

Ins & Outs of Water Storage Tanks

When asked to describe his favorite project, Chad Harrington, E.I.T. in the Municipal Water Group at Larkin Group, Inc. ponders the many hours of floating in a half-filled water tank taking pictures and writing down notes, all the while trying to keep balanced on the raft that holds him above the water's surface. Then he thoughtfully answers, *"it is interesting floating around the interior of a tank documenting its condition."* Chad should know he has recently been working with the City of Lee's Summit on the rehabilitation of two 5.5-million gallon storage tanks. The project is near completion just in time for the spring thaw.

A valuable asset to any community is the delivery of a safe water supply. Water storage tanks are the components relied upon to maintain supply while keeping pressures during peak demand periods.

"Maintenance of storage tanks is an important component of water system asset management. Operators appreciate our help in identifying potential problems before they become system emergencies."

**Tony O'Malley, P.E. Principal
Municipal Water**

If a tank fails, whether by structural or operational issues, the community loses the ability to maintain an adequate water supply for drinking water and fire protection. Tony O'Malley, P.E., Principal of the Municipal Water group at Larkin Group says *"Maintenance of storage tanks is an important component of water system asset management. Operators appreciate our help in identifying potential problems before they become system emergencies."*



Chipman Road (High Service) Ground Storage Tank

For over 60 years of its proud history, Larkin Group, Inc. has provided services to communities and public water supply systems to maintain their water systems' valuable assets. Key services Larkin staff provides include tank evaluations, surface preparation and design, coating application observation services, and warranty inspections.

Evaluation services are provided to determine if an existing tank is in need of repair or modifications. Larkin's staff has specialized field experience with construction administration and observation services which enables them to detect deficiencies in a tank's structure and its operations. The evaluation includes a visit to the site to document the condition of each storage tank. The visit involves an interior and exterior examination of the structure. An interior inspection can take several hours and requires sanitized clothing, such as a wet suit to be worn. Any equipment such as a camera, flashlight, gas detector, and a raft must also be treated before coming in contact with the interior of a tank. An exterior inspection requires the use of safety harnesses to safely climb the ladder on the outside of each tank. Using photographs, laboratory analysis of paint samples, adhesion tests, and written notes an evaluated report is developed which describes deficiencies and outlines Larkin's recommendations for repairs or modifications. The report typically includes estimated costs for all options presented.



Bowlin Road Ground Storage Tank

Recommendations may include, but are not limited to, repair of cracked welded seams, removal of rust stains, structural member replacement, caulking, and sandblast preparation, or power tool preparation, followed by re-coating. Once the repairs or modifications are complete the storage tank is then painted. This is the point where Larkin's "hands-on" experience truly benefits our clients. Larkin provides preparation and paint observation services to ensure a successful project. Inspection includes checking for:

- Lead and chromium levels in existing coatings that may require containment
- Testing for environmental conditions before coating application
- Dry film thickness after coating and curing per manufacturer's specifications
- Holiday testing of interior surfaces to eliminate pin holes

Larkin is typically on site when construction begins. Before any painting can be started, the contractor must properly prepare the steel surfaces by sandblasting. Periodically during sandblasting, Larkin's staff will take what they term to be "environmentals", which are samples of:

- Air temperature (wet/dry)
- Determine dew point
- Relative humidity
- Steel surface temperature

The environmental tests are also taken before the start of painting session. Another procedure to ensure a uniform paint coating called Holiday Test is performed.



Holidays are pin holes or voids formed in the paint on metal surfaces. If the top coat has not properly covered the metal, it can easily be detected by Holiday Testing.

Holiday testing uses a wet sponge attached to a low-voltage regulator. Wiping the sponge across the tank surface, the wet sponge comes in contact with the metal. If there are any imperfections in the finish coat surface, the tester will send out an audible tone. When imperfections are detected, Larkin's staff will mark them so the paint contractor can properly refinish the surface.

During construction of a new tank, an additional test is performed by a hired subcontractor to determine the integrity of seam welds. This test is called a radiographic examination. Using radiograph equipment and a qualified radiographer, a representative amount of welds are x-ray tested to determine if there are any voids or lack of penetration. John Oelklaus, a 41-year veteran of the Municipal Water Group at Larkin Group, Inc. explains *"I've seen radiographers use hand-held metal plates which lay flat up against a tank's side to take x-rays of the seams. When you look at the display screen of an x-ray, you can see right where a joint does not meet even though it may not be apparent to the naked eye."*





With this method, the radiographer can detect cracks, imperfect welding seams, and improper penetration by a weld in a butt joint. The imperfections must be re-welded and tested again before the storage tank is considered substantially complete.

Whether a newly constructed or rehabilitated tank, once the paint has cured, the tank is disinfected and placed back into operation as quickly as possible. The inside water level is restored to specified operating levels and the system pressure returns to normal.

If you would like to receive more information about this project and our services, contact us at 816-361-0440 or visit our website at www.larkin-grp.com.



LARKIN GROUP INC.

Consulting Engineers
9200 Ward Parkway, Ste. 400
Kansas City, MO 64114
Ph. 816-361-0440

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