bare hands. Temp. can exceed 500 deg. F.

Reflection and Refraction

- Reflection: Light is reflected at an angle = to the angle at which it struck, but in the opposite direction.
 - If not flat will reflect at an angle.

Reflection (continued)

- Ellipsoidal reflector – has 2 focal points. All light at end where ellipsoidal reflector is will divert through 2nd focal point.
- Large percentage of light is forced through 2nd opening which is easily controlled.

Refraction

- When a ray of light passes into a denser medium it is bent toward a perpendicular – drawn to the surface at the point of entry. In other words light rays bend.

Refraction (continued)

- Plano-convex lens – one flat side & one curved. Helps to concentrate light beam. Thicker the lens, more sharp & concentrated, but thicker it is, hotter it is & cracks easily. Fix is to use two lenses.

Refraction (continued)

- If using two lenses is impractical; can use 2 other kinds of lenses
 - Fresnel Lens: plano face is retained, but curved face is cut back in steps
 - Step Lens: Convex side retains shape, but plano side is cut back.

Ellipsoidal Reflector Spotlight (ERS)

- Prominent instrument used in theatrical stage lighting.
- Can vary the edge of the beam from a sharp focus to soft focus.
- Can cut the beam to keep light off places you wish to remain unlit

Ellipsoidal Reflector Spotlight (ERS)

- Because of large amount of control, used where precision is required
- Used for specials, front of house lighting, side lighting & pattern projection

Ellipsoidal Reflector Spotlight (ERS)

- Large variety of instrument sizes
 - 6 X 9, 6 X 12, 6 X 16, 6 X 22
 - 1st # refers to front lens diameter
 - 2nd # to the focal length

Ellipsoidal Reflector Spotlight (ERS)

- Focal Length: the distance from some point in the lens to the point where all the light rays coming from a distant light source & passing through the lens are concentrated by the lens.

Ellipsoidal Reflector Spotlight (ERS)

- Focal Point: the point of concentration of the lens.

Fresnel Spotlight

- The name comes from the type of lens used in the instrument.
- Focusing instrument
- Can be varied from spot to flood beam by changing the distance between the lamp and the lens.
- Measured by the diameter of its lens in 3", 4 1/2", 6", 8"

Fresnel Spotlight

- Measured by the diameter of its lens in 3", 4 ½", 6", 8"
- Edge of beam is always soft
- Accessories to help control beam.
 - Barn door
 - Top hat
 - Foil

Fresnel Spotlight

- Uses:
 - General color washes
 - To create a low sidelight or backlight silhouette
 - Most popular are 6" and 8"

Scoops

- Basically a reflector ("scoop"-shaped) that floods light in a particular direction
- Little control, but very even wash

Scoops

- Usually used for lighting backdrops and for even color washes across a stage.
- Provide very wide, even washes & are a practical way to get washes w/ a min. # of instruments.

Striplights

- Most common use is backdrop or cyclorama lighting.
- Also for general stage washes, in form of down lighting
- A strip of lights in one housing

Striplights

- Effects:
 - When used for background lighting, usual desire is an even wash over background.
 - Achieved by placing a row of strips on ground aiming up & by hanging another set above & aiming down