

# Performing Arts Safety Bulletin #7

## RIGGING SYSTEMS AND FLOWN SCENERY



Anyone who is responsible for rigging must understand the legislation before proceeding with any rigging work. Rigging is one of the most dangerous tasks in the theatre and it presents hazards for:

- The operator (musculoskeletal and other bodily injuries)
- The performers or crew onstage below (being crushed by falling scenery)
- The audience (being crushed by falling scenery)
- Other set pieces, furniture, stage floors and the rigging equipment itself

### Definition:

**Rigging** - Generally refers to anything that is used for attaching, supporting or flying scenery, drapery, lighting, audio, visual and sound equipment. This includes fibre ropes, wire ropes, chains, slings, attachments, connecting fittings and associated components.

**NOTE:** This guideline does not cover hoists, chain falls and material handling equipment.

### Applicable WorkSafeBC Regulations:

Part 15 Rigging: <http://www2.worksafebc.com/publications/OHSRegulation/Part15.asp>

### 1. OPERATION AND MAINTENANCE OF PERMANENT RIGGING SYSTEMS

- a) The owner of rigging equipment should ensure that proper equipment is used as intended and within the designed safety factor. The owner should ensure that all equipment is properly operated and maintained by a qualified person.

**NOTE:** For the purposes of the sectors covered by this guideline, typically the qualified person is a live performance technical director or rigging technician, or a professional engineer. The qualified person must be knowledgeable of the work, the hazards involved, and the means to control the hazards, by reason of education, training, experience or a combination of these.

- b) All rigging of accessible pipes and winch systems (including winches, clues, lines, head blocks and line blocks) must be inspected after installation and then inspected and maintained annually by a qualified professional, according to the manufacturer's instructions.
- c) The methods and frequency of maintenance of a rigging system should be determined by the owner or by a contractor on behalf of the owner in accordance with:
  - The manufacturer's or his/her agent's recommendations for maintenance;
  - The system's current condition;
  - The frequency and method of use of the rigging system;
  - WorkSafeBC regulations.
- d) The maintenance of a rigging system should include:
  - An inspection and examination, by a competent person, at least once a year of all parts and functions of the rigging system (Items that receive frequent use or considerable wear should be inspected more often.);
  - Cleaning, lubricating and adjusting all parts of the rigging system at regular intervals, and repairing or replacing worn or defective components;
  - Repairing or replacing damaged or broken parts.

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**NOTE:** Defective components must be marked and removed from service until they are repaired by a qualified person.

- e) The inspector should be satisfied that the rigging system is in a safe operating condition and that the parts and functions will remain in a safe operating condition until the next scheduled inspection and examination.
- f) A permanent log of maintenance and inspections should be kept. All entries should be signed by the inspector and verified by the owner or designate.
- g) Where a part of a rigging system is replaced for any reason, the replacement part should be at least equivalent to the original part as supplied by the manufacturer or as specified in the design submission.
- h) The operation of all rigging equipment and systems, including chain hoists, trusses, etc., must meet with manufacturer's specifications and recommendations.
- i) Only properly trained and qualified persons may be involved with the operation of rigging equipment and systems. The operator should have such knowledge of and experience in operating the rigging system that:
  - The operator is able to operate the rigging system safely without supervision;
  - The operator understands:
    - Safe operation of the equipment and its safety devices
    - Safe working loads
    - All potential hazards during operation
    - Emergency procedures
- j) Crew and performers should be warned of the dangers arising from loads, such as flown scenery, hazards during operation and emergency procedures.
- k) Avoid having extra people on stage or in the auditorium while work is in progress. If there is a risk of head injury from falling objects (scenery, equipment, hardware, tools, etc.), then all workers in the danger zone must wear hard hats. Before overhead work begins:
  - Ensure the area below the work area is clear of anyone not wearing a hard hat.
  - Mark off the area as a danger zone (using orange traffic cones or stantions and caution tape).
  - Place signs, if needed.
- l) As far as reasonably practicable, suspended loads must not be passed over people. Operators must be aware if and when workers are underneath loads.
- m) Operators must maintain control and visual contact with a moving piece at all times.

### 2. TEMPORARY FLOWN SCENERY – HARD OR FRAMED

- a) The construction of individual pieces of flown scenic units, and the assembly of the pieces into the unit(s), will be done by a qualified person or approved by a supervisor.

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- b) In constructing pieces of hard or framed scenic units to be flown, all elements should be joined by gluing and screwing or bolting or welding or an equivalent permanent method of joinery.
- c) In flown units, pieces that move and that may create fouling hazards or may change the balance of the unit in the air should be secured before the unit is flown.
- d) The pins of hinges used in the assembly of flown units should be safetied to the unit.
- e) All load-bearing or potentially load-bearing hardware should be bolted or welded to the piece.
- f) The assembled unit should be inspected by a qualified person or supervisor before the unit is flown.

### 3. TEMPORARY FLOWN SCENERY – PICK-UP POINTS AND LINES

- a) The number and placement of the pick-up points on a flown unit should be adequate to prevent any undue stress on or sagging within the unit.
- b) The pick-up points on a flown unit should be placed to ensure the structural integrity of the unit. All flying hardware should be bolted or welded to the flown unit.

### 4. TEMPORARY FLOWN SCENERY – SOFT

- a) Bottom pipe or chain in a pipe or chain pocket should be fastened securely to prevent the pipe or chain from falling out of the pocket.
- b) The spacing and strength of ties should be adequate for the weight of the piece.
- c) For information on fire proofing scenery, refer to *Performing Arts Safety Bulletin #5: Flame Resistant Treatment of Scenic Elements*.

### 5. TEMPORARY FLOWN SCENERY – RIGGING

- a) All ropes, chains, bolts, clamps and other elements of the rigging of a flown unit should be of appropriate size and strength for the load that they will bear. Manufacturers' recommendations and guidelines for the use of such materials should be followed where available. All components should be marked with a load rating, either attached to or engraved on the component or, in the case of rope, included in accompanying documentation.
- b) The minimum strength-to-load ratio for the elements of the rigging of a flown unit is eight-to-one.
- c) Turn-buckles, trim chains and other devices for the adjustment of the trim of a flown unit should be secured in position.
- d) Any ropes, chains or other lines on which scenery is flown should be safely terminated and secured.