RIGGING SYSTEM SAFETY AND USE

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NOTICE

The material contained in these “slides” does not constitute the entire presentation as the verbal information presented simultaneously is also important to the understanding of the material.

Every effort has been made to ensure this information is correct and reflects prevailing professional standards of the theatrical rigging, health, safety, hygiene and entertainment communities.

H & H Specialties, Jerry Gorrell and Theatre Safety Programs make no representation, guarantee or warranty as to the accuracy or sufficiency of the information presented and assume no responsibility for misapplication of the materials, information or instruction provided.

SAFETY SIGNAL WORDS

DANGER: Indicates a hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations

WARNING: Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION: Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used without the safety alert symbol as an alternative to “NOTICE”.

SAFETY SIGNAL WORDS

NOTICE: “NOTICE” is the preferred signal word to address practices not related to personal injury.

SAFETY INSTRUCTIONS: Signs containing safety instructions or procedures

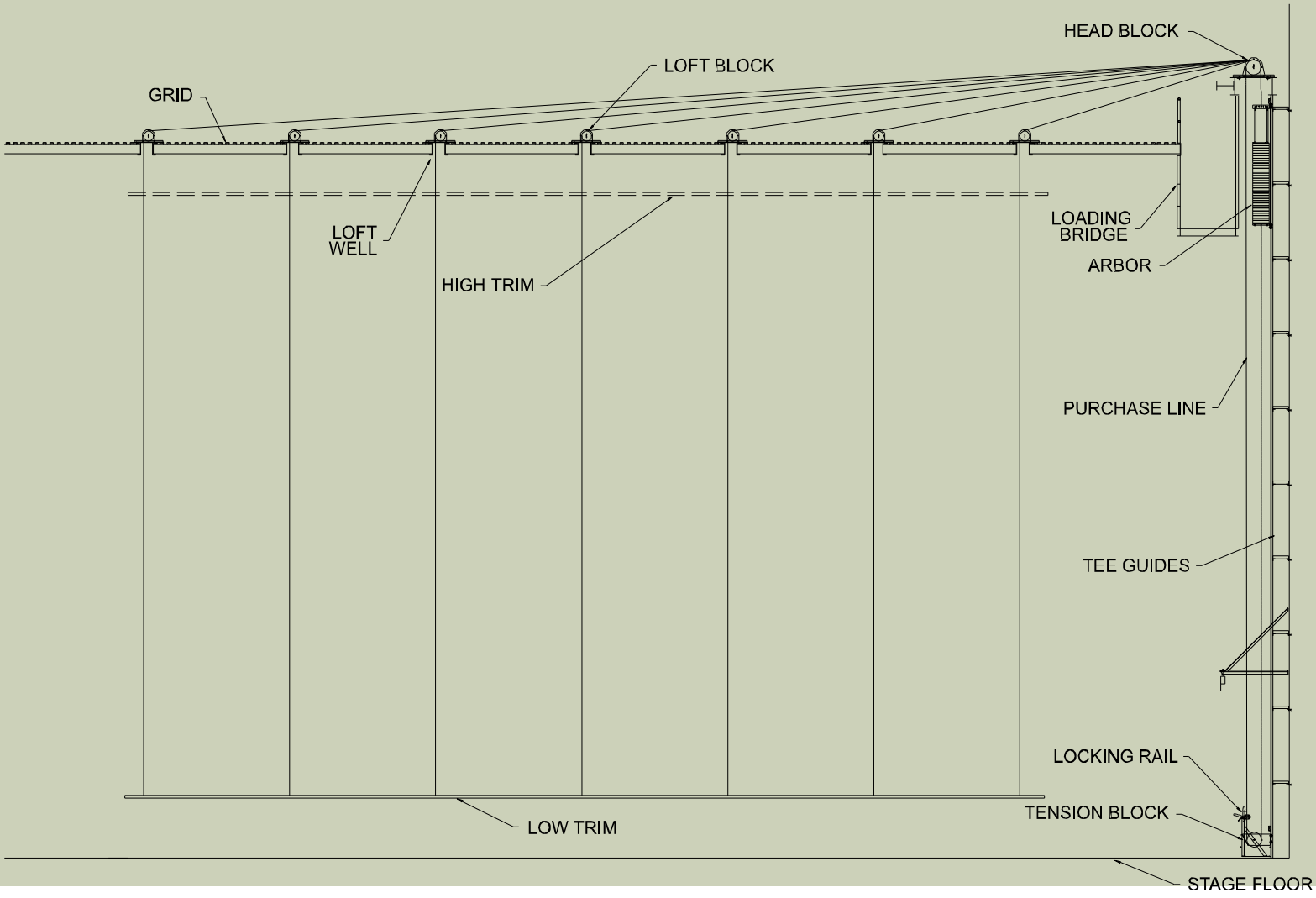
⚠ WARNING

- Rigging systems and equipment shall be operated only by trained, qualified and authorized personnel.
- The rigging system shall be kept in balance during normal operations and the operators trained in the methods for keeping the system in balance.
- Defective equipment shall not be used and marked and secured to prevent use.
- Failure to follow the instructions contained in this presentation may result in property damage, serious injury or death.

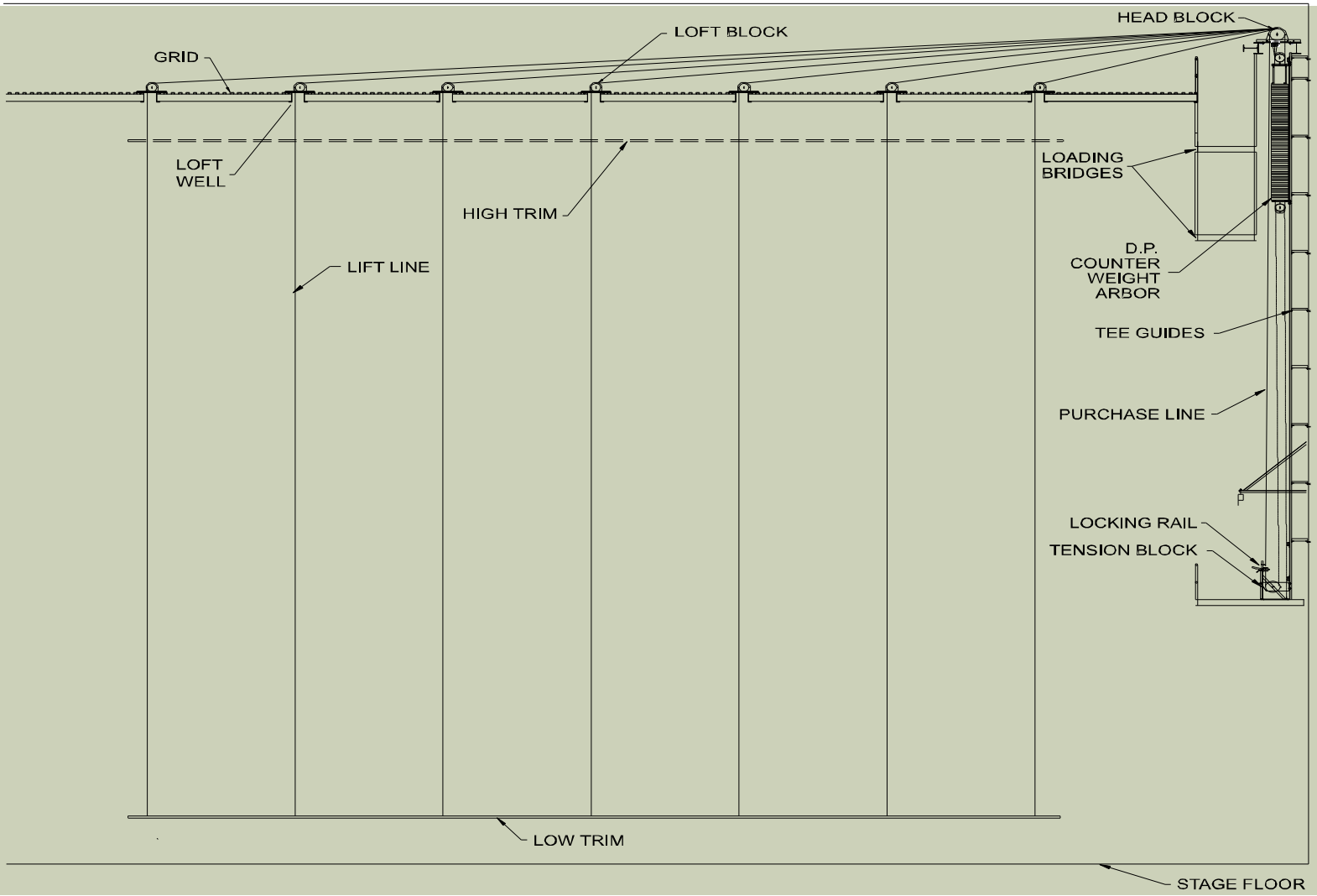
BASIC THEATRE RIGGING SYSTEMS

- **Single-Purchase Counterweight Systems**
  - Steel Tee Guides
  - Aluminum Jay Bar Guides
  - Wire Guides
- **Double-Purchase Counterweight Systems**
  - Steel Tee Guides
  - Aluminum Jay Bar Guides
  - Wire Guides

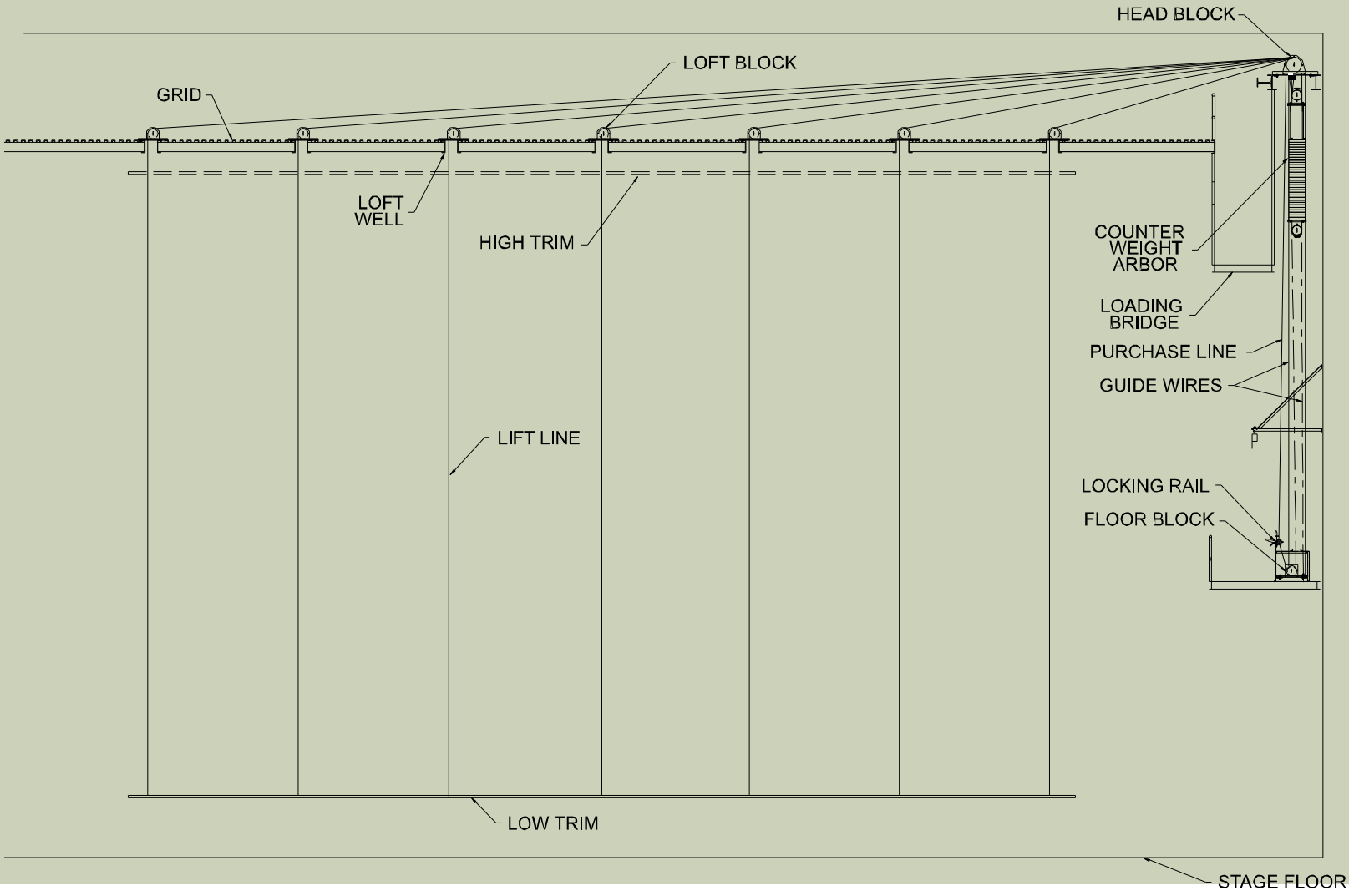
TYPICAL SINGLE-PURCHASE COUNTERWEIGHT SYSTEM



DOUBLE-PURCHASE COUNTERWEIGHT SYSTEM



DOUBLE-PURCHASE WIRE GUIDED COUNTERWEIGHT SYSTEM



BASIC RIGGING SYSTEM OPERATION

BASIC SYSTEM OPERATION

- When removing equipment from a batten, *NEVER* remove the load from a batten before removing the counterweights from the arbor.
- When loading a batten, *NEVER* add counterweights to the arbor before attaching the load to the batten.

BASIC SYSTEM OPERATION

- In normal operation counterweights equal to the weight of the scenery attached to the batten are loaded into the counterweight arbor from a loading bridge.
- The counterweights are loaded into the counterweight arbor from the loading bridge(s) only after the scenery is attached to the batten.
- **NOTE**: Some systems may not have a loading bridge and others may have more than one.

BASIC SYSTEM OPERATION

- Double purchase rigging systems require the balancing weight in the counterweight arbor be double the weight of the load on the batten.

- The use of sandbags, “trailers” and the substitution of steel counterweights with counterweights of any other heavier material may overload the system and cause a failure of the system.

BASIC SYSTEM OPERATION

- When operating rigging systems using wires to guide the counterweight arbor, care must be taken to avoid moving the counterweight arbor at speeds that cause the arbor to swing.
- Swinging of the counterweight arbor may cause the counterweight arbor to strike part of the building structure, other counterweight arbors, or kink, deform or cause other damage to the guide wires.

BASIC SYSTEM OPERATION

- The **flyman** operates the rigging system*
- *The position is always referred to as flyman regardless of the operators gender.
- Complex shows may have more than one flyman.
- If there is more than one flyman, one will be designated as the **head flyman.**
- The head flyman is responsible for supervision of the entire rigging system operation.

BASIC SYSTEM OPERATION

- The flyman shall have visual contact with the piece of scenery they are moving at all times during its movement.
- If the flyman cannot maintain visual contact through the entire travel distance, a second person or "spotter" shall be located in a position where they can see the working piece during its entire travel distance and can immediately communicate any problems to the flyman operating the lineset being moved.
- The spotter is required to have complete control of the situation and shall maintain that control at all times.

BASIC SYSTEM OPERATION

- Scenery that is attached to a line set that moves during a performance is called a "**Working Piece**".
- **High Trim** is the highest position of the batten during the show. (This is usually at a height so the scenic element is just out of view of the audience).
- **Low Trim**, also called the **Working Position** is the position of the batten when the scenic element is in use (or its lowest position with no scenery attached).

BASIC SYSTEM OPERATION

- When a batten is being lowered to the stage or “deck” the flyman notifies the crew on the stage by clearly calling out “Heads Up”.
- To fly a batten in pull down on the onstage purchase line.
- To fly a batten out pull down on the offstage purchase line.

BASIC SYSTEM OPERATION

- When scenery or draperies are resting on the floor as they are being attached, or removed from the batten or being worked on, their full weight is not being used to offset the counterweights used to balance them.

BASIC SYSTEM OPERATION

⚠CAUTION

- Before releasing purchase line rope lock check that line set is in balance
- If line set is out of balance operator may not be able to control the lineset.

CREW RESPONSIBILITIES

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- **(HEAD) FLYMAN:**
- The flyman directs the loading and unloading of scenery, equipment and counterweights.
- The flyman controls the sequence of operation by giving directions for loading or unloading of counterweights and removing or attaching scenery or equipment.
- The flyman operates the rigging system during the performance.

CREW RESPONSIBILITIES

- The flyman determines when the line set is in balance.
- The flyman gives the order to attach or remove the scenery or equipment.
- The head flyman also is responsible for maintaining the rigging system usage log.

CREW RESPONSIBILITIES

LOADING BRIDGE CREW or "LOADERS":

- The loading bridge crew or “loaders” load or unload counterweights as instructed by the flyman.

CREW RESPONSIBILITIES

STAGE CREW HEAD:

(Head Carpenter, Technical Director, Head Electrician or other designated person)

During setup and strike the stage crew head is responsible for determining that the area around a moving piece is clear and that a piece being loaded or unloaded and will not foul on curtains, scenery, battens, lights or other equipment.

CREW RESPONSIBILITIES

STAGE CREW:

The stage crew, under the direction of the stage crew head, loads or unloads the scenery, lights or other equipment from the battens (or spot lines).

The stage crew may have to hold the batten down while the counterweights are being loaded or removed from the arbor. They may do this by holding the batten with their hands or by using a "bull line."

⚠WARNING

WHEN HOLDING A BATTEN BY HAND, *NEVER, EVER* LEAN OVER THE BATTEN!

IT MAY BE NECESSARY TO LET GO OF THE BATTEN QUICKLY IF THE BATTEN RUNS AWAY.

LOADING AND UNLOADING OF COUNTERWEIGHTS

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Removing the load from a batten before the counterweights are removed from the arbor is NOT PERMITTED and is DANGEROUS

⚠ CAUTION

- Persons not involved in the actual loading or unloading of counterweights should stay a safe distance from the lock rail while loading or unloading of counterweights is in progress.

ATTACHING SCENERY OR EQUIPMENT

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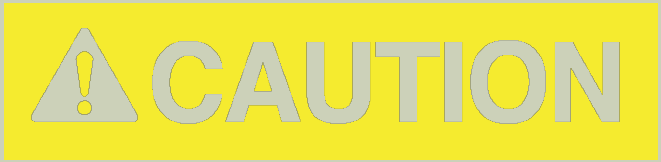
TO ATTACH SCENERY OR OTHER EQUIPMENT TO A BATTEN THE PROCEDURE ON THE FOLLOWING 7 SLIDES SHALL BE USED

NOTE: The loader(s) shall load or unload counterweights only when instructed to do so by the flyman.



NEVER leave an out of balance lineset unattended or unsecured.

ATTACHING SCENERY OR EQUIPMENT

1.The flyman brings the batten that is to be loaded to its lowest position and secures the line set.

The rope lock is only to be used to secure the counterweight arbor from moving when the lineset is in a balanced condition.

Rope locks are intended to secure out-of-balance loads of only 50 lbs. or less.

ATTACHING SCENERY OR EQUIPMENT

2.The stage crew attaches the scenery, drop(s), lighting equipment or other items securely to the batten.

3.The flyman determines weight of material attached to batten and calculates number of weights to be placed on the counterweight arbor.

ATTACHING SCENERY OR EQUIPMENT

4.The flyman informs the weight loader of the number and size of counterweights to be placed on the arbor.

5.The weight loader on the loading bridge adds the estimated amount of counterweight to the arbor, placing spreader plates every 2 feet or at the levels marked on the arbor.

Unused spreader plates shall be stored at the top of the counterweight stack.

ATTACHING SCENERY OR EQUIPMENT

6. The locking collars are placed on top of the weights in the counterweight arbor and the tri-knob on the locking collars are tightened.

NOTE: Weights used for "pipe weight" are counted in first 12 weights unless a spreader plate is placed on the top “pipe weight”.

NOTE: The ends of the pipe weight weights are frequently painted to identify them.

ATTACHING SCENERY OR EQUIPMENT

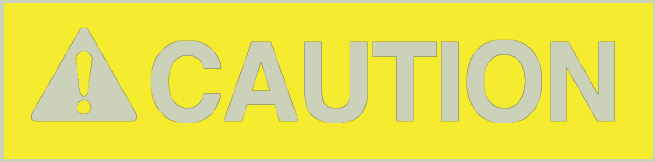
7. The weight loader informs the flyman that the weights have been added and the counterweight arbor secured.

8.The flyman carefully checks to see if lineset is in balance.

9. If the lineset is in balance, then the batten is flown to a suitable height (out of the way of the stage crew – or to its high trim) and the rope lock is secured and next set may be loaded.

ATTACHING SCENERY OR EQUIPMENT

- If lineset is not in balance, steps 4 thru 8 are repeated until lineset is in balance.



- At **NO TIME** should a flyman and/or loader be working with more than one lineset.

⚠WARNING

A COUNTERWEIGHT ARBOR IS NEVER TO BE MOVED UNLESS THE LOCKING COLLARS ARE SECURE!

LOADING OF COUNTERWEIGHTS WITHOUT A LOADING BRIDGE

- The counterweight arbor is brought to its lowest position.
- The winch, block and fall or other device is attached to the counterweight arbor and the batten is brought to low trim.
- The load is placed on the batten.

LOADING OF COUNTERWEIGHTS WITHOUT A LOADING BRIDGE

- The winch, block and fall or other device is used to bring the counterweight arbor to a position where the required weight can be added to the arbor.
- The winch, block and fall or other device is disconnected from the counterweight arbor.

REMOVING SCENERY AND/OR EQUIPMENT

REMOVING SCENERY OR EQUIPMENT

TO REMOVE A PIECE OF SCENERY OR OTHER EQUIPMENT FROM A BATTEN THE FOLLOWING PROCEDURE IS TO BE FOLLOWED:

The flyman brings the batten that is to be unloaded to its lowest position.

The flyman secures the lineset.

REMOVAL OF SCENERY OR EQUIPMENT

- The rope lock is to be used only to secure the counterweight arbor from moving when a lineset is in a balanced condition.
- Rope locks are intended to secure out-of-balance loads of only 50 lbs. or less.

REMOVAL OF SCENERY OR EQUIPMENT

- The flyman requests the weight loader to remove all counterweights except "pipe weight."
- The weight loader should repeat the number of weights to be removed or say "going to pipe weight."
- If only some items are to be removed the flyman calculates the number of weights to be removed and informs the weight loader to remove this number of weights.

REMOVAL OF SCENERY OR EQUIPMENT

- The weight loader removes the requested number of weights from the counterweight arbor and places the locking collar on top of the remaining weights and spreader plates, then tightens the tri- knob on the locking collars.

REMOVAL OF SCENERY OR EQUIPMENT

- The weight loader informs flyman that the requested number of weights has been unloaded or that the counterweight arbor is at “pipe weight”.
- Scenery, drop(s), lighting equipment, or other items are removed from batten.

REMOVAL OF SCENERY OR EQUIPMENT

- The flyman carefully checks to see if line set is in balance. If it is in balance the rope lock is secured and next set may be unloaded.
- If line set is not in balance, weights are added or removed until the line set is in balance.
- When the batten is unloaded and correctly balanced it is flown to its highest point or its normal working level and the rope lock secured.

UNLOADING OF COUNTERWEIGHTS WITHOUT A LOADING BRIDGE

- The counterweight arbor is brought to its lowest position.
- The winch, block and fall or other device is attached to the arbor.
- The counterweight is unloaded from the arbor. The winch, block and fall or other device is used to support the load.
- The winch, block and fall or other device is used to control the out-of-balance condition while the batten is brought to low trim and unloaded.

UNLOADING OF COUNTERWEIGHTS WITHOUT A LOADING BRIDGE

- **Removing the load from a batten before the weights are removed from the counterweight arbor is NOT PERMITTED and is DANGEROUS!**

METHODS OF SECURING A COUNTERWEIGHT ARBOR

METHODS OF SECURING AN ARBOR

TIE-OFF LINE

A stopper hitch (or Sunday) tied around the arbor purchase line(s) and to the lock rail or an eye provided for this purpose on the lock rail.

METHODS OF SECURING AN ARBOR

TWISTING OF OPERATING LINES

Manually (for small loads) or by use of a belaying pin (Toggle Method).

METHODS OF SECURING AN ARBOR

TOGGLE METHOD

The belaying pin MUST be strong enough (and intended for this use) so as not to break under the load to be imposed.

- The use of scrap pieces of wood for this purpose is **NOT PERMITTED.**

METHODS OF SECURING AN ARBOR

⚠WARNING

When using the toggle method, the toggle has been known to suddenly and unexpectedly come undone.

KNOTS

ROLLING HITCH

BOWLINE

STOPPER HITCH

EMERGENCY PROCEDURES FOR A RUN-AWAY LINESET

If a lineset becomes too far out-of-balance and the load is in the air and either the batten or the counterweight arbor becomes so heavy that the purchase line cannot hold it - it will "**run away**."

EMERGENCY PROCEDURES FOR A RUN-AWAY LINESET

- If the out-of-balance condition is not great and the lineset begins to creep, it **MAY** be possible to stop it by brute strength. However, if the lineset begins to move rapidly, which indicates a large out-of-balance condition – If there is **ANY** doubt…. **DO THE FOLLOWING:**
- Shout the warning “CLEAR – RUN-A-AWAY” to all persons on the stage.
- Take cover. The possibility of flying counterweights and objects falling from the grid or flyloft is great.

RUN-AWAYS ARE ALWAYS CAUSED BY HUMAN ERROR AND LACK OF CONCENTRATION ON THE JOB BEING PERFORMED

EXAMPLE OF FLYMAN - LOADER DIALOGUE DURING LOADING

After the line set is secure:

FLYMAN: “Put 10 weights on line set number five.”

LOADER: “10 weights going on line set number five.”

Loader installs 10 weights on line set number five, placing spreader plates every 2' or as marked on the counterweight arbor and secures locking collars.

LOADER: “10 weights on line set number five - complete.”

EXAMPLE OF FLYMAN - LOADER DIALOGUE DURING WEIGHT ADJUSTMENTS

After the line set is secure:

FLYMAN: “Add 2 weights to line set number five.”

LOADER: “Add 2 weights to line set number five.”

Loader adds 2 weights to line set number five counterweight arbor, placing spreader plates every 2' or as marked on the counterweight arbor, leaving unused spreader plates on the top of the weight stack and secures the locking collars.

LOADER: “2 weights onto line set number five - complete.”

EXAMPLE OF FLYMAN - LOADER DIALOGUE DURING WEIGHT ADJUSTMENTS

After the line set is secure:

FLYMAN: "Remove 2 weights from line set number five."

LOADER: "Remove 2 weights from line set number five."

Loader removes 2 weights from line set number five and secures the locking collars.

LOADER: "2 weights off of line set number five - complete."

EXAMPLE OF FLYMAN - LOADER DIALOGUE DURING UNLOADING

After the line set is secure:

FLYMAN: "Line set number five to pipe weight."

LOADER: "Line set number five to pipe weight."

- Loader removes all weights except pipe weight from line set number five and secures the locking collars.

LOADER: "Line set number five is at pipe weight."

PRECAUTIONS TO PREVENT/MINIMIZE INJURY

- **NO** Horseplay.
- General good housekeeping rules apply.
- Equipment not in use shall be properly stored.
- Walkways shall remain clear and unobstructed.
- Lighting shall provide sufficient illumination so people are able to see where they are and what they are doing.
- Barricade/Rope off – Open traps, orchestra pits, lowered orchestra pit lifts, and holes people could fall into or stage edges or escape stairs that people could fall from.

RIGGING SYSTEM OPERATING POLICIES

Falling counterweights may cause serious injury

- Weights stored on loading bridge(s) are to be stacked on the onstage side of the bridge.
- Weights are not to be stacked more than three high. Under no circumstance are weights to be stacked higher than the kick board.
- Fall protection is required when loading and unloading counterweights if a fall hazard of 4’ or more exists.

RIGGING SYSTEM OPERATING POLICIES

- Loose clothes and jewelry shall not be worn.
- Secure long hair.
- All persons on the stage shall wear hard hats while work is being performed overhead. Only authorized personnel shall be on the stage during such work and the stage so posted.
- Use of portable CD players, MP3 players, cell phones, radios, headphones (except show intercom) and similar devices is not allowed while operating the rigging system.

RIGGING SYSTEM OPERATING POLICIES

- Operating, using or performing any type of work on or with the rigging system, any other theatrical system, or rigging from any part of the building structure while under the influence of drugs or alcohol is prohibited unless the drugs are by prescription and operation is permitted by the Technical Director or equivalent supervision.
- Persons taking prescription medication shall inform the Technical Director or their supervisor of the use of prescription drugs.

WORK SAFELY

THE END