

Routine Tower Inspection Report



90' Tower Mount Wachusett Princeton, MA

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Routine Inspection: Historically, antenna towers in the NAE portfolio have not been routinely inspected on a set interval. A routine inspection was performed on June 22, 2018 by Adam Stewart of the NAE Structural Engineering Section. The intent of this effort is to establish a routine inspection cycle consistent with industry standards.

Dates of Previous Inspections: 11 October 2011

Tower Description and History

The tower is a self-supporting, galvanized steel lattice structure with three legs, which are numbered as shown in *Figure 1*. The date of construction of the tower is unknown and there is no known set of plans for the tower. All tower components appear to be galvanized steel painted with alternating white and orange sections.

The tower is comprised of nine sections, each 10' high for an estimated total height of 90'. The sections are bolted to each other with four bolts (see Photo 1). The bracing members are bolted to plates welded to the pipe legs for Sections 1 through 4 (see Photo 2). For Section 5-9, there are 5/8" and 3/8" bars welded to the pipe legs (see Photo 3).

The tower legs are composed of 2" diameter pipe with an estimated pipe wall thickness at the base of 1/8". Tower leg wall thickness at other sections is unknown. The tower leg diameter changes to 1%" at Section 6 and may go to 1" diam. at Section 9.

Each leg is anchored to a 16" square concrete base with four 5/8" diameter bolts (see Photo 4).

The tower was fully repainted in September of 2013.

Critical Findings

None.

Evaluation

A. Foundation

Each tower leg is securely connected to its respective concrete foundation (see Photo 4) and the concrete is in good condition. The area around the tower base has been cleared since the last inspection and a fence with locking gate installed for security (see Photo 5).

B. Superstructure

The superstructure coating system is in good condition, with only small areas of minor deterioration (see Photo 6). All cross bracing members are tightly attached and in good condition. All observed connections

between tower sections were tight and showed no signs of movement or distress. No significant displacement, misalignment, or torsion of the structure was observed. The lower connection of the tower ladder is loose, allowing latter to rotate side to side when in use (see Photo 7)

C. Guy-Wires

Not Applicable

D. Signal and Electrical

The 90ft tower has numerous whip antennas of various size. The majority of the antennas are securely attached, with larger antennas being secured at both the base and top (see Photo 8). One large whip antenna is cantilevered off the structure by approximately 6ft, and only attached at the base (see Photo 9). Mounting hardware is insufficient for the loads created by such a large cantilever and has torsionally racked under the load of the antenna (see Photo 10 and Photo 11). Project staff stated that this antenna is not Corps equipment and belongs to one of the other tower tenants.

No significant electrical deficiencies were observed, but a full assessment of the electrical and lightening protection systems is outside the scope of this inspection.

Overall Condition Rating

Routine, 2011	Good
Routine, 2018	Good

Previous Recommendations

A. Mission Critical and Safety

None

- B. Budgetary
 - 1. If no tower as-built drawings are found, then it is recommended that a thorough assessment be accomplished to ascertain the towers overall dimensions, panel heights, member dimensions and other physical characteristics.

Status: INCOMPLETE

2. Paint the tower. Engineering-Planning Division should develop Plans and Specifications for this project. Use FAA approved standard colors.

Status: COMPLETE

3. Install a device to prevent access to the ladder by civilian personnel. The summit of Mount Wachusett is presently being developed by Massachusetts DCR to provide further amenities and attracts many tourists and hikers. The USACE tower's lack of security should be addressed as soon as possible.

Status: COMPLETE

- Although no distortion was visually evident, a survey of the tower's alignment and twist to see if it is within industry accepted tolerances for this type and height of tower, should be performed. Status: INCOMPLETE, RECINDED
- C. Normal Maintenance

1. Remove all vegetation (rhododendron bush) from the base of the tower and clear mulch and soil from around each of the tower anchor bases.

Status: COMPLETE

2. Inventory each of the antennas presently occupying this NAE tower to identify current users and to facilitate future maintenance considerations.

Status: INCOMPLETE





Figure 1 - Tower Leg Numbering

PHOTOS



Photo 1 – Typical connection between tower sections



Photo 2 - Typical bracing connection for Sections 1 through 4



Photo 3 - Typical bracing connection for Sections 5 through 9



Photo 4 – Typical tower foundation connection



Photo 5 - Base of tower secured by fence with locking gate



Photo 6 - Typical condition of coating system



Photo 7 - Loose ladder connection at base



Photo 8 - Larger antenna secured at both ends



Photo 9 - Large cantilevered antenna without top support



Photo 10 - Cantilevered antenna viewed from below showing misalignment and deflection due to load



Photo 11 - Cantilevered antenna viewed from tower showing misalignment and deflection due to load