DOWNLOAD PDF STAGE LIGHTING EXPLAINED

Chapter 1 : Stage Lighting Design Software - CAD - Stage Lighting Online Tutorials, Information and How T

The concept of stage lighting If you've been to a big concert, then you probably already understand the basic concept of stage lighting. It's that part of music you cannot experience by listening to the recording, or turning on the radio.

Stage lighting instrument In the context of lighting design, a lighting instrument also called a luminaire or lantern is a device that produces controlled lighting as part of the effects a lighting designer brings to a show. The term lighting instrument is preferred to light to avoid confusion between light and light sources. There are a variety of instruments frequently used in the theater. Although they vary in many ways they all have the following four basic components in one form or other: Additional features will vary depend on the exact type of fixture. Most theatrical light bulbs or lamps, the term usually preferred are tungsten-halogen or quartz-halogen , an improvement on the original incandescent design that uses a halogen gas instead of an inert gas to increase lamp life and output. Fluorescent lights are infrequently used other than as worklights because, although they are far more efficient, they are expensive to make dimmed run at less than full power without using specialised dimmer ballasts and only very expensive models will dim to very low levels. They also do not produce light from a single point or easily concentrated area, and usually have a warm-up period, during which they emit no light or do so intermittently. High-intensity discharge lamps or HID lamps , however, are now common where a very bright light output is requiredâ€”for example in large follow spots, hydrargyrum medium-arc iodide HMI floods, and modern automated fixtures. Over the last six years, LED-based luminares of all varieties and types have been introduced to the market. Some of these fixtures have become very popular, whereas others have not been able to match the output from incandescent and discharge sources that lighting designers prefer. LED fixtures are making a positive impact on the lighting market, and are becoming more popular when compared to the energy usage of current incandescent, halogen, and discharge sources. On the end of such, a clamp known as a hook-clamp, C-clamp, or pipe clampâ€”pipe referring to battens is normally fixed, made in a "C" configuration with a screw to lock the instrument onto the pipe or batten from which it is typically hung. Once secured, the fixture can be panned and tilted using tension adjustment knobs on the yoke and clamp. An adjustable c-wrench, ratchet US or spanner UK is often used to assist the technician in adjusting the fixture. In the event of failure, the cable would halt the fall of the fixture before it could cause serious damage or injury. Many venues place strict guidelines regarding the use of safety cables. Types of lighting fixture[edit] All lights are loosely classified as either floodlights wash lights or spotlights. The distinction has to do with the degree to which one is able to control the shape and quality of the light produced by the instrument, with spotlights being controllable, sometimes to an extremely precise degree, and floodlights being completely uncontrollable. Instruments that fall somewhere in the middle of the spectrum can be classified as either a spot or a flood, depending on the type of instrument and how it is used. In general, spotlights have lenses while floodlights are lensless, although this is not always the case. Within the groups of "wash" and "spot" light, there are other, more specific types of fixtures. This nomenclature also changes across the world depending on location and industry. Profile These fixtures feature a compound lens which allows the designer to place obstructions within the image path which are then projected. These obstructions could be "gobos" or shutters. A profile is a spot light, but allows for precise focusing. Fresnel A Fresnel is a type of wash light and is named as such due to the Fresnel lens it features as the final optical device within the chain. Traditionally theatre and stage lighting has been of the "generic" type. These are lights which are focussed, geled, and then simply dimmed to give the effect the designer wants. In recent years the emergence of moving lights or automated lights has had a substantial impact of theatre and stage lighting. Stage Lighting A typical moving light allows the designer to control the position, color, shape, and strobing of the light beam created. This can be used for exciting effects for the entertainment or dancefloor use. Moving lights are also often used instead of having a large number of "generic" lights. This is because one moving light can do the work of several generics. In the UK the nomenclature is slightly different from North America. This article primarily uses the North American terminology. A Spotlight in the UK often refers to a Followspot , or any lantern in general which has been focused tightly into a small area. The following

definitions are from a North American point of view. UK naming conventions are used in most of the world,[citation needed] in fact most North American theatres will also use the UK terms except when talking in a more general sense i. Heat will cause the portion of the lamp which has oil on it to expand when it is on creating the bubble, and causing the lamp to explode. That is why one should never directly touch the glass portion of a lamp. Cleaning with rubbing alcohol will remove the oil. Historically this has been done by the use of intensity control. Technological advancements have made intensity control relatively simple - solid state dimmers are controlled by one or more lighting controllers. Controllers are commonly lighting consoles designed for sophisticated control over very large numbers of dimmers or luminaires, but may be simpler devices which play back stored sequences of lighting states with minimal user interfaces. Consoles are also referred to as lighting desks or light-boards. The lighting controller is connected to the dimmers or directly to automated luminaires using a control cable or wireless link e. DMX or network, allowing the dimmers which are bulky, hot and sometimes noisy, to be positioned away from the stage and audience and allowing automated luminaires to be positioned wherever necessary. In addition to DMX, newer control connections include RDM remote device management which adds management and status feedback capabilities to devices which use it while maintaining compatibility with DMX; and Architecture for Control Networks ACN which is a fully featured multiple controller networking protocol. These allow the possibility of feedback of position, state or fault conditions from units, whilst allowing much more detailed control of them. Dimmer A pair of electronic 2. The brightness of a lamp depends on its electric current, which in turn depends on the applied lamp voltage. Conversely, a higher voltage will cause higher lamp current and increased brighter light output. Dimmers are frequently found in large enclosures called racks or dimmer racks that draw significant three-phase power. They are often removable modules that range from ampere, 2. In the case of incandescent lamps, some color changes occur as a lamp is dimmed, allowing for a limited amount of color control through a dimmer. Fades brightness transitions can be either UP or DOWN, meaning that the light output is increasing or decreasing during the transition. Most modern dimmers are solid state, though many mechanical dimmers are still in operation. CPMs are used to supply line voltage to non-dimming electrical devices such as smoke machines, chain winches, and scenic motors that require constant operating voltage. When a device is powered by a CPM, it is fully energized whenever the CPM is turned on, independent of lighting console levels. CPMs must be used in lieu of dimmers to power non-dimming devices that require specific line voltages e. Dimmers are seldom used to control non-dimming devices because even if a dimmer channel is trusted to always operate at full power, it may not be controlled when communications are disrupted by start up and shut down of the lighting control surface, noise interference, or DMX disconnects or failure. Such a loss of control might cause a dimmer to dim a circuit and thus potentially damage its non-dimming device. Devices like moving heads also require independent power, as they cannot function on a partially dimmed channel for power, on top of requiring several other channels in order to convey all of the data they require for their several features. In order to simplify the control of moving head lanterns, instead of assigning channels manually to the lantern, many desks also offer a fixtures section, where one can assign the lantern as a fixture, allowing the desk to organise the data being transferred to the lantern on a much simpler scale for the operator. Fixtures may also incorporate smoke machines, snow machines, haze machines etc. Increasingly, modern lighting instruments are available which allow remote control of effects other than light intensity, including direction, color, beam shape, projected image, and beam angle. The ability to move an instrument ever more quickly and quietly is an industry goal. Some automated lights have built-in dimming and so are connected directly to the control cable or network and are independent of external dimmers.

Chapter 2 : Stage lighting - Wikipedia

Stage Lighting Explained delves deep into the mysteries of theater illumination. It looks at not just what works and how to achieve success, but why it works. With refreshing clarity and attention to detail, the reader is introduced to the theory behind the practice.

Double Day and Co. The expressionistic production of Macbeth was performed on a bare stage under the constant gaze of three gigantic, moveable, witches masks. The primary acting areas were isolated in carefully focused shafts of light. For this production of Macbeth, Jones used Spotlights on the First Electric, 5-Spotlights on each of the two Torm positions and 4 Baby Spots focused on the three masks in the foot light trough. Six lamps were used to light the Banquet Scene III,iv illustrated above-- two down lights center, one side light from stage left and the three baby spots focused on the masks. The First Generation of Lighting Designers: Included in this extensive list is T. Faustus staged on a bare stage surrounded by black drapes, and The Cradle Will Rock which was locked out of its theatre by the government and forced to give an "outlaw" performance in the Venice Theatre. Image 10; Focus charts: Images 12 to 39 , Macbeth. Focus notes and equipment lists: Images 9 to 16 and Power Light plot Image The layout, which he considered "necessary for general lighting of this type of production" included.. Building on his theatrical experience, Feder created a second career as an architectural lighting designer. When comparing his two professions as a theatrical and architectural lighting designer, he commented: Jean Rosenthal Today, over forty years after her death, Jean Rosenthal is primarily remembered as the Lighting Designer for some of the great musicals of the nineteen-fifties and sixties and the early comedies of Neil Simon. When the man from the rental house, who was to install the electrical system became ill, Rosenthal suddenly became the "worker in light. This was, perhaps, her earliest lighting credit. These two men joined forces and created the legendary Mercury Theatre. Jean Rosenthal became their production and lighting manager. Although credited as the "Production Manager," it is believed that she designed the lighting for the eight productions staged by the company. Her imprint on the world of dance is huge. Echoing a comment by dance designer Thomas Skelton, "Jeannie Rosenthal invented dance lighting. For more information on Miss Rosenthal, link to my Jean Rosenthal page. She created her first "stage show" when she was only five. Her original goal was to become an actress, but by the time she finished high school her interests had shifted to scene design. Her first Broadway design credit was for the costumes for The Girl from Wyoming which opened its 86 performance run on October 29, Three years later, in March , she would design the sets for Gabrielle, an adaption of Tristan which saw a two performance run on the stage of the Maxine Elliot Theatre. Peggy Clark and Smith would work together on 43 Broadway productions. The lighting for that production was designed, not by Clark, but by Jean Rosenthal. Her last Broadway lighting credit was Musical Chairs in The original Layout, plus hook-up charts and cue sheets can now be viewed online at The Lighting Archive thelightingarchive. In she was elected president of Local of the United Scenic Artists. She was the first woman to hold this position. She also taught lighting design at both Smith College and Yale University Lang Reynolds, was one of my mentors at Southern Illinois University in the mid 70s. Among the many musicals she designed are two of the longest running Broadway shows: Virtual copies of the paper work including light plot, hook up chart, magic sheet, focus charts, equipment list, follow spot cues, and tracking sheets for the cues for the original production of A Chorus Line is archived at the Theatrical Lighting Database. She died peacefully in the company of her long-time partner and assistant, Marilyn Rennagel, on April 19, Thomas R Skelton, Jr. Dance pieces he lit include: Link to the Fall River Legend paperwork. This series of 25 articles, collectively titled The Handbook of Dance Stagecraft, in the words of Richard Archer, a member of the StageCraft List, "showed us all how to light dance. His last show was Shakespeare for my Father, which closed in January He died in the summer of after a long battle with lung cancer. Link to the archive listing. Virtual copies of the paper work including light plot, hook up chart, magic sheet, focus charts, equipment list, follow spot cues, and tracking sheets for the cues for the Revival of Fall River Legend at the Metropolitan Opera House are archived at the Theatrical Lighting Database. A Star is Born and the theatrical segments of Chicago: The Musical , The Producers and Dreamgirls

In he began the Broadway Lighting Master Class, a four day seminar conducted by major New York lighting designers. Virtual copies of his paper work including light plot, hook-up chart, cue synopsis, cue sheets, follow spot cues, focus charts, equipment list, for the production of Hair is archived at the Theatrical Lighting Database. Jennifer Tipton Jennifer Tipton , the principal lighting designer for the Paul Taylor Dance Company, was born in Columbus, Ohio, the daughter of two science professors. She developed her love of dance and theatre long before college. After graduation she moved to New York to continue her studies in dance and began performing with the Merry-Go-Rounders, a touring company which performed primarily for children. She began to look at the larger picture, and that larger picture was determined and controlled by the light. She became his assistant, and as the stage manager, was soon recreating his designs on the road for the Paul Taylor Dance Company. Her first lighting design credit for Paul Taylor was Orbs , a two-act dance set to the music of Beethoven. The Art of the Pas de Deux at the Spoleto Festival Italy , which brought her to the attention of the theatrical world. Beginning in Tipton has been a professor of design at the Yale School of Drama where she advises her graduate lighting students to "use what you have, She tends to work within a confined pallette, no color and a little color correction in either direction. She began working Off-Broadway in In the early s she adapted, to Broadway, the lighting design for two London West End productions: In the late s she became the lighting supervisor for the Martha Graham Dance Company. In the fall of she created The Lighting Archive web site. I know because I have reproduced these cues. They are just not in the formats we use today. Ken Billington Ken Billington is probably the most successful "young" lighting designer. After receiving his first New York lighting credit, an off-Broadway production: In the fall of he received what I believe was his first Broadway credit for the three show season of the New Pheonix Repertory Theatre at the Ethel Barrymore Theatre. He has developed a reputation for lighting big production:

Chapter 3 : DMX - Wikipedia

Stage lighting is the craft of lighting as it applies to the production of theatre, dance, opera and other performance arts. Several different types of stage lighting instruments are used in this discipline.

Lighting Control Types of Consoles There are many types of lighting consoles, for different purposes. Most fall into one of these categories. The simplest board you are likely to encounter is a manual two-scene preset board. This console has two or more rows "presets" of faders and a crossfader to transfer control from one preset to another. The crossfader is usually "split" -- a double fader which can be moved as one or separately, each side controlling one of the presets. If the double faders are both at the top, the top preset controls the lights. Moving both faders to the bottom transfers control to the bottom row. In this way a set of intensities may be arranged on the top row, and another state on the bottom row, and a smooth transition achieved between one lighting state and another. For instance, the top row might be a state with light on the left side of the stage, and the bottom row might have the focus on the right. We want the right side to appear before the left side disappears. Therefore we begin with both faders at the top, and only move ONE of them down, thus bringing in the new state, and later bring the other one down to join it, fading out the old state. Manual lighting boards in the past often had a great many presets; sometimes there were two board operators, one to set up the new presets and another to execute the crossfades. Boards with many presets might have a master controlling each one. The development of lighting computers and their relative affordability in recent years has rendered this type of board nearly obsolete; however, simple two-scene preset boards are still found in small venues. Many of these have the ability to program automatic timed fades and chasers as well. There are two basic types of computerized boards also still, occasionally, referred to as "memory" consoles: There are many different types of boards, but they have a few basic functions in common: Editor - a panel where the operator calls up channels, sets their intensity, records the set of intensities as cues, programs the timing of cues, assigns them text if desired, and so on. Most boards have a numerical keyboard as well as buttons for "channel," "memory," "time" and various other functions for which immediate access is needed. In addition there are usually one or more menu keys, enabling access to more complicated and less urgent functions such as soft patch. There is invariably some kind of manual override if a cue is done automatically. The crossfaders might take over from the automatic fade, and some boards also have buttons for "hold," to stop a cue, "back" to take it back to the previous cue, and so on. Manual faders â€” a set of manual faders for immediate access during the performance. This is useful in improvisatory situations, where there might be an MC, musicians etc. At the very least there might be audience lights, work lights, a smoke machine, etc. Effects â€” possibility to program chasers etc. Patch â€” usually within the menu function, since this is not usually needed during the performance. This function enables the operator to route different dimmers to different control channels, and other more complicated possibilities. Remote Focus Unit, or "RFU" pronounced "ARE-foo" â€” Depending on the console, this unit enables the designer or electrician, in the house or onstage, to bring up channels or dimmers, run cues, and many other functions, without requiring an operator to sit at the console itself. Another channel controls intensity, three more might control color by inserting cyan, magenta and yellow filters for example. Another channel might control a wheel of gobos. It would be much too cumbersome to plot all these as different channels with intensities although it is certainly possible. So a control board for moving lights is already programmed to identify all these as belonging to one instrument, and the operator will key in "spot 1" and then access the different functions. There might be one wheel for intensity, three wheels for color CMY , another to change gobos, and so on. Generally there would be a joystick or similar device for plotting the movement. Cues too will be more complicated, because we might not want all the functions to change at the same speed. So there is much more need in such boards for splitting a cue into parts, thus separating a cross fade into several different plotted times. Beyond this, different boards have many different functions. There are all kinds of ways to plot chasers, to grab hold of a group of lights and move them at once, and so on. Control boards for music are different in concept. The lighting is generally much more dynamic than for theater, with far more movement and change. There is also more demand for immediate manual operation. As

a result, concert boards have more manual faders than theater boards. Nearly all of them have a "page" button, which enables the manual faders to change content. A typical board might have 20 manual faders. These would be assigned groups of lights, moving lights, or lighting states, recorded as "page 1. During the show, pressing the page button switches the fader assignment from one page to another. Each song might have its own page, so that each song could have its own set of looks. Another difference from theater is that music boards often require a more complicated system for chases. The Avolite Diamond has an "unfold" function, where a chase is assigned to a certain fader, and "unfold" spreads each step of the chase out onto all the different faders so that they can be changed at will, and then "folded" up again to the assigned fader. There will also be buttons enabling other chase functions, such as "solo", which turns off all instruments other than the one on the specified fader. These different types of boards have affected each other. Theater boards have incorporated many of the complicated timing functions required for concert lighting and moving lights. Concert boards have taken on memory functions once used only for theater. Tracking, Tracing, Cue-Only, and Blocking: Two functions with which lighting designers should certainly be familiar are "tracking" and "cue-only. In our example, magenta numbers indicate levels that have not changed. If you are in "cue-only" mode, the cue sheet now looks like this: This is fine if you only wanted to raise the level for the current cue which may, indeed, be what you wanted , but if your intent was to brighten it for every cue in the entire scene, then you need to manually make the change in every cue, or you can make it once in "tracking" mode, in which case the cue sheet would look like this: Obviously, we can track it the way we did with channel 1, right? Look at cue We seem to have tracked channel 19 right into our blackout, through it, and into the following scene. Fortunately, most consoles give us a way to avoid doing such things. We do this by changing the cue "type" to that which some consoles refer to as an "Allfade" and others refer to as a "Blocking Cue": Notice how the "Type" column now lists cue as a [B]locking cue, and the color of the zeros has changed. Note also that channels 19 and 20 now are listed at zero rather than being blank. Now we can go into tracking mode, make our change, and it will look like this: As you see, changing the channel level while in "tracking" mode causes the new level to change in each successive cue until it gets to a blocking cue or a cue in which the level was already going to change. Which one is best is a matter of personal taste and working style, but you, as a designer, should become familiar with both. Many consoles offer a "trace" function, which works like tracking, except backward. A submaster is one or more channels, recorded at proportional levels, which are controlled as a single unit. Submasters are usually controlled by physical sliders; some consoles also allow the user to control them via the numeric keypad. Often, the slider will be associated with a "bump" button â€" a momentary switch which, when pressed, brings the submaster to full. There are several types of submasters: The most basic type of submaster. Simply set the channels at the levels you want and record the submaster. Raising the level of the slider brings the channels to their prerecorded levels. Sets a proportional limit for the affected channels. In general, inhibitive subs override levels set in cues and in additive submasters, but not levels set by the numeric keypad. One common use of inhibitive subs is in cases in which the houselights are controlled by the console, instead of by an external controller. Effects subs hold chases or other effects cues see the operating manual for your specific console. These effects may be triggered by raising the level of the slider, pressing the bump button, or â€" in the case of some consoles â€" by a macro linked to a cue. Each submaster can be individually assigned whichever type the user needs. A cue or submaster which causes a group of channels to cycle through a sequence of pre-established levels is called an "effect". There are several types of effects and each console handles them differently. The most often used type is the "step" effect. It is common to all modern consoles although style and terminology may differ from console to console and is what we discuss in this chapter. A step effect operates by transferring control sequentially from one collection of settings to the next. Each collection of settings is a "step" and in this discussion, we refer to whichever step currently has control as the "active" step. Each step has several elements: In a positive effect, the channels in the active step are at their "high" levels and the channels in the inactive steps are at their "low" levels. Hover your mouse over the "GO" button for an example of a positive effect. In a negative effect, the active channels are at their low levels and the inactive channels are at their high levels. Hover your mouse over the "GO" button for an example of a negative effect: In an alternate effect, the cycles switch from positive and negative

and then back again. Each step has a unique number, and is edited individually. The channel or channels which will be controlled by this step, when the step is active. Depending upon the individual console, for the effect to work properly, it may be necessary to take these channels out before running the effect. The amount of time between the point at which one step is triggered and the point at which the next step is triggered.

Chapter 4 : www.nxgvision.com Basic Stage Lighting Page

Note: This guide is intended to give you an understanding of the lighting process to help get you started in the very basics of lighting. It is for a learning tool only, and is in no way, meant to be substituted for training in lighting and electronics.

However lighting instruments group into families and it is convenient to consider our requirements in terms of what each family offers in terms of beam size, beam shape, and beam quality. Floods Floodlights are the simplest of all theatre luminaires, comprising of little more than a lamp and reflector in a box that can be panned from side to side and tilted up and down. As they have no lenses, the output characteristics of the floodlight are determined solely by the reflector and lamp type. The light is therefore suitable for lighting skies and cloths, it is not selective enough for lighting actors. Most modern theatre floodlights use linear quartz halogen lamps with a symmetrical half-pipe shaped reflector. The light is distributed equally above and below the horizontal axis of the lamp and, to a much lesser extent, equally to each side of the lamp. They use a specially shaped asymmetric reflector in order to produce a light beam that spreads much further in one direction than the other relative to the horizontal axis of the lamp. This allows for a more even spread of light down the cyc cloth or back drop, or up the cloth if the cyc light is used as a groundrow. Like floodlights, there is also some light distributed to the sides of the lamp. Floodlights may be single units, or grouped into 3s or 4s to produce a batten, used for colour mixing. The fresnel lens is named after its inventor Augustin Fresnel who developed the lens for use in lighthouses to solve the problems presented by the basic plano-convex lens which was less efficient, too heavy and prone to cracking. The fresnel lens has since become one of the most popular lenses used in luminaires for stage lighting, largely for the same reasons. The fresnel luminaire is easily identified by looking at the lens from the outside of the luminaire where the concentric rings are easily seen. Fresnel luminaires produce a soft edged beam of light that is brightest in the centre and gradually darkens toward the edges. This characteristic makes blending the light beams between adjacent fresnel luminaires into a continuous pool of light of even brightness quite easy. The fresnel luminaire is the workhorse of all theatre luminaires. Fresnels are very versatile luminaires that are often used for stage colour washes, as well as for selective highlighting. The ease of blending the light beam from one fresnel with that of an adjacent fresnel makes them quick to point and focus onto the stage ready for use. The glass may be completely clear or the flat side may have a textured surface, the latter sometimes being called pebble-convex lenses. The textured surface softens the beam a little to improve the overall beam quality. Older PC lenses tended to produce a rainbow around the edge of the light beam and project the filament outline in the centre of the light beam. Their glass was also prone to cracking. Modern PC lenses have largely eliminated these problems. The light beam characteristics of the PC spotlight make it ideal for dramatic highlights when focused to a narrow spot or for more general colour washes when focused as a wider flood. Adding a light diffuser, such as Rosco Hamburg Frost, changes the light beam to make it soft much like the light beam of a fresnel. PC luminaires are ideal for use as tightly focused specials for highlights such as when you want to pick out a single performer for dramatic effect. They are also suitable for use in front of house positions. Plano-Convex PC and Fresnel luminaires belong to the same family of "focus spots" with the only difference between the two being the type of lens that is fitted. Both types use a spherical reflector which, in conjunction with the single lens, provides a low cost optical system albeit a little less efficient than the more complex optical systems used in profile luminaires. The beam angle of focus spots is adjustable over a wide range, typically from a narrow spot of degrees to a flood of degrees. This adjustment is achieved by moving the lamp and reflector relative to the lens which is fixed in position on the body of the luminaire. Moving the lamp closer to the lens increases beam width towards its widest flood setting while moving it away from the lens reduces the beam width towards its narrowest spot setting. An accessory called a barndoor is usually fitted to the front of focus spots to provide a means of controlling the edges of the beam. Profile Spots Fixed beam profile spots In a profile spot, the lamp and the reflector remain stationary while the lens is movable whereas in the focus spot, the lens is stationary and it is the lamp and reflector that move. The lens movement in a

profile spot controls the beam quality; the lenses are capable of producing a very hard precise edge which can be gradually softened by progressive movement of the lens tube. Control of beam size and shape in standard profile spots is achieved by adjustments at the central point of the optical system known as the gate. At this point, all profile spots have four shutters which can be used to make any size of four sided shape. There is a slot with runners which accept either an iris diaphragm to give a full range of circular beam sizes, or a metal mask to produce any required beam shape. A mask for use in the gate is known as a GOBO and because of the intense heat at this point in the lantern, gobos must be made from heat resistant material. This is faster than softening with lenses, and makes more efficient use of the spotlights optics. Most profile spots also have an adjustement allowing subtle changes to be made to the positioning of the lamp within the reflector. This allows the beam to be finely tuned between peak, where the centre of the beam is more intense, or flat where the beam has an even intensity. The shuttering and masking devices in profile spots convert a lot of the unused light to heat and so shutters should be used to trim the beam edge rather than cut it down to size. This means selecting an instrument with the appropriate lens for the throw distance from the stage. Modern fixed beam profiles are available in beam angles such as: In a zoomspot two lenses are adjustable in relation to the lamp and to each other to enable the beam width and focus to be adjusted. The beam width is at its widest when the lenses are closest together and at its narrowest when they are at their furthest apart. Fixed beam profile spots usually have only one lens, although some designs use two lenses, but in either case only the beam focus is adjustable and the lenses are optimised for the specified beam width. To maximise their efficiency zoom profiles are designed to be used within a certain range of beam angles typical ranges are degrees or degrees. Zoom Profiles vs Fixed Beam Profiles Zoom profiles allow the size of the light beam to be readily set to the size needed for any particular purpose, minimising the light and energy wastage that may otherwise result from large shutter cuts. This also eliminates the need for lighting designers to calculate the exact beam angles required for each luminaire so the appropriate luminaires can be rigged for each show. The down-side is that the extra lenses and variable beam width makes zoom profiles a little less efficient. The wider the zoom range the less optimal the optical system becomes. This is why manufacturers make a series of zoom lens systems with limited zoom ranges rather than a single lens system that zooms all the way from pin spot to wide flood. When luminaires are routinely moved to different positions within a theatre, or toured to different theatres, the versatility of zoom profiles makes them the obvious and popular choice for multi-purpose venues and schools. Fixed beam luminaires allow the manufacturer to optimise the optical system to achieve the best performance from the luminaire, at the specified beam width, to provide a more efficient luminaire with superior light beam characteristics that is simpler to use. When the luminaires are permanently rigged at the same positions in a theatre the need to calculate beam angles from one show to another is largely eliminated making it practical to select luminaires based more on efficiency and light quality than versatility. Compact filament lamps such as the HPL used in conjunction with a coated glass reflector that can remove much of the infra-red energy from the beam, produces a highly efficient spotlight. The efficient heat management from the glass reflector, provides a cooler gate temperature, providing increased life to shutters, iris and gobos. Beamlights and Parcans Most lighting instruments produce a conical beam so that the spread widens as the throw increases. Beamlights use a parabolic reflector to produce a near parallel beam which is more intense than a lens spotlight of the same wattage. In the parcan the optics are fully contained within the glass envelope of the lamp. Various Lamps providing angles of a squashed near-parallel beam are available. The intensity produces a depth-enhancing haze in the air, so intense that it is effective even with deep colours. The basis of most rock lighting today. LED Technologies The lighting families that we have already discussed floods, focus spots, profile spots and beamlights have assumed the use of traditional incandescent lamps as the source of illumination. LED lights used for stage lighting all fall into the same families as their traditional incandescent counterparts, the only signigicant difference been changes to the light source and reflector design. To what extent will face and body be modelled or flattened? What area of stage will be selected and what will be the size and direction of shadows cast on floor and scenery? A vertical beam is the most selective light possible. The lit area of stage, and the shadow cast upon it, need be no wider than the widest part of the actor. If the light comes from a little forward of the actor, it will start to reach the eyes and mouth provided that she keeps

her chin up and is not defeated by a hat brim! However, the lit area, and shadow cast, starts to extend upstage from the actor - i. Light from below projects an actor shadow that looms above the actor rising and falling as she moves towards and away from the light source. When this is the only lighting angle, the effect on the face is not at all natural. But a little from below, usually just reflected light can help to soften the harshness of light from above. Lighting from the back and side Now consider a light from behind. Then a light or lights from a series of side angles i. Once again the criteria is visibility, modelling, selectivity and shadows. A light source behind the actor does not illuminate the face, but it helps to give depth to the stage by separating the action from the scenery through creating a haze and highlighting head and shoulders. The shadow of the actor is cast forward, helping the selection of areas. Since the light does not fall on the face, strong colours can be used. If the light comes from a little to one side of the actor it will start to reach the eyes and mouth on that side. The area lit, and the shadows cast, will extend along the stage floor on the other side. Add a second light source from the other side, and both sides of the face will receive light. However, there is now a second shadow and the selected area of stage floor extends to both sides of the actor. As the side lighting comes from an increasingly lower angle, the shadows will lengthen to both sides of the actor and a larger corridor will be selected across the stage. As the light hits the face from a lower angle, it will light more into the eyes and teeth, although there will still be a tendency towards a central dark line where the beams meet down the centre of the face. This is particularly important in dance. When the light becomes horizontal there will be a lighting corridor across the whole stage. By focusing just clear of the floor, it is possible to lose shadows into the wings, and the light will only be apparent when an actor stands in it. Finding a compromise We normally seek to light an actor for maximum visibility and maximum modelling, with minimum shadow. Additionally in many productions, we need to select as tight an area as possible. Which combination of angles offers the optimum compromise? The basic compromise that has long been the standard approach is a pair of beams crossing on to the actor one for each side of the face from positions that are both forward and to the side of the actor. The suggested angle is often around 45 degrees in both directions - i. The actor is now It by three beams with a ? Although a single beam can be flat it can also be quite tight. For modelling, sidelights can be added and, although they will spread the lit area, they can be at quite steep angles since they do not need to make a major contribution to visibility.

Chapter 5 : Glossary of Technical Theatre Terms â€“ www.nxgvision.com

Stage lighting explained delves deep into the mysteries of theater illumination. Not just what works and how to achieve success, but why it works.

For higher refresh rates, packets having fewer than channels can be sent. The standard does not specify the minimum number of slots that can be sent in a packet. Quoting from the standard: The device using data from the packet must know the position of that data within the packet. Dimmer packs or racks use a group of slots to determine the levels for their dimmers. Typically a dimmer has a starting address that represents the lowest numbered dimmer in that pack, and the addressing increases from there to the highest numbered dimmer. As an example, for two packs of six dimmers each, the first pack would start at address 1 and the second pack at address 7. Each slot in the DMX packet corresponds to one dimmer. To control these parameters more accurately, some fixtures use two channels for parameters that require greater accuracy. The first of the two channels controls the coarse steps for the whole range of movement and the second the fine steps for each coarse step , this gives a bit value range of steps, permitting much greater accuracy for any bit controlled parameter such as Pan or Tilt. The cable can be abused without any loss of function in ways that would render Ethernet or other high speed data cables useless, although cable faults can occasionally lead to intermittent problems such as random triggering. Unexpected fixture behavior is caused by addressing errors, cable faults, or incorrect data from the controller. Other proprietary uses have been implemented for these pins. Schemes that use voltage outside of the range allowed by EIA are disallowed. Guidance on allowed usage can be found in Annex B of E1. Current standard practice is to leave the secondary data link pins unused. Some manufacturers made units with three-pin XLR connectors, because of their lower cost. However, as 3-pin XLRs are commonly used for connecting microphones and sound mixing consoles , there is a risk of wrongly connecting DMX equipment to microphones and other sound equipment. The DMX signals emitted by lighting desks can damage microphones and other sound equipment if connected to it. As a result, the best practice is to use only 5-pin XLRs for DMX signals, to avoid risk of confusion with connectors used for sound signals. Termination[edit] The DMX signal lines require a single termination resistor to be fitted at the extreme end of the signal cable. Some of the more common symptoms of improper termination are; flashing, uncontrollable or incorrect light operation, or other undesired random special effects. Some equipment has automatic termination, others a physical switch, while the remainder requires a physical terminator eg male XLR-5 plug fitted with a resistor to be installed by the user. It is important for users to check whether their devices have automatic or switched termination, as otherwise they may end up with the DMX line being terminated multiple times or not at all when they believed it to be correct. Additionally, terminating the DMX line often exposes physical cable faults - for example, if the "Data -" wire is broken, an unterminated DMX run may partially work, while fitting the terminator immediately exposes the problem. Wireless operation[edit] Recently, wireless DMX adapters have become popular, especially in architectural lighting installations where cable lengths can be prohibitively long. Such networks typically employ a wireless transmitter at the controller, with strategically placed receivers near the fixtures to convert the wireless signal back to conventional DMX wired network signals. The first commercially marketed wireless DMX system was based on frequency-hopping spread spectrum FHSS technology using commercial wireless modems. This has been solved in newer wireless DMX systems by using adaptive frequency hopping and cognitive coexistence, a technique to detect and avoid surrounding wireless systems, to avoid transmitting on occupied frequencies. Development[edit] Many alternatives to DMX have been proposed to address perceived limitations such as the maximum slot count of per universe, the unidirectional signal, and the lack of inherent error detection. This packet can be interleaved with Null packets. However, SIPs have rarely been implemented. RDM allows for diagnostic feedback from fixtures to the controller by extending the DMX standard to encompass bidirectional communication between the lighting controller and lighting fixtures. An Ethernet-based protocol can distribute multiple DMX universes through a single cable from a control location to breakout boxes closer to fixtures. These boxes then output the conventional DMX signal.

Chapter 6 : Formats and Editions of Stage lighting explained [www.nxgvision.com]

Stage Lighting System - Lighting Rig Anatomy - A guide to the elements of a stage lighting system. Which Spotlights Should I Use For My Stage Show? - Profiles, Fresnels and PC spotlights explained.

There are five main types of lanterns in the world of stage lighting: The reflector concentrates the light towards the opening in the box. There is no control over the focussing of a flood, other than its general direction. Floods are often available in battens a number of individually-controllable floods in a single box which can take different gels, so that colour mixing is easier. Floods such as the Coda 4 Batten 4 x W linear floods have four separate cables and units can be daisy-chained together up to the maximum load each dimmer circuit can take. The shape of the lantern defines the beam shape, and the shadow of the edge of the lantern will be visible at the edge of the beam. This works well when you are using the flood directly in front of a wall or cloth, to which it is perpendicular. If you use the flood from the side or at an angle to a piece of set, the edge of the light will be visible and there will be sharp lines seen on the set. Although floods were used as the predominant on-stage light source for many years, they are not really suitable for this kind of use in modern theatre because the beam is too wide and produces unwanted light in the wings, masking and all over the set. They should only be used for a specific effect or for lighting set. If your flood has no protective glass or lens, we recommend you use a colour frame with clear gel to provide some protection in case the lamp shatters. The lens is a series of stepped concentric circles on the front and pebbled on the back and is named after its French inventor, Augustin-Jean Fresnel He developed the lens for French lighthouses so that they could be seen further out to sea and could achieve a longer focal length with a lot less glass than a standard plano-convex lens. It was first used in stage lighting in the late s. The size of the beam can be adjusted by moving the lamp and reflector closer to or farther from the lens, either by a screw mechanism or a simple slide. The beam can be shaped by the four barndoors attached to the front of the lantern. The basic design of this lantern dates back to the first days of stage lighting, but the modern version has one important difference. This lantern uses a modified plano-convex lens with a pebbled effect on the plano flat side. The pebbled effect gives the beam its characteristic soft edge. The edge of the beam is slightly harder than a Fresnel, but is not hard edged. The pebble convex lens uses the efficiency of the plano convex lens and gives the light a softer edge. Like a Fresnel, there is one focussing knob to change the beam angle, and barndoors are used to shape the beam. PCs on the Backstage Heritage Collection Archive 4 Profile Profile lanterns produce clearly defined spots of light hard-edged or soft-edged and are the most focussable and versatile of the lanterns. They have a lens some have two lenses , a lamp and a reflector, and they also have shutters and a gate. Profiles get their name from their ability to project the shape of anything placed in the gate of the lantern between the lamp and the lens. The shutters are a more flexible and accurate version of the barndoors which can be used on Fresnels or PCs. Some profiles with only one lens have two sets of shutters, one of which gives a hard edge to the beam, and one which gives a softer edge. These are known as bifocal profiles. Profiles with two lenses zoom profiles are best for projecting gobos and other shapes, as the size and sharpness of the beam is fully adjustable throughout the beam angle range of the lantern. A zoom profile lantern is known by the range of its beam angle e. The beam size can be reduced even further by the use of an iris diaphragm. A Leko is an ellipsoidal profile spot. They are of fixed beam angle. Kook â€” founders of Century Lighting. A Source Four is a type of ellipsoidal profile which uses a specially designed W lamp which improves the efficiency of the optics, and has more light output than a standard 1kW lamp. Gobos Gobos are metal cutouts or metal etched onto glass, which are used in a gobo holder to project a defined shape or two break up a beam in a particular pattern. More information about Gobos. A followspot is a special type of profile lantern with additional controls, extra handles, sights, built-in colour changer and iris, and is usually of much higher power.

Chapter 7 : A Brief History of Stage Lighting

Stage Lighting Basics "A one page tutorial explaining what stage lighting is" A single page text tutorial Click Here: The Stage Lighting Library.

Email With a newly updated article on a popular topic at On Stage Lighting, we look at stage lighting design software and CAD options when it comes to planning and communication in our lighting world in an extended Guide To Choosing Stage Lighting Design Software. Uses Of Software In Lighting Design Whilst being no stranger to scribbling a lighting plan on the back of a tour schedule with a biro usually as the first few rigging boxes are coming out of the truck , you may want to present your ideas and technical information in a clear and more professional way. As the complexity of the design increases so does the number of people involved in making it all happen and the consequences of a planning or communication mistake. Using a computer to help the lighting design process has many advantages over traditional hand drawn lighting plans and manually collated data methods. These range from A for Accuracy all the way to Z for, well, Z: The 3rd dimension in 3D CAD modelling a useful part of getting those calculations, angles and distances right. There are also great possibilities in digital storage and collaboration, reuse of previous hard work and just generally getting a computer to take the donkey work of repetition or maths when planning lighting design and system. The pitfalls to using software in lighting design are similar to the use of computers for any other purpose. The dangers of digital file storage, crashes or file compatibility are familiar to most in the modern world, along with the steep learning curve required to be able to work as effectively using the software as with paper and pencil. We will also look at some software with extremely specific uses with which the cost of ownership must be weighed against the amount of actual use for a given user. It will consider specialist stage lighting software, and also look at more generic applications that can be used for parts of the design process. Different users require different functionality from their lighting software along with things that are important or workflow areas that have to be easier than others. Drawing and presenting lighting plans or light plots, if you are in the US Creation and sharing of lists such as equipment inventories, gel cuttings lists, cable allocations etc. Calculation and communication including power requirements, circuit information, weight loadings. If you are going to be designing a show, owning and preparing the equipment, rigging it and operating the lighting system in isolation you could get away with nothing more than a few Post-It notes and making it up on the day. Putting on shows is nearly always a collaborative effort, and successful collaboration comes from effective communication. Using services such as Dropbox, our stage lighting partners can easily work on the same files in a single place and always have access to the latest version of the lighting plan or the equipment inventory. The collaborative possibilities of this kind of workflow are currently changing the way many of us work in all walks of a life and lighting design communication is no exception. Being able to work directly in a cloud based spreadsheet while the Production Electrician is also accessing the latest version is the kind of real time collaboration that makes Google Apps great for me. I must add that as a web publisher that is against monopolies and market domination I have plenty of issues with Google as a whole, but currently still find myself at the mercy of the free crack that is Google Apps with Gmail etc. While Lightwright has some great lighting design specific tools and a huge amount of thought has gone into it, such a collaborative concept can be also be found generically in a shared Google spreadsheet. Different stakeholders have access at different levels, changes can be made and are and can be reverted to. All in real time and for free in the case of Google Docs, if you are prepared to put in the time create your own. Perhaps in the future On Stage Lighting will do a series of tutorials on using Google Docs in lighting design. While there are a range of software options ranging from free to mega-expensive, some of those questions might be: Do I just fancy a piece of fancy software to mess about with? Stage lighting design software can be extremely expensive to own and in my experience the most comprehensive read: Also, there is a temptation to think that being able to use, even better, own such shiny software makes you more employable and even a better LD! This is not the case. While being able to use CAD is a useful skill it does not make you a Lighting Designer, better or otherwise. As a freelance LD making your own way, running the latest version of the fanciest software is a lovely overhead

eating into your profit unless it can be financially proven that you are actually more productive or your client experience is so improved that it keeps you ahead in the game. Or at least stops you falling behind. No one, not the client, not the ad agency, not the production company, nobody, is going to pay for anything. Why would they when the show will happen with or without all those beautifully crafted drawings and lists? Or if you drew it in chalk on the floor. The show either looks good and the minimum number of creatives had a crying fit. There is also an argument for you making your own life more bearable or enjoyable with the use of dedicated lighting software, but this should not be confused with an actual business case. In order to even need to be more productive with fancy software, you need to have a whole lot of relevant lighting gigs in a year. The ability to cleanly draw a lighting plan, print it out or email it. Vector drawing uses mathematical equations to create lines, curves and solids which means they are accurate, completely scalable and resulting drawings or details are disconnected from screen or print resolutions. Any mainstream vector drawing software will produce a nice lighting plan with annotations showing colours, circuits and focus information. If you are already familiar with Adobe products, we are looking at Illustrator rather than Photoshop, and there are plenty of vector titles available including free software. The downside to using a non-lighting specific CAD packages for the production of 2D lighting plants is their lack of scaled stage lighting symbols to drag and drop into your plan and the immediate availability of other stage lighting data such as manufacturer details or specific calculations etc. The difference between vector based graphics software and dedicated CAD products is only really the presentation of the tools, in particular dimensional and other data entry and reporting. The difference between generic CAD software that might be used by architects or engineers and stage lighting specific drawing packages is again the presentation of the tools, with developers putting what the lighting designer needs front and centre. Professional CAD software generally has the functionality that we could shape for our needs, stage lighting design drawing packages have just already shaped them and put them into toolbars with names that we recognise. Then there is collaboration and integration with other systems such as being able to use existing venue plans or add stage lighting data to a drawing from another CAD software. Any drawing software that can cope with the AutoCAD standard. The ability to import these formats can be used with lighting symbols that are available from equipment manufacturers but it is vital to watch out for scaling errors when importing symbols this way. In fact, when working with imported vector data such as. DXF drawings, watch out for scaling errors in general! Such errors have the power to make grown men weep into wireless ergonomic keyboards. The most dedicated lighting design drawing software packages can save you the trouble of importing loads of different lighting symbols by shipping with their own fixture library. They also usually come with with the ability to generate some useful lists such as fixture quantities and gel cuts based on data attached to the symbols. If you need to draw 2D plans and are on a budget, get the extra usefulness of one of the free or cheaper lighting design software or basic generic CAD packages. Ideally find something that will be able to deal with the. DWG files that are thrown at you unless you are going to be simply producing neat lighting plans for others to follow with minimal external input. What about all those lists, calculations and the communication of technical information in other formats other than a CAD drawing. Without an advanced knowledge of spreadsheet functions, we can still benefit from be able to at least set up an Auto Sum or tally and, using something like free Google Spreadsheets, collaborate on these lists in real time. The benefit of these specialist pieces of software is that a lot of care and attention has gone into creating something that works out of the box for the lighting designer. Some of these CAD packages or software combinations can have their data input at the drawing or at the list, depending on the way you like to work as an LD. If you would like to get your software to provide extra features such as sectional and elevational drawings, basic 3D views and organise information, then the more robust lighting design software is a better option. You also have 3D geometry that you can use for visualisation or pre-programming either within the software or for import into another package. Using different views of a 3D space are vital in lighting design, particularly for a theatre show, to help you make decisions of angle, light positions and flying heights and it sure beats doing lots of different drawings! Equipment lists, lighting accessories, gels and control channels can be generated by the lighting plan drawing process which saves time and effort on your part while electrical power calculations or weights can be easily viewed. Visualisation Software While still in a communicative frame of mind, we

should consider the business of visualisation. In this case, we are looking to be able to demonstrate to interested parties Directors, Clients, your mum etc. For me, the key to concept visualisation software is to produce credible images sometimes even video files of key points in the show, and produce them with the minimum of time cost. This is because much of the work of visualisation is done before contracts are signed, gigs got or anyone has even agreed to a hire budget. So, what are our options for this kind of visualisation? The cheapest form of visualisation of show that is yet to happen could be images from a previous show that have corresponding design elements. If no relevant image is available then the Lighting Designer might create something, either using their art material of choice or even lighting a 1: The digital step up from this is photographic images that have been through a Photoshop style editing software to create an impression of what the Lighting Designer wishes to communicate. This might be based on a venue shot or an artistic impression created by another key designer. In the world of corporate events, visualisation of the environment is often farmed out to a graphics artist to be used by the production company to secure the work. This means that a certain amount of work has already gone into the data for visualisation and created in any number of software packages and presented in a range of file formats, including 3D virtual tours. The specialist software also tries to integrate all or most of your lighting design into one process and can spit out plans, lists and visualisation images at any point. A downside to the use of this kind of software vs. One of the benefits of something like 3DS MAX or Maya is basically your ability to cheat all kinds of things in order to produce lighting you want your stakeholder to see. Remember that above we needed these visualisations to happen fast, often before a contract, so we need to cheat. Architectural lighting designers are big on real data such as photometric lighting, IES models etc. The longer I studied 3D CGI graphics, the further I got from the idea that if only I used all the data and the right materials, it would look how I wanted it to. This ignores the vagaries of the rendering engine and all the maths involved in ray tracing, shader specularity and radiosity calculations. This does mean that the Lighting Designer needs to know what the show will look like in order to create the images. If the LD is hoping that the modelling software will show them the end result in lighting terms, they are going to be disappointed. Visualisation software in stage lighting should be used to communicate to someone else, you know in your head to be true. And what you produce at that point may well be the difference between getting the gig and not. When choosing software for lighting design visualisation, consider at which point in the process you need to create the outputs and if some of the work has already been done by another party. There is no point in spending days creating a full lighting design to produce a visualisation image in CAD if a Photoshop wizard somewhere has already produced a 2D raster picture that you could make adjustments to using a virtual paintbrush. A while ago, I worked with Autodesk Viz the cut down version of 3DS Max because many of the show visuals were coming off the desktop of the graphic artist in that format. Pre-Programming Visualisation Software At the top end of lighting design software functionality, real time plotting of your rig is the name of the game. The software enables you to set up your virtual lighting rig with control systems, plug in a compatible lighting desk and plot your show before even committing lantern to pipe. This facility is most useful with large moving light rigs and helps the Lighting Designer and Operator build up some of the elements of a show before setting foot in the theatre. Conventional lighting dimmer circuits can also be programmed although the light intensity levels cannot really be accurately depicted however posh the software is. What pre-programming does assist with is the setting up of moving light positions, palettes and effects and even base cues without the cost of time in the venue with all the kit. This saving is real in the world of performance, but the question of who should bear the cost of running a pre-programming suite is often answered by when you know that lighting production companies are increasingly providing the best software and facilities, along with the actual lighting consoles themselves. The different software packages available to do this vary in cost, with the cheaper ones often trading off CAD or paperwork capabilities against the facility for real time programming of your light show. All require you to also have a fairly decent PC to run them on plus the hardware to input a lighting control signal DMX or Ethernet that will control the virtual lights. Similar to the previous visualisation section, there are things to be taken into account when choosing pre-programming lighting software and they fall broadly in similar areas:

Chapter 8 : Stage Lighting Explained by Neil Fraser,

These days, you don't have to hang around lighting people for long before hearing these terms, but what do they mean? RDM stands for remote device management and is a cool way to change "menu settings" on your lights from afar.

Stage lighting explained Stage lighting is the craft of lighting as it applies to the production of theatre , dance , opera and other performance arts. People who work on stage lighting are commonly referred to as lighting technician s. The equipment used for stage lighting e. The personnel needed to install, operate, and control the equipment also cross over into these different areas of "stage lighting" applications. History The earliest known form of stage lighting was during the early Grecian and later the Roman theatres. They would build their theatres facing east to west so that in the afternoon they could perform plays and have the natural sunlight hit the actors, but not those seated in the orchestra. Natural light continued to be utilized when playhouses were built with a large circular opening at the top of the theatre. Early Modern English theatres were roofless, allowing natural light to be utilized for lighting the stage. As theatres moved indoors, artificial lighting became a necessity and it was developed as theatres and technology became more advanced. At an unknown date, candlelight was introduced which brought more developments to theatrical lighting across Europe. While Oliver Cromwell was ruling Britain, all stage production was suspended in and no advancements were made to English theatres. During this theatrical famine, great developments were being made in theatres on the European mainland. New playhouses were built in England and their large sizes called for more elaborate lighting. After the refurbishing of the theatres, it was found that the "main source of light in Restoration theatres to be chandeliers" which were "concentrated toward the front of the house, and especially over the forestage". Dipped candles were made by dipping a wick into hot wax repeatedly to create a cylindrical candle. Candles needed frequent trimming and relighting regardless of what was happening on-stage because "they dripped hot grease on both the audience and actors". There were two different types of Restoration theatres in England: Restoration commercial theatres and Restoration court theatres. Commercial theatres tended to be more "conservative in their lighting, for economic reasons" and therefore used "candle-burning chandeliers" primarily. Court theatres could afford to "use most of the Continental innovations" in their productions Penzel Theatres such as the Drury Lane Theatre and the Covent Garden Theatre were lit by a large central chandelier and had a varying number of smaller stage chandeliers and candle sconces around the walls of the theatres. Chandeliers and sconces seemed to be the primary lighting sources here but other developments were being made, especially at the Hall. By the s, the Hall Theatre started using footlights, and between and they used candles or lamps. It can be noted that by the end of the 17th century, "French and English stages were fairly similar". Gas lighting hit the English stage in the early s beginning with the Drury Lane and Covent Garden theatres. In the s, a new type of artificial illumination was developed. In this type of illumination, a gas flame is used to heat a cylinder of quicklime calcium oxide. Upon reaching a certain temperature, the quicklime would begin to incandesce. This illumination could then be directed by reflectors and lenses. It took some time from the development of this new Limelight before it found its way into theatrical use, which started around Limelight became popular in the s and beyond, until it was displaced by electrical lighting. Lighting advances made in English Theatres during this timeframe paved the way for the many lighting advances in the modern theatrical world. Functions of Lighting Stage lighting has multiple functions, including: The ability to see what is occurring on stage. Any lighting design will be ineffective if the viewers cannot see the characters, unless this is the explicit intent. Altering the perception of shapes onstage, particularly three-dimensional stage elements. Setting the tone of a scene. Harsh red light has a different effect than soft lavender light. Location and time of day: Establishing or altering position in time and space. Blues can suggest night time while orange and red can suggest a sunrise or sunset. Use of mechanical filters "gobos" to project sky scenes, the Moon, etc. Lighting may be used to project scenery or to act as scenery onstage. A lighting event may trigger or advance the action onstage and off. Lighting may be used to show only the areas of the stage which the designer wants the audience to see, and to "paint a picture". In pop and rock concerts or DJ shows or rave s, colored lights and lasers may be used as a visual effect. Lighting

design is an art form, and thus no one way is the "correct" way. There is a modern movement that states that the lighting design helps to create the environment in which the action takes place while supporting the style of the piece. The intensity of a luminaire lighting instrument or fixture depends on a number of factors including its lamp power, the design of the instrument and its efficiency , optical obstructions such as colour gel s or mechanical filter s, the distance to the area to be lit and the beam or field angle of the fixture, the colour and material to be lit, and the relative contrasts to other regions of illumination. In the simplest case, a single gel is inserted into the optical path to produce light of the same color. For example, a blue gel is used to create blue light. Custom colors are obtained by means of subtractive CMY color mixing, by inserting combinations of cyan, magenta and yellow filters into the optical path of the lighting fixture. The inserted filters may have varying densities, with correspondingly varied percentages of transmission, that subtractively mix colours. This creates custom colours in a manner similar to ink jet printers, which mix varied densities of cyan, magenta and yellow inks. Manufacturers will sometimes include an additional green or amber "CTO" color correction filter to extend the range gamut of subtractive color mixing systems. Lamp power also influences color in tungsten lamps. As the lamp power is decreased, the tungsten filament in a bulb will tend to produce increasing percentages of orange light, as compared to the nearly white light emitted at full power. This is known as amber drift or amber shift. Thus a watt instrument at 50 percent power will emit a higher percentage of orange light than a watt instrument operating at full power. This type of color mixing is often used with borderlights and cyclorama lights. The pattern of light an instrument makes is largely determined by three factors. The first are the specifics of the lamp , reflector and lens assembly. Different mounting positions for the lamp axial, base up, base down , different sizes and shapes of reflector and the nature of the lens or lenses being used can all affect the pattern of light. Secondly, the specifics of how the lamp is focused affect its pattern. In ellipsoidal reflector spotlight s ERS or profile spotlights, there are two beams of light emitted from the lamp. Lastly, a gobo or break up pattern may be applied to ERSs and similar instruments. This is typically a thin sheet of metal with a shape cut into it. It is inserted into the instrument near its aperture. Gobos, or templates, come in many shapes, but often include leaves, waves, stars and similar patterns. Hanging is the act of placing the instrument in its assigned position. These fixtures and the more traditional follow spots add direction and motion to the relevant characteristics of light. Scanners have a body which contains the lamp, circuit boards, transformer, and effects color, gobo, iris etc. A mirror is panned and tilted in the desired position by pan and tilt motors, thereby causing the light beam to move. Moving head fixtures have the effects and lamp assembly inside the head with transformers and other electronics in the base or external ballast. There are advantages and disadvantages to both. Scanners are typically faster and less costly than moving head units but have a narrower range of movement. Moving head fixtures have a much larger range of movement as well as a more natural inertial movement but are typically more expensive. Stanley McCandless was perhaps the first to define controllable qualities of light used in theater. In A Method for Lighting the Stage, McCandless discusses color, distribution, intensity and movement as the qualities that can be manipulated by a lighting designer to achieve the desired visual, emotional and thematic look on stage. The McCandless Method, outlined in that book, is widely embraced today. The method involves lighting an object on the stage from three anglesâ€”2 lights at 45 degrees to the left and right, and one at 90 degrees perpendicular to the front of the object. A lighting designer LD is familiar with the various types of lighting instruments and their uses. In consultation with the director , the DSM deputy stage manager and the scenic design er, and after observing rehearsal s, the LD creates an instrument schedule and a light plot as well as informing the DSM where each LX lighting cue is designed to be triggered in the script, which the DSM notes down in his plot book. The schedule is a list of all required lighting equipment, including color gel, gobos, color wheels, barndoors and other accessories. The light plot is typically a plan view of the theatre where the performance will take place, with every luminaire marked. This typically specifies the approximate lighting focus and direction, a reference number, accessories, and the channel number of the dimmer system or lighting control console. Practical experience is required to know the effective use of different lighting instruments and color in creating a design. Many designers start their careers as lighting technicians. Often, this is followed by training in a vocational college or university that offers theatre courses.

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stage lighting the main types of theatre light explained CAN'T TELL A FLOOD LIGHT FROM A FRESNEL? THEN READ THIS QUICK GUIDE, WHICH EXPLAINS THE MAIN TYPES OF THEATRE LIGHT AND WHAT YOU CAN USE THEM FOR.