

Competitive Sealed Proposals vs. Bidding

By: Raymond E. Penny, Manager Southwest Region and
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Experience has shown that unless you pre-qualify bidders, awarding construction work to the bidder with the lowest price (the *low bidder*) may leave you unsatisfied at the end of the project. To compound this issue, bidder prequalification is not permitted in many state and local jurisdictions, leaving qualification of bidders to be incorporated into the bidding process. All too often, the bidding process is not well suited for this task. Those who took credit for saving money by awarding to the low bidder don't always want credit for that decision by the end of the project—especially if the low bidder struggled to finish and cut corners. The owner's pre-job hero may be a purchasing agent or a department manager attempting to obtain the lowest responsible bid using a system with many limitations. The post-job goat never wants to answer tough questions from management, the board, or the council, and when he or she does, most often it's the contractor's fault. Completing the job or project with the low bidder is seldom as rewarding as it seemed it would be.

Is price the only important factor? Is the feeling of saving money in the short term so strong that it overrides judgment or blocks memory? Is the reward for being under budget at award greater than the penalty for being over budget at completion? Where does "fair" fit in? Is it fair for the bidder with the lowest price to lose the job? Is it fair for the municipality when the low bidder finishes late or cuts corners in scope or quality? Do liquidated damages ever really compensate the owner?

Industrial painting contractors who live and die by competitive bidding know that to have even an opportunity to make money, they have to offer the lowest price. They also know that if the job doesn't go well (bad weather, poor planning, late deliveries, ineffective management, etc.), then cutting corners or claiming extras is the only way to stay in business and get another chance to be the low bidder. Owners say they are required by law to award to the low bidder. Many owners don't know how, or have given up trying, to improve the bidding process, so they continue to struggle with the low bidder.

The State of Texas does not require public entities to award projects to the bidder with the lowest price. As of September 1, 2007, the State now allows public entities to take *Competitive Sealed Proposals* (CSP) and to award the best

value based on an evaluation of all offers. This process is available for water tank rehabilitation and painting, as well as many other types of projects. Several of our Texas clients, including the City of Richardson, have used this new approach very successfully over the last few years. They establish the evaluation criteria and the relative value to the municipality of each item of the evaluation criteria and include that information in the contract documents which are provided to contractors interested in submitting proposals.

At the appointed time for CSP submittal, the City of Richardson opens each submittal and reads only the proposer's name and the total price offered. Proposals are not made available for review by the proposing contractors or the public until the contract is awarded, but are evaluated by a team or a committee selected by the owner. A contractor is selected based on the results of the evaluation and the award is not official until approved by the City Council. The CSP process allows for negotiations related to scope and price between the owner and successful proposer prior to award.

The City of Richardson recently completed the second of two water storage tank rehabilitation projects using the CSP process. Both projects were completed within budget, on time and without incident. No gnashing of teeth, no ulcers, no shouting, no threat of law suits. The City plans to consider this approach for all its water storage tank rehabilitation projects in the future.

Interested political subdivisions, including municipalities in Texas or any other state, should consult their purchasing departments to obtain detailed requirements before selecting CSP as an alternative procurement method. In Texas, further information can be found in the Texas Local Government Code, Chapter 252.043 Award of Contract and Chapter 271.116 for Competitive Sealed Proposals.

Inside This Issue

- **Construction Inspection**—Is resident observation of a painting contractor's work really worth the cost?
- **Tanks — Safety and Sanitary Concerns**
- **What Should a Tank Owner Expect From an Antenna Installation?**

Construction Inspection

Is resident observation of a painting contractor's work really worth the cost?

One of the issues that comes up frequently among owners trying to get water tanks maintained in this time of limited availability of funds is what type of project representation during cleaning and painting is most cost effective. Is resident inspection necessary, can we get by with spot inspection, or is no inspection the way to go? Before you decide that resident inspection is too expensive, let's look at a few of the issues involved.

Over the past 20 years, the cost of tank painting has increased dramatically. Changes in materials due to technological advances and regulatory mandates, along with environmental and worker protection requirements, have more than doubled the cost of painting a tank. Coating systems that used to be topcoated every 8 to 10 years or so have now been replaced by better performing coatings that can last 20 or more years. Environmental regulations and increased sensitivity by citizens have also increased the environmental risk associated with tank painting projects. Twenty-five years ago, it was commonplace to open blast an elevated tank in a small town center or residential area. Workers would be dispatched every evening to sweep up debris from patios and walkways owned by people that lodged complaints. Residents might even clean their own property. Can anyone imagine a similar situation today? So, let's look at the options for inspection of the rehabilitation of a one million-gallon elevated tank.

In today's competitive environment, an owner can expect the cost of tank repainting a one-million gallon elevated tank to be in the neighborhood of \$750,000 for a complete clean inside and out with a 20-year coating on the exterior and a 15-year coating on the interior. With no inspection, the owner is placing faith in the contractors' personnel that all mistakes will be corrected, all manufacturers' guidelines will be followed, work will be shut down when weather conditions warrant, and all environmental regulations will be followed. Certainly there are some who would make a \$750,000 investment with no oversight and for them, probably no amount of analysis will change their minds.

Spot inspection is sometimes referred to as *critical phase* inspection, but we take issue with this terminology. Critical phase infers that inspection will be performed at critical points in time during the projects. This is simply not possible on today's projects. Critical phases are performed each and every day. Each day the contractor blast cleans what surface area can be painted before the end of the day. Those areas are coated and the process starts over the next day. The premise of spot inspection is that the contractor never knows which day the inspector will show up to look at the blast or coating

application. In theory, the contractor must be ready each and every day as if the inspector will be there. If the inspector never finds any deficient workmanship during his spot inspections, the owner may feel some level of comfort; however, when rework is required, you have to ask yourself what was not caught on the days no inspector shows up? This does not even take into consideration the environmental risk the owner is taking during the 90% of the time no inspector is on site.

Typically, the cost of resident project representation is in the neighborhood of 5% of the project cost. This will be slightly higher on small projects and lower on larger projects. On this \$750,000 project, we can expect about \$38,000 for resident project representation. The cost of the spot inspection would be 25% to 50% of the cost of resident. For the additional \$20,000 to \$25,000 what does an owner get? They get a representative on site whenever the contractor is working to look out for the owner's interests. They get verification that the correct materials were used every day, verification that the weather conditions were acceptable every day, verification that the steel was properly cleaned every day, verification that environmental regulations were followed every day, verification that the waste material was properly handled every day, and verification that the materials were properly applied every day. Deficiencies in any of these areas on any day could open the owner to significant liability or reduce the life of the coating system dramatically. How much risk are you willing to take for environmental problems or premature coating failure for what may amount to about 3% or less of the total project cost?

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Tanks — Safety and Sanitary Concerns

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Everyone knows that water tanks need to be maintained. We often hear *maintenance* referred to as a coat of paint, and maybe welding some holes shut or replacing some obviously corroded components. A maintenance program should also include a full tank evaluation, including reviewing the safety and sanitary components of the tank. Detailed Technical Specifications can then be written to address any deficiencies. Many firms only evaluate the condition of the paint. However, an evaluation by a professional should include all aspects of the tank including the **coatings**, the tank's **structural** condition, compliance with current **safety** requirements, and the **sanitary** aspects of the tank. Even if a tank owner is not aware of safety or sanitary issues on your tank, if someone—whether an employee, hired contractor, or even a vandal is hurt on your tank, you could be held responsible. Even if the tank's safety devices are structurally sound, they may not be in compliance with current OSHA standards, which have changed several times since they were first enacted in 1971. What if a bird, squirrel, or even insects get in the tank and contaminate the water? You might not be aware, but nearly every tank Tank Industry Consultants evaluates has either safety, or sanitary issues – and often both.

The safety concerns on a water tank include, but are not limited to:

- Are ladders compliant with current OSHA dimensional standards and equipped with operational safe-climbing devices?
- Are the platforms and/or balcony handrails tall enough and designed to comply with current dimensional requirements?
- Is there sufficient means of ingress and egress to provide safe access and adequate ventilation to the confined space of the water tank?
- Have antennas been installed that restrict access and pose a concern for safe access to the tank and structure?

Sanitary issues include, but are not limited to possible cross connections, overflow pipes and discharge designs, vents, locking and locked manhole covers, misaligned cathodic protection hand-hole covers, and possibly even gaps or holes in the tank. Two critical areas in maintaining a sanitary water supply are the vent and overflow pipe screening. Deteriorated vent screening, or vent screening that is not restrictive enough could allow insects, birds, and animals to come into contact with the water supply.

The ultimate goal of a tank maintenance program is to evaluate all aspects of the tank and operational requirements, write a detailed specification to properly perform the maintenance, hire a qualified contractor, and provide competent and thorough contract administration and on-site observation of the work being performed. It does no good to perform safety and sanitary upgrades, if the upgrades are not performed correctly and the structure still does not meet all appropriate standards.

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What Should a Tank Owner Expect From an Antenna Installation?

By: John M. Lieb, P.E.
Chief Engineer

What should a tank owner expect from an antenna installation on a tank? Aside from the obvious expectation of a revenue stream from the service providers installing the equipment, the primary goal of every antenna project should be a functional, reliable installation that is easy to maintain and that doesn't interfere with the operation or maintenance of the components of the tank on which the antenna equipment is mounted. There are three critical stages along the way to achieving this goal: Planning, Execution, and Verification.

Planning

The planning stage should address the following issues:

- Are the components of the tank designed and in structurally adequate condition to withstand the additional loads imposed by the antenna components on the tank under all anticipated service conditions? A **Structural Evaluation** of the tank should be conducted to determine the design adequacy or structural integrity of the tank components to resist the static and dynamic loads imposed by the antenna equipment.
- Will the installation of the antennas interfere with operation or maintenance of the tank or its components? For example, antenna mounting brackets may obstruct the operation of a tank roof vent or poorly routed cables may present safety hazards for access to and maintenance of the tank. A thorough **Design Review** of the proposed installation plans should be performed to ensure that the installation does not compromise the safety, structural integrity or maintainability of the tank.

It is critical that the structural evaluation and the design review of the antenna installations be performed by a third-party engineer with expertise and experience in the design, construction, and maintenance of elevated storage tanks. Without independent engineering review and evaluation of the installation plans, the tank owner must rely on the antenna installer and/or the tank contractor to ensure that the installation is safe, effective, and properly performed, and does not interfere with the operation or maintenance of the tank. It is during this phase that the engineer will identify any structural deficiencies and/or interferences in the installation plans that must be corrected before installation commences.

Execution

The execution stage should commence only after any structural deficiencies and/or tank safety and maintenance issues identified by the engineer in the planning stage have been resolved. Once this step has been completed, the installation should be executed in strict accordance with the final installation plans and specifications.

Verification

The final stage in the antenna installation project is verification that the installation work was actually executed in accordance with the final installation plans and specifications. Careful attention to details in the planning and execution stages will usually make the verification stage very simple and painless. On the other hand, lack of attention to details in the first two stages can result in problems that may or may not be identified in the verification stage. Whether the problems are discovered now or later, the net result is usually costly re-work and a dissatisfied tank owner.

Sensor Technology for Floating Roofs

By: *John M. Lieb, P.E.*
Chief Engineer

What if you could equip your floating roof with its own eyes and ears so that it could sense when conditions are not right or when it is in danger of sinking and call for help on its own? A revolutionary intelligent sensor system that promises to do just that is in the final stages of development. And although revolutionary in the sense that the system acts intelligently based on data collected from the sensors, the hardware components used in the system have a proven track record of durability and reliability.

Why is an Intelligent Sensor System Needed?

As the population of floating roof tanks throughout the world ages, the risk of sinking or other failure increases. Experience shows that early detection of the warning signs of sinking or other failure almost always allows sufficient time to correct the conditions that may otherwise lead to failure. However, it is difficult, if not impossible, for tank operators to watch every tank all the time. Even when surveillance is supplemented with remote camera technology, someone has to watch the cameras.

What are the Warning Signs of Failure?

Conditions and warning signs that may lead to failure or sinking of the floating roof include:

- Excessive accumulation of rain water on external floating roofs
- Loss of floatation or buoyancy as a result of leaks in the pontoon compartments
- Tilting of the roof
- Hydrocarbon vapors on the deck
- Fire as the result of lightning strike or ignition of hydrocarbon vapors from other sources
- Unusual vibrations

What does the Intelligent Sensor System Do?

The new technology senses the above conditions via a series of strategically placed sensor modules on the top side of the floating roof. Using solar power, intrinsically safe wireless and advanced battery chemistries, micro electrical-mechanical systems (MEMS) and nanotechnology, the sensor modules are designed and constructed to sense and measure the following conditions:

- Accumulation of water or other liquid on the floating roof
- Global and local inclination of the roof
- Presence or accumulation of flammable gas
- Excessive heat and/or fire
- Vibrations

The sensor modules not only sense and measure the above conditions at independent locations on the roof, but they also communicate, via a base station for each tank and using global positioning system (GPS), these conditions and measurements with other sensor modules on the roof to ensure that the data measured by the sensors accurately represents the overall environment of the floating roof. The base station controls the sensor module communications, sensor information processing, diagnostics, synchronization, and alarm generation. Various levels of warnings or alarms can be issued, depending on the conditions measured by the sensors. The sensor modules and base station have been developed to mesh nearly seamlessly with existing data processing systems. And the system works around the clock so that there is virtually no chance of overlooking unusual or dangerous conditions.

For more information about this exciting new technology, please contact John Lieb at or (630) 226-0745 or Lieb@TankIndustry.com.

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