

Local 15 Entry Test Study Guide

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If you require assistance with the reading or written portions of this test, please let the BOE Chair know so we can accommodate those needs. The written test will include visual aids (pictures, diagrams, and drawings) of things you may see on the job site. This Study Guide is intended to lead you to understanding the scope of what you will be expected to know to pass this exam.

IATSE Local 15 is a mixed local, representing theatrical, AV, concert, and other live event workers. As such, Local 15 needs to ensure that all represented workers have a minimum level of skill and knowledge necessary to work efficiently and safely in live event environments. Do A/V Techs need to know how to tie a clove hitch? Do Riggers need to know about HDMI or do Electricians need to know about Decibels? The answer to each of these is both yes and no, depending on the work that day.

For the safety of crews around you and to work with and around others, we expect you to have and learn a wide variety of knowledge within the entertainment industry. If your supervisor tells you to hang the light: “Stage Right of the blue HDMI cable,” you don’t have to know the data rate of it, but you do have to know the shape of it.

In addition, there are principles, procedures, and practices that you should know before you step foot on a job site.

The standard for passing this test is 70%. It is not expected for anyone to know everything about everything. Live events are home to many specialties working together.

Topics covered in this Test:




- 1) Cables and Connectors
- 2) PPE, Hand & Power Tools
- 3) Equipment
- 4) Stage Terminology
- 5) Procedures
- 6) Safe Practices
- 7) Section View and Groundplan Examples of Area Venues





1) Cables and Connectors: There can be thousands of cables and connectors on even the smallest of shows. Not only will you be required to know what they are called, but also what department typically uses them. This test has no “Trick” questions or answers. You will not need to know the exceptions to the rule.






Name	Description	Department
Speakon (NL2, NL4, NL8)	2, 4 or 8 conductors. Used to connect Amplifiers to speakers. NL4/NL8 often have NL2 breakouts at one end	Sound




		
<p>Ethernet</p> 	<p>8 conductors. There are several ethernet standards that use the same connector: Cat5e, and Cat6 are usually used in our industry. Sometimes found with a locking “Ethercon” connector that looks like a XLR barrel. Some applications required a shielded version of this type of cable.</p>	<p>General, A/V, Data</p>
<p>Edison</p> 	<p>3 Conductor “normal” extension cord. Generally, non-grounded is not suitable for our use. Depending on wire gauge and jacket, suitable for up to 15-amp service. Can also be referred to as a Parallel Bar Ground (PBG).</p>	<p>Power</p>
<p>IEC Power</p> 	<p>Many devices requiring standard 120V “wall power” use this IEC Plug, usually with an Edison plug on one end, and a IEC socket to attach to the device. Sometimes called a “Computer cable” or a D-Plug.</p>	<p>Power</p>

<p>Stage-Pin</p> 	<p>3 conductors. Used for connecting conventional lighting instruments to dimmers. Can also be referred to as Grounded Stage Pin (GSP).</p>	<p>Lighting, Power</p>
<p>L5-15</p> 	<p>3 conductors with a twist lock connector. Suitable for 15-amp service. Sometimes found on moving lights, small dimmer packs, or other distribution.</p>	<p>Lighting, Power</p>
<p>L15-30</p> 	<p>4 Conductors with a twist lock connector, suitable for 30-amp service. Found on small generators, some chain motors, and power distribution. There are many different variants of this type of connector with different configurations and electrical ratings.</p>	<p>Power, Rigging</p>
<p>Coaxial Cable/BNC</p> 	<p>2 conductors. Depending on wire type, used for anything from wireless antennas to HD video transmission. Different ratings of BNC are not interchangeable for all tasks, always check with your lead before using.</p>	<p>Video, Sound, Data</p>

<p>Camlock (Feeder)/Bare Ends</p> 	<p>Used for high amperage power distribution like providing generator power to an entire production. Never connect or disconnect Camlock/bare wire without explicit permission from the department head in charge of power.</p>	<p>Power</p>
<p>Pin & Sleeve (CEPro)</p> 	<p>Depending on type, up to 8 conductors and 125-amp loads. Smaller ones are used for some moving lights or machinery (sometimes called CEPro), and larger versions used power distribution and as feeder cable instead of Camlock (sometimes called Hubbell cable).</p>	<p>Power</p>
<p>7-pin Socapex</p> 	<p>Used on some chain hoists and automation equipment where one cable supplies both control signal and power.</p>	<p>Rigging</p>

<p>9-pin Socapex</p> 	<p>Used for carrying multiple circuits of power, often broken out to individual lighting instruments</p>	<p>Lighting, Power</p>
<p>Serial</p> 	<p>9 pins, usually using the RS-232 standard. Used for communication between automation devices, like a projector communicating with lighting control system in a theater.</p>	<p>General, A/V</p>
<p>USB</p> 	<p>General</p>	
<p>DVI</p> 	<p>Depending on version, DVI can carry analog or digital video. DVI-I: Analog DVI-D: Digital.</p> <p>A Dual Link connector has more pins and can carry two video signals.</p>	<p>Video</p>
<p>HDMI</p>	<p>Carries digital video, sound, and sometimes networking. Make sure to find the right version of HDMI cable for the application. They all fit the same plug, but newer ones can carry more data and higher quality video.</p>	<p>Video, Audio</p>





		
<p>Display Port</p>  	<p>Used to carry a Digital Video signal. While still widely used, the DisplayPort standard is relatively old. The larger connector pictured is still used on some high-end consumer and PC equipment, but the smaller plug pictured lower is common on apple laptops and is very common to find in A/V.</p> <p>Some of those smaller display ports are thunderbolt compatible, although that standard has been superseded by the adoption of the USB Type C plug.</p> <p>When using an adapter to convert from display port to another video standard like HDMI, you may need to check if a thunderbolt compatible adapter is required.</p>	<p>Video</p>
<p>Thunderbolt/USB Type C</p> 	<p>Thunderbolt is a cable standard for moving a high amount of data. Often, they are used to connect peripherals like video outputs, sound and video, interfaces, and fast data storage. While thunderbolt 3 uses a USB Type C plug, not every Type C cable is capable of Thunderbolt.</p>	<p>General, A/V</p>
<p>3-Pin XLR</p> 	<p>Standard balanced audio cable. Used for sound sources to destinations, like microphones to a mixer.</p> <p>*in some cases, specially made 3-pin XLR cables are used as DMX cables.</p>	<p>Audio</p>
<p>4-Pin XLR</p>	<p>Used for powering and controlling lighting accessories like gobo rotators and color scrollers.</p>	<p>Lighting, Data</p>

		
<p>5-Pin XLR (DMX)</p> 	<p>Usually used for sending DMX-512 from a lighting console to daisy-chain of lighting instruments. 512 means that each 5-pin cable can control up to 512 parameters. For example, 512 conventional dimmers, or 32 LED fixtures that require 16 channels of control each.</p>	<p>Lighting, Data</p>
<p>TS/TRS (1/4-inch plugs)</p> 	<p>Tip-Sleeve: 2 conductors. Standard un-balanced audio connector-like a normal guitar or instrument cable.</p> <p>Tip-Ring-Sleeve: Same form factor, but with an extra conductor for either a balanced signal, or an unbalanced stereo pair. Scale it down to 1/8", and you have a standard headphone plug.</p>	<p>Sound</p>
<p>Fiber Optic</p> 	<p>Used for high-speed data signals like sound, video, or networking. There are many more types of fiber optic cable and connector than pictured. If you suspect you are handling a fiber optic cable, proceed with great care because the glass core of the cable is extremely fragile and can easily break if crushed or bent.</p>	<p>General, A/V</p>


2) PPE, Hand & Power Tools:



You should know how to properly use Personal Protective Equipment (PPE), Hand Tools and Power Tools. You must ask for help if you are not completely familiar with the safe use of these.

PPE:

<p>Foam Ear Inserts (Ear Plugs)</p> 	<p>These protect from damaging levels of noise. Anything louder than city traffic (85+ dB) can cause permanent hearing damage after 2 hours of exposure.</p>
<p>Hard Hat</p> 	<p>Most hard hats are designed only to protect from falling hazards from above. By law, employers must provide appropriate PPE to workers, if you bring your own, it must at minimum meet the current ANSI Z89.1 standard. Climbing helmets are acceptable if they meet the same ANSI standard.</p>
<p>Safety glasses</p> 	<p>To protect from projectiles or dust hitting your eyes.</p>
<p>Gloves (Insulating rubber)</p> 	<p>In some cases when working with high voltage, gloves with an electrical insulation rating may be required.</p>




<p>Gloves (welding)</p> 	<p>When welding, sturdy leather gloves are required to shield your hands and for arms from sparks and hot slag.</p>
<p>Welding Leathers</p> 	<p>In absence of a strong and flame-resistant coat, welding sleeves can be used to protect your arms and upper torso from welding sparks and hot slag.</p>
<p>Welding helmet</p> 	<p>Welding helmets are required for welding work due to the massive amount of UV emitted by an open arc. Without covering, your skin and eyes can be burned by an arc flash in a matter of seconds.</p>






<p>Work gloves</p> 	<p>These protect from burns due to hot lighting instruments or abrasions from handling rough materials. Some people prefer fingerless gloves for dexterity.</p>
<p>Full Body Harness</p> 	<p>Whenever someone is working at a height above 4 feet, by law an employer must provide a fall protection or prevention system. The choice of system should be evaluated by trained qualified person. Usually, if working at height in this industry you will need to be able to don a full body fall arrest harness, and use a shock absorbing lanyard to stay tied off 100% of the time.</p>
<p>Respirator</p> 	<p>Various types of masks protect you from exposure to dust, airborne biohazards, fumes, or chemical in the air depending on the type of filter used.</p> <p>These types of respirators have vents that allow air to expel without passing back through the filter and are not considered acceptable to prevent the spread of respiratory illnesses.</p>
<p>Dust Mask</p>	<p>A NIOSH approved dust mask, like an N95, is acceptable for protection from air-born particles and droplets.</p> <p>If you are using an N95 or any type of mask to prevent the spread of respiratory illness, it must not feature a valve that allows exhaled air to bypass the filter.</p>





	
<p>Boots (Safety Toe)</p> 	<p>These protect your foot from piercing damage by objects on the floor as well as from crushing damage. Many venues Local 15 workers are employed in require workers to wear ANSI Protective Toe compliant shoes. The protective toe can be either steel or a composite material.</p>





Hand & Power Tools:




Local 15 has a list of tools you are responsible for bringing to every job site*. All other tools must be provided by the employer. In addition, you should know by name and sight these tools, what they do, and what fasteners correspond to them. Do not use any tool you are unfamiliar with and ask for instruction when in doubt.





<p>Tool Belt*</p> 	<p>The tool belt you choose should be capable of carrying all required tools. You don't need a stealthy one specifically designed for theater—you should only need it for building, assembling, and loading shows in and out of a venue. You may find it worthwhile to also keep a smaller tool holder to just keep the essentials for a given job on you if you find you don't need the entire required tool list once you've started work.</p>
<p>Crescent Wrench*</p> 	<p>A 6" or 8" adjustable wrench may be the stagehand's most important tool. Never show up to a job without one. A shorter handle is fine as long as the jaw opens wide, over 1".</p> <p>It is required for your wrench to have a place to attach a safety line so the tool can't fall if dropped from any height.</p>
<p>Hammer*</p> 	<p>If you aren't sure which kind to choose, try a standard 12-ounce claw hammer. A heavier straight claw framing hammer is fine too. Choose something that comfortable in your hand. Make sure to never use a steel claw hammer on aluminum truss pins.</p>


<p>Pliers, Wire Cutters*</p> 	<p>Most people prefer 8-inch pliers and wire cutters. If cutting a lot of zip ties, use flush cutters to avoid leaving a sharp point.</p>
<p>Measuring Tape*</p> 	<p>A 25' tape measure is a good balance between working length and extra weight on your tool belt.</p>
<p>Multi-Tip Screwdriver*</p> 	<p>Common bits: #2 Phillips, #2 Robertson/Square, various flat heads, 3/16"/1/4"/5/16" Hex, T-25 and T-30 Torx,</p>
<p>Torpedo Level</p> 	<p>A standard 9" torpedo level. One with a metal straight edge is handy.</p>
<p>Socket Wrench and sockets</p> 	<p>The most common imperial socket sizes for our industry are 7/16", 1/2", 9/16", and 3/4" in some instances.</p> <p>Some scenery is made overseas and uses metric hardware.</p>

<p>Speed wrenches</p> 	<p>With double sided speed wrenches, you can carry two tools that will fit almost all bolt sizes we work with.</p>
<p>Screw Gun, Drill Motor</p> 	<p>A screw gun or impact driver uses a rotary hammering action to drive screws into wood and metal with ease but may not always be suitable for a delicate job and should not be used for drilling holes.</p> <p>A cordless drill or drill motor often has a clutch to prevent driving a screw too deep or seizing a drill bit in a hole.</p>
<p>Multi Tool</p> 	<p>A multi tool with built in pliers, cutters, and a knife is very handy, but remember that a multi tool is not a substitute for the independent version of a tool on the required tool list.</p>
<p>Allen Wrench</p> 	<p>Both metric and SAE sets are recommended</p>

<p>Glue Gun</p> 	<p>Hot glue is widely used to quickly repair scenery and props. Never leave a glue gun on its side while plugged in, this is a common cause of fire!</p>
<p>Hand Stapler</p> 	<p>Usually used for attaching textiles into wood. Make sure to use to the correct staples for the stapler.</p>
<p>Air Compressor</p> 	<p>Before you start work, make sure the compressor regulator is set to an appropriate pressure for the tool you plan to use and the release valve is closed.</p>
<p>Air Hose</p> 	<p>Used to connect a pneumatic tool to a pressurized air source like a compressor.</p>





<p>Pneumatic nail gun/stapler</p> 	<p>When using a pneumatic tool, always use eye and ear protection. If it fires a fastener into a work piece, consider fastener length and pressure, and make sure you know what is on the other side of the work piece before starting to work.</p>
<p>Circular Saw</p> 	<p>Use eye and ear protection, and make sure to use proper work-holding tools and techniques.</p>
<p>Band Saw</p> 	<p>Band saws are used for cutting irregular shapes in wood or metal. They are also known for cutting irregular shapes in fingers, so make sure you are confident in your training before turning on a band saw. Use eye and ear protection.</p>





<p>Radial Arm Saw</p> 	<p>A radial arm saw is usually found in a scenic shop for making accurate cuts in stock lumber. Use eye and ear protection.</p>
<p>Compound Miter Saw</p> 	<p>A compound miter saw performs a similar function to a radial arm saw, but in a smaller form factor appropriate for use on a jobsite. Use eye and ear protection.</p>
<p>Metal cut-off saw</p> 	<p>Used to make accurate cuts in stock metal like angle iron, square tube, and pipe. Use eye and ear protection. The metal must be clamped in place before cutting.</p>
<p>Angle Grinder</p> 	<p>Always check if an angle grinder is fitted with a cut-off or grinding wheel. Using a cut off wheel for grinding can cause it to explode. Either way, use eye and ear protection.</p>

<p>Pop Rivet</p> 	<p>Used to attach two pieces of thin material together permanently.</p>
<p>Soldering Iron</p> 	<p>Use to tin and solder electrical connections. Make sure you have appropriate ventilation in the area you will be working.</p>

3) Equipment: As a Stagehand, you will be required to know what things are, even if you don't know what they do or how they function. Imagine your lead asks you to get the yellow bin sitting next to the "Sub." Since there is a naval base 35 miles away you might be tempted to go for a drive, but in the theater a "Sub" is a name used for a Sub-Woofer Speaker and not a submersible boat. Below are the names of many objects that you will regularly see in the course of setting up for a show arranged by department.

AUDIO DEPT:


<p>Antenna (shark fin)</p>  A black, shark-fin shaped antenna with the Audio-Technica logo and name printed on its side. A cable is attached to the bottom.	<p>Most wireless microphone signals are received by an antenna that looks like a sideways shark fin. You may also see antennas that look like a helix or plastic dome—those can be used to transmit audio from the monitor mixer to a performer's in ear monitors because of their directional pattern.</p>
<p>Point source speaker</p>  A black, rectangular point source speaker with a mesh grille on the front and a small logo at the bottom.	<p>Sometimes called a speaker cabinet or cab, or fill speakers. Self-contained unit made up of a speaker (sometimes 2 or3), it's enclosure, and sometimes a built-in amplifier. Used in smaller venues, or to reach places that a line array can't.</p>
<p>Line array</p>  A stack of four black line array speaker modules, each with a mesh grille and a handle on top.	<p>A Line array is an array of speaker designed to complement each other to consistently cover an area in sound. Most large productions use them, and they are often rigged from the ceiling or grid above a stage.</p>
<p>Subwoofer (Sub)</p>  A large, black, rectangular subwoofer with a circular speaker grille on the front face.	<p>Subwoofers are large speakers mounted in enclosures specifically designed to reproduce low frequency sounds that smaller point source and line array speaker system can't.</p>

<p>Amp rack</p> 	<p>Many speaker cabinets don't have them built in, so many shows travel with rack cases containing amplifiers. Often found underneath the stage, or in monitor world. Be aware, amplifier racks are extremely heavy.</p>
<p>Microphones</p> 	<p>Microphones come in all shapes and sizes. Pictured is the industry standard entry level dynamic microphone Shure SM-58. Condenser microphones are often more sensitive, which is why they are often preferred on strings and woodwinds. Dynamic microphones are often preferred for things like loud vocals and drums. All microphones have a polar pattern in which they best detect sound, which should be considered when choosing and placing them.</p> <p>Do not plug any microphone into a channel without specific instruction.</p>
<p>Analog Sound Snake</p> 	<p>An analog snake is a multi-pin cable that is usually designed with a rugged stage box on one end, and loose cable ends on the end designed to connect to a mixer.</p>
<p>Mic Stand</p> 	<p>Mic stands come in many shapes and sizes, but most common are boom stands like the one pictured. When storing them, collapse each joint as short as they will go, retract the legs, and ask the lead if the microphone clip gets carefully unscrewed and stored with the microphone.</p>

<p>Analog Mixer</p> 	<p>This older style of mixer uses analog circuitry to process sound signals before sending them out the outputs. If you want to look up the basics, a Mackie 1604 is a good example of an industry standard mixer.</p> <p>The draw back with Analog mixers is that for more complex signal processing, they require “outboard” gear in external rack cases.</p>
<p>Digital Mixer</p> 	<p>While some digital mixers still require external processing units, the high channel counts, and ease of use means most shows use digital mixers now. Imagine—a show that required four extremely heavy 32 channel snakes can do the same thing with one ethernet cable. If you want a head start, the most common digital mixers Local 15 technicians run into are the Behringer X32, Yamaha QL5, and Allen and Heath QU-24.</p>
<p>Wedge, Monitor</p> 	<p>A monitor refers to any speaker used in a production that isn’t used to amplify the show to the audience. A wedge or floor monitor sits on stage in front of a performer so they can hear themselves and the rest of the musicians. A backstage monitor might be used so performers or technicians know what point the program is at. A side fill monitor fills a stage with a monitor feed for a more immersive effect for performers.</p>
<p>DI</p> 	<p>A Direct Box is used to convert an unbalanced, high impedance sound signal (like many instrument pickups put out) into a balanced, low impedance signal that is compatible with sound mixer pre-amps. These days, in the same form factor, there are lots of other handy sound tools, from other types of signal conversion, some with USB sound cards built in, or even ones with built in digital network audio inputs.</p>
<p>Backline</p>	<p>Backline is the term for the equipment used by a band onstage that isn’t part of the main sound system. Everything from guitar amplifiers, drum rugs, and sometimes the instruments themselves are under the care of the backline technicians.</p>


LIGHTING DEPT:

<p>Dimmer rack</p> 	<p>A dimmer rack uses control signals from a light board to adjust power levels sent to lighting fixtures. LED lighting fixtures use much less power, and have their dimmers built in, but any show that uses conventional lamps will need to store their dimmers in some sort of rack. Watch out, they are very heavy just like amplifier racks.</p>
<p>Ellipsoidal Instrument</p> 	<p>An Ellipsoidal is a lighting instrument that uses an ellipsoidal reflector behind the lamp. These lighting instruments can be finely focused and adjusted, and usually include shutters or slots to insert patterns to shape and texture the light beam.</p> <p>These will often be called for by the beam angle produced by the interchangeable lens barrels: i.e., “bring me three 19 degrees” or “let’s swap this out for a 6x9.”</p> <p>Other common verbiage for these types of lights: leko, Source-4, or zoom (if the beam angle is adjustable).</p>
<p>Groundrow/Striplight</p> 	<p>Usually, a strip of lights pointing a wash of light up at performers or scenic elements.</p>
<p>Flood</p> 	<p>A flood light is any fixture that outputs light in an unfocused, wide pattern. The flood lighting instrument pictured here is often referred to as a mole or “audience blinder” since it is usually pointed directly towards the audience.</p>



<p>PAR</p>  <p>The top image shows a PAR56 fixture, which is a large, black, cylindrical light fixture with a handle on top. The bottom image shows a Source 4 PAR fixture, which is a smaller, black, cylindrical light fixture with a handle on top and a yellowish lens.</p>	<p>The “PAR” in par-can stands for parabolic aluminized reflector, the type of reflector these fixtures use. These types of instruments can either have a lamp with different textures/patterns on the lens to create different beam angles or an interchangeable lens with a separate lamp.</p> <p>PARs can also come in a variety of sizes.</p> <p>The top photo is a PAR56, and the lower is a Source 4 PAR.</p> <p>These days, lots of basic LED wash and beam fixtures are called LED par cans even though they use completely different technology, but in many cases, they serve the same purpose.</p>
<p>Mover</p>  <p>The image shows a black moving light fixture with a handle on top and a lens on the front. It is mounted on a base.</p>	<p>A moving light, moving head, or just mover is any fixture that has onboard motors to aim and modify the light coming out of the fixture. Early versions simply moved a mirror while the light source stayed still, but now most moving lights look similar to the one pictured. Some use LED light sources, but many still use Short-Arc lamps for extremely bright effects. These fixtures require multiple parameters of control from the lightboard, and so are deemed “intelligent” instruments.</p> <p>There are many formats of lighting instrument that are sold on different moving heads: Beams, wash beams, washes, profile, pin spots, and other specialized designs. Some moving heads are essentially video projectors designed to move.</p>





<p>Fresnel</p> 	<p>A Fresnel fixture uses a Fresnel lens, recognizable by its concentric circles. The instrument can't create a sharp-edged beam, but its simple adjustment can quickly convert a beam to a spot, or vice versa. Add barn doors (flaps to shape the light), and you have a very versatile, if not old-fashioned lighting instrument.</p> <p>Fresnels come in a variety of sizes and are commonly referred to as their lens diameter and wattage.</p>
<p>Gel/Color</p> 	<p>To change the color of a beam of light, most lighting instruments have a slot in front of the lens to insert a gel frame, which holds a sheet of tinted plastic that only allows the chosen color to pass through.</p> <p>If you are tasked with cutting gel to size, always confirm what size is needed and never forget to mark the corner of each piece you cut with the manufacturer's abbreviation and color code. Pictured is R24 , AKA Rosco Scarlet</p>
<p>LED</p> 	<p>Just about any of the fixtures in this list have LED (light emitting diode) counterparts. Even to this day, it's difficult to reproduce the brightness and color depth of light sources like incandescent or short arc, the convenience of not needing gel, power savings, heat reduction, and cost of LED technology have made them ubiquitous. It's hard to find a production that isn't using them somewhere.</p> <p>Like moving heads, these fixtures require multiple parameters of control from the lightboard, and so are deemed "intelligent" instruments.</p> <p>Another common use for LEDs are in a flexible strip that is easily affixed to scenery. Different types of LED strip require different methods when cutting to length and installing, so make sure to get instructions.</p>
<p>Scoop</p> 	<p>A scoop light uses a massive mogul screw lamp to produce a wash of light. They are very old fashioned and not very common anymore, but some theaters still use them as work lights or cyc lights.</p>





<p>Cyc light</p> 	<p>A Cyc light is a fixture designed to cast a smooth wash of light on a tall surface from a short distance, most often to light a cyc—the white fabric background found in the back of many stages.</p> <p>These instruments can be multicell devices, where each cell can hold a different gel color like the incandescent one pictured, but LED Cyc Lights also common.</p>
<p>C-Clamp</p> 	<p>This kind of C-Clamp is used to attach lighting instruments to steel pipe. Use the small square bolt (Pan Bolt) to rotate the fixture, not the large hex bolt. Do not overtighten these clamps—if tightening the bolt more is drilling a hole in the pipe beneath the clamp bolt, you have gone too far. Never use this kind of clamp on stage truss without a protective shield.</p> <p>The Pan Bolt is delicate, over tightening can break the head off completely.</p> <p>Note—a lighting C-Clamp is different than a C-clamp used in stage carpentry.</p>
<p>Truss Clamp</p> 	<p>For mounting lighting instruments to stage truss without damaging a truss chord, use these truss clamps. Again—no need to overtighten. As long as the wingnut is in no danger of vibrating loose, you shouldn't need to use a wrench to tighten this.</p> <p>There are a variety of different manufacturers' versions of this clamp that all hang and tighten differently. This is just one example.</p>
<p>Light Console (Theatrical)</p> 	<p>To control dimmers and multi-parameter intelligent light fixtures, most theatrical productions use ETC EOS software and hardware. These consoles are tailored to easily store and playback lighting scenes and effects.</p> <p>ETC makes their software free to download and has excellent video tutorials if you would like to learn.</p>
<p>Light Console (Large Event)</p> 	<p>For concerts, festivals, and other complex live events, most light designers prefer a different type of console. Usually Grand MA or Hog brands, these machines are designed for “busking” a style of live performance lighting akin to playing a musical instrument instead of the same cue sequence each night like a theater requires.</p>





<p>Light Console (Small Format)</p> 	<p>For small setups, like conference break out rooms, a simpler solution is desired. Basic lighting consoles, like this Leprecon model, have a low number of parameters and are handy for controlling just a few lighting instruments. Sometimes referred to as a “Scene to Scene Preset.”</p>
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FLY/RIGGING DEPT:

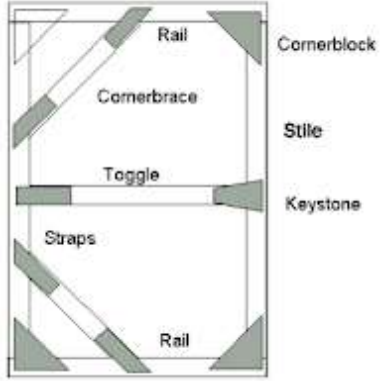
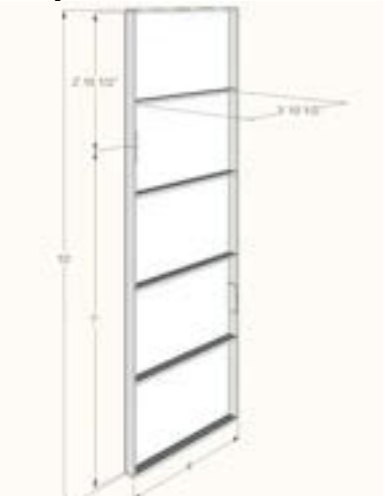

<p>Hoist</p> 	<p>A chain hoist is the backbone of most arena event rigging systems. Riggers pull and attach chains with slings, spansets, or GACflex to the structural steel of a building, then chain hoists climb up those chains lifting lighting and scenery truss into the air.</p> <p>Hoists used for overhead lifting in the entertainment industry are different than the wire winches used for pulling out stuck cars—they must contain one or even two braking systems to make sure that once a load is in the air, it is never dropped.</p> <p>There are several types of chain hoist, including the basic fixed speed one pictured, variable speed automation hoists, and ones with double reaved chain systems for extra capacity. Always follow manufacturer instructions.</p>
<p>STAC Chain</p> 	<p>Special Theatrical Alloy Chain, AKA STAC chain, is used for fine adjustment when positioning a chain motor hanging between two rigging points. STAC chain is easily recognizable by its 4 ¾” link length and accompanying load rating tag that should never be removed.</p>





<p>Trim Chain</p> 	<p>Trim chain is used in a theatrical counterweight fly system for rough length adjustment between a lift line and a batten or scenic element. Only Grade 30 Proof- Coil chain is approved for use as trim chain.</p>
<p>Turnbuckle</p> 	<p>A turnbuckle provides fine adjustment in a rigging system. Only forged turnbuckles rated for overhead lifting are suitable for use in the entertainment rigging industry.</p> <p>If someone mentions “mousing” a turnbuckle, that means using a zip tie or a piece of wire to tie the eye to the body of the turnbuckle, as an extra precaution to prevent the eye from unscrewing.</p>
<p>Pickle</p> 	<p>A pickle is the simplest form of motor controller, featuring just an up and down button. When plugged into a powered chain hoist, it provides convenient control for raising a motor to working height when attaching truss or other production equipment.</p>
<p>Motor Control</p> 	<p>Pictured is a yellow control pendant, and motor control/power distro. The pictured system can power and control up to eight chain hoists. Never touch a motor pendant or controller without explicit instructions from the department head responsible for that rigging system.</p>

<p>Shackle</p> 	<p>A shackle is the standard device for connecting a load to one or two rigging points, made up of the curved bell, and a threaded pin. Always follow manufacturer instructions.</p> <p>Never interchange pins and bells from other shackles.</p> <p>If someone mentions “mousing” a shackle, that means using a zip tie or a piece of wire to tie the pin to the bell, as an extra precaution to prevent the pin from unscrewing.</p>
<p>Wire Rope Sling</p> 	<p>Widely used in arena rigging to attach rigging points to structural steel. Usually made from galvanized IPS or EIPS (Extra Improved Plow Steel), sometimes it's referred to as “GAC” for galvanized aircraft cable.</p>
<p>Spanset</p> 	<p>“Spanset” is the trade name for a type of synthetic round-sling frequently used to hang stage truss from motor points, as well as many other general lifting applications. When attaching a sling to a truss, check with the person in charge to determine the correct way to wrap the truss.</p> <p>These slings are made from synthetic cord wrapped many times around inside the webbing cover, making a durable yet lightweight solution. In many cases, these may be inappropriate to use because the synthetic construction is not fire resistant.</p>
<p>GACflex</p> 	<p>When a strong, fire resistant, steel connection is desired, GACflex or Steelflex round-slings are preferred. These are made the same way as normal spansets, but the synthetic cord is substituted for a steel wire, wrapped around many times in the same way.</p>





<p>Brick</p> 	<p>The term “Brick” usually refers to a slab of iron used as a counterweight used in a theatrical counterweight rigging system. The terms used to describe their weight depend on the venue. Some simple call them by their weight, some refer to the heaviest as Pigs or Full Bricks, mid weight as Half Pig or half brick, and for the lightest, Piglet, Wafer, or Pancake.</p> <p>Because of this consistency, if you are asked to load weight in a theater, let the head rigger or flyperson know if you need training, and always ask how they prefer to communicate weights.</p>
<p>Cheeseboro (cheeseburger)</p> 	<p>A Cheeseboro (affectionately called a cheeseburger) is a device used to clamp onto a pipe for carpentry and rigging purposes. Pictured here is a swiveling “double cheeseburger”, a version of the device that connects two pipes together in any orientation. These are generally avoided in overhead rigging because they are not rated for that purpose but are still widely used in the construction of stage structures.</p> <p>Sometimes these are referred to as Scaffolding or Scaff Clamps.</p>
<p>Spigoted Truss</p> 	<p>A spigoted truss can use a couple different methods of interlocking connection: pictured is a forked connection, where truss pieces fit together like a puzzle piece and are secured with pins and R-clips. Alternatively, some styles use egg shaped pegs instead of forks (we call them truss eggs) hold everything in place. Never use a steel hammer on aluminum truss pins!</p>
<p>Bolted Truss</p> 	<p>Instead of pins hammered in place, bolted truss is simply held together with bolts, washers, and nuts. Assembling truss is one of the few times where the bolts should really be fastened as tight as you can make them, as long as you aren't damaging the truss itself.</p> <p>Only use the bolts that come with and are designed for truss.</p>




SCENERY/STAGE CARPENTRY:

<p>Broadway Flat</p> 	<p>A “Flat” is one of the most common scenic elements. Flats can be made in any size, but most companies have standard sizes that they build and keep in stock to use as components in sets they build.</p> <p>Broadway flats are built with thin lumber so that the flats can easily be rigged from a theatrical counterweight line set where space between moving scenic elements comes at a premium.</p>
<p>Hollywood Flat</p> 	<p>A Hollywood flat is more likely to be found making the walls of a set that rests on a stage deck or platform, and with proper bracing can easily be stacked and combined to create larger surfaces. These flats are thicker, but still use lightweight sizes of lumber, usually 1x3 or 1x4 dimensional lumber for ease of construction and portability.</p>
<p>Pallet (scenery sled)</p> 	<p>A Pallet is a low-profile rolling platform used to move scenic elements like furniture and props across a stage with minimal visual impact. Often consisting of a single sheet of plywood or MDF with slots carved for low profile casters like the one shown here.</p> <p>Sometimes, these are hooked into stage automation systems. In that case, a “knife”, is inserted through the pallet into a connector, or “dog”, that is pulled along a track under the stage by an automation cable winch.</p>

<p>C-Clamp</p> 	<p>Notably simpler than its lighting department sibling, a standard C-Clamp's only purpose is to squeeze two things together. Not suitable for overhead rigging.</p>
<p>wagon/riser</p> 	<p>A riser or platform is a portion of a stage that is elevated above the rest of the stage deck. Most common are Drum Risers, or Ego Risers, usually for lead singers and performers.</p> <p>A riser that moves on casters is usually called a wagon.</p>
<p>Coffin Lock/Key</p> 	<p>To quickly secure scenery and stage elements to each other, these Coffin or Rotoloks use a camming action to hold flats or stage pieces tightly against one and other. You'll need a T-Handled 5/16" Hex Key to use these.</p> <p>Many modern staging systems no longer use coffin locks, but a 5/16" hex screw is still the standard across many manufacturers.</p>
<p>hamper (hamster)</p> 	<p>To store stage drapes, drops, or other soft goods, most companies use these large industrial canvas hampers, affectionally called hamsters.</p>



VIDEO:

<p>Fast Fold screen</p> 	<p>The Da-Lite Fast Fold screens are the most common projector screens used in convention halls and large breakout rooms. Stored in compact plastic transport cases, the frames latch open and are affixed using crank handled screws (make sure to not lose them). The screen is then stretched into place and fastened with snaps. Most fast fold screens are color coded or marked so it's clear which joints fit together, but don't be afraid to ask for help.</p> <p>Fast fold screens require two to four technicians to safely erect.</p> <p>When storing, make sure the screen is folded such that the screen surface is only ever touching itself, not the black borders.</p>
<p>Dress Kit</p> 	<p>When required, a dress kit, including Top border, legs, and skirt, can be installed on a fast fold screen. This requires additional aluminum frame components and needs to be installed before the screen is erected.</p>
<p>Tripod Screen</p> 	<p>When a fast-fold screen is larger or more complex than a small event requires, these simple tripod screens are commonly used.</p> <p>Extend the legs, rotate and raise the rolled-up screen to the height you want the bottom of the image to fall to, then extend the hook and unroll the screen until you reach the desired aspect ratio.</p>
<p>Projectors</p> 	<p>There are thousands of projector models used in the A/V world, but you should understand these concepts that apply to most projectors:</p> <p>Zoom: On most projectors, zoom refers to the adjustable optics used to compensate for the distance between screen and projector. It is either controlled electronically, or by a small lever near the lens.</p> <p>Focus: Just like a camera, a projector lens needs to be focused so that the image is sharpest when appearing on the screen. This might be controlled electronically, or by a small lever near the lens.</p> <p>Keystone: To compensate for off-angle projection, keystone can compress an image to fit a rectangle screen. Not all projectors can keystone, and digital keystone sacrifices image resolution, so position a projector in a square plane with the screen when possible.</p>

	<p><u>Lens Shift</u>: Some projectors can mechanically shift an image without distortion to compensate for when a projector can't be placed directly in line with the center of the screen. This can be accomplished by a small screw next to the lens that can be adjusted like a joystick when loosened or done mechanically with control buttons.</p>
<p>Teleprompter</p> 	<p>When a presenter is reciting from a script but hasn't memorized it, they may require a teleprompter system that displays their speech to them as they read it. Sometimes, the text is displayed on monitors behind the audience, on a DSM, or in front of a camera like in a broadcast studio.</p> <p>The teleprompter shown is a "presidential" style teleprompter, where monitors project the text onto slightly mirrored glass that sits in front of the presenter.</p>
<p>DSM (downstage monitor)</p> 	<p>A downstage or confidence monitor is a screen positioned so that a presenter can either see their presentation notes, a teleprompter feed, and or the same feed that is being sent to the projector so they can be confident in what the audience is seeing.</p>
<p>Video Switcher</p> 	<p>A video switcher is the device responsible for choosing what video feed is sent to an output like a projector, recorder, or DSM.</p> <p>Broadcast style switchers are most recognizable by the spaceship like transition lever, but most switchers we use are rack mounted like the Barco PDS-902 switcher pictured here. These are often configured such that you choose a video signal source like a computer or camera feed, a destination like a projector or DSM, then press the "TAKE" button to confirm your decision.</p>
<p>DA/Splitter</p>	<p>A DA or distribution amplifier is a device that actively splits video signals to multiple outputs. Often referred to by number of outputs like 1x4 or 1x6.</p>

ALL DEPTS:

<p>Road box</p> 	<p>Usually featuring metal corners, foam padding, and sturdy latches, a road or flight case is designed to withstand the rigors of fast paced live events and tours.</p> <p>The pictured case features wheel pockets, allowing identical boxes to be stacked. When stacking boxes, always make sure the wheels line up appropriately for the wheel pockets. When doing this with a forklift, one experienced person should be responsible for communicating with the forklift driver. Never place your fingers between a wheel and a wheel pocket, even for an instant.</p>
<p>Cable Caddy</p> 	<p>A Cadillac or caddy style case is usually used for long cables like snakes, socapex, or feeder, so these can be extremely heavy.</p> <p>A caddy usually features a lid that can swing all the way flat against the back of a case, and cutouts to run cables out the end of the box when the lid is closed.</p>
<p>Gondola case</p> 	<p>A gondola case is a large road case that essentially serves as a mobile closet. They are often used as wardrobe storage like the wardrobe gondola pictured, but they can also be configured as portable workstations, aka a “work box” for a crew member or department.</p> <p>Since they are so tall and sometimes top heavy, take extreme care when moving these cases.</p>
<p>Hand Truck</p> 	  <p>Don't confuse a hand truck with a furniture dolly (top) or a wheel board (bottom), a dolly designed for a specific piece of equipment like a speaker system.</p>

<p>Packing Blanket</p> 	<p>When storing flats or other fragile scenery for transport, use padding like a moving blanket to protect against abrasion.</p>
<p>Deck Cart</p> 	<p>To safely move and store flats and stage components, carts like this one feature automatically locking latches that secure staging pieces as soon as they are lifted into the cart.</p> <p>Not all deck carts look or function the same. Many staging companies use much larger or complex deck carts, so take care when using them that you don't place your hand in an area where it could be crushed.</p> <p>Carts should be kept from moving while being loaded and unloaded. Loads on the cart must be held back from falling while other items are loaded or unloaded. Never leave a deck cart unattended when not mechanically secured.</p>

4) Stage Terminology: Below are words and phrases that are commonly used in theatre and other live event settings.

<p>Grid</p>	<p>The grid is a support structure of the rigging system of a venue. In a theater, typically holding ropes and pulleys that enables stage crew to quickly and safely 'fly' elements of the set and lighting in and out of place. In arenas or outdoor stages, the grid is a structure built from I-Beams or structural truss.</p>
<p>Jump</p>	<p>The jump is a platform/catwalk in a theatre located about halfway between the stage floor and the overhead grid. Access is by ladder or spiral stair, but some houses it can be accessed via elevator. The use depends on the theatre; from lighting storage, automation control, secondary pin rail, etc.</p>
<p>House Right, House Left</p>	<p>Where stage right and stage left are called from the perspective of someone standing on stage and facing the audience, House right and left are called from the perspective of the audience. When on stage, assume any direction called is a stage direction, not house direction.</p>
<p>Proscenium (Pro)</p>	<p>Not every venue has a proscenium, but generally, the proscenium is the architectural or ornamental opening between the stage and the audience just downstage of the main curtains.</p> <p>In a thrust or semi-thrust theater, the part of the stage extending out into the audience is extended. In a full thrust theater, the audience on one side of the stage is parallel to the audience the other side.</p>
<p>Plaster Line</p>	<p>An imaginary line across the stage from one upstage corner of the proscenium to the other. Usually this is the line from which upstage/downstage measurements are taken to place scenery.</p>

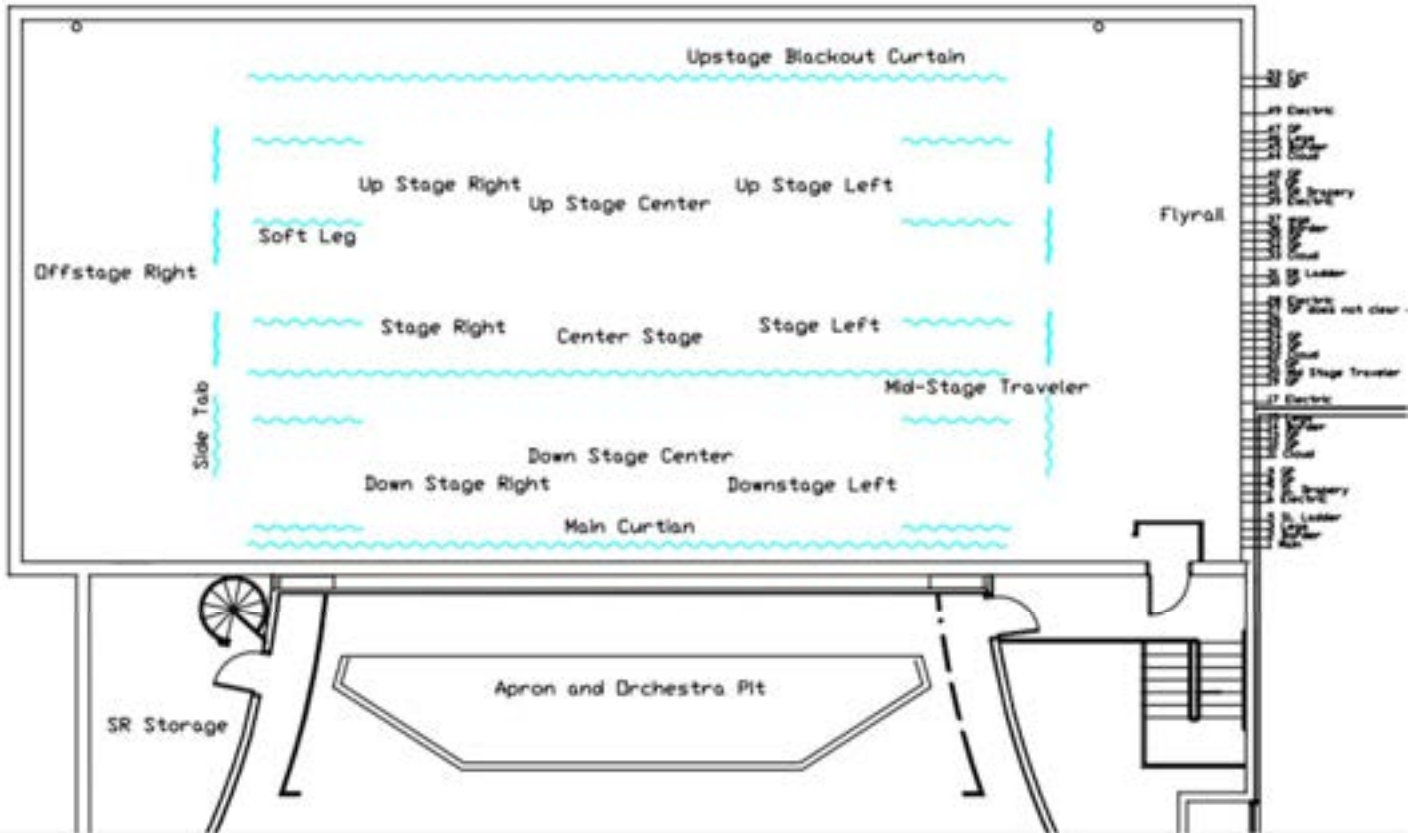
Smoke Pocket/Fire Curtain	Theatres of a certain height have a Fire Curtain than is triggered in the event of a fire that will cut off the house from the stage, preventing the fire from spreading from one area to the other. Smoke Pockets are thick steel tracks located on either upstage side of the Proscenium, running from stage floor to the grid, and act as a guide for the Fire Curtain.
Raked Stage	A raked stage is angled so that the downstage edge of the stage (closest to the audience) is lower than the upstage edge. Historically this was commonly done in early theaters where most of the audience stood on a flat floor in front of the stage.
Balcony, balcony rail	A balcony is a level of seating above the main audience seating area. Often, you will find a lighting position, or balcony rail, mounted in front of the seating area.
Properties (Props)	Any item a performer handles on stage. This can include items used to dress the set to establish place, time, and inform the audience about the location/character. Do not touch, rest something upon, or sit on Props. If you are in doubt, assume it's a prop.
Flip, Rotate (spin)	To flip something means to turn the item over, such as flipping a pancake. Rotating is spinning an object in its current place while keeping it upright (Doe-See-Doe)
FOH Truss/FOH Electric	FOH = Front of House. A truss or lighting catwalk suspended above the audience. When there are more than one, the 1 st FOH truss is located closest to the stage. Some people may call these AP/AntiPro or Beam positions.
Cove	A cove is an enclosed lighting position that usually provides front light towards the stage. Often, this term is reserved for lighting positions either extremely far from the stage or recessed into the architecture of the building.
1 st Electric (2 nd Elec, etc....)	When a stage features several pipes or trusses spanning over the width of the stage specifically for lighting, as most theaters and many touring shows do, they are named sequentially from the downstage edge of the stage, where 1 st electric is the closest to the audience.
Head Carp	The Head Carpenter is typically the person in charge of managing every technician performing work on a stage. Whenever you arrive at a job, the head carp is who you should seek out if you don't know where to check in.
Flyperson	A flyperson is someone responsible for operating a theatrical counterweight rigging system.
Video Resolution and Aspect Ratios	Video resolution determines how many pixels are contained in an image; aspect ratio is the ratio of horizontal to vertical pixels. 16:9 is a common aspect ratio for widescreen video. 4:3 used to be common.
Lumen	Lumens, or lm, are a measure of total visible light from a lamp or light sources. Understanding the concept of total light output is important in choosing the correct lighting instrument or projector for a job. Footlamberts and Nits are also measurements of light output sometimes used
Finch	Short extension cable, typically 1 foot in length. Sometimes called a jumper.
Spike Mark	A spike mark is a colored tape marking on a stage denoting exact location a scenic element, prop, equipment, or performer is supposed to go.

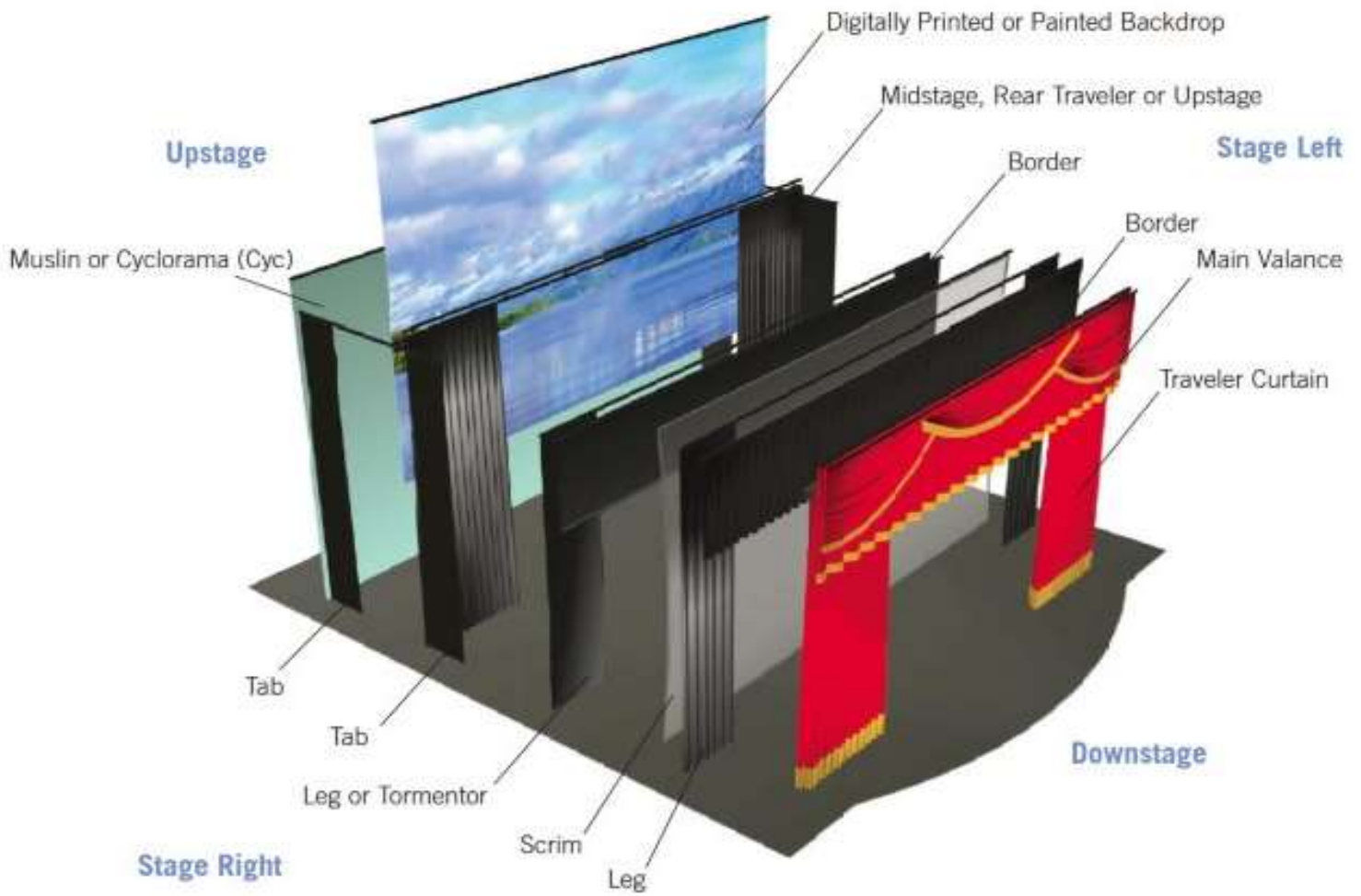
Knife and Dog	In scenic automation, the knife is an easily removable strip of steel or durable plastic (UHMW) that links scenery to a “dog,” a steel carrier set into a track in the stage, which is usually affixed to a wire moved by an automation or manual winch.
Monitor World	Monitor world is a side stage area where the audio monitor engineer and their equipment can be found.
Dimmer Beach	Dimmer beach is a side stage area containing lighting and power distribution for a show. Typically, it is located closest to the Company Tie-In, but not always.
Video Village	Video Village is often found offstage and is the hub for video signals sent around a production.
Company Tie-In/ Switch	Is a dedicated switch box where the productions power distribution needs are connected to the venue’s electrical service. This electrical panel typically has high amperage and is extremely dangerous. NEVER connect directly to this panel. ALWAYS check in with the House Electrician first.
General Session (GS)	At a business or entertainment convention, a General Session is the main event in a large convention hall. Depending on the event, a GS can be a very complex live event featuring high profile speakers and entertainment on the same stage.
Breakout (BO) Rooms	Smaller events at conventions are usually scheduled in breakout rooms, usually consisting of a projector and screen, a demo table, and a basic sound system.
Demo Table	In a breakout room or general session, a demo table is often required to hold presentation computers or other equipment a presenter might need.
Graveyard/Bone Yard	A bone yard is the designated area to store empty road cases and spare equipment while a production is in progress.
Loading Dock/Stage Door	The loading dock is where event equipment is loaded/unloaded from trucks. The stage door is a venue entrance designated for production staff. Unless instructed otherwise, enter a venue through the stage door.
Loading Ramps	There are a few different types of ramps used for loading trucks. In absence of an elevated loading dock, a truck ramp is used to access a trailer from the ground. These can be massive, requiring a team of stagehands to position. Sometimes built into a loading dock or placed manually, a dock plate is a sheet of metal used to bridge the small gap between the loading dock and a truck. In some cases, the nose of the trailer, or dance floor, is slightly elevated requiring a dance floor ramp similar to a dock plate.

SOFT GOODS:

Batten	Usually 1 ½” in diameter, a batten is a schedule 40 pipe suspended by a rigging system designed to hold soft goods and other scenery.
Valence	On stages where the main curtain opens and might not rise, the valence a matching border that runs along the top of the stage to hide the furthest upstage lighting and scenic rigging.
Main Curtain	Sometimes called the main rag, main drapes, or even just the main, the main curtain pictured in the diagram is split in the middle and opens off stage in both directions. Most main curtains can operate this way, but in

	theaters with a complete rigging system they can also raise out into the fly tower.
Border	<p>A border is a strip of masking, usually black velour that frames the top of a stage. The border is placed to hide from view any rigging, lighting, or scenic equipment the audience isn't supposed to see.</p> <p>The Border can be referred to as a teaser in some situations.</p>
Legs	<p>Legs are a thin strip of vertical masking, usually black velour drapes, that frame the sides of a stage. Pairs of borders and legs are usually hung from the same overhead pipe. The space between 2 legs on the same side of the stage is called a wing.</p> <p>The pair of legs directly upstage of the main curtain are called tormentors or torms, and when reinforced with frames, are called hard legs.</p>
Traveler	A traveler is any scenic element, like a curtain or Broadway flat, that moves across the stage in a suspended track. The traveler hand/operator line is the rope used to move the piece back and forth from off stage. Usually, when someone says traveler, they are referring to a curtain that opens and closes like the midstage traveler pictured below.
Drop	A Drop is any backdrop that hangs from a counterweight rigging line set. Often covering the whole width of a stage, these were historically made from painted muslin.
Scrim	A scrim is a translucent mesh fabric that can be lowered in across a stage. When lit from the front, it obscures anything upstage, but when scenery or performers are lit up behind it, it can hardly be seen.
Cyc	A cyc, usually the furthest upstage scenic element, is simply a white fabric stretched across the whole stage and colored using cyc lights.





5) Procedures:

Bucket Brigade/Fireline: To quickly move many small loads, stand shoulder to shoulder in a line from the origin to the destination. DO NOT MOVE unless instructed to. Pass each item carefully from the person giving it to you to the next person in line. COMMUNICATE! If there is a hold up, speak up, “Slower” or “Stop” or “Ready”

Folding a Drop or Curtain: 1) Do it how the Head Carp says. OR 2) Sweep and dry mop the stage. Lay the curtain out flat on the stage, with the facing side UP! Repeat careful folds from the bottom to the top until the desired storage width is achieved. Fold each end to the center. Repeat as many times as needed. Leave a gap in the middle large enough to facilitate folding the stage right side onto the stage left side for storage.

Tying on a Drop or Curtain: Usually the best practice is to start tying a drop or curtain on at the center of the pipe. The drop will have a “Centerline” mark, or the tie-lines will be a different color. Your Crew Lead will give you specific instruction about Legs as they don’t reach the center and will be different for every show. Always tie drops and curtains as you would your shoes, with a bow knot. You may be asked to tie an “opera knot,” ask someone to show you their version of this knot. There are slight variations.

Groundplan, Section, and Projection: A Groundplan is a 2D drawing as if the roof of the theater has been removed and you are looking, with a bird’s-eye view down onto the stage floor. A Section is a 2D drawing as if the side of the building has been removed and you are looking sideways at the set. A Projection is a 2D drawing of the set as if you were looking from a seat in the audience at the stage.

Light Plot, Stage Plot, etc.: When someone refers to a plot, they are usually talking about a groundplan specific to their department. A light plot informs electricians on where to hang lights, a stage plot shows locations of scenic elements or where performers will be and where their equipment must be placed during a show.

Carrying truss and flats safely: Although it may seem counterintuitive, a large piece of Aluminum Truss can be carried most comfortably by 2 workers grabbing opposite corners of the truss and walking the same direction. Carrying a flat with matching grips means that the grips face each other, grab the flat with opposite hands “high” and opposite hands “low” so that you could tip the flat without swapping hands.

Walking up a Flat: One person stands at the bottom edge of the flat and places their foot at the center of the flat against the bottom edge, bracing it. The other crew member(s) lift the top of the flat and then, when the top of the flat is above their head, continues pushing up while walking forward until the flat is vertical. (Note: this procedure can be done in reverse to lower a flat.) All these procedures work with long objects like pipes or lumber in much the same way.

Floating a Flat: A flat without protrusions can be lowered to the ground by bracing the bottom edge and letting it fall on its own with permission of the Head Carpenter. The air pressure being pushed by the flat will slow its fall as it nears the ground. To do this, the area must be cleared and clean, and an announcement that the procedure is being used must be made so that no one interferes with the flat as it falls. A hero trying to “catch” the falling flat will break the flat and injure themselves.

Assembling Truss: When connecting truss together make sure the diagonals are making “V”s or “A”s at the faceplate. Depending on the truss in question, you may have to flip and Doe-See-Doe the piece to make it fit.

Dispose of bad rigging equipment: Always remove damaged or potentially damaged rigging equipment from service. ALL rigging equipment is rated for use only if it is in proper working order. A shackle with a tiny crack is worthless. NEVER replace or substitute components (i.e. pins of shackle, bolts from turnbuckles) of rigging hardware, it may fit but they are not interchangeable. ALWAYS let the Rigging Lead know when you think you find damage or if pieces of equipment don't fit properly. **Never force rigging equipment!**

Knots: There are two knots you are required to know. The Bowline and the Clove Hitch. There are many online resources to learn these knots and every stagehand must be able to tie them. Using these knots correctly takes some experience. A good guideline is that a clove hitch is, 90% of the time, used for tying around an object like a pipe. The bowline creates a loop that does not change size.

You should learn/practice these knots ahead of time, but there will be time and opportunity to practice and multiple chances for success during testing.

Other recommended knots: Trucker's Hitch, Prusik, Sheet Bend, Half Hitch, and Shoelace Knot (how most people tie their shoes)

Coiling Cables: Unless otherwise instructed, coil cables over-under. If you have questions about this technique, you can seek out YouTube videos or related websites. Never wrap the cable around your elbow.

“THANK YOU, ###!”: Especially during a load in and out, if you hear a warning that an action is being taken it is very desirable to repeat the warning after looking around and becoming aware of the situation. i.e., The Flyman says, “Batten coming in!” Repeat, “Thank you, Batten coming in!”

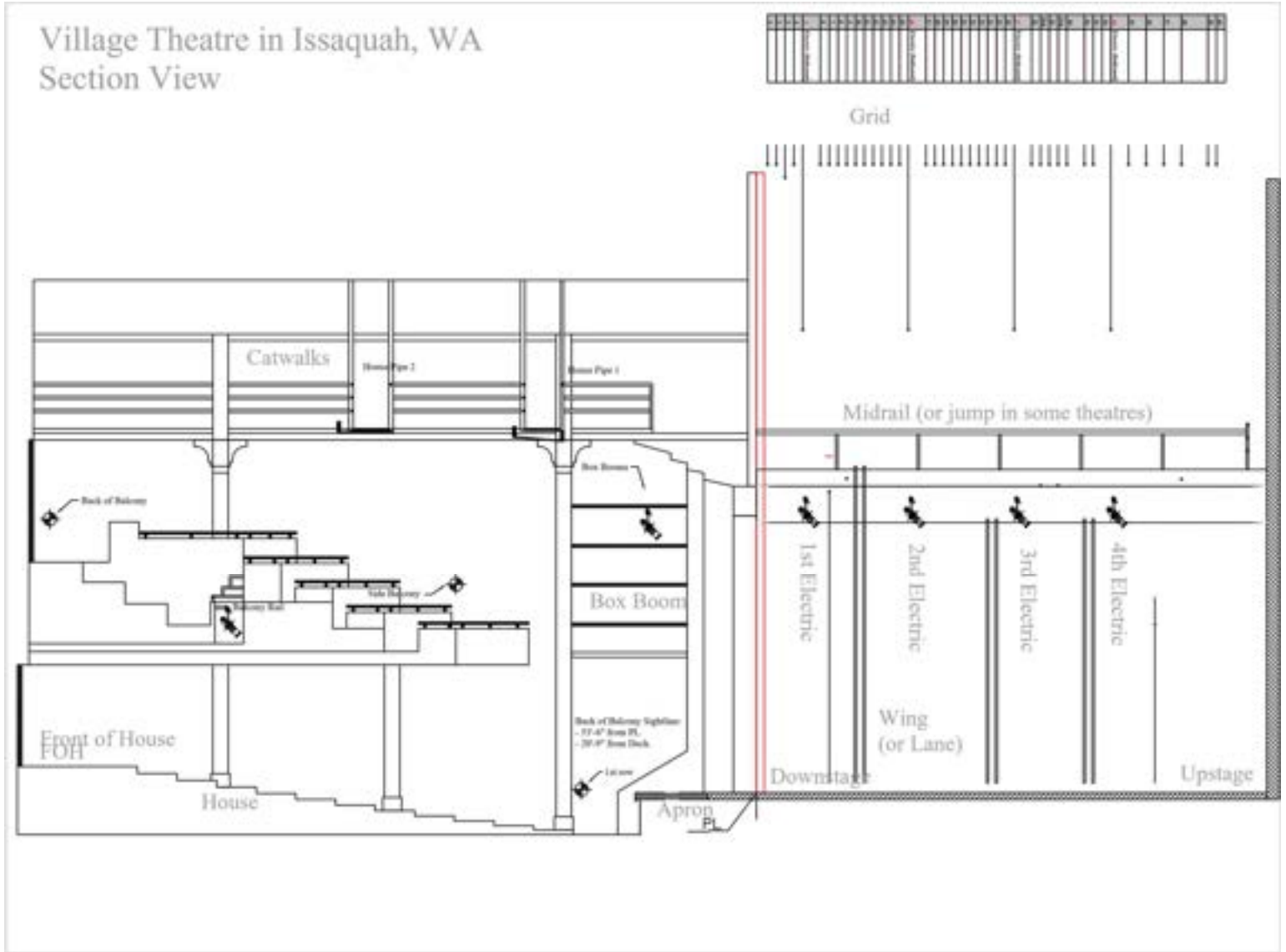
Doe-See-Doe, Flip, and Tip: “Doe-See-Doe” means to leave the top up, the bottom down, and to rotate the object, or yourself, around the object so that it doesn't change position but faces a different direction. “Flip” means, like an acrobat, to turn the object so that the top is now on the bottom and the bottom on the top. “Tip” means to turn the object 90° so that the top and bottom are now on the side.

6) Best Practices and Work Tips:

- Know the Leads of the crews of all departments by sight as soon as possible.
- If the answer in your head is “I'm not sure, but I guess so,” you should ask to have your Lead confirm your choice.
- While carrying any long pole, pipe, or board, by yourself, always have one end low and one end high.
- When lowering a long pipe from above, tie a clove hitch on the bottom end and tie a half hitch on the top end.
- Never run sound cable directly parallel to power cables, and vice versa.
- When you finish a job let your Crew Lead know that you have done so and ask “What's next?”
- Asking questions is encouraged, and timing is everything. Learn the best time to ask.

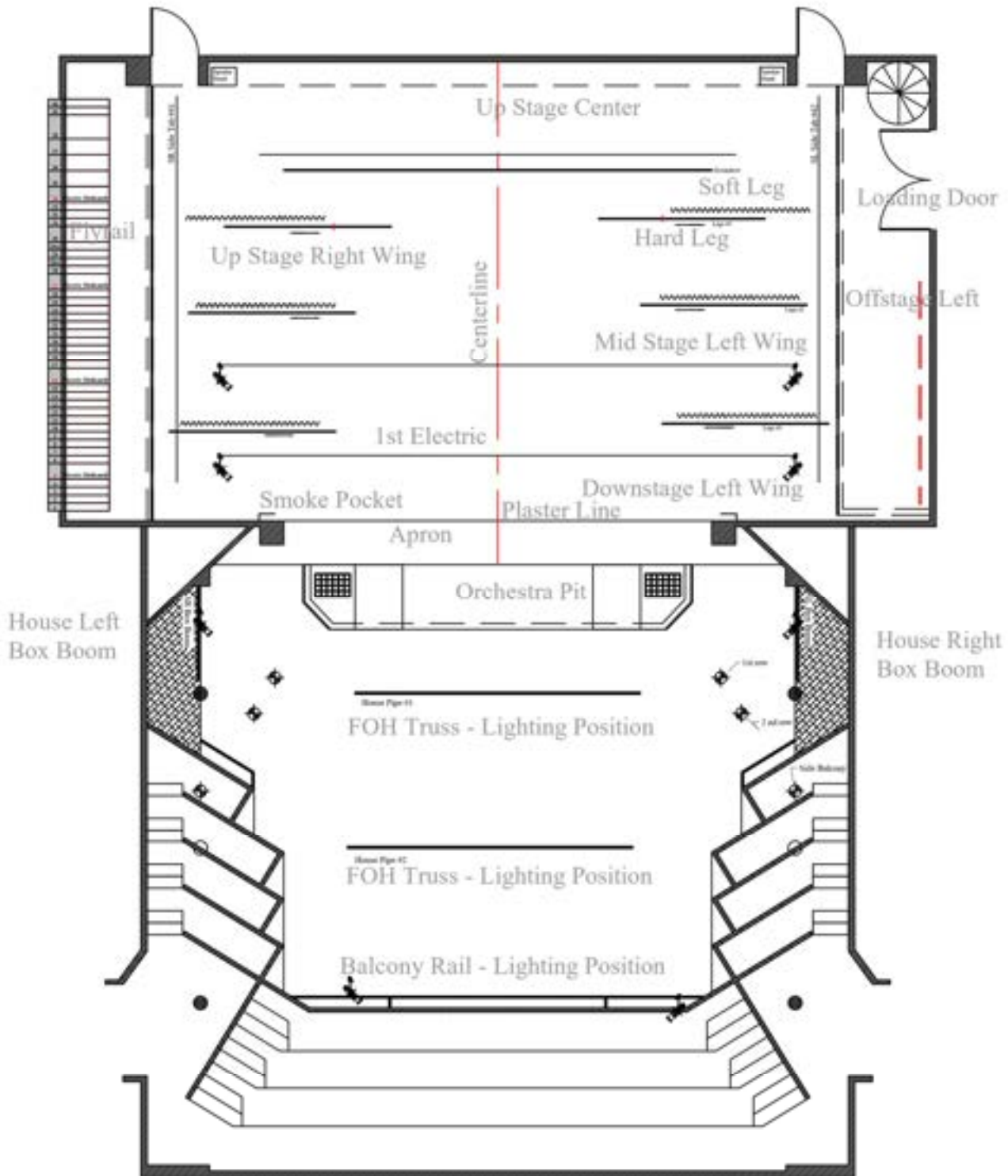
- Never climb onto or above the second highest step of a ladder.
- Unless specifically asked to do so, only mop a stage floor or Marley dance floor with water, hot if possible.
- Always connect the grounding wire (typically green in color) first and remove it last. If there is no electrical ground, you are the electrical ground.
- Lift with your legs.
- Replace batteries before rehearsals and performances.
- Know your Weingarten Rights.
- Stay with your department until released by your Department Lead.
- Never leave the job site until released by your Local Lead, Head Carpenter, or Payroll Steward.
- A hardhat is required when overhead work is being performed.
- Being on time means that you are ready to perform your job at the exact call time. You are responsible for all the time it takes you to get your tools ready, check in with the Steward, get a sip of water, etc....
- Be aware of your surroundings, including potential hazards, other workers, the general public, and/or VIPs.
- NEVER RUN!

7) Section View and Groundplan Examples of Area Venues

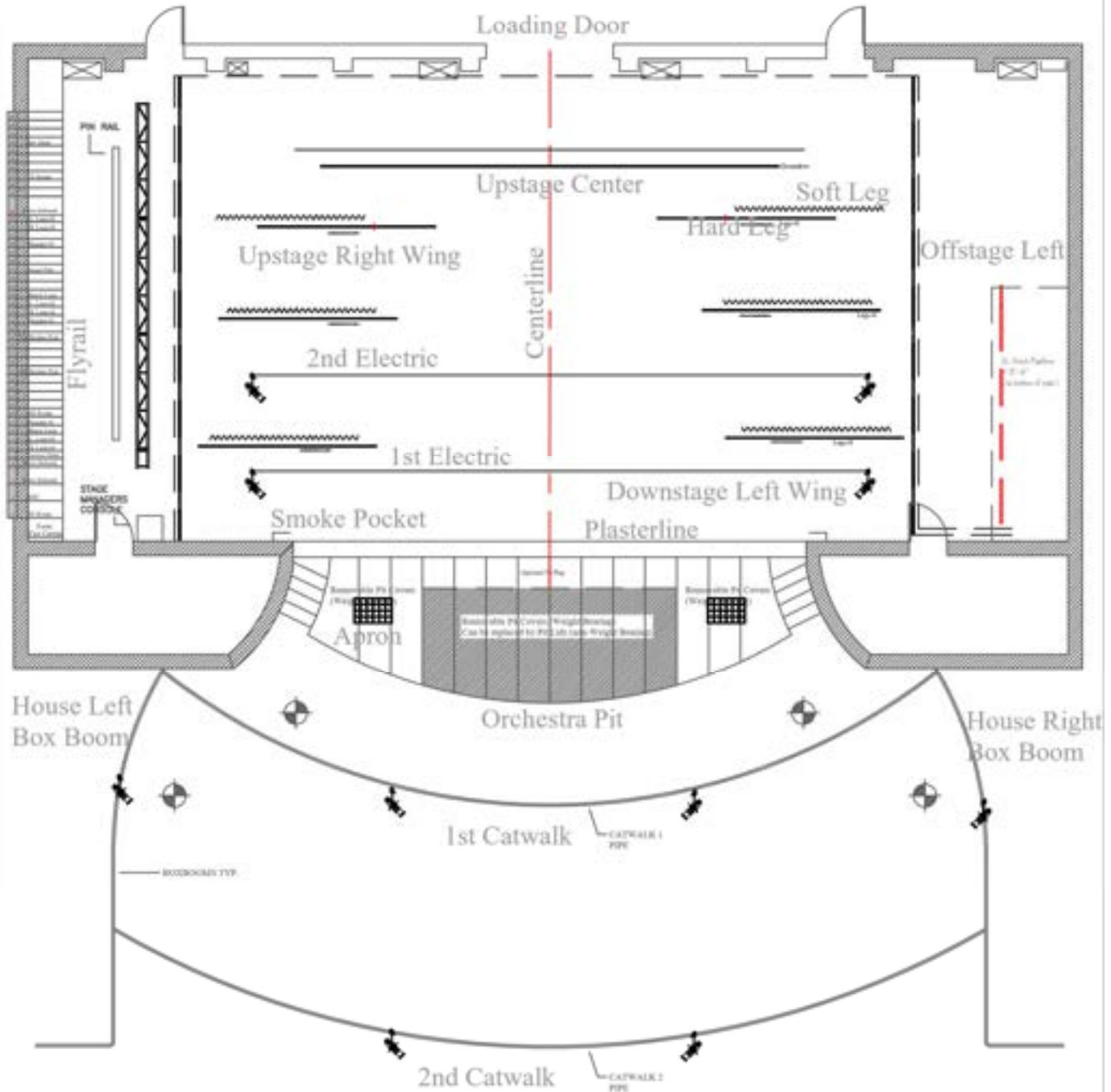


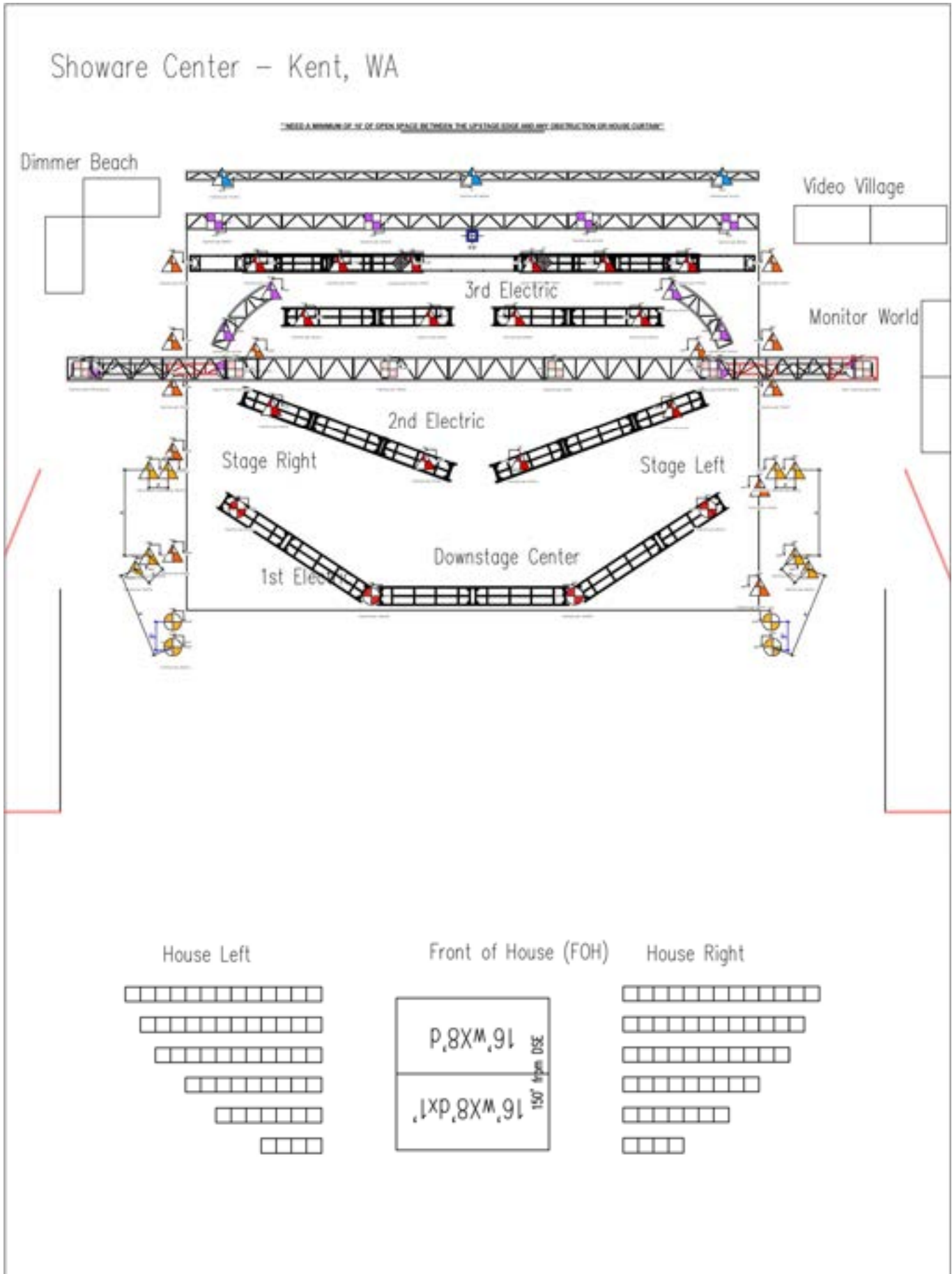
Village Theatre in Issaquah, WA

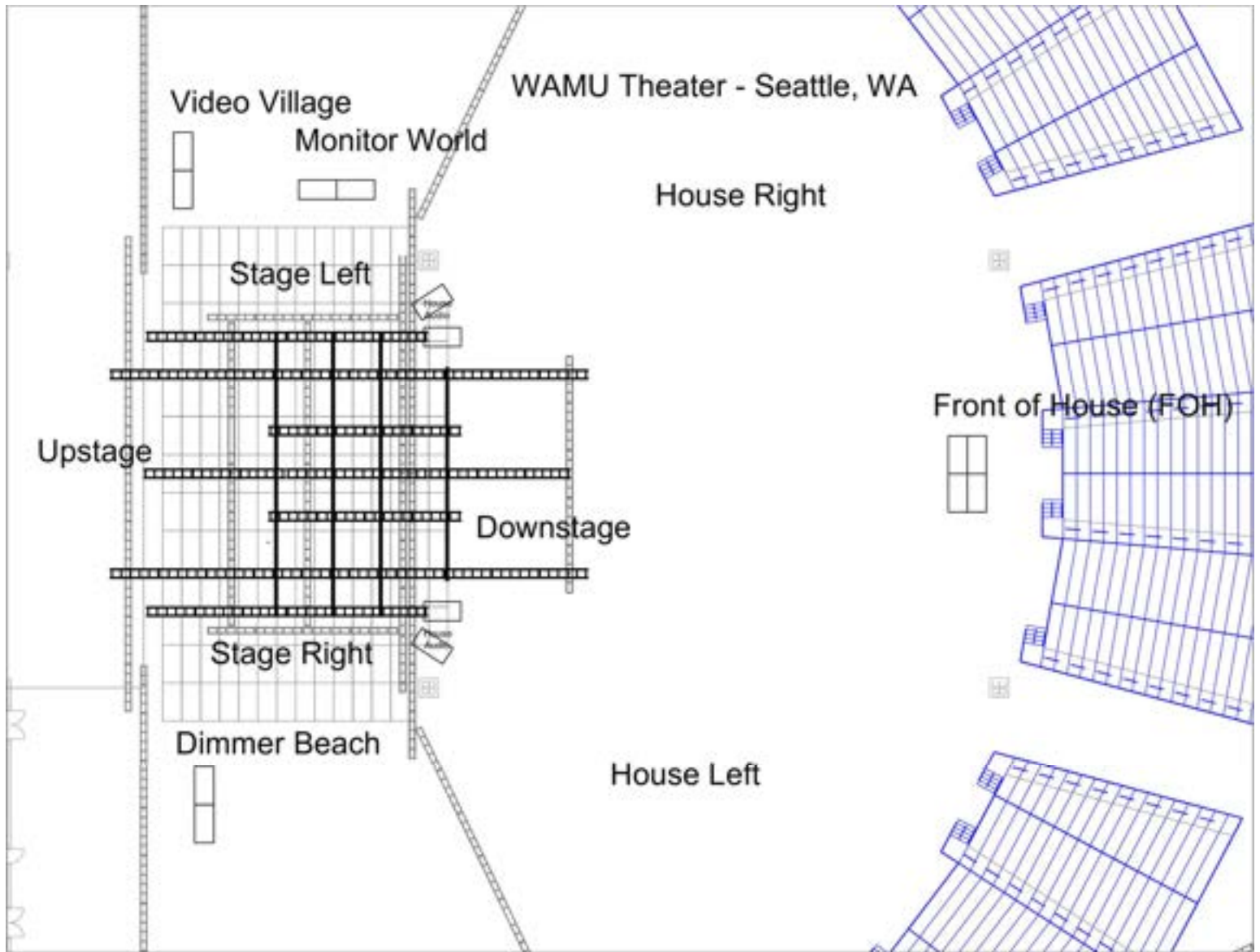
Groundplan



Village Theatre - EPAC Groundplan Everett, WA







WA State Convention Center - 4th Floor

