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## **12" and 15" GROUND SUPPORT TOWER - OPERATING INSTRUCTIONS**

For your safety and protection, **YOU MUST** read these instructions completely before using the equipment, and keep them for future reference.

Carefully observe all warnings, precautions and instructions when using this equipment. All personnel using this equipment should be trained for the proper and safe use of this equipment.

### **SAFETY NOTES**

1. Unless optional outriggers are used the system to be lifted **MUST** be a four (4) sided box or rectangle and include four (4) towers, one in each corner.
2. The total load of each tower, including hoist, must not exceed the figures produced in Structural Engineers Report.
3. The ground, floor, or stage on which the towers will stand must be capable of withstanding the substantial point load imposed by these towers. Please refer to Structural Engineers Report for the correct figures.
4. A square of 3/4" (20mm) plywood should be placed under each tower base in order to avoid damage to the floor surface and to help disperse the load.
5. The towers must be assembled with the diagonals forming a continuous pattern. The sides of the tower with the diagonals should be parallel with the longest span of truss (If the rig is 5 section wide and 3 sections deep the diagonals will be on the upstage and downstage faces of the tower).
6. Towers must be vertical before any weight is applied, or the strength and stability will be impaired.
7. Tower sections must be examined regularly for signs of damage; Please refer to "Notes on Truss Certification" sheet. Care should be taken when handling tower sections.
8. The Camlocs, truss pins with clips, or truss bolts must be checked every time the towers are used.
9. Once a load has been applied to the tower, the screw jacks should be adjusted to so that each is carrying an equal load. Use a wrench and adjust by hand until equal pressure is achieved.

10. When rigging the chain hoist it is essential there are no twists in the chain. The hoist should be rigged on the downstage or offstage side of the sleeve block (depending on alignment of the head block) so the moving chain will not rub against the structure.
11. All hoists must be run simultaneously so the rig always remains level.
12. Also, the motor must be rigged in such a way as to keep the motor and hook below the top of the sleeve block or plate. This enables the truss to be raised to the top of the tower, actually touching the underside of the roller beam and locking the lighting rig rigidly to the tower (be careful not to trap lighting or motor cables between the two). This does not apply to the Super-truss sleeve plates where the wheels must not run over the end of the Tower truss.
13. Once the rig is at show trim a safety should be fitted. A 2000 - 3000 Kg (4000- 6614 LBS) truck ratchet strap or spanset is suitable (unless fireworks or pyro are used). This must be fitted tightly around the top of the roller beam and the sleeve block. Any slack could result in the safety being ineffective; in the event of a chain failure, the block would drop before any weight would be taken.
14. Before raising truss the motor on each tower should be "bumped" until the load is evenly distributed. (Subject to the rig design, number of towers and load distribution)
15. The stability of the tower is derived from the sleeving action of the sleeve block. Therefore the base area of the whole structure, not just the tower base, should be evaluated when determining the height / depth ratio. The tower height should not exceed that stated in the Structural Engineers Report.
16. It is recommended to connect the towers together at the base with tube and clamps (2" dia.) and to form an 'X' brace between the towers using cables tensioned with a rated come-a-long. This will provide total rigidity of the structure which is particularly important if any moving objects are flown or spot operators are used on the lighting truss.
17. When possible, once the rig is at full height additional safety cables should be attached between the truss and the venue roof to provide a fail safe.
18. A full understanding of the principals employed in the systems design is necessary before use. It is important that the weight and distribution of the entire load is known, and that experienced personnel, who are able to evaluate the circumstances, are used to operate this equipment.
19. If the truss is being used outdoors Guy wires must be used; Please refer to "Guy Wire set" sheet.

## **GENERAL POINTS**

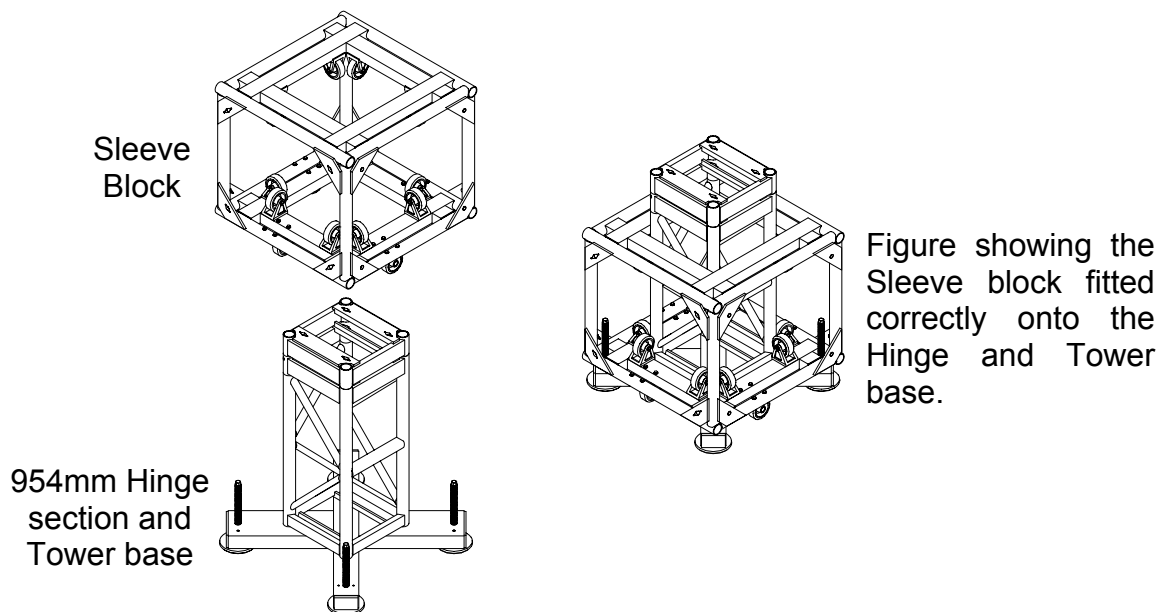
1. The height of the base, hinge and head block must be added when figuring the total tower height. The screw jacks in the base can add (4 1/2" (114mm) when they are fully extended.

2. It is recommended that you double check the total height available in each venue as the information provide could be incorrect and result in wasted time if towers are built the wrong height.
3. The recommended kit comprises a multiple of section lengths that cover most of the height variations likely to be encountered. To alter these lengths without understanding the principals is inadvisable.
  - A) The individual lengths are multiples of 30" (76.2 cm) in order to have a X2 capability. Two of one length will always equal another.
  - B) This combination allows the hinge to fall just above the sleeve block regardless of stage height when bases rest on the floor below the stage.
  - C) The total height of the tower above stage, is limited by the length of chain in your hoist; an 80' (25m) chain enables a 15" X 15" tower of 32.8' (10 metres) above the stage which given a 6.5' (2 metres) high stage accounts for the 40' (12 metres) total kit height. 12" X 12" tower has a maximum height of 30' (9 metres).
4. If a single truss with 2 towers ( Goalpost ) is specified, then a minimum of 2 outriggers per tower must be fitted perpendicular to the truss run.
5. If a single tower is specified, then 4 outriggers must be attached to the tower.

## **TOWER ASSEMBLY**

### **METHOD A - When tower bases sit on top of the Stage Surface**

#### **MAKE CERTAIN THE STAGE DECK IS CAPABLE OF SUPPORTING THE WEIGHT**



**NECESSARY !!**

1. Place the bases on the stage with the screw jacks completely off the floor. Connect 954mm hinge section to the top of each of the base. Take care to align the hinge so that it opens toward the truss.
2. Lift a sleeve block and slide it down over each hinge section so that the wheels are on the stage around the base. In the case of Super-truss please refer to the "Super-truss user instructions".

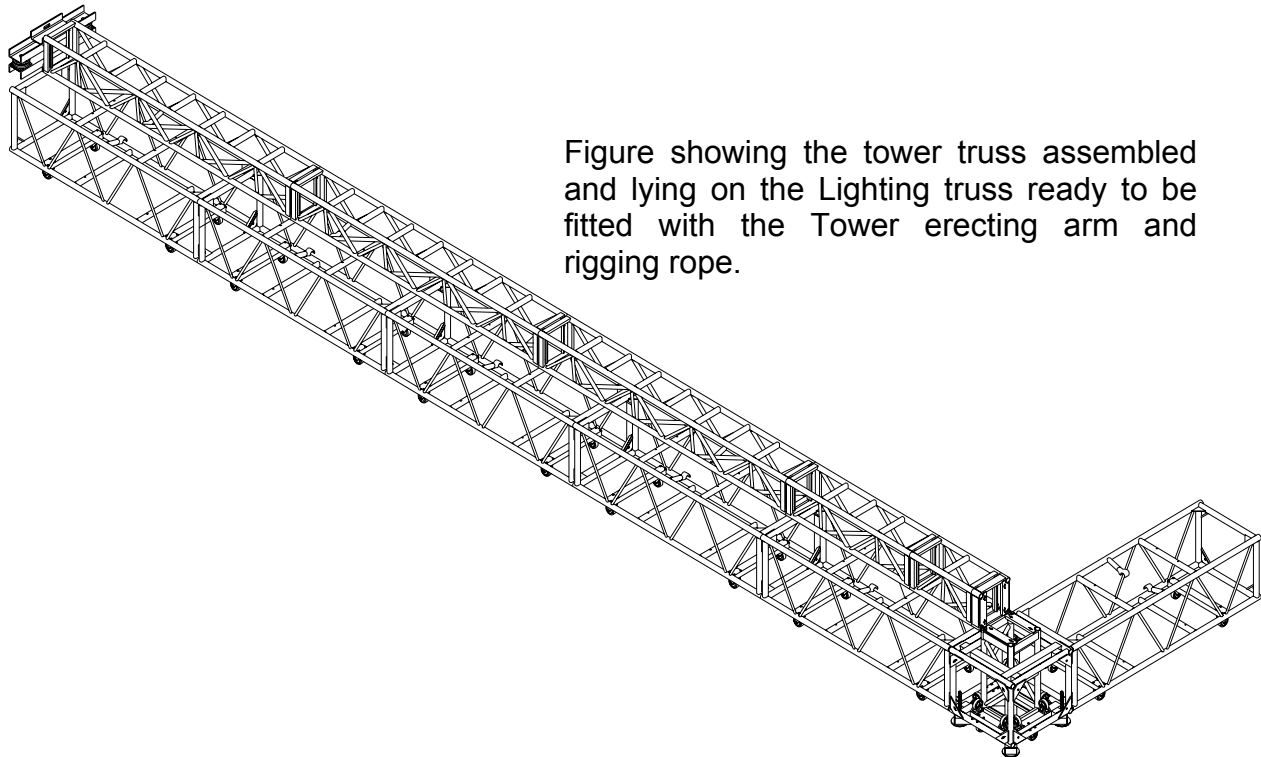
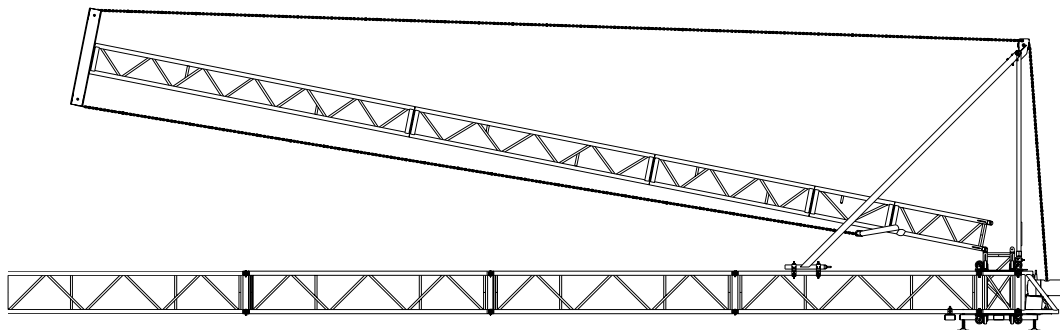


Figure showing the tower truss assembled and lying on the Lighting truss ready to be fitted with the Tower erecting arm and rigging rope.

3. Lay out and connect the entire lighting truss to the desired shape incorporating the sleeve blocks with bases as previously assembled.
4. Position the rig on the stage and place 3/4" (19mm) plywood under each base.
5. Assemble remaining tower sections and the roller beams to desired height. Be sure the diagonals are on the same side and form a continuous pattern.

Figure Showing tower lifting system



section. Be sure to align the tubes on the tower with the tubes on the hinge and that the diagonals are all facing the proper direction.

7. Attach a rigging rope (recommended length 30 meters (100ft) to the head block and run it over the top of the tower truss as shown in the figure below. If using a Tower Lifting System refer to instructions and continue with step 13 after securing the Hinge pins, bolts or camlocs.
8. Check that entire rig is assembled and ALL truss pins with r clips, camlocs, or truss bolts are secured correctly.
9. Raise tower by using 4 or 5 of the crew pulling on the rope plus 5 or 6 pushing up on the tower. Take care not to pull the tower over when it reaches its vertical position.
10. While continuing to hold tension on the rope insert and lock camloc or truss bolts in the hinge section.
11. After the camlocs, pins, or truss bolts are secure one person, equipped with a proper safety harness, should climb the tower, untie the rope and run it over the roller beam wheels so the loose end reaches the stage.
12. Then, attach the hook of the chain hoist chain to the rope and pull the chain up the tower over the rollers and back down to the sleeve block. (The hoist should be on the onstage or upstage side of the sleeve block with the hook on the chain on the offstage or downstage side). The person on top of the tower will need to feed the hook over the rollers (take care not to get fingers between the chain and rollers) and check to see that there are NO TWISTS in the chain.
13. Attach hoist to the bottom tubes of the truss with spansets or truss flying point. In the case of Super-truss, attach hoist and chain to the lifting points. The chain hook and hoist should be rigged so they ride below the top of the truss. Be sure the hook of the hoist is carrying the load and that the hoist housing is not wedged between the gusset plates. Again, check to be sure there are no twists in chain.
14. Screw down the jacks on the base until each of the four has an equal load (a torque wrench is recommended). Check for level in both upstage/downstage and on/off stage directions using at least an 45 cm level. Do not apply any load to the motor until the jacks have been screwed down.

Continue to the next tower repeating steps 6 - 14.

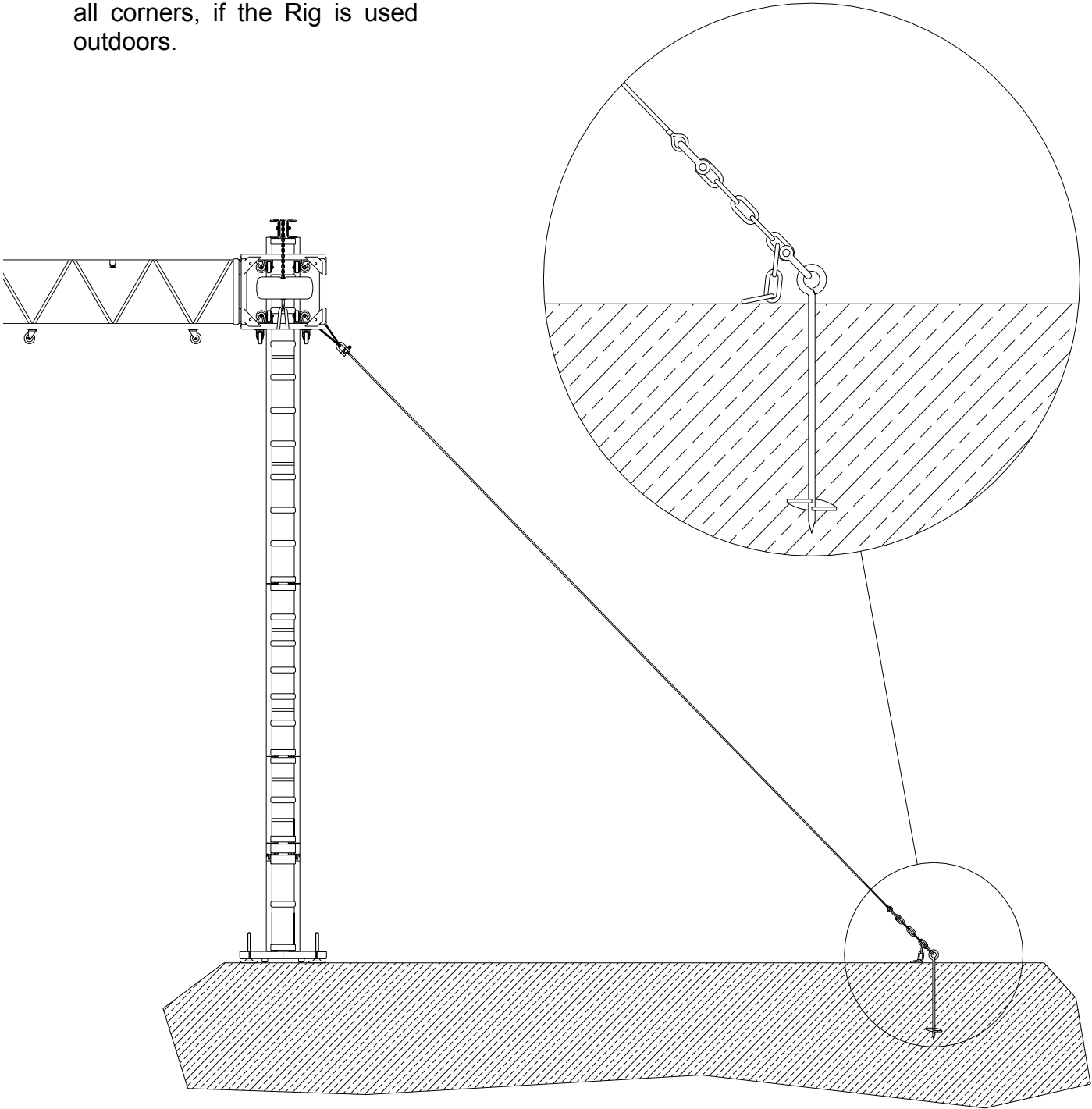
15. After all towers have been erected and levelled, electrical cables should be run for the chain hoists.
16. Then 'bump' each motor until there is equal tension on all chains. When all personnel have been cleared raise the rig to a working height. **HOISTS MUST ALWAYS BE RUN TOGETHER. IF FOR ANY REASON ONE SHOULD STOP THEY SHOULD ALL BE STOPPED.**

17. Finish setting up the rig. Be sure no cables will be pinched between the sleeve block and roller beam. All cables near the sleeve blocks should be tied to insure they can't become tangled.
18. When the rig has been raised to "show trim" a safety MUST be put on each tower. This should be a spanset running from one side of the sleeve block, over the roller beam to the opposite side of the sleeve block. This must be fitted tightly around the top of the roller beam and the sleeve block. Any slack could result in the safety being ineffective.

METHOD B - With base on the floor below stage.

1. Without removing any panels from the temporary stage, lay out and connect lighting truss to desired shape incorporating the sleeve blocks as designed.
2. Roll the rig into its correct position and mark the stage decks to be removed. Now roll the rig left or right so the decks can be removed.
3. After the decks have been removed roll the rig back to its correct position with the sleeve blocks over the holes in the stage.
4. Place the tower base on the floor under the stage.
5. Having measured the distance from the house floor to stage, join the appropriate length of tower to the hinge section so that the hinge will fall a few inches above the height of the sleeve block. Take care to ensure the hinge opens toward the truss.
6. With the hinge section on top, insert the pre-assembled tower and hinge section through the sleeve block and connect it to the base. Be sure the diagonals are properly located and form a continuous pattern.
7. Continue assemble as in Method A from Step 5 onwards.
8. As noted in "Safety Notes" on page 2. If the truss is to be used outdoors then the whole system must be restrained against wind loading on the truss; Please refer to "Guy Wire set" sheet.

Figure showing a Guy wire set up on one corner of the Tower system. This must be used on all corners, if the Rig is used outdoors.



## **DISASSEMBLY**

1. Climb each tower (with proper safety harness) and release the safety lock off.
2. Ensure all hoists run together and lower the rig to working height.
3. Raise lamp bars and remove any equipment that will stop the rig from being lowered to the stage deck. Do not remove motor cables.
4. When everything and everyone is clear, lower the rig to the deck.
5. Clear the rig of all other equipment and cables.

**DO NOT DISCONNECT ANY CAMLOCKS, PINS, OR TRUSS BOLTS, ANYWHERE ON THE RIG !**

6. Have someone climb (with proper safety harness) each tower and lower chains from towers using the rigging rope, the person will need to guide and feed hook over the rollers (take care not to get fingers between the chain and rollers). If using a Tower Lifting System refer to the instructions for lowering towers.
7. After the chain has been lowered the rope should be tied to the top of tower and the person should return to the stage.
8. With a crew standing ready on the rope and base of the tower remove the truss pins, camlocs or truss bolts that allow hinge to open.  
**ONLY DISCONNECT THE HINGE CAMLOCKS, PINS, OR TRUSS BOLTS ! !**
9. Carefully lower the tower using the Tower erecting arm (optional).
10. Disconnect the tower from the hinge section and place on the floor. Continue to the next tower repeating steps 6 - 10 until all towers have been lowered.

**ALL Towers MUST be lowered before any truss is disassembled.**

11. After all towers have been lowered disassemble the towers and rig. Put the hoists in their cases. Spansets and shackles can also be stored in the case.