

Lighting Safety Workshop Notes

FMSA-200

Fall 2023

OVERVIEW:

- Everything in this workshop is explained in more detail in the **Set Lighting Technician's Handbook**, by Harry C. Box. This book is *the* reference for Grip/LX technique and safety. It is mandatory reading for anyone with a keen interest in lighting for cinematography.
- If you don't feel comfortable using the gear, if something doesn't look safe, or if someone is pressuring you to do something you know is dangerous, you have a legal and moral right to refuse unsafe work. There isn't a film production in the world that's worth your life.
- When given an instruction on-set, reply **"copy"** as an acknowledgment that you've heard and understood what was said.
- When you are doing a location scout, make sure you know where the electrical breaker box located is at all times, and is accessible when you are going to be shooting on location. This is very important as you need to know how to reset a breaker when you accidentally trip a circuit.

STUDIO + GEAR CLOSET:

- Detailed instructions on how to reset the Production Studio, plus diagrams of the room's electrical circuits, outlets, and lighting grid can be found on the Studio's main doors, and the door of the Gear Closet.

- To open the breaker box, you must contact JCI using the number listed on the Gear Closet door. It may take them some time to arrive.
 - Each outlet of 4 Type-A Edison plugs can supply **15 amps** of power.
 - Each outlet with a twist-lock can supply **20 amps** of power.
 - **Should the power used exceed those available amps, the breaker will trip.**
 - Without the breaker, this would result in excess heat being generated, potentially resulting in an electrical fire.
- **Amperage can be calculated by dividing a fixture's wattage by the voltage** (120V in North America, 240V in Europe and most of Asia).
 - The equation is as follows: $\text{Watts} / \text{Volts} = \text{Amps}$. A good way to remember this is "West Virginia"
 - Watts: power output of a light/device (like horsepower)
 - Volts: the potential difference between in which current is pushed through.
 - Amps: current; rate of flow of electrons. Volume of electricity per second.
 - Try using "paper amps" for an easier and faster equation that you can solve without a calculator. Simply round the voltage down from 120V to 100V, which will in turn give you a safe margin of error.
- The Gear Closet is colour-coded in reference to equipment typically used by different departments.
 - **Green** is for **LX**, or "Electrics," or "Lighting". Typically, they specialize in powered lighting equipment such as fixtures, cables, and small stands. They distribute power accordingly to the lights.
 - **Pink** is for **Grips**. Typically, they specialize in non-electrical lighting equipment and where special rigging is required. They use modifiers for lights, set up stands, and are in charge of safety for such rigging.
 - These roles are commonly combined on smaller productions, called a "Grip/LX swing". For safety's sake, communicate before production about clarification about your duties on set.

AC CABLE:

- “AC” is industry lingo for extension cable. It stands for “Alternating Current”.
- **It is important to use the correct AWG (American Wire Gauge) of AC cable.**
 - The smaller the number, the thicker the cable.
 - **The safe industry standard is 12AWG.**
 - All AC cables in the Production Studio, and those designated as for FMSA by Media Resources, are 12AWG.
 - A note of caution - some older cables available at Media Resources are 14AWG. They can be identified by the bulky outlet box on the end.
- **Use gloves when handling AC cable.**
 - You never know what it's come into contact with - anything from dead rats, to used needles, to feces.
- **When plugging in a cable, don't kneel. Squat.**
 - If a ground fault occurs, the soles of your shoes can potentially act as an insulator to prevent you from getting shocked.
- There are **two methods** of coiling AC cable.
 - **Over-over, which is the default method for FMSA AC cables on campus.** This is the easiest and simplest method. This is mainly for thicker cables.
 - Over-under, which is useful if you want to throw the cable and have it land in a straight line. This is mainly for thinner XLR, BNC/SDI cables.
 - There are videos online that demonstrate these far better than can be explained through written text. **The key is to practice, practice, and practice again.**
 - Each coil should be around the size of a dinner plate. If unsure, just follow the natural coil of the cable.
 - Once the AC cable is coiled, crouch down, pin the cable between your legs, and use the attached sash cable to tie a simple shoelace knot around the cable ends.

- **Ground Fault Circuit Interrupters, or GFCIs, should always be used when working near water or in wet conditions.**
 - A GFCI is like a breaker box, and functions in a similar way.
 - **A “ground fault” is when electricity takes an unexpected path to flow into the earth. Think of it as water flowing from a leaky pipe.**
 - A ground wire - the rounded, longest prong on a Type-A Edison plug - is designed as a safety precaution to prevent this.
 - If the ground wire is severed, an electrical field can be generated, and the current will take the least resistant path to flow into the earth - **whether this path is through a light stand, through water, or through you.**
 - The vast majority of ground faults are caused by deteriorated equipment. **This is why it is important to coil cables and wrap fixtures correctly.**
 - **It only takes 0.1A to stop a human heart.** Remember, an average household breaker will only trip past 15A or 20A.
 - **A GFCI will trip before you receive a potentially lethal shock.**

LIGHT STANDS:

- There are three types of light stands available at ECU:
 - A “baby” spud, specifically $\frac{5}{8}$ ”. The positive end is on the stand. Note the grooved notch, to physically secure the t-handle to the light.
 - A “junior” receiver, specifically $1\frac{1}{8}$ ”, for heavier lights. Also called a “combo”
 - Some spuds (such as on the Polaris 1K) are a combination of this and a baby.
- When transporting a light stand, carry it vertically.
 - It’s heavy, but it will prevent the risk of hitting something or someone behind you.
 - **Before lifting a stand, check to confirm each riser is secured.**

- **Add a sandbag onto the leg pointing in the same direction as the fixture.**
 - If necessary, additional sandbags can be added. If you need to add more than three, try finding a safer and more stable position for the stand.
 - **Avoid the sandbag touching the ground.** This will reduce the weight on the light, and thus reduce the effectiveness of the sandbag. Confirm this by giving the sandbag a light kick.
 - **Righty-tighty, lefty-loosey. Always.**
 - Getting this wrong could result in a fixture falling onto your head.
 - When using a t-handle, use your free hand to grip the riser. If it slides down unexpectedly, the position of your grip should stop it from hitting you.
 - **If a stand falls, let it fall. Do not try to catch it.**
 - It's too heavy, too dangerous, and it's not worth risking an injury for.
 - **"a falling knife has no handle."**
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FIXTURES:

- There are two types of lighting fixtures commonly available:
 - Tungsten fixtures, which use an incandescent bulb.
 - LED fixtures, a modern invention, which use less power.
 - Lamps that are visible, but not necessarily lighting the shot are called "practicals"
- **Tungsten fixtures are extremely hot. Use gloves.**
 - 95% of the energy used by an incandescent bulb is converted into heat.
 - **It can take several minutes for a fixture to cool.** Don't rush to wrap it.
 - **Always use a scrim to reduce the brightness of the fixture. Do not use ND gel, because it will burn.** A dimmer is less dangerous, but it changes the colour temperature of the light. Lower intensity is more orange, and higher intensity is bluer.
 - **Remove a hot scrim with metal pliers.** Set it on the ground to cool. Use a "C74" (reverse C47) to

- **Staring directly at a bulb when it is turned on can cause eye damage.**
 - To prevent this, call **“sparking!”** when you are about to turn on the light. You can also say **“Watch your eyes”** as a more discreet way of announcing.
 - This is a common safety measure and a courtesy on-set.
- When changing a bulb, **do not touch the glass part of a bulb.** The oils on your skin or gloves will weaken the glass, and cause the bulb to explode when the fixture is powered.
 - **Use gloves to grab the bulb’s base.** In a pinch, you can use a clean paper towel. Take your time, and work slowly.
 - During filming, it is faster and safer to swap a fixture entirely, instead of replacing a bulb. **Do not change a bulb until the fixture is completely cooled down.**
- **If a light is flickering, or acting unusually, don’t touch it. It could be a ground fault.**
 - **Use a cable or a plug to safely turn off the light.**
 - Designate the light as broken using a piece of white gaff tape with the letters “NG” (or, “not good”) written on it. Remove it from the set.

ADDITIONAL INFORMATION:

- **If you have any questions**, or if you’d like to learn more, **feel free to contact us technicians.** We are happy to answer.
 - The easiest way to email us is at **fmsatech@ecuad.ca**.
 - More information can be found at **fmsasupport.ecuad.ca**.
- **Remember - safety is the number one priority, always!**