PREPARE TO PROTECT

Steve Houghton, Groome Industrial Service Group, USA, examines the cost implications of planned vs unplanned surface preparation and coatings work on tanks and pipelines.

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In a perfect world, oil and gas facilities would only coat tanks and pipelines when there is a desire for a change of scenery or colour. However, in the real world, tanks and piping see spot failures to varying degrees, at any given time. It is essential to address these issues before a large-scale failure occurs.

A proactive approach to maintenance puts safety, efficiency, and production at the forefront and allows a facility owner to stay ahead of the curve. Being proactive will translate, over the longer term, into cost savings as planned work helps enable a plant or facility to ensure operations continue in an uninterrupted fashion, and to ensure that any planned downtime is minimised.

To best develop a maintenance plan for tanks and pipelines, the unique variables of each piece of infrastructure need to be considered. These include size, style, content, years in service, preventive maintenance, service history, and the ownership history of the facility, etc. All of these factors contribute to an asset's unique, and optimal, asset lifecycle management plan.

As this plan is developed, it is critical to keep in mind that while the contents of a tank or pipe are, in many cases, a commodity, the asset itself must be managed as a distinct resource. A dedicated maintenance plan for each asset will help deliver a strong return on investment (ROI) over the many years of its useful life.

The cost of corrosion

The cost implications of unplanned work can account for an uncomfortably large percentage of an annual budget if management does not adhere to a lifecycle management programme.

Some businesses consider large, unexpected maintenance and downtime expenses as simply the cost of doing business. However, other managers view preventive or life cycle maintenance as a cost-saving opportunity.

As an example, it is estimated that pipeline corrosion alone accounts for close to US$9 billion in expenditures on an annual basis across North America, according to *North American Oil & Gas Pipelines*.[1] This data makes it clear that cutting corrosion control should never be considered, with corrosion ranking as the leading cause of pipeline failures. A focus on corrosion control is essential not only for cost reasons, but due to safety and environmental factors as well.

While developing a plan for an annual budget, it is crucial to understand how a planned budget holds up relative to the averages. The annual average percentage of costs in the industry is broken down as follows: 10% failure, 38% CAPEX, and 52% operation and maintenance costs.

Compared to other industries, a figure of just 10% for failures is low. That said, the implication of a potentially unfavourable revenue impact is inversely higher. While a tank or pipeline is an asset and not a commodity, the contents of that asset are quite valuable. One of the ultimate goals for owners is to reduce loss not only during all phases of production, but during the storage and transfer processes as well. Minimising loss and the chance for asset failure also greatly reduces liability, which reflects positively on the safety of employees, contractors, and neighbouring assets.

Coating: the three factors

An ongoing, proactive approach to protective coating ensures that pipes, tanks, and other assets are not exposed to destructive elements, which will in turn prevent surface breakdown and reduce the wear and tear of the assets. More importantly, the procedure and execution of the coating process must take place correctly, or the intended benefits will not be realised.

There are three basic steps that must be followed:

Evaluation

First, the surface that is to be coated must be carefully evaluated. There are multiple factors, including asset age, asset use or function, and environment, which must be understood and accounted for in determining what type of work should be performed.

Coating consideration

The coating itself must also be considered. A mistake that is often made is that the compatibility of the coating with the asset substrate or material is considered, but the compatibility of the new coating with the old coating and previously performed work is not. System adhesion is a potentially serious implication if two incompatible systems are used. All of these considerations are vital to the long-term success of the application.

Environmental factors

Environmental factors such as temperature, humidity, air salinity, wind, and rain, etc., all contribute to the potential wear and failure of an asset. These factors must be heavily weighed when determining

the proper course of action to take with each asset. It is also important to consider that a system that has performed well in a temperate and dry area may not perform as well in a hot and humid area.

Prioritisation checklist

How does a facility's management team rank these considerations in terms of importance? The top priority when considering preventive maintenance should be the asset type paired with asset protection, with contractor or vendor skill set and accompanying track record not far behind. Utilising a contractor with a strategic mindset also certainly pays dividends.

While some may focus on a specific asset when going to market, others focus on reducing total cost of ownership (TCO).

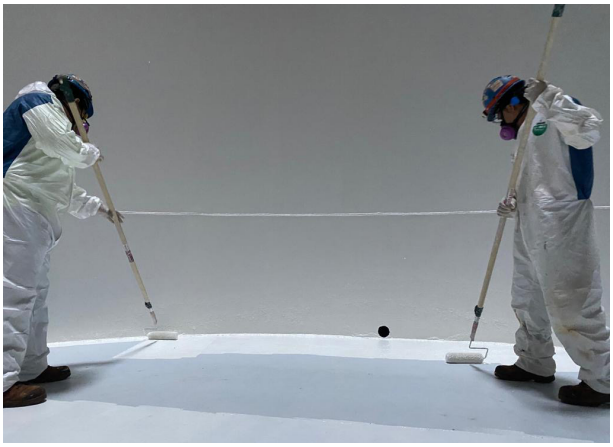

Figure 1. Interior lining application.

Figure 2. Tanks come in all shapes and sizes, with a wide range of purposes and unique challenges in placement.

Depending on a company's cost saving initiative goals, many boxes can be ticked by prioritising the reduction of TCO on future projects.

First, finding skilled contractors at a competitive price, who already have a contract to work at a facility, can be difficult. When one of these contractors is eventually found, there is often the wish that they could handle more scope. In cases where there are multiple coatings projects on different assets within a facility, there are obvious time and cost benefits of hiring one contractor rather than several.

Second, there is a soft cost advantage that can be realised from purchase order reductions due to vendor consolidation. Depending on a company's strategic initiatives, there may be more value in accomplishing vendor consolidation vs the soft cost savings. Either way, this is a win-win scenario.

Third, there is a direct hard-cost reduction which will affect a percentage of every job. The fixed mobilisation costs that every contractor deals with are significantly reduced if one contractor manages two projects instead of one. A consolidation effort enables a facility to leverage vendors and other hard costs similar to mobilisation, depending on scope.

Fourth, consolidation can show exponential gains when a contractor is capable of not just managing multiple projects, but managing them in a turnkey fashion. Not every contractor can complete or supply 100% of the items and/or specialised services needed to complete a project. As an example, if for a particular project the contractor cannot buy the specified paint at a competitive price (or at all), cannot provide the specialised welding services needed during preparation, and/or cannot ensure the needed scaffolding is in place, the total project cost will increase as that contractor will be forced to outsource various project components.

Finally, knowledge of assets is crucial. An established track record of performance is important. If achieving any of the aforementioned goals is desirable, it is important to understand a contractor's experience of the myriad different assets at a facility.

Ultimately, unplanned work and unplanned outages add an average of 30 – 40% to the baseline cost of planned maintenance and work. The additional expenses are avoidable and controllable, but the question is how to avoid them. Pre-emptive calculations can work to one's advantage: it is important to complete a risk-benefit analysis to determine the need, cost, recovery time, production demand, and safety concerns of planned maintenance.

The other consideration: safety implications

Safety should always be of paramount importance with any job on a worksite. However, in light of the COVID-19 pandemic, the focus is heightened on every process and procedure that requires outside professionals to work on a job. If someone contagious enters a facility, this can force an unplanned and costly shutdown, as well as create a potentially dangerous health situation for employees, partners, and others on the worksite.

More than ever, safety management is a complex and essential responsibility. Outside workers coming into a facility must be both highly trained and in full understanding of compliance issues. There are not only internal HR and

insurance considerations, but also local, state, and federal guidelines.

A best practice is to assign a 'gatekeeper' to coordinate frequent and ongoing communications with outside vendors and to ensure that there is a strong culture of safety across an organisation. Consideration should also be given to a 'safety bubble', which is made up of those people that are potentially affected by the actions of others in the same environment. In a plant or refinery, a safety bubble includes plant personnel, contractors, and vendors, and this may also spill over to the local community.

It is essential to implement safety plans and establish protocols in a facility to ensure safety during the pandemic – and to ensure that any outside workers take necessary precautions including health screenings, proper personal protective equipment (PPE) usage, and the documentation of travel. In addition, utilising contractors that offer turnkey services can also help manage the safety bubble by limiting vendor count and offering strategic scheduling.

Whenever a project is in the planning phase or is getting ready to start, it is essential to pay attention to safety considerations and ask important questions such as 'can we do more?' and 'what should we do differently?' Even in normal times, determining whether or not to move forward with planned work depends on many factors, chief among them cost, vendor support, and safety.

Conclusion

Properly preparing and then successfully applying a protective coating to the surface of a tank, pipe, or similar asset is crucial to preventing corrosion and prolonging the life of valuable equipment. The equation for preventative maintenance is simple and straightforward: a facility with a plan and strategy for proper preventive maintenance, including safety considerations, will enjoy a higher ROI vs a reactive approach where failures occur before problems are addressed. A proactive approach will consistently improve the bottom line and streamline the operations of a facility. T&T

Figure 3. All of these tanks may look the same, but they are not in the same condition. Proper evaluation will determine the actual condition and required maintenance. A wide-angle visual inspection will not suffice.

Reference

1. 'Corrosion Control Industry Faces Challenges to Protect Oil and Gas Infrastructure', *North American Oil & Gas Pipelines*, https://napipelines.com/corrosion-control-industry-oil-gas-infrastructure/