

Planning Advisory Notice

FAA Aviation Obstruction Lighting (“Tower Lighting”)

Very few facets of tower ownership pose the liability to the tower owner that improper lighting, marking, and monitoring do. In Order 13-30 released March 1, 2013, the FCC states, “An aviation accident attributable to an air obstacle occurs every twelve days on average. More than ninety-five percent of those accidents are related to wires, utility poles, or static lines, and eighty-five percent of them occur during the day.” Wrongful death or serious injury lawsuits and settlements associated with aircraft impacts to tower structures are commonly in the seven figure range.

FCC fines for improper lighting, marking, and monitoring normally vary from \$10,000 to \$30,000 depending on the severity of the infraction. In the average year, the FCC may assess over \$300,000 in fines for these violations. In addition this can be a public relations issue for the tower owner to manage which has un-assignable costs to the owner through damage to reputation.

Publicly owned corporations may experience a loss of stock value due to investor concerns of overall compliance. For the site manager or corporate compliance officer, the result can be career ending.

The tower erector and/or tower lighting service company may also be at risk of litigation from the structure owner. “Flow down” lawsuits are perceived as a possible avenue to shift responsibility and blame. It is important to understand that the majority of tower owners hire contractors who through the Master Service Agreement, are stating that they are experienced with the marking and lighting requirements.

A quick look at the rules: In CFR Title 47, Subpart C, the FCC names the FAA as the department responsible for creating and maintaining the regulations that govern the manner in which structures may be lighted, marked, and monitored. The FAA, however, has no authority to assess fines or other actions as does the FCC. In short, the FAA makes the rules and the FCC is the enforcer. Monitoring requirements are an exception; both branches have requirements for monitoring structure lighting.

Lighting and Marking

With no intentional disregard to other FAA Advisory Circulars (AC’s), the AC of primary importance addressing structure lighting, marking, and

Initial PAN advisory group members are Dave Anthony, President of Shenandoah Tower Service, Ltd.; John Erichsen, Principal EET PE, Chairman TIA Committee TR14; Scott Kisting, Vice President of MUTI-Sabre Industries Telecom Services; Stephanie Brewer, Compliance Coordinator, MUTI-Sabre Industries Telecom Services; and Dale Heath, Product Line Manager of CommScope.



monitoring is the current (as of this writing) AC 70/7460-1K Chg 2 "Obstruction Marking and Lighting" which details the proper lighting configurations and paint schemes for most structure types by height above ground level (AGL) and other variables. Chapters from the "7460" are normally referenced when the FAA issues a determination for a structure. Appendix 1 in the 7460 illustrates the different types of lighting configurations by letter code. For example, Chapters 4 and 12 are usually referenced for monitoring and overall lighting/marketing regulation purposes. A determination referencing Chapters 4, 8, and 12 would indicate a medium intensity dual ("E") system. Chapters 3, 4, 5, and 12 would indicate a determination for red lighting at night and paint for day ("A"). Chapters 4, 6, and 12 indicate medium intensity 24-hour white ("D") lighting is to be used. The same method of chapter reference would be used for "B", "C", and "F" configurations, associating Appendix 1 with the overall height of the tower AGL to determine the number of light levels and lights/types required at each level.

The Migratory Bird Ruling

The FCC's Order on Remand effective June 18, 2012 included considerations for impacts to towers by migratory birds. One positive note from this order offers owners of towers over 350' AGL the opportunity to omit all levels of L-810 "side marker" lights in A, E, and F configurations provided the red L-864 lighting

synchronized flash rate is between 27 and 33 flashes per minute (FPM) and the light output of the beacons remains within the allowable range of 2,000 candela +/- 25%. Considering the maintenance requirement for these lights, this is a very attractive option for many tower owners. A1 and E1 configurations filed under this stipulation must synchronize and flash the



Picture 1: Beacon nested within panel antennas creating an unsafe, obstructed view. Not only is this tower owner subject to a Notice of Violation and forfeiture, the window of liability exposure is wide open if an aircraft incident occurs.

L-810 markers with the L-864 beacons, meaning little gain for the tower owner. Tower owners must request this configuration at filing. *NOTE: Existing towers must be re-filed with the FCC along with the required request form prior to eliminating the L-810 marker light levels.*

Common Lighting Installation/Maintenance Mistakes

- **Obstructed View** - Possibly the most common error is to mount tower lighting inside an array of

continued on next page

panel antennas, or to add antennas to an existing structure and obstruct the view of the tower lighting. Unobstructed view is iterated throughout the AC 70/7460-1K Chg 2. The top beacon on the tower must not be obstructed or a second beacon must be added (see Picture 1). Lower level beacons and markers must exhibit a 360 degree unobstructed view (see Pictures 2, 3). Failure to follow this procedure creates an unsafe condition.

- **Leveling** - Since the FAA requirements in AC 150/5345-43G dictate beam path, tower lighting is directional. The lighting must be installed in a level, upright manner to ensure proper visibility.
- **Top Beacon Placement** - While the AC 70/7460-1K Chg 2 allows a 10' buffer in positioning lower levels of lighting, the top beacon must be mounted on the tower top unless the beacon cannot be

other appurtenance on the structure and a second beacon may be added at the same level to provide unobstructed view.

High Intensity lighting systems normally used on towers over 500' AGL in height may require a medium intensity Antenna Obstruction Light (AOL) atop a broadcast antenna, provided this appurtenance extends 40' or more above the main structure (top of tower steel).

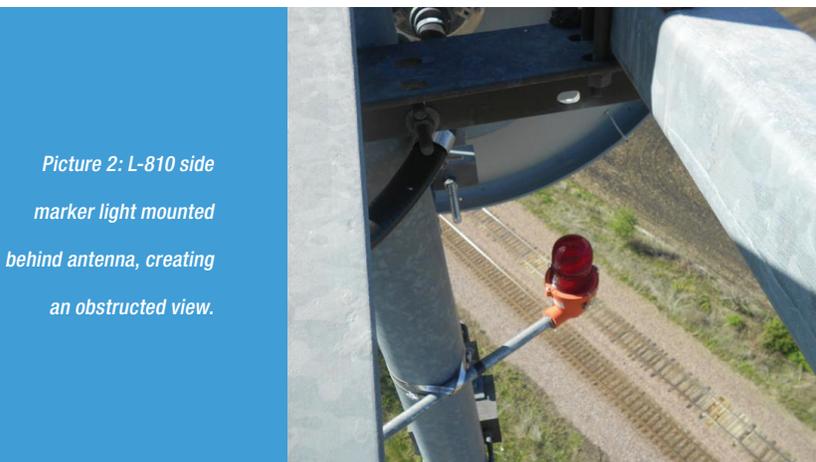
- **Cable Attachment** - Simple steel band clamps are not designed to support cable and should never be used for this purpose.

Maintenance

Many times maintenance is overlooked on lighting systems. This is normally the most expensive method of maintenance considering a mobilization fee and mileage charge is often included with each separate service call. As one owner put it, this method is very similar to calling a landscaper to mow a different section of your yard every day.

Respected tower lighting service companies can often save tower owners substantial expenditures (and headaches) through a long-term maintenance plan. PMs (Preventative Maintenance) by qualified service companies will not only include necessary repairs, but replacement of parts that are at the end of their life cycle. A full inspection of the system and, when applicable, the orange and white paint bands with full documentation should include a list of parts replaced and photographs of the system components. It is important to understand replacement of the lamps or tubes in the lights is not the only consideration. Cracked lenses must be addressed (see picture 4). The FCC requires an annual inspection

supported by a top appurtenance. For example, the beacon can be mounted on a pole (the pole should be designed for this intent and certified to the TIA-222-G addendum II specification) and raised above an array of panel antennas. If raising the beacon would prohibit future inspection and maintenance, the beacon may be lowered to a maximum of 10' below the top of any antenna or



Picture 2: L-810 side marker light mounted behind antenna, creating an obstructed view.

continued on page 68



Picture 3: The FCC will allow an adjustment in the placement of an antenna with the proper filing, or the FAA (see AC70/7460-1K Chg 2) allows an adjustment in the placement of the lighting tiers by up to 10'. It is critical to understand that this is a 10' measurement from ground level, not to the base of the tower. Counting tower sections is not a safe means of measurement. All lighting must have an unobstructed view.

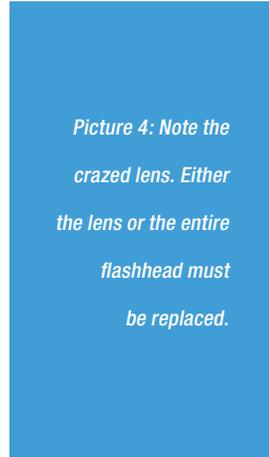
and cleaning of lenses on the lighting system at the tier levels. Crazed lenses (damage from UV rays and other sources creates tiny cracks in the lens that inhibit the output of the light) must be replaced.

Lighting Inspection

The FCC may, upon application and successful investigation, allow tower owners who use automated monitoring systems that meet or exceed all minimum requirements to perform the inspection on an annual basis rather than on three month intervals. Contact your district FCC office or see www.FCC.gov for more information.

Monitoring

Tower light monitoring is referenced in many areas of the FCC and FAA regulations. Lighting can be monitored by either visual or automated means, but



Picture 4: Note the crazed lens. Either the lens or the entire flashhead must be replaced.

thorough documentation and recording is required in either case. Good tower monitoring practices are the basis for safety of air traffic flying near the tower and reduction of liability exposure. In the interest of brevity, we will only list a few points of reference from the regulations herein:

- 1) FCC CFR Title 47, 17.47: Describes FCC monitoring requirements such as checking the lighting system status every 24 hours and inspection of the automated alarm reporting system every 3 months.
- 2) FCC CFR Title 47, 17.48: Defines the time parameters for reporting light outages.
- 3) FCC CFR Title 47, 17.49: Details the requirements for records of tower light monitoring, outages, and repairs.
- 4) FAA AC70/7460-1K Chg 2, Chapter 2 Paragraph 23: States FAA monitoring requirements (*NOTE: The fine print notes at the bottom of the pages contain important information. Read thoroughly.*)
- 5) FAA AC150/5345-43G, Section 3, 3.3.5.1.1: Describes alarm conditions such as missed flashes and wrong intensity. ■