

Cellular Antenna Installation on Water Storage Tanks

by

TANK INDUSTRY CONSULTANTS

4783 Dorsey Hall Drive, Suite 120
Ellicott City, Maryland 21042

Have you been contacted yet by one of the cellular phone carriers in your area? No, not to try to sell you cellular phone service--but to try to lease space on your water tower to install their antennas. If you haven't been contacted yet--don't worry--it's most likely just a matter of time before they'll be in touch. Chances are you may already have antennas attached to your tank. If you do, this could be good--or it could also be bad. Cellular antennas on water towers can be a great source of revenue for you, the local water utility. TIC is aware of cellular phone companies who are currently paying anywhere from \$2,400 to \$62,000 per year for the privilege of renting space on water towers. On the other hand, if the antenna and attachments are not properly designed and installed, the operation and maintenance of your water tank can be severely hampered.

While the advantage to the water utility of having antennas installed on a water tank is primarily financial, cellular companies have several reasons for wanting to rent space on your water tower. With increasing NIMBY (Not In My Back Yard!!) concerns, cellular carriers are looking for existing structures to attach antennas to rather than building their own towers. This option also saves them money in land acquisition and tower construction costs, as well as future maintenance costs. Also, zoning restrictions may not allow the construction of cellular antennas. Some utilities are constructing new tanks with the intent of providing access and points of attachment for initial or future antenna installation and service. However, as with everything else in life, there is a right way and a wrong way to do it, and a poor cellular antenna installation can create problems for the tank owner which can easily outweigh the financial advantages they provide.

At TIC, we evaluate hundreds of tanks each year, and some of the typical problems we encounter

when antennas have been installed improperly include:

- Openings cut in the roof compromise the sanitary integrity of the tank and contents.
- Cables improperly mounted to tank ladders and across access openings create OSHA and safety-related deficiencies.
- Antenna cables lying across the balcony floor make access nearly impossible and create severe trip hazards.
- Cables, mounting devices, and the antennas themselves can hamper access to vents and manholes.
- Antenna brackets mounted on the balcony floor can prevent access around the tank.

In addition to the sanitary and safety deficiencies caused by improper antenna installation, there are also problems created which can impede or prevent future maintenance of the tank. These problems include:

- Improper (or unperformed) touch-up painting after the antenna is installed can lead to premature coating failure on the interior and exterior of the tank.
- Cables, antennas, and mounting devices placed too close to the tank and its appurtenances can make it difficult, in not impossible, to clean and paint behind the cables.
- There are also structural problems that can be caused by antenna installation.
- Improper cable penetrations can cause damage to your tank.
- Improperly mounted brackets or antennas can create a potential liability should high winds, ice loading, seismic activity, or other similar events cause the installation to fail, damaging the tank or surrounding property.
- Unistruts screwed directly into tubular columns can pierce the steel, allowing oxygen and moisture inside the column, thus promoting undetected corrosion from within the column.

- Improperly designed brackets can buckle the tank during high winds.

Most cellular companies have installations designed by their own engineers or consultants. However, our experience is that most designers and installation contractors have little experience with water tank design and even less experience in water tank maintenance. Therefore, simple items to prolong the life of the coating system or avoid potential sanitary, structural, or safety problems are often overlooked. While we're not suggesting that you take over the design responsibilities, it is prudent to have all plans, designs, and drawings reviewed by an independent third party whose only interest is protecting the water tank owner and who understands tank maintenance and design. The following list contains some of the more important items that should be checked for in the plans and designs installation of the antenna:

- All work must be properly scheduled, for example touch-up painting should be performed after installation (don't forget that the interior coating will also typically be damaged due to welding operations on the tank exterior).
- Tank penetration and reinforcement requirements must be adhered to.
- The size and location of cable support and mounting brackets should be reviewed.
- Welding requirements, procedures, and acceptance criteria should be clearly stated.
- The location and placement of cables should be verified to prevent safety or personnel hazards.
- The location and placement of cables and antenna should be designed to reduce interference with future cleaning and painting operations.
- The procedures for surface preparation and touch-up painting of damaged areas (inside and out) should be stipulated.
- Pertinent industry standards should be adhered to in completing all work.

Additionally, you should require site visits by the designer of record. Ideally, you would want periodic site visits to verify the work is being properly performed throughout the installation. Typical items requiring evaluation should include the proper installation of the antennas, brackets, and related conduit; removal of weld spatter; proper

surface preparation and coating application; and quality of welds. At a minimum, a final site visit needs to be performed to check the installed product against the plans and drawings.

With any type of investment of this nature, a contractual relationship will be required between the Cellular Phone Company and the Water Tank Owner. While TIC has no lawyers on staff and the intent of this paper is not to present legal issues, there are several contractual items that should be addressed. (Note: qualified legal advice and direction should be obtained prior to entering into this type of contract.) These items include:

What happens when the tank is maintained?

- Do the antennas remain? This requires the tank painters to work around the antennas, including their containment systems, increasing tank maintenance costs significantly.
- What happens if the antennas or their cables are damaged during the painting work?
- Would the Tank Owner be responsible not only for repair to the Cellular Phone Company's equipment, but also for lost revenues?
- Would the Tank Owner be responsible for the costs associated with a temporary cell site?

What are the aesthetic requirements for the antennas?

What parties are responsible for damage that result from acts of God?

What party is responsible for on-site safety and what party is responsible if the tank ladders, platforms, balconies, etc. do not comply with OSHA and there is an accident?

What amount of accessibility to the tank and tank site is afforded the antenna owner?

Where on-site and what type of building is going to be constructed for the call switching?

If the antennas project above the top of the tank, what party is responsible for filing the appropriate FAA forms to obtain the required approval?

What party is responsible to verify and analyze the structural integrity of the tank and antennas?

What if the Owner decides the tank is not needed prior to the end of the contract?

What happens if another cellular carrier wants to put antennas on the tank?

Will the design of the antenna brackets accommodate more than one carrier, or will it limit the number of carriers on the tank?

The goal of a proper antenna installation is to make sure that the financial benefits outweigh the problems created by the installation of the antennas on your tower. Allowing cellular antennas to be mounted on your water tower can be a win-win situation, providing the installation is properly performed. The Tank Owner receives the benefit of additional revenues, and the cellular companies get a low initial cost, minimal maintenance location to mount their antennas.