Operation & Maintenance Manual

Single Purchase Counterweight Rigging System

Without a Loading Bridge

JR CLANCY
QUALITY SINCE 1885

⚠ WARNING

Improper use of rigging equipment can result in serious injury.

Do not operate without proper training and authorization.

Not for lifting people.

Table of Contents

Note – This is a generic manual provided for guidance in the operation and maintenance of a theatrical rigging system. This manual shows the most frequently used features and options, which may differ from your system. Your system may differ from or not contain all of the options shown in this manual. If you own a J. R. Clancy rigging system, contact us for availability of a project specific manual.

Introduction

Anyone who enters a building with public access has reason to expect that he or she is safe from harm from the building itself or from the equipment and activities within the building. It is the legal responsibility of the owner and his designated manager to ensure that this expectation is met.

It is the responsibility of the owner to hire and train competent people. A competent person is defined as one who is capable of identifying existing and predictable hazards in the workplace, and who has authorization to take prompt corrective action to eliminate those hazards. It is the further responsibility of the owner and his designated manager to provide a safe working environment for all employees, including proper equipment, training on the use of equipment, and written procedures for its use and maintenance. It is also important to keep all unauthorized and/or untrained personnel from the working areas of the stage.

Before operating any stage equipment, operators must be given the necessary training and must then work only under the direction of qualified supervisors. Operators of the equipment must:

- Learn the feel, sound, and even the smell of your equipment so that you will immediately sense when something is not correct.
- Study the capacities and capabilities of each system and its components.
- Thoroughly learn and practice the proper operating procedures.
- Before operating any equipment, ask yourself questions about the current condition of equipment and about any existing conditions which may affect proper operation or which could be affected by its

operation. For example, is anything fouling the equipment or in the path of its intended travel?

Any problem noticed during setup or operation of the stage equipment should be corrected **IMMEDIATELY**.

A routine maintenance schedule must be established and followed and appropriate records maintained. Perform an initial inspection, followed by inspections on a regular basis.

Routine maintenance prolongs the useful life of equipment and keeps it operating at peak efficiency. This insures the quietest possible operation and the least effort on the part of the operator.

In addition to routine maintenance, we strongly recommend that a qualified rigging firm be engaged to perform periodic inspections and to correct any deficiencies discovered. These firms have personnel who are trained to spot present hazards and many "potential" hazards.

DISCLAIMER

The information in this manual will not cover all possible situations, nor could such inclusive instructions be possibly written by the equipment manufacturer, due to the various processes of mounting theatrical performances. This manual is intended to provide a guide to the safe and efficient operation of the furnished stage equipment and its routine maintenance. No manual can replace your duty for constant vigilance and common sense. We are not responsible for any damage that results from failure to comply with this manual.

Single Purchase Counterweight Set Description

A single purchase counterweight set is a mechanical system designed to move scenery, lighting equipment, etc. vertically within a performance space. Steel or cast iron counterweights are held in an arbor to balance the load over the stage and thus reduce the amount of effort required to raise or lower the load. The total weight of the batten, scenery or lights, and the wire rope located below the loft blocks (the "**load**") works against the total weight of the counterweights, arbor and wire rope located below the head block.

When the forces are equal, the set is "**in balance**". If the **load** is greater than the arbor weight directly below the head block, the set is "**batten heavy**". If the arbor weight is greater than the weight below the loft blocks, the set is "**arbor heavy**". When the set is **in balance** the effort required to move the set is only the amount needed to overcome system friction and the inertia of the total mass (equipment load and counterweights).

⚠ WARNING

It is essential that sets be "in balance" during normal operation and that operators completely understand the methods of keeping the system in balance.

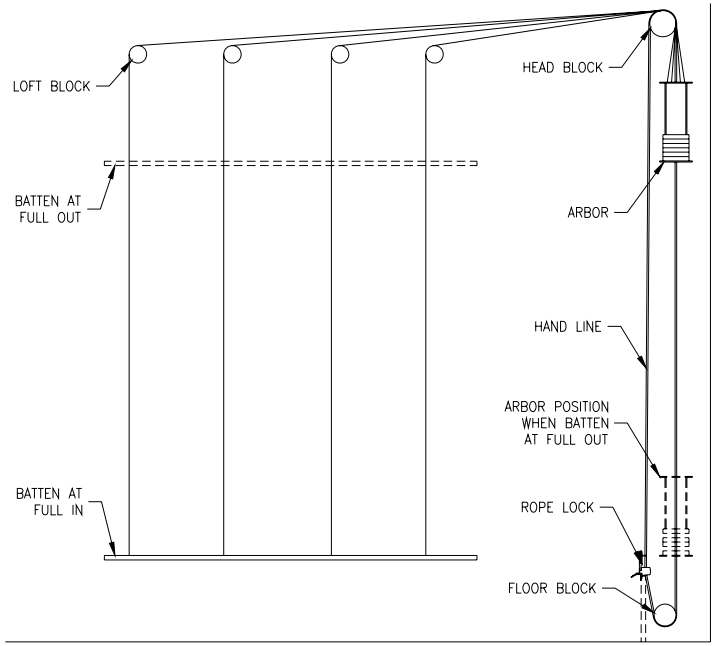
Note that exact balance is only achieved at one point (midway) during the set's travel due to the weight of the lifting cables passing over the head and loft blocks. A counterweight set may be equipped with a "cable compensation systems" that maintains balance between the load and the counterweight over its travel.

Loft Block

Loft blocks are located between the head block and the load, to support the lift lines and change their direction of travel. Each loftblock typically carries only a portion of the load.

Head Block

Head blocks are located between the loft blocks and arbor; they collect and support the lift lines and change their direction. They also support the hand line. The head block typically carries the full load of the set.



Arbor

Counterweight arbors hold the weight that counterbalances the load on the batten. The hand line used to operate the set is connected to the top and bottom of the arbor.

Floor Block

Floor blocks are located below the arbors to keep the handline in tension and to change the direction of the hand line. Many floor blocks are adjustable to compensate for stretch in hand lines and maintain a constant tension in the line.

Hand Line

The hand line (also called the “purchase line” or “operating line”) allows the operator to control the movement of the set. If the ON STAGE LINE (the front of the hand line looping between the floor block and head block) is pulled down, the arbor will rise and the batten will lower. If the OFF STAGE LINE (the back of the hand line looping between the bottom of the arbor and the floor block) is pulled down, the arbor will be lowered and the batten will rise. In these instructions, reference will be made to the motion of a set with respect to the batten and the on stage line. To "raise the set" means to raise the batten. When a batten is at its maximum high trim (just under the loft blocks or gridiron) and the arbor is at its lowest position, the set is considered to be FULL OUT. Conversely, when battens are at their lowest trim (the bottom of the batten is about 4 to 5 feet above the stage floor) and the arbor is at its highest position, the set is considered to be FULL IN.

Rope Lock

Rope locks are used to hold a balanced system load in position, and must not be used to attempt to hold an out of balance load.

Rope locks should be adjusted by an authorized person to hold an out of balance load not more than 50 lbs. Rope locks should be adjusted to grip,

but not crush the rope. Adjustment should be checked regularly, as the rope diameter may change with temperature, humidity, load, and wear.

Rope locks are not intended to brake or slow the speed of a set, nor should they be used in an attempt to control the speed of an unbalanced set. Large out of balance loads will move or "run through the rope lock", causing a serious safety hazard.

When sets are significantly out of balance, they need to be tied off in a manner that will safely hold the out of balance load.

Batten

The batten can be a pipe, truss, or other horizontal member that is supported by the lifting cables. Curtains, scenery, and lights are clamped or tied to a batten.

A table listing allowable batten loading for various lift line center-to-center distances is provided in the appendix.

Counterweight Operation without a Loading Bridge

DO NOT operate stage rigging without proper training and authorization. Know the limitations and capacities of your systems.

⚠ WARNING

Your manual counterweight system does not have a loading bridge.

This creates potential risks as the system will be significantly out of balance during loading and unloading operations, including risk of serious injury.

Extreme caution must be used when operating this equipment.

DISCLAIMER

J. R. Clancy was not involved in The decision not to provide a loading bridge for this rigging system. It is the Owner's responsibility to fully understand the additional hazards created by the lack of a loading bridge and guard against them.

GENERAL INFORMATION

- **The key to operation of a counterweighted system is to always keep the system in a stable condition: Either the set must be IN BALANCE; or the heavy side of the system (arbor or batten)**

should be in its lowest position. This is not always possible in systems without a loading bridge. You must fully understand the hazards of out of balance counterweight sets and have a plan to protect against the hazards. Otherwise, do not operate this equipment.

- If a counterweight set can't be balanced exactly, it is usually better to make the set arbor heavy so the batten won't accidentally descend.
- While loading or unloading sets, a competent safety person must be stationed near the rail to prevent anyone from releasing a rope lock by mistake and to keep people at a safe distance from the work area. Newer rope locks may be padlocked to prevent opening.
- Identify the empty trim (or "pipe") weight for each batten so the trim weights will not be mistakenly removed. This will also speed up the unloading process. This "permanent" counterweight can be identified by painting them red or yellow, or by strapping them in place with flat metal bands or plastic cable ties. Do not use chain, rope or cable, as this will cause weights placed above the chains to rock.
- Take care to keep the weights in neat stacks at the sides of the gallery. Weights that are evenly stacked are more stable and less likely to topple. To keep weights from being kicked off accidentally, no weight stack should exceed the height of the toe boards at the bottom of the railings. Keep stacks the same height to prevent tripping. Put only one size weight in each stack to speed batten loading. Distribute the stacks evenly along the sides of the gallery to avoid concentrating too much weight in one location. DO NOT OVERLOAD THE GALLERY.

General Precautions

- Pay attention to what is happening around you. "THINK"
- Always look around when entering the stage house, especially up.
- Remove unnecessary items from your pockets and belt.
- Secure any needed tools to your body before going above the stage floor.
- Wear a hard hat when "SETTING" or "STRIKING" a show.
- Wear heavy-duty work gloves.
- Wear hard sole or safety shoes.
- Do not wear loose fitting clothes and jewelry.
- Secure long hair.

Handling Counterweight

Counterweights are made from steel or cast iron. A slot is provided in each end to accommodate the arbor rods. Weights supplied by J.R. Clancy have two diagonally opposite corners removed. Alternating the position of the weights in a stack or arbor creates finger holds.

Arbors are provided with SPREADER PLATES. These are flat bars with holes sized to fit the arbor rods. The spreader plates serve two functions. One spreader may be used to mark the top of the house or balance load. More importantly, they ensure that, should the set run away from the operator and strike the top or bottom stop batten or crash rail, the arbor rods will not spread and allow the weights to topple out of the arbor. The spreader plates must be located between the counterweight every two feet, or less, to accomplish this function.

A STOP COLLAR, with a red hand screw, is provided on each rod above the top spreader plate. These help to keep counterweight in place during an accidental crash. Note that the front collar is welded to the upper spreader plate.

⚠ WARNING

Falling counterweight may cause serious injury.

ALWAYS check for people or obstructions before operating. PEOPLE MUST NOT BE NEAR OR UNDER MOVING ARBORS OR BATTENS.

ALWAYS place spreader plates every 2 feet in the weight stack.

ALWAYS lock stop collars firmly on top of the stack.

NEVER place weight on top of stop collars.

ALWAYS check that the set is in balance and that the stop collars are in place and locked before moving a set.

Do not use rope lock to hold out of balance loads greater than 50 lbs.

ATTACHING LOADS TO BATTENS AND LOADING ARBORS

Systems without loading bridges will require working with out of balance sets. Several methods are described in the following section. Choosing the best method of operation depends upon the specific design of your system, the nature of the out of balance condition, and your facility's personnel and equipment resources. A competent person must determine which procedure is the appropriate for a given situation. It may be necessary to perform a hazard assessment to identify hazards, assess the severity of the hazards, and protect against the hazard.

Capstan (Bull Winch) or Block and Tackle

One method of working with changing or out of balance loads is to use a capstan winch or block and fall under the supervision of a competent person.

A capstan winch is a portable, dollied winch with a rope capstan drum that is used to haul an arbor down when there is an unbalanced load on the batten. It may also be used to slowly lower a loaded batten while the arbor is under the control of the winch. The tension in the hauling line keeps the rope tightened around the capstan drum. See the detailed instructions provided with your capstan winch.

A Bull Winch is similar to a Capstan Winch except that it uses a wire rope cable to haul or control the arbor.

Note: Capstan or Bull Winches require special modifications to standard locking rails and arbors. Verify that your system has these modifications before using a capstan or bull winch. If your system was supplied with a capstan or bull winch, refer to the winch instructions for complete operational information.

1. Bring the empty batten to the FULL OUT (or High Trim) above the stage floor. Engage the rope lock and set the oval safety ring.
2. Attach an appropriately rated block and tackle assembly or the rope from a capstan winch, to the bottom of the arbor. If a block and tackle is used, secure the bottom block to the locking rail with a suitably rated chain and shackle. Confirm that the locking rail is rated to carry the load that will be applied. The block and tackle may also be secured to the hand line using a "prusik knot". Do not secure equipment in a manner that puts tension into the floor block.
3. Release the rope lock and oval safety ring. Bring the empty batten down to the FULL IN (or Low Trim) position. The arbor should be braced against the upper stop batten.

4. Securely attach the scenery, drapery, track, etc. to the batten. Be sure that the scenery chains, clamps or other hanging devices are (1) strong enough to hold the load, (2) securely fastened, and (3) in good condition. If the scenery is suspended by just a few pickup points, it is important that they be attached to the batten near the lift lines to avoid deforming the batten.
5. Once the load has been safely secured to the batten, haul the arbor down to the locking rail with the block and tackle or the capstan winch. Load the arbor with counterweight to properly balance the load.
6. Once the load has been safely secured to the batten, load the arbor at the loading gallery level using the following procedure:
    - Raise the spreader plates and stop collars and hold them. A spring-loaded "Pony" clamp may be used to hold them out of the way during loading.
    - Load the counterweight into the carriage by setting the weight on the stack vertically, using both hands. Ease the top back until the top slot fits around the rear rod and ease the bottom forward. Grasp the bottom of the weight between the heels of the hands and bring forward so that it slides around the front rod.
    - Other methods are possible and acceptable as long as two things are kept in mind: First, keep fingers, etc. out from under the weights. Second, always maintain complete control over the weights.
    - Insert spreader plates every two feet as the weight stack is built. Fill the arbor with counterweight to equal the weight of the batten and scenery.
    - Remove any clamps securing the spreader plates and slide spreader plates down to the top of the weight stack. Extra spreader plates may be secured under the top spreader plate.
    - Hand tighten the setscrews on both stop collars to secure the spreader plates and weights.
7. The set should always be in balance or under operator control before releasing the rope lock. IN BALANCE means that the weight of the batten and load equals the weight of the arbor and counterweight. Any excessive tension in the hand line above or below the rope lock means that the set is significantly out of balance. Tension in the hand line above the rope lock and a slack condition in the hand line under the arbor indicate that the arbor is too heavy. Tension below the rope lock and a slack condition in the hand line above the rope lock indicates that the batten is too heavy.
8. After determining that the set is close to balanced, open the rope lock while an assistant holds the hand line. Close the rope lock again and make any needed adjustment to the counterweight. Remember that rope locks are intended to lock arbors and loads that are balanced. A properly adjusted rope lock should hold about 50 pounds. Adjusting the rope lock to hold additional loads only wears out hand lines faster and increases the potential for an accident in the form of a runaway counterweight set.
9. In systems that have long travels or many lift lines, there will be transfer of cable weight between the arbor side and the batten side as the lift lines go over the head block. This can lead to a set that is in balance at the mid point of its travel being out of balance at the ends of travel.

Using Tag Tines

One method of assisting the operator in bringing the piece up to balance is to loop several properly sized "TAG" lines over the batten in close proximity to the lift lines and have the deck crew hold these lines while the arbor is loaded at the loading gallery. Slowly let the batten up to where

the piece weight matches the arbor weight. Once the piece is in the air and IN BALANCE, one side of the tag line is released and the other side is pulled to remove the line from the batten. Be sure EVERYONE is clear as the rope falls to the floor.

Tag lines on the batten may be used in reverse to unload the set. As the batten comes into reach (often with a ladder or personnel lift), a crewmember drapes tag lines over the batten. The deck crew then pulls the batten down as the scenery or curtains are laid on the floor. Keep the tag lines on the batten and secured by several persons until the arbor is unloaded or secured. The crew should grab the batten to directly assist the operation for the last few feet.

DO NOT "hang" your arms over the batten. If the batten starts to move up, the batten may lift you off the floor.

Care should be taken not to crash the carriage against the upper stop bar or the head block. Once the batten is at low trim, the deck crew should hold onto the batten until the carriage can be unloaded down to the empty batten trim weights.

Incremental Loading

If loads can be attached to the batten in "stages" (i.e. lighting equipment or tracks and curtains), loading the set can be done incrementally. This is particularly useful for systems without loading galleries.

Run the set so the batten is full in (at low trim). Attach the load to the batten so that the load is slightly out of balance, but the arbor may still be pulled down to the floor by a couple of people. Once the arbor is hauled down, secure it with a snub line (or sunday) from the locking rail top to the load side (back or offstage side) of the handline using a prusik knot. When it is at the floor, overload the arbor slightly, and pull it back up. When the arbor is up, again secure the arbor with a snub line.

Add more equipment to the batten until the load is slightly more than that in the arbor. Repeat the process until the all loads are attached and the set is balanced.

Unloading the set is performed by reversing the process.

Using Temporary Weights (Sandbags)

If items attached to the batten need to be removed temporarily, sandbags may be attached at the lift line location on the batten to simulate the load. These temporary weights should be added to the batten prior to removing the scenery or equipment.

Twisting the Handline

If the out of balance condition is less than 150 lbs, you can take the on- and off-stage hand lines and twist them together four or five times. This adds friction into the handline and keeps the set from moving.

A belaying pin or steel pipe may be held in the twists to help hold the lines. NEVER insert end of the pin or pipe between the arbor guides tracks to hold the load. It may release unexpectedly and cause serous injury.

The out of balance load can be controlled by slowly releasing the lines.

This operation places extra load into the floor block, which is typically not designed for significant out of balance conditions. Caution should be used to ensure that the floor blocks and their guides are not bent or damaged. Limit out of balance loads to 150 lbs.

"Line Lok" or "Uncle Buddy"

A few commercially available devices can be used to hold the hand lines of a set together in an out of balance condition. These are steel fabrications that mimic the twisting of the hand lines as described above. As with twisting the hand lines, these devices may damage the floor block if not used correctly. Refer to the instructions that come with these devices.

Human Assisted Hauling

If the unbalanced load is small, a few people my gather around the hand line and pull the arbor down (or the batten up) with brute strength. This approach may appear simple, but requires careful coordination. Plan where each person can stand safely, and how the individuals will work together to handle the load without interfering with each other or endangering each other.

If this method is used, a snub line or chain should be rigged to the locking rail and be readily available to secure the arbor once it is in position.

REMOVING LOADS AND UNLOADING ARBORS

Removing or "striking" pieces is essentially done by reversing the order of the loading procedure.

OPERATING A COUNTERWEIGHT SET

1. Start by identifying the arbor visually and by looking at the locking rail that is provided with INDEX CARDS. These identify the set number and often its contents or function.
2. Look for obstructions that might prevent its safe operation before operating any set.
3. When approaching an arbor for the first time, especially when it is loaded, observation of the front and back purchase lines will indicate the condition of the balance. If the front line is taut and the rear line is loose, the set is arbor heavy. If the rear line is taut and the front line is loose, the set is batten heavy. As an added precaution, simply squeezing the front and rear lines together will indicate movement more rapidly than visual observation as the lock is opened. If the set is out of balance, correct it. If you MUST operate it in an "as is" condition GET HELP from a competent person and perform a hazard assessment before moving the set.
4. A properly balanced counterweight set will be within 50 pounds of neutral balance at the midpoint of travel. However, if there are several lift lines, or if the travel distance is long, the set may be out of balance at the ends of travel. If operation becomes difficult, get help.
5. Before moving the batten or arbor, it is good practice to yell "Batten number X coming in (or going out)". Make sure that people and other items are clear of any moving battens. Use another person as a "spotter" if you cannot see the moving batten during its full travel.
6. To operate the set, release the oval metal SAFETY RING that is used to prevent the lock from opening accidentally under a heavy strain or if bumped. The ring is fitted permanently around the operating line and is slipped over the handle of the rope lock whenever it is not in operation. Then release the rope lock handle slowly until the exact state of balance is known.
7. Because of the friction inherent in any counterweight set, it may be necessary to pull a balanced set both up and down. If the pull required is excessive or different than normal, stop at once, engage the rope lock, and find out what is wrong.
8. When the batten reaches the desired position, engage the rope lock and the safety ring. If a position must be found repeatedly, the hand line can be "spiked" or "stabbed" with string through the hand line. Do not adhesive tape to mark the hand line as it will leave a sticky residue when removed.

9. If the hand line has stretched or shrunk due to changes in load or humidity, the set can be harder to operate. Most systems have floor blocks that can be easily adjusted to remove slack or relieve excessive tension in the hand line.

   Counterweight rigging with manila rope hand lines requires much more frequent adjustment for easy operation than systems with polyester hand lines because the length of manila rope changes with temperature and humidity conditions.

   Guide rail mounted tension blocks can be adjusted by pushing the block kick tab down with your foot (or a rod if in a counterweight pit) while pulling forward on the back hand line. This will release the tension block guide shoes and allow the block's weight to automatically adjust the tension in the hand line.

Counterweight Set Maintenance

General

All equipment requires periodic maintenance and inspection to insure long life and trouble free operation. Inspect your system on a regular, scheduled basis and keep records. These inspections will provide information on length of service and any changes in performance which might indicate wearing parts.

It is the responsibility of the venue owner to regularly inspect and maintain its rigging and other equipment as well as the continuous training of its operators.

Everyday Observation

In addition to regularly scheduled inspections you need to know your system and ask the following questions each time a set is operated.

- Is the set balanced?
- Is the rope lock properly adjusted?
- Is there excessive friction in the system?
- Is it too hard to operate?
- Are the spreader plates properly spaced among the Counterweights and are the stop collars down on the top weight and locked?
- Are there any obstructions or fouled lines?

Any "no" answer should result in an immediate halt to the operation of the set until the fault is corrected.

INSPECTION

Time, temperature, humidity and both the frequency and severity of operation affect rigging items. A schedule should be established and followed for checking all items. The frequency with which inspections should be done depends upon the above parameters and will be unique to your program and location. Your inspection should at least include the items on an inspection form. A sample is included at the end of this section.

When heavy or complicated equipment exists, JR Clancy suggests that you hire a qualified stage rigging firm to perform a full evaluation of your facility on a regular basis. This is in addition to your own periodic inspection program. We further suggest that you maintain full records of all inspections and maintenance for government (OSHA) and insurance

purposes. Maintenance records are also useful in making future checks and in evaluating the potential useful life of equipment.

INSPECTION CHECK LIST

Create an inspection checklist, which works for you and includes items that are unique to your facility and the uses to which it is put. The following list of potential items and questions is only intended as a guide to get you started in creating your own inspection list.

COUNTERWEIGHT RIGGING

- Lift Lines
  - Abrasion, rust, broken strands, kinks
  - Terminations tight, properly applied, worn, cracked
  - Turnbuckles adjusted and safety wired
- Hand lines – Dispose of old rope to prevent re-use..
  - Abrasion
  - Overly smooth or glossy
  - Kinking
  - Overstressed
  - Rot or dry rot
  - Connections
- Locking Rail
  - Undamaged
  - Properly and securely mounted
  - Index cards in place and correct
- Rope Locks
  - Properly adjusted
  - Condition
  - Wear on handles and dogs
  - Safety rings in place
- Head, Loft, Mule and Floor Blocks
  - Mounting
  - Bearings and shafts
  - Sheaves (groove wear)
  - Guide shoe wear (floorblocks only)
- Counterweight Arbor
  - Top and bottom condition
  - Rods and nuts (straight and tight)
  - Spreader plates and lock collars (in place with all hardware) - LOCATE A SPREADER PLATE EVERY TWO FEET AND KEEP STOP COLLARS DOWN AND LOCKED.
- Arbor guides
  - Clean (Do not lubricate or dirt will accumulate and cause premature wear on the guide shoes)
  - Straight joints match up

Testing

Except for periodic rope lock adjustments, systems used under normal conditions need not be tested.

However, if you wish to test the system yourself, JR Clancy recommends the following procedure:

1. Fully inspect the lineset you wish to test.
   a. Look for wear on the handline, guide shoes, rope lock dogs (the gripping cams inside a rope lock) and cable.
   b. Inspect all cable fittings and terminations.

c. Make sure all bolts and nuts are fully tightened.

2. You will want to run your test with an empty batten, so remove any scenic pieces or other items such as draperies or tracks.

3. With the arbor at "pipe weight" (just enough weight to balance the empty pipe), run the batten to its high trim and down again several times. The set will be harder to move at each end of its travel due to the transfer of the weight of the lifting cables. This is normal.

4. Listen for any abnormalities such as cables that may be rubbing or "slapping".

5. If the set is hard to run at any other point during its travel, this may indicate a problem. Typical problems include guide shoes binding in the guide tracks or cables that have "jumped" out of their grooves. If you cannot isolate the cause of your problem, contact your local stage rigging contractor for assistance, or call JR Clancy.

To test you rope lock's setting, JR Clancy recommends the following procedure:

1. With the arbor at "pipe weight", fly the empty batten to its high trim, and then lower it slightly so that the arbor is about two feet above the bottom stop batten.

2. Close the rope lock and secure the handle with the oval ring.

3. Add 50 lb of weights to the arbor - If the arbor moves before all the weight is added, the rope lock setting is too loose and should be tightened by adjusting the screw on the back of the rope lock (see rope lock instructions).

4. If you can add more than 50 lb of weights to the arbor, and it does not move, the rope lock is too tight and should be loosened by adjusting the screw on the back of the rope lock (see rope lock instructions).

5. Repeat the above process until the rope lock allows the handline to slip at about 50 lbs.

MAINTENANCE

JR Clancy's manually operated counterweight stage rigging systems are designed, manufactured and installed to provide almost a lifetime of trouble-free service under normal use. Most maintenance is preventive. JR Clancy suggests the following:

- Keep equipment, and the areas surrounding it, clean and free of accumulated dirt, dust and debris
- Periodically inspect system as described above. Correct or repair any deficiencies, or replace worn equipment.
- Maintain proper adjustment of the rope lock
- Keep tension (floor block) sheaves adjusted to minimize slack in the hand line
- Replace burned out index strip lights

Data Tables

ALLOWABLE BATTEN LOADS

Span between lift lines		8'	9'	10'	11'	12'
1-1/4" Schedule 40 Pipe 2.27 Lb/Ft						
Uniform load at 1/3 of yield[1]	(lbs/ft)	35	28	22	18	15
Uniform load at 1/360 deflection[2]	(lbs/ft)	31	22	16	12	9
Point load at 1/3 of yield[3]	(lbs)	119	107	96	88	82
Point load at 1/360 deflection[4]	(lbs)	82	65	52	43	36
1-1/2" Schedule 40 Pipe 2.72 Lb/Ft						
Uniform load at 1/3 of yield[1]	(lbs/ft)	49	39	31	25	24
Uniform load at 1/360 deflection[2]	(lbs/ft)	49	34	25	19	15
Point load at 1/3 of yield[3]	(lbs)	165	147	133	121	112
Point load at 1/360 deflection[4]	(lbs)	130	103	83	69	58
1-1/2" Schedule 80 Pipe 3.63 Lb/Ft						
Uniform load at 1/3 of yield[1]	(lbs/ft)	62	48	39	32	26
Uniform load at 1/360 deflection[2]	(lbs/ft)	62	43	32	24	18
Point load at 1/3 of yield[3]	(lbs)	209	186	169	154	142
Point load at 1/360 deflection[4]	(lbs)	164	130	105	87	73
2" Schedule 40 Pipe 3.65 Lb/Ft						
Uniform load at 1/3 of yield[1]	(lbs/ft)	86	67	54	44	37
Uniform load at 1/360 deflection[2]	(lbs/ft)	105	74	54	41	31
Point load at 1/3 of yield[3]	(lbs)	283	253	228	208	192
Point load at 1/360 deflection[4]	(lbs)	279	221	179	148	124

(1) Allowable load in pounds per foot of batten at 1/3 of yield.
(2) Allowable uniform load with a max. deflection of 1/360 between pickup lines.
(3) Maximum concentrated load at midpoint between pickup lines at 1/3 yield.
(4) Concentrated load at midpoint between pickup lines with deflection of 1/360.

APPROXIMATE LOAD CAPACITIES OF CLANCY ARBORS
(Using Steel Counterweights)

	4" WIDE WEIGHTS		6" WIDE WEIGHTS	
ARBOR LENGTH	**LB**	**KG**	**LB**	**KG**
4 ft.	504	229	782	355
5 ft.	672	305	1,043	473
6 ft.	841	381	1,303	591
7 ft.	1,009	458	1,564	709
8 ft.	1,177	534	1,825	828
9 ft.	1,345	610	2,086	946
10 ft.	1,514	687	2,346	1,064
11 ft.	1,682	763	2,607	1,183
12 ft.	1,850	839	2,868	1,301
13 ft.	2,018	915	3,129	1,419