

The Carlson Tower Lift

Model 25

for use with ROHN® 25G and
Amerite® 25 light-duty
lattice towers

**INSTALLATION, OPERATION &
MAINTENANCE MANUAL**

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INTRODUCTION

Two Types of Tower Lift Installations

A Carlson Tower Lift Model 25 can be installed on ROHN® 25G and Amerite® 25 towers up to 60 feet tall in either of two scenarios:

1. Together with a new tower installation
- or:
2. Retrofitted onto a standing tower

When installing the Lift together with a newly installed tower, the assembly and installation steps in this Manual are all performed after the new tower is installed.

If the Tower Lift is installed onto an existing tower, the same assembly and installation procedure is performed, but extra steps are also required.

First, the antenna, mast, rotators, thrust bearing and any other equipment mounted at the top of the tower needs to be detached from the tower and brought to the ground. You will do this using the method you prefer, either by manually climbing the tower or by using a bucket truck, commonly called a cherry picker. The latter method is preferred if possible.

You will also need to deal with the guy lines and any other hardware attached to the tower. These extra steps are described in Sections III-C and III-D of the Manual.

Note that this should be the last time you will need to access or work on equipment at the top of the tower. Once installed, the Tower Lift will lower and raise the Carriage holding all your equipment, enabling you to perform all servicing and equipment changes when the Carriage is lowered. When your work is completed, the Lift will raise the Carriage and equipment back to the top.

Mid-Level Guying Option

A second key factor also affects Lift installation, both new and retrofit: whether or not the tower requires mid-level guying. This determination is made by the buyer in advance of purchase. If mid-level guy lines are needed, the Carlson Tower Lift will include three Mid-Level Guy Line Assemblies. This is true for retrofits as well as new installations, because the Mid-Level Guy Line Assembly is specially designed to work smoothly with the Lift. Installing the Mid-Level Guy Line Assemblies is described in Section III-C of the Manual.

Customer-Provided Equipment

1. All antenna related equipment:

- Antenna(s)
- Mast
- Mast clamp or thrust bearing
- Rotator(s)
- Cabling for RF, rotator, and antenna-switch controls

2. Top-level guy lines

- Ground attachments and turnbuckles for all guy lines
- Messenger wire, spacers, and attachment hardware
- Power drill for use with Winch

Tower Lift Specifications

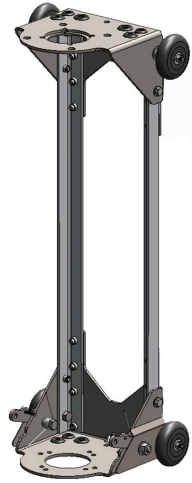
Maximum tower height	60 feet from Winch to Top Pulley
Shipping weight and size	79 lbs. in a 16" x 32" reinforced box
Maximum equipment weight	250 lbs. – antenna(s), rotator, mast, and thrust bearing
Lift cable	120 feet, 5/32" diameter, Type 316 stainless steel
Winch Assembly	Worm-gear type, 1500 lb. capacity, ¼-inch hex shaft
Maximum mast diameter	2.375-inch OD
Compatible antenna types	Yagi, beam, quad
Compatible thrust bearings	Yaesu GS-065 DX Engineering TB300
Compatible rotators	Yaesu G-450ADC, G-800DXA, G-1000DXA
Compatible mast clamp	Yaesu GC-038
Power control	Carriage is raised with the Speed Wrench or a power drill
Roller wheels	Polyurethane, lifetime sealed, double ball bearing
Parking lock rope	120 feet; 3/16-inch diameter black polyester cord

SECTION I - Tower Lift Components

NOTE: The names of all supplied components are Capitalized throughout this Manual.

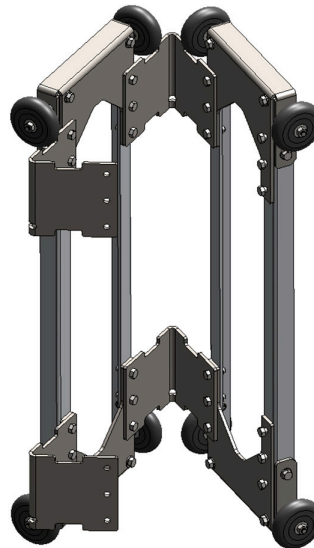
I-A Lift Components:

Carrier tram



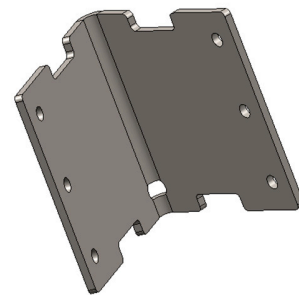
Support Trams Assembly

When the Support Trams Assembly is connected to the Carrier Tram, this constitutes the Carriage.



6 Tram Connectors

Two of the six Tram Connectors are fully pre-attached, joining the two Support Trams to create the Support Trams Assembly. Two other Tram Connectors come attached to one side of the Tram Assembly, as their attachment to the Carrier Tram is made during Carriage assembly. The final two Tram Connectors come loose, as both sides are attached to the Trams Assembly and the Carriage Tram, respectively, to complete the Carriage Assembly around the tower.



(See III-B. Assemble the Carriage Around the Tower, page x.)

Tram Connector Hardware

12 flat-head bolts, 12 washers, and 12 lock nuts are included to make the final Tram Connector attachments. (24 of each are pre-installed.) All hardware is stainless steel.

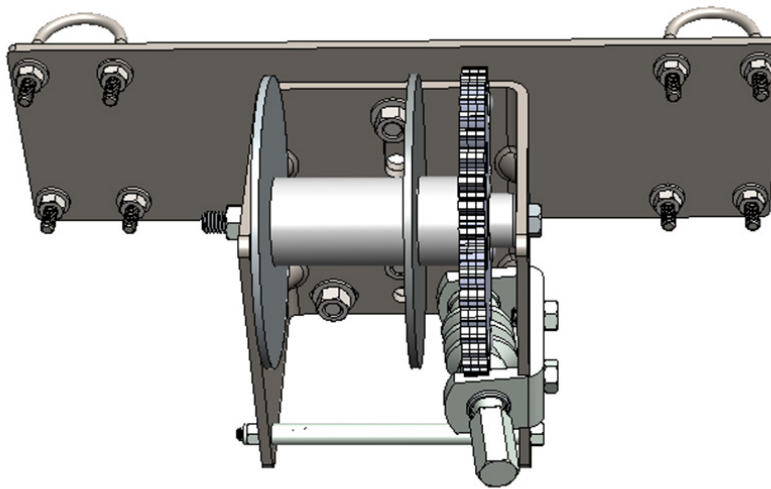
3 Quick Links – 1/4"

The three Quick Links are used to attach the top-level guy lines to the three Tram Connectors at the top of the Carriage.



Winch Assembly

The Winch is pre-bolted to a mounting plate

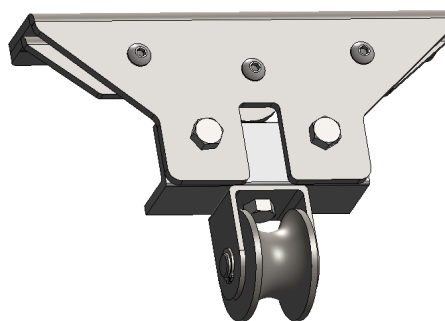


Winch Hardware – (4) U-bolts, (8) locknuts, (8) washers

This hardware comes bolted to the mounting plate, as depicted above. The U-bolts and nuts will be separated and rejoined when the Winch is mounted to the tower. (See III-A. Install the Winch Assembly on the Tower, pg x.)

Top Pulley Assembly

The Top Pulley Assembly is the Pulley bolted to a Rung Bracket.



Lift Cable

The 120-foot Lift Cable comes with one end pre-attached to the Winch, and with an Eye Bolt affixed at the loose end (for later attachment to the top of the Carriage). The Top Pulley Assembly is pre-threaded onto the loose end of the Lift Cable.

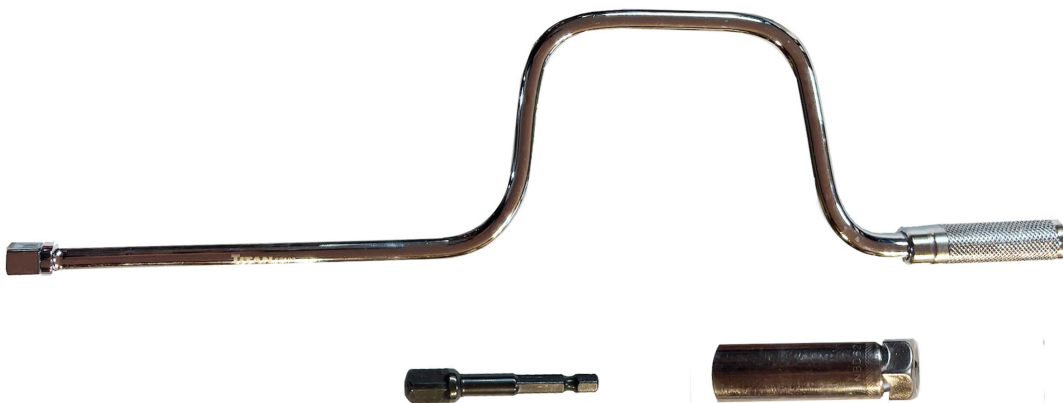


Parking Lock Rope – 120 feet; 3/16-inch diameter black polyester cord

The two ends of the Parking Lock Rope attach to levers on the two Parking Locks at the bottom of the Carrier Tram. The 120-foot Rope can be cut into two 60-foot Ropes, or left as a loop. It functions the same either way.



Speed Wrench, 5/8-inch Deep-Well Socket, 3/8" Socket Adapter for power drill



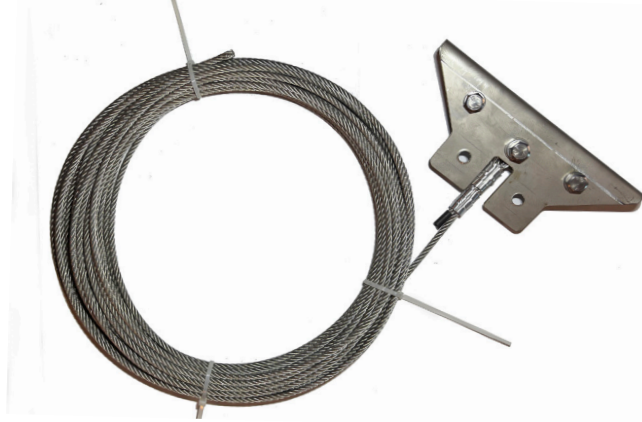
Anti-Seize Lubricant, 1-oz tube

NOTE: If your tower does not require mid-level guying, everything you need is listed above. However, if you need mid-level guy lines, you will also receive the following components:



I-B. Mid-Level Guy Line Assemblies

There are three Mid-Level Guy Line Assemblies. Each Assembly consists of a 60-foot Guy Line pre-attached to a Rung Bracket. (The customer will cut the three Guy Lines to the length needed to reach and attach to the ground.)



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SECTION II – Safety Rules

When installing a Tower Lift, be sure to follow these safety steps to prevent an unexpected event, just as you would when installing a crank-up or tilt-over tower.

1. Make sure the weather forecast predicts calm conditions and that your existing tower design is built to be temporarily un-guyed and climbed in still weather. This includes having a large enough concrete base for the tower be stable when climbed with no guy lines connected.
2. Have a wide area blocked off to keep non-essential personnel a safe distance away.
3. Before installation begins, position a pair of two-by-fours through the tower about eight feet above the ground as a safety feature. This prevents the carriage from accidentally going below the eight-foot height.
4. Notice that, for safety, the shaft on the Winch – operated by the Speed Wrench or the power drill – is on the opposite side of the tower from the Carrier Tram.

5. Do not enter the area directly under the Carrier Tram.

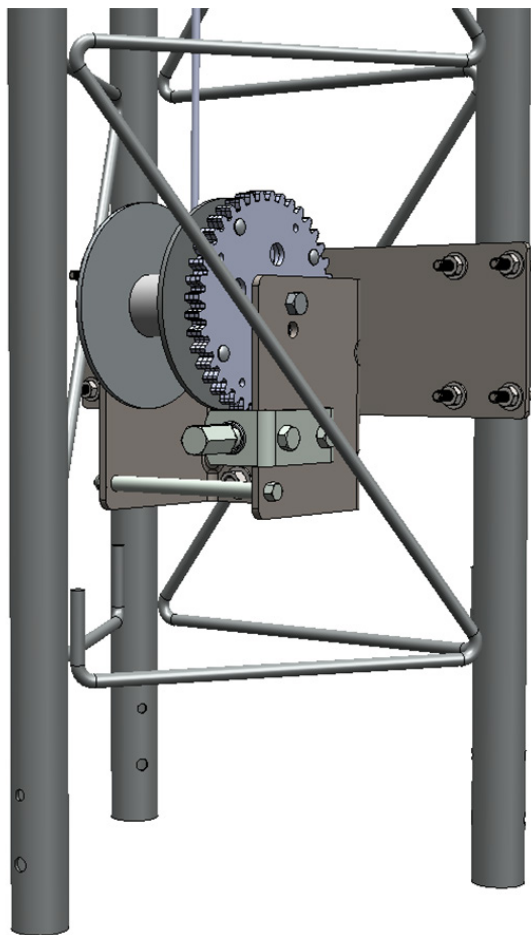
SECTION III – Lift Assembly & Installation

NOTE: Use hand tools only to assemble and install the Lift. Do not use power tools. Do use the provided Anti-Seize Lubricant on all threads to prevent galling. Be sure to use gloves when handling the metal parts, as they may have sharp edges.

While on the ground:

III-A. Install the Winch Assembly on the Tower

Install the Winch Assembly on the inside of the tower face that holds the Carrier Tram. Position it about four inches down from a horizontal tower rung that is approximately 24 inches up from the ground. Use the four U-bolts to fasten the Winch's mounting plate to the two tower legs. Do NOT over-tighten as that could crush the tubing.



One end of the 120-foot Lift Cable is pre-connected to the Winch. From there the Cable feeds up and out from the front of the Winch. The other end of the Lift Cable is affixed to an Eye Bolt (with threaded lock washer and bolt). After the Carriage is loaded, the Eye Bolt will be bolted to the top of the Carrier Tram.

The Top Pulley Assembly is also pre-threaded onto the loose end of the Lift Cable and tie-wrapped (temporarily) to the Eye Bolt.

III-B. Assemble the Carriage Around the Tower

After the Winch is installed, place a pair of two-foot-long two-by-fours all the way through the tower, sitting on the horizontal rung just above the Winch.

(The two-by-fours will remain at this working level until the Carriage is fully loaded and ready to be raised. The same two-by-four set up can be deployed whenever the installed Carriage is subsequently lowered for equipment servicing.)



Set the Support Trams Assembly on the two-by-fours, up against the tower.



Now bolt the two unattached Tram Connectors to the open side of the Support Trams Assembly, securing it around the tower.

Then place the Carrier Tram on the two-by-fours, positioned so you can bolt it to the four Tram Connectors on the Support Trams Assembly.

The Carriage is now fully assembled.



Now attach the three Quick Links to the Tram Connectors at the top of the assembled Carriage. These Links will hook to the ends of your top-level guy lines after the Carriage is loaded with the antenna and equipment.

One last climb:

Now that the Winch and Carriage are assembled and installed on the tower, it's time to make the Lift operational. Performing the tasks described below requires either manually climbing the tower or using a bucket truck.

This part of the Carlson Tower Lift installation must be performed by people with experience working on towers and who are fully compliant with tower-climbing safety rules and best practices.

If mid-level guying is needed, now is the time to install the Mid-Level Guy Line Assemblies. If you do not need mid-level guying, skip this section and go to section III-D.

III-C. Install the Mid-Level Guy Line Assemblies

If your 25G tower requires mid-level guying, your next task is to install the Mid-Level Guy Line Assemblies. This Assembly is specially designed to work with the Carlson Tower Lift.

Use your preferred method, whether climbing or using a cherry picker, to raise the Guy Line Assemblies to mid-level.

If you are installing the Carlson Tower Lift together with a new 25-G type tower, you are ready to attach the three new Mid-Level Guy Line Assemblies.

If instead you are retrofitting a standing tower, you must first remove the tower's existing mid-level guys from the tower so they can be replaced with the Mid-Level Guy Line Assemblies. Remove the existing guys and their attachment brackets.

NOTE: As you move up and down the tower during installation, remove any brackets or hardware attached anywhere on the tower that would inhibit the Carriage's movement on the tower.

You are now ready to bolt the three Mid-Level Guy Line Assemblies to the three mid-level horizontal rungs, one on each tower face.

For each Assembly, carefully unscrew the three top bolts from the captive nuts in back plate. Note that unscrewing the center bolt also releases the swaged-and-looped end of the Guy Line.



Place the open Rung Bracket over the mid-level rung, then retighten the three bolts to secure the Assembly onto the rungs. Be sure to re-insert the middle Bolt through the swaged loop at the end of the Guy Line before tightening the bolt to the captive nut on the backside of the Rung Bracket.



After the Guy Lines are attached to the tower rungs, attach the other ends to the ground (if not already anchored) and tighten with the turnbuckles. We recommend doing this now – after the Mid-Level Assemblies are installed – rather than after the full installation is completed, as this will make your climb to the top of the tower more stable.

III-D. Install the Top Pulley Assembly and Lift Cable

To install the Top Pulley Assembly and Lift Cable, the Pulley Assembly pre-threaded onto the Lift Cable needs to come up through the center of the tower to the top. To perform this, whether by climbing or using a bucket truck, bring a rope to the top of the tower, and then drop one end of the rope down the center of the tower to a person on the ground. That person ties the rope to the Pulley Assembly threaded onto the end of the Lift Cable. Then the person on top pulls the rope up, bringing the Lift Cable and Pulley Assembly to the top.

When the Cable and Pulley Assembly have been lifted to the top, untie the rope from the Pulley Assembly, then bolt the Pulley Assembly to the top horizontal rung of the tower on the same face as the Carrier Tram. Note that the three bolts at the top of the Assembly are lightly screwed into captive nuts in the back plate. Loosen the bolts and place the open Rung Bracket over the top rung, and then retighten the bolts to secure the Top Pulley Assembly onto the rung.

Once the Top Pulley Assembly is bolted into place, pull the end of the Lift Cable with the attached Eye Bolt out from the Pulley and feed it down the outside of the tower until it reaches the ground, so the Eye Bolt can be bolted to the top of the Carriage.

NOTE: If this is a retrofit on an existing tower, there is one final task to do while you are at the top of the tower: Detach the existing guy lines and let them fall to the ground. They will be re-attached to the top of the Carriage after it has been loaded with the antenna equipment before raising.

Prepare for lift off:

III-E. Load the Carriage

Now it's time to load the Carriage with the mast, one or more antennas, a rotator or mast clamp, a thrust bearing, and any other needed equipment. Maximum equipment load is 250 lbs. At the bottom of the Carriage, the round cut-out fits either the Yaesu GC-038 mast clamp or a range of rotators available from both Yaesu and DX Engineering. The round cut-out on the top plate of the Carriage accommodates either the DX TB 300 heavy-duty thrust bearing or, using the included adapter plate, the Yaesu GS-065 thrust bearing. (The adapter plate comes tie-wrapped to top of Carrier Tram.)

The Carriage can accommodate a dual azimuth/elevation rotator such as the Yaesu G-5500. The Az and El units can be joined and installed on the top plate of the Carrier Tram, or on the mast above. Or, you can attach the Az rotator to the bottom plate of the Carrier Tram and mount the El rotator on top of the Carriage or higher up on the mast.

You'll see six grommets in both the top and bottom mounting plates on the Carriage. Feed your equipment cabling through those holes, then connect them to their target equipment. In a typical installation, four of the six grommets will be used for RF cables, one for a rotator cable, and one for an antenna-switch control cable. This hole usage might vary depending on the equipment configuration.

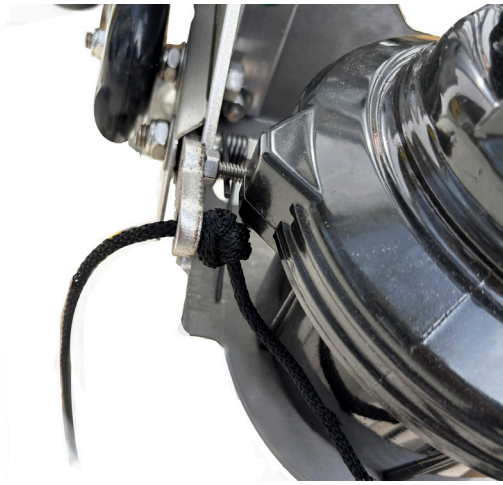
If you have any questions about equipment compatibility and loading, contact support@rooftowers.com.

III-F. Attach the Lift Cable, Parking Lock Ropes, and the top-level guy lines to the Carriage

Remove the washer and nut from the Eye Bolt at the end of the Lift Cable and insert the Bolt through the hole at the back center of the top of the Carrier Tram. Securely tighten the Bolt with the lock washer and nut.



Now feed each end of the 120-foot Parking Lock Rope through the respective holes in the two levers on the Parking Locks at the bottom of the Carriage. Use a double knot or fisherman's knot to securely tie each end of the Rope. Seal the knots with a dab of Shoe Goo or the like.



The 120-foot Rope can then be cut into two 60-foot Ropes, or left as a single loop. Either way, it functions as two Ropes attached to the two Parking Locks.

Connect the three upper-level guy lines to the three Quick Links at top of the Carriage.



III-G. Install the messenger wire

Attach a messenger wire (user-supplied) just as you would with a regular antenna installation on a tower. However, rather than running inside the tower, the messenger wire will run outside the tower where the Lift operates. Attach the top end of the wire to an eye bolt screwed into the hole in the bottom plate of the Carrier Tram, and attach the bottom end to a horizontal tower arm, such as an eave bracket, mounted on the tower below Winch.

III-H. Raise the Carriage to the top of the tower

After the Carriage is loaded and the three top-level guy lines and the Lift Cable have been attached, the Carriage is ready to be raised to the top of the tower for the first time.

To raise the Carriage, follow the steps below in Section IV-C. Raising the Carriage

Once the Carriage is parked at the top of the tower, your Carlson Tower Lift is fully installed and your loaded equipment is ready to operate. The Carriage can be lowered whenever you need to service or make changes to your antennas or other equipment, and then raised back to the top after servicing.

SECTION IV – Lift Operation

IV-A. Operating the Parking Locks

The Tower Lift has a built-in locking mechanism – the two Parking Locks – at the base of the Carrier Tram. A single lock is sufficient to securely hold the Carriage in place on the tower, but there are two Parking Locks as a safety feature, one on each side of the bottom plate of the Carrier Tram.

When the Parking Locks are engaged, the Carriage will securely rest on – park on – a horizontal tower rung. When the Locks are disengaged, the Carriage is freed from resting on the rung so that it can be lowered by cranking the Winch backward.

These Parking Lock actions are performed by a person on the ground who engages and disengages the Locks by managing the Parking Lock Ropes attached to Parking Lock levers. When both Ropes are pulled down, the Locks disengage from resting on the rung, allowing the Carriage to be cranked downward. When the operator stops pulling on and thus loosens the Ropes, the spring-loaded Locks will automatically re-engage, and then come to rest on the next rung down as the Carriage is lowered.

Note that while the Carriage can be lowered only when the Ropes are pulled down to disengage the Locks, the Carriage can be raised whether or not the Locks are engaged. If the Parking Lock Ropes are loose while the Carriage is being raised, thereby engaging the Locks, you will hear a clicking sound as the Parking Locks pass each tower rung on the way up. This sound can be a useful signal when you have the Carriage close to its destination.

IV-B. Lowering the Carriage

1. Schedule the operation in calm weather that does not exceed the tower's free-standing ratings.
2. Put on hardhats and clear people from the area.
3. Place two-by-fours through lower tower rungs at a level that enables comfortable working once the Carriage is fully lowered.
4. Loosen the top-level guy line turnbuckles at the ground a couple of turns so you can raise the Carriage up an inch or two, using the Speed Wrench. Then release the Parking Locks by pulling down on their Ropes.

If you have Mid-Level Guy Lines, perform Steps 5, 6, and 7. If you do NOT have Mid-Level Guy Lines, go directly to Step 8.

5. Lower the Carriage down to just above the Mid-Level Guy Line attachments.
6. Back off the mid-level turnbuckles and disconnect the three Guy Lines from their ground attachments, then walk each Line back to the bottom of the tower and place it directly below the center of the Rung Bracket it is connected to, just outside of the tower. Hold the lines down with a brick or other heavy object.
7. Holding the Locks open with the Parking Lock Ropes, use the Speed Wrench to lower the Carriage a few feet below the Mid-Level Guy Line attachments.
8. Now use the power drill to continue lowering the Carriage until it rests on the two-by-fours.

You can now easily access the antenna(s) and other equipment to safely perform the needed service.

IV-C. Raising the Carriage

When you have completed your equipment servicing, raise the Carriage back up to the top.

1. Schedule the operation in calm weather that does not exceed the tower's free-standing ratings.
2. Put on hardhats and clear people from the area.

If you have Mid-Level Guy Lines, perform Steps 3, 4, 5, and 6. If you do not have Mid-Level Guy Line, go directly to Step 7.

3. If these Guy Lines are still disconnected from their ground attachments after lowering the Carriage, leave them that way until Step 6 below. But if they have been re-attached to the ground, follow the instructions in Step 6 in the preceding section to disconnect and move them to the base of the tower.

4. Carefully arrange and manage your RF and rotator cables so that they will follow the Carriage without tangling. [A messenger cable and cable rings can handle this task. This may require more text after I get the Messenger Cable section written.]
5. To start the rise, use the Speed Wrench to raise the Carriage a foot or two to make sure there is no binding of the RF and control cables. When you see the Carriage is moving smoothly, you can use the power drill to continue its rise.
6. Using the drill, move the Carriage up to just above the Mid-Level Guy Line connection and park it there. Then bring the mid-level Guy Lines back out from the tower base to their ground connections and retighten the turnbuckles.
7. Raise the Carriage using the power drill. As you get up to a couple feet below the top, switch to manual operation with the Speed Wrench. Loosen the top-level guy line turnbuckles at the ground as needed to allow the bottom of the Carriage to move a few inches above the second highest horizontal rung, where it will park. Watch the top guy lines to see when they begin to tighten, just as you are going an inch or two above the second-to-top horizontal rung of the tower.
8. When the Carriage is just above where you want it to be, release the Parking Lock Ropes to engage the Parking Locks and lower the Carriage until it locks into place.

NOTE: To see how this rising-and-setting maneuver works, practice it on your first Carriage raising when the Carriage is about five or six feet above the ground.

9. Retighten the top-level guy turnbuckles at the ground to secure the Carriage on the tower.

The antenna and equipment in the Lift Carriage is now ready to operate.

SECTION V – Maintenance

The Tower Lift hardware is fabricated from stainless steel and aluminum. These metals should remain functional for decades without worry. However, the three items below should be inspected annually:

1. The first items to check are the Parking Lock Ropes. On average, they should be replaced annually with a 3/16-inch diameter black polyester cord similar to the supplied Parking Lock Ropes shown in Section I.
2. Lubricate the Winch annually in both the parking brake area and the mast bearing area, where you see moving parts. Use spray-on motorcycle chain lube (with paraffin).
3. Finally, the bearings and surfaces of the rollers on all three Trams should be monitored periodically for degradation, and replaced when necessary.