

This document will provide basic instructions on how to properly tension the wires that hold up the FEMC Forest Canopy Tower.

Recommended Maintenance Schedule:

The tower wires should be tensioned **twice a year**, once during the spring and once during the fall.

Required Equipment:

- 2 x People
- 2 x $\frac{3}{4}$ " Wrenches (Do not use the adjustable kind, you'll risk stripping the nuts)
- 2 wrenches of any other size to help spin the turn-buckles
- Grease/Lubricant to prevent nuts from getting stuck (we used Super Lube teflon spray)
- 2 x Tensiometer (Located in the tower shelter at the base of the tower. They should be located in two very antique/vintage looking wooden boxes.)

Tensioning Technique:

1. Each person should have one tensiometer, one $\frac{3}{4}$ " wrench, and one other wrench.
2. The cables should be tensioned in pairs, with one person on the cable on the down slope side and the other person on the upper slope. The cables at 1 and 2 should be done at the same time and the cables at 3 and 4 should be done at the same time (Figure 4).
3. Once each person is positioned at the correct cable base, they should see three cables, one at the bottom, middle, and top. Begin at the bottom cable and work your way up together. (Figure 5)
4. Begin by having each person attach their tensiometer to the cable near the base, but above where any excess cable slack is gathered and attached. The tensiometer should be positioned as shown in Figure 3, being sure the cable sits within the low point on the cable guides. To tighten the tensiometer to the cable, turn the twist-handle until the cable deflection indicator lines up with the deflection set point.
5. Let your partner know the reading of the tension indicator. The tension for the cables should be between **600 and 700 lbs**. If both cables fall within that range, they are good and should not be tensioned. Proceed to check the middle level and then top.
6. For any cables that are out of range. Use the $\frac{3}{4}$ wrench and Start by loosening to the two nuts located above and below the turnbuckle (Figure 1). If the nut will not spin and the turnbuckle does, brace the turnbuckle with the other wrench and try again.
7. Once the two lock-nuts have been loosened. Insert the wrench in the turnbuckle and rotate it to begin tightening or loosening the cables to the desired tension (Figure 2). *Note: Do not tighten lock-nuts until all cables have been adjusted to desired tension.*
8. Tensioning one corner will impact adjacent corners; work with your partner and adjust as needed.
9. Once you finish one pair of cables move onto the others and repeat steps 1-8.



Figure 1. Loosening the lock-nuts above and below the turnbuckle.



Figure 2. Tensioning the wire by rotating the turnbuckle, using the wrench for leverage.

Last Updated: 05/20/2019

10. Make sure to check tension of all cables after adjustments to make sure they are all within the acceptable range. Working on adjacent corners (1 and 2, 2 and 3, 3 and 4, 4 and 1) work your way around the cable base checking that all wires are tensioned to the appropriate range.
11. Once cables have been checked, apply grease/lubricant to all of the lock-nuts that have been loosened and begin tightening the lock nuts.
12. Make sure that tensiometers are left out to dry before storing them away in their cases. Pat them dry with a paper towel and leave on top of case for a day before storing away in case.

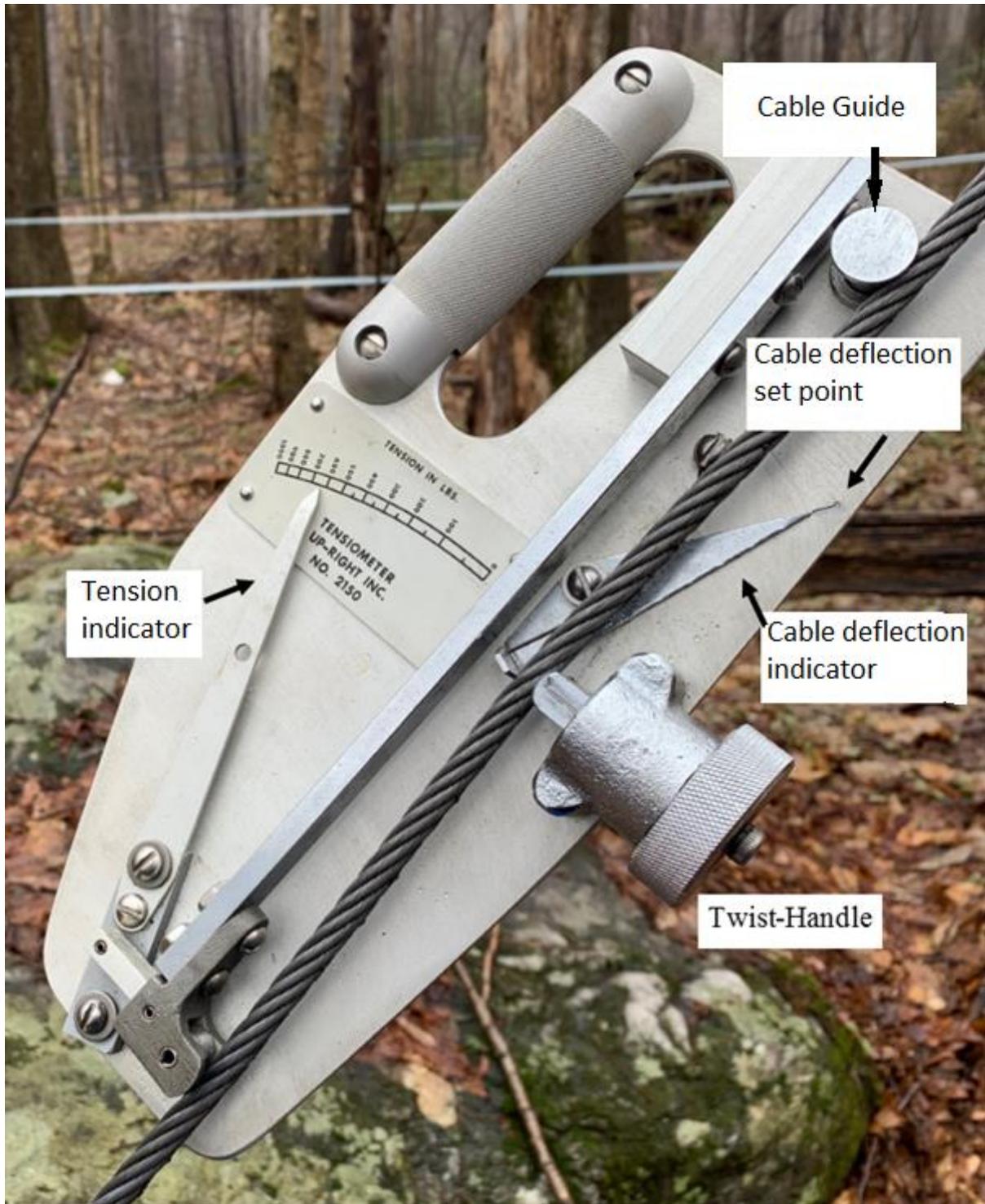


Figure 3. Tensiometer used to measure the tensions in the cables that support the forest canopy tower.

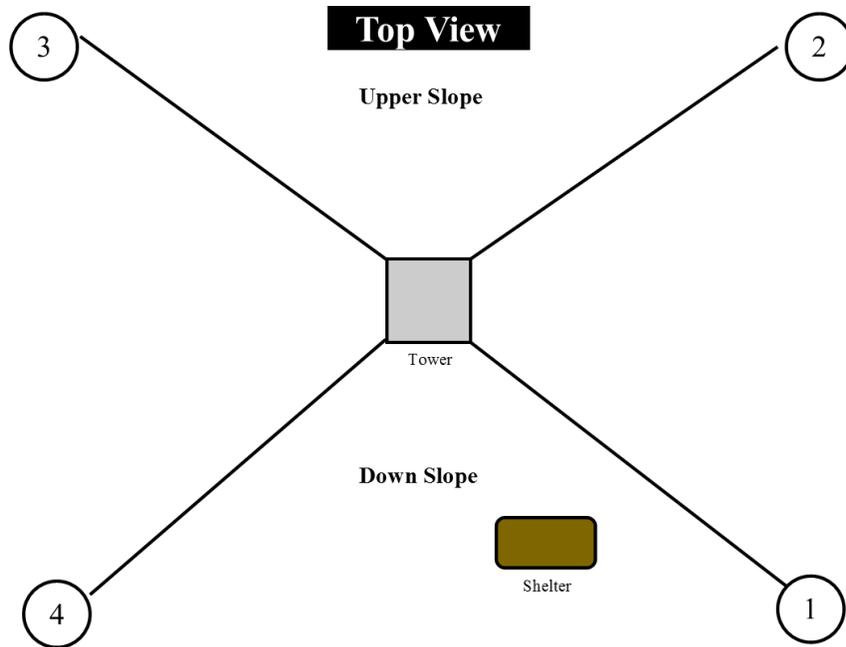


Figure 4. Top view of the forest canopy tower. This view shows the four cable bases.

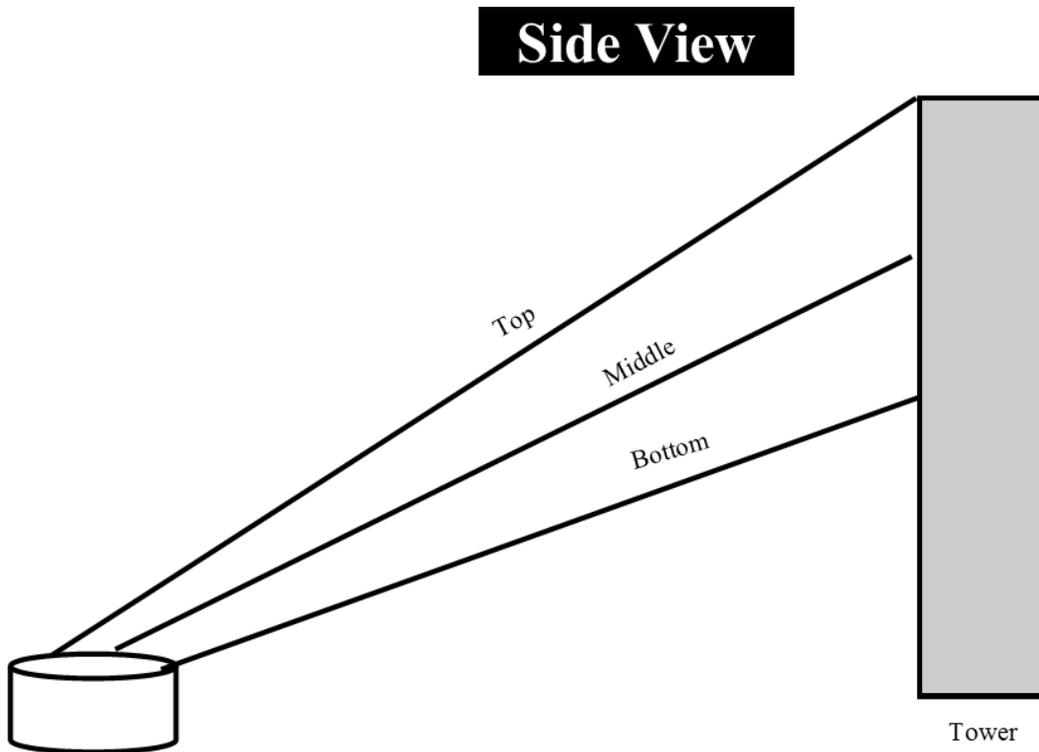


Figure 5. Side View of the forest canopy tower. This view shows the 3 distinct levels of cabling that are at each of the cable bases.