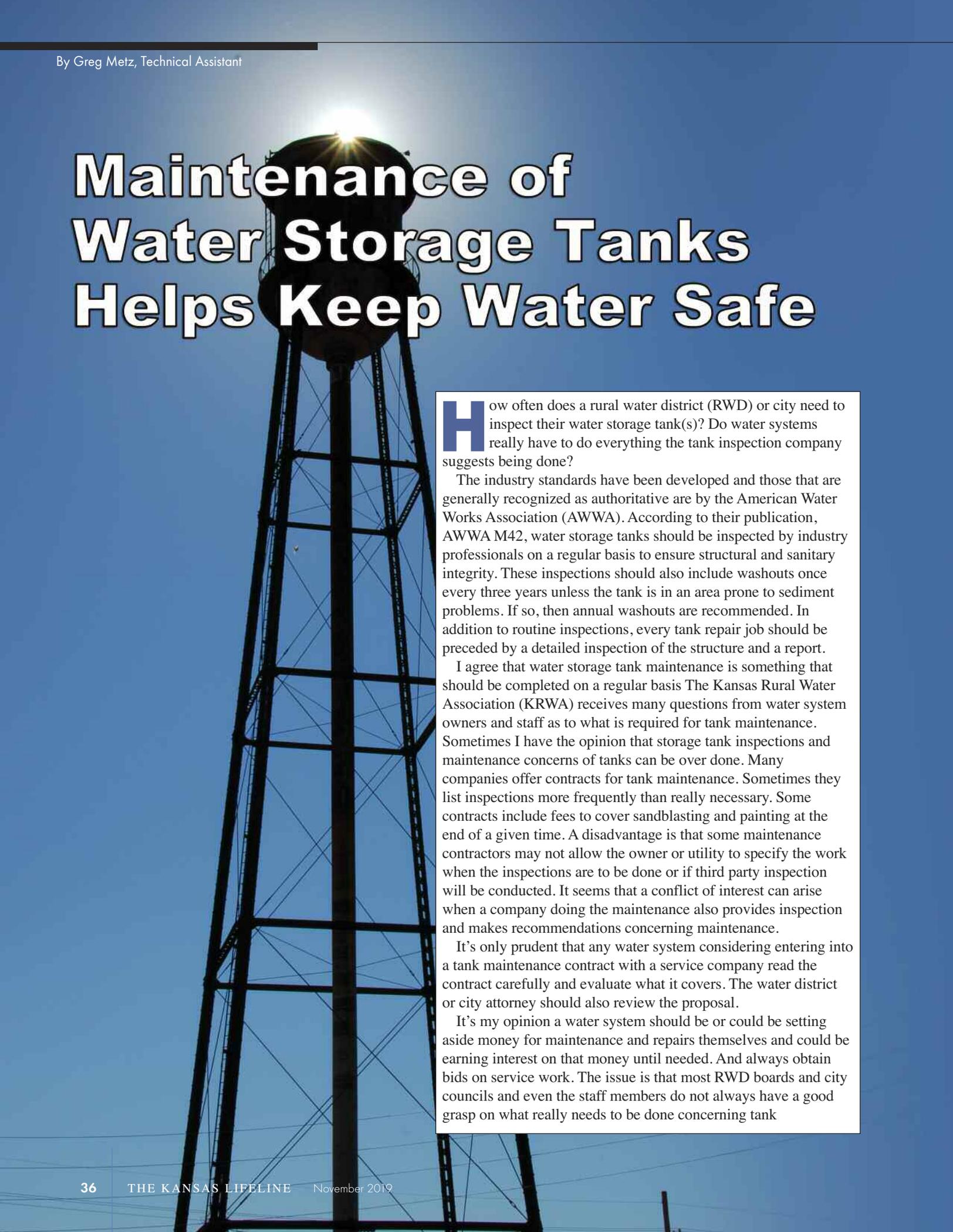


# Maintenance of Water Storage Tanks Helps Keep Water Safe



**H**ow often does a rural water district (RWD) or city need to inspect their water storage tank(s)? Do water systems really have to do everything the tank inspection company suggests being done?

The industry standards have been developed and those that are generally recognized as authoritative are by the American Water Works Association (AWWA). According to their publication, AWWA M42, water storage tanks should be inspected by industry professionals on a regular basis to ensure structural and sanitary integrity. These inspections should also include washouts once every three years unless the tank is in an area prone to sediment problems. If so, then annual washouts are recommended. In addition to routine inspections, every tank repair job should be preceded by a detailed inspection of the structure and a report.

I agree that water storage tank maintenance is something that should be completed on a regular basis. The Kansas Rural Water Association (KRWA) receives many questions from water system owners and staff as to what is required for tank maintenance. Sometimes I have the opinion that storage tank inspections and maintenance concerns of tanks can be over done. Many companies offer contracts for tank maintenance. Sometimes they list inspections more frequently than really necessary. Some contracts include fees to cover sandblasting and painting at the end of a given time. A disadvantage is that some maintenance contractors may not allow the owner or utility to specify the work when the inspections are to be done or if third party inspection will be conducted. It seems that a conflict of interest can arise when a company doing the maintenance also provides inspection and makes recommendations concerning maintenance.

It's only prudent that any water system considering entering into a tank maintenance contract with a service company read the contract carefully and evaluate what it covers. The water district or city attorney should also review the proposal.

It's my opinion a water system should be or could be setting aside money for maintenance and repairs themselves and could be earning interest on that money until needed. And always obtain bids on service work. The issue is that most RWD boards and city councils and even the staff members do not always have a good grasp on what really needs to be done concerning tank

maintenance. Service contracts for maintenance can be good for a system and some can suggest be much more than what is needed. Every water system is different.

### The KDHE sanitary survey

The Kansas Department of Health and Environment (KDHE) recommends inspecting water storage tanks every three to five years. KDHE inspects water systems every three years; that inspection is referred to as a sanitary survey. The KDHE sanitary survey considers health and safety issues associated with water storage tanks. An example is to check the vents and overflows which should be screened or covered to prevent birds or other varmints to enter the tank. Several dead birds were recently found in a tank for a system that I visited. The aesthetic aspects of the tank are also reviewed by KDHE including paint systems, potential for vandalism or other structural concerns. There have been tanks that had bullet holes resulting in leaks. Sometimes KDHE will review the tank maintenance reports if they see something of concern.

Tank maintenance companies will also provide reports about ladders, fall protection and safety prevention. These rules are not regulated by KDHE but by EPA, KS Dept. of Labor, and insurance companies. Requirements for confined space hazards and fall protection must be followed at all times by any company doing this kind of work. KRWA holds training classes across the state that cover all the regulations for confined space entry, fall protection, trenching and shoring. It is not required for a water system to install a fall protection system on the ladder of a water storage tank but it is a nice feature for safety. As far as locks and covers on ladders to prevent outside persons from climbing the tank, that's just a good idea and usually is driven by a safety factor and insurance company recommendation. An insurance company may not offer insurance if the ladder and tank are not secured adequately to prevent unwanted persons tampering with or climbing the tank.

There are basically two options for tank inspections: 1) dry and wet. "Dry" is just as it sounds. All water is removed from the tank and qualified inspection personnel enter the tank and conduct the internal inspection in accordance with AWWA guidelines. Depending on the water source, this method will require the wasting of at least some of the water and may include an expense associated with refilling the tank. A "wet" inspection is conducted when a diver enters the tank. The benefit is not having to drain the tank. Both methods fully meet AWWA inspection requirements. If using divers, make sure they follow all disinfection procedures. I like the dry inspection better because I think it provides a better inspection and cleaning.

**Stratification seems to be more of a problem in smaller systems that have low usage. In some cases, poor design has resulted in water levels not being allowed to fluctuate.**

### Stratification

Another issue associated with water storage tanks is the potential stratification of the water. Circulation is a key to minimize stratification and freezing in the tank. The majority of water storage tanks are what we refer to as "last in – first out" design, meaning when the tank is filling the water enters through the same pipeline at the bottom of the tank as the water leaving the tank. When the pumping rate is more than the usage rate the water level rises in the tank. If the

usage is equal or greater than the pumping rate there is no or little circulation and the water at the top of the tank can stratify. There is a way to prove this, simply by taking temperature readings of the water at various levels in the tank. I'm certain someone has conducted such studies but that topic is for another time. Stratification seems to be more of a problem in smaller systems that have low usage. In some cases, poor design has resulted in water levels not being allowed to fluctuate. Tank levels can be and should be adjusted to produce adequate circulation within the tank. New technology has allowed tanks to have "first in – last out" design which means the water entering the tank is pumped in at the top of the tank. This creates better circulation in the tank resulting in both reduced stratification and helping reduce problems with freezing.

Mixers inside of tanks are promoted to help prevent stratification. However, mixing water at the top of the tank which may be poor quality with water of better quality at the lower part of the tank may result in a lower quality of water throughout the tank. Some water systems though, depending on the location and system design, report that mixers have been used with success.

### Annual Conference, March 24 – 26

The 2020 KRWA Annual Conference and Exhibition is just around the corner, so to speak. I hope you mark your calendars for March 24 – 26 for the 53rd annual event. The KRWA conference offers the widest array of training sessions and certainly the largest exhibition for the water and wastewater industries. Plan to attend and learn about the products and services that can help your city or RWD or other utility.

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