



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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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-B and III-C 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-B 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
3. Ground attachments and turnbuckles for all guy lines
4. Messenger wire, attachment hardware, and spacers
5. Power drill for use with Winch
6. Two 2x4s, 2-feet long

Tower Lift Specifications

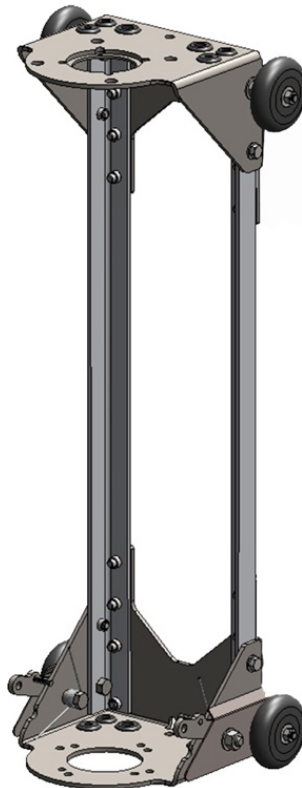
Maximum tower height	60 feet from Winch to Top Pulley
Shipping weight and size	69 lbs. in a 32" x 16" x 16" reinforced box
Maximum equipment weight	250 lbs. – antenna(s), rotator, mast, and thrust bearing
Lift cable	120 feet, 1/8" diameter, Type 316 stainless steel
Winch	Worm-gear type, 1500 lb. capacity, ¼" hex shaft
Maximum mast diameter	2.375" 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" diameter black polyester cord

Section I – Tower Lift - Components

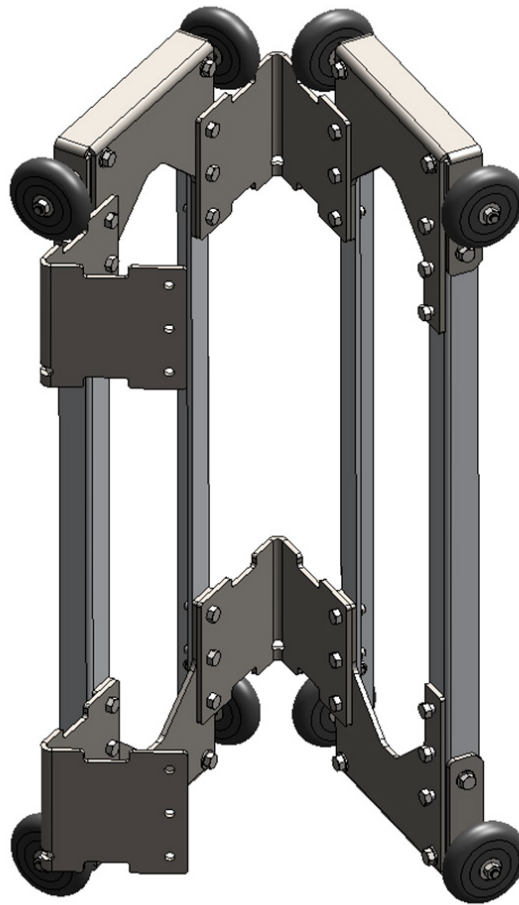
NOTE: The names of all supplied components are Capitalized throughout this Manual.

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 with Hardware

The six Tram Connectors are used to connect the three Trams together to form the Lift Carriage. Two Connectors are used, top and bottom, at each of the three Tram connections. Each Tram Connector uses six bolts, six nuts and six washers, three for each side of each Connector.

- Two of the six Tram Connectors come pre-attached to two Support Trams, joining them and creating the Support Trams Assembly.
- Two Tram Connectors are loosely attached to one side of the Support Trams Assembly for convenience, to be tightened into place during the Carriage Assembly process.
- The final two Tram Connectors come separately, with bolts and nuts loosely attached for convenience. They will be attached and tightened to the Trams Assembly and the Carriage Tram to complete the Carriage Assembly around the tower.

(See III-D. *Assemble the Carriage Around the Tower*, page 9.)

The Tram Connectors and all hardware are stainless steel.

3 Quick Links – ¼"



The three Quick Links are used to attach the top-level guy lines to the top of the Carriage, joining the end of each line to the slot at the bottom-center of each of the three Tram Connectors.

Winch Assembly, Lift Cable, Top Pulley Assembly



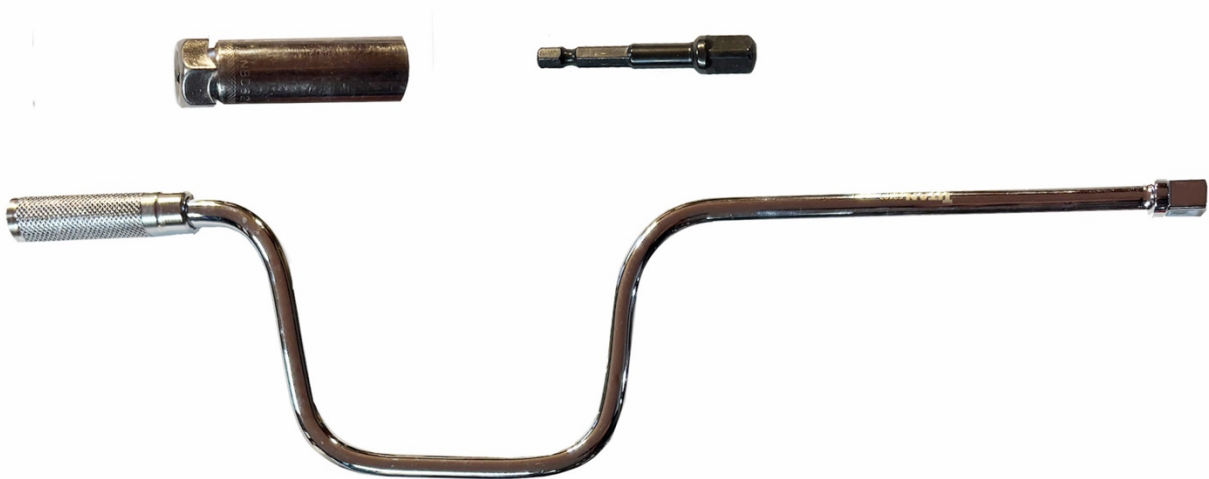
- The **Winch Assembly** consists of the worm-gear **Winch** and a pre-attached 13" x 6" **Mounting Plate**. (4) U-bolts are loosely attached to the Plate with (8) locknuts and (8) washers. The U-bolts will be separated and rejoined when the Winch is mounted to the tower. (See Section III-A. *Install the Winch Assembly on the Tower*, page 7.)
- The **Top Pulley Assembly** is the **Pulley** bolted to a **Rung Bracket**, pre-attached to the **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 also pre-threaded onto the loose end of the Lift Cable, just inside the Eye Bolt.

Parking Lock Rope – 120 feet; 3/16" 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" Deep-Well Socket, 3/8" Socket Adapter for power drill

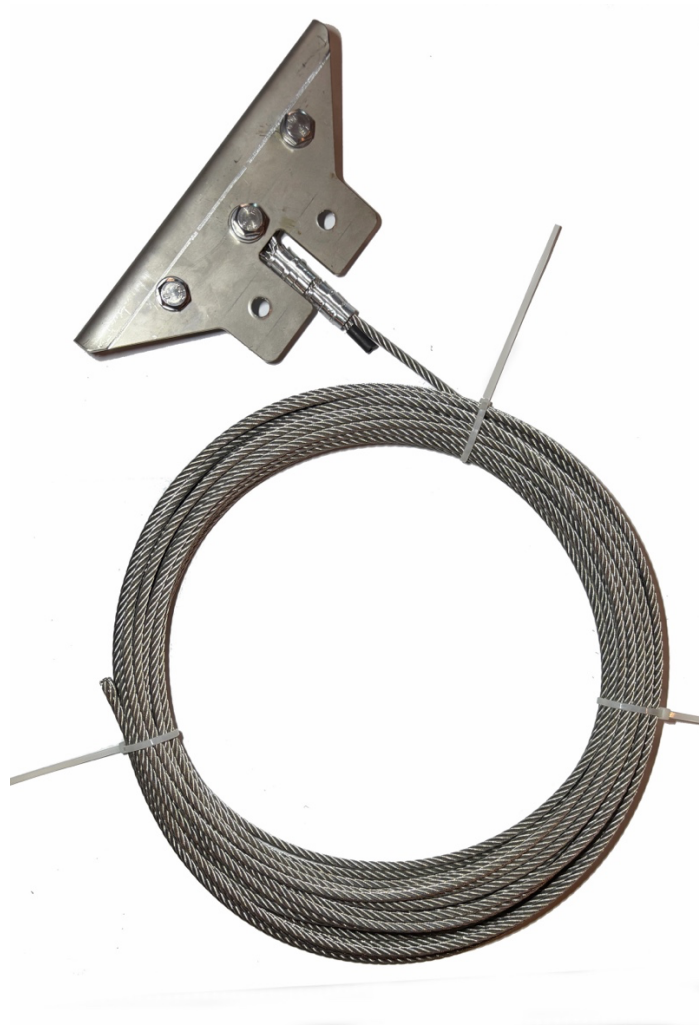


Anti-Seize Lubricant, 1-oz tube



- *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 each Guy Line to the length needed to reach and attach to the ground.)

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. 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.
4. **Do not enter the area directly under the Carrier Tram.**
5. Use gloves when handling the metal parts, as they may have sharp edges

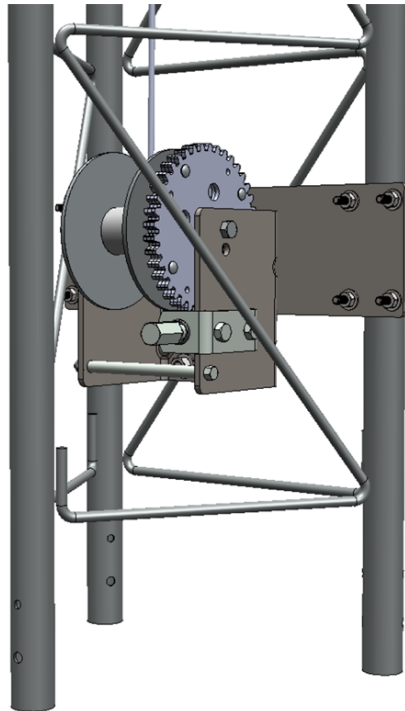
Section III – Lift Assembly & Installation

- *Use hand tools only to assemble and install the Lift. Do not use power tools. Use the provided Anti-Seize Lubricant on all threads to prevent galling.*

On the ground:

III-A. Install the Winch Assembly on the Tower

Now mount 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 that are loosely attached to the Mounting Plate to fasten and tighten the Winch Assembly 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 spool. From there the Cable feeds up and out from the front of the Winch. The other end of the Lift Cable is pre-affixed to an Eye Bolt (with threaded lock washer and locknut) which will attach to the top of the Carrier Tram.

The Top Pulley Assembly is also pre-threaded onto the loose end of the Lift Cable, just below the Eye Bolt. (The Lift Cable and Top Pulley Assembly will subsequently be pulled to the top of the tower. See Section III-C. *Install the Top Pulley Assembly and Lift Cable*, page 9.)

One last climb:

Now that the Winch and Lift Cable are installed at the base of the tower, it's time to install the Top Pulley Assembly and, if needed, the Mid-Level Guy Line Assemblies, on the tower rungs. 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 climbing and working on towers and who are fully compliant with tower-climbing safety rules and best practices.*

If mid-level guying is needed, install the Mid-Level Guy Line Assemblies on your way up the tower, before installing the Top Pulley Assembly.

If you do not need mid-level guying, skip this section and go to section III-C.

III-B. Install the Mid-Level Guy Line Assemblies (if needed)

The Mid-Level Guy Line Assemblies are specially designed to work with the Carlson Tower Lift.

If you are installing the Carlson Tower Lift together with a new 25G tower, you can attach the three Mid-Level Guy Line Assemblies as soon as you have brought them up to that level. 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.

- *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.

For each Assembly, carefully unscrew the three top bolts from the captive nuts in back plate. Note that unscrewing the center bolt also temporarily releases the looped-and-swaged 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 Line Assemblies are attached to the tower rungs, attach the other ends of the Guy Lines to the ground and tighten with the turnbuckles. Attach and tighten at the ground now – after the Mid-Level Assemblies are installed on the tower – rather than waiting until the full installation is completed, as this will make your climb to the top of the tower to install the Top Pulley Assembly more stable.

III-C. 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 and bolt the Rung Bracket on the Pulley Assembly onto 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 later 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.

Back on the ground:

III-D. Assemble the Carriage Around the Tower

Place the 2x4s on the horizontal rung just above the Winch, approximately four feet above the ground.

The 2x4s are placed at this working level to assist with Carriage assembly, and will remain at this level until the Carriage is fully loaded and starting its rise up the tower. (See Section III-H. *Raise the Carriage to the top of the tower*, page 13.)

First, attach the Lift Cable to the top of the Carrier Tram. 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.

Using the Speed Wrench on the Winch shaft, position the bottom of Carrier Tram a few inches above the 2x4s.

Now set the Support Trams Assembly on the 2x4s, up against the tower, opposite the Carrier Tram.

Place the side with the two loosely attached Tram Connectors around the tower leg, then tighten the six bolts on the Tram to secure it around the tower.

Now attach the remaining two Tram Connectors to the other side of the Support Trams Assembly.



Now, use the Speed Wrench on the Winch to position the Carrier Tram so that the holes at the top and bottom of its two side bars align precisely to the corresponding holes on the Tram Connectors you just bolted to the Support Trams Assembly. Tighten all 12 bolts.



The Carriage is now fully assembled.

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 the Yaesu GS-065 thrust bearing.

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 pattern might vary depending on the equipment configuration.

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

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

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.

Now attach the three Quick Links to the Tram Connectors at the top of the assembled Carriage. Connect the three upper-level guy lines to the three Quick Links.

III-G. Install a 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 attached, the Carriage is ready to be raised to the top of the tower for the first time. When the Carriage is raised past the 8-foot level, park it temporarily. Then remove the 2x4s from their lower level, and place them on tower rungs at the 7–8-foot level. (The lower 2x4s set-up will be deployed again whenever the installed Carriage is subsequently lowered for equipment servicing.)

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 secure and 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. Remove the 2x4s from the 8-foot level, and place them on lower tower rungs just above the Winch, as they were during Carriage assembly. (See Section III-D. *Assemble the Carriage Around the Tower*, page 9.)
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 each Guy Line 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 2x4s.

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.
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, 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 then be parked. 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.
 - *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 secure and 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" 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. The bearings and surfaces of the rollers on all three Trams should be monitored periodically for degradation, and replaced when necessary.