

UNCOVERING TANK BOTTOM CORROSION:

Causes and Prevention

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Storage tanks hold everything from chemicals and petroleum to natural gas and fuel. They hold and protect the vital materials used to meet modern industrial needs.

As any system owner understands, the substances contained have the potential to be hazardous and mismanagement can lead to costly, avoidable failure. One of the biggest threats to the integrity of storage tanks is tank bottom corrosion. Tank bottoms are prone to both topside and underside bottom plate corrosion.



Thinning of the surrounding material can result in local (through-holes) or widespread pitting and possible leakage. To avoid this, consultants must employ quantitative and qualitative estimation methods that can identify hidden system weaknesses that will affect hydraulic integrity and determine future periodic tank inspection intervals.

American Petroleum Institute (API) 653 is the approved method to inspect tanks built to API 650 or API 12C for potential repair, alteration, relocation and reconstruction. Using this protocol, along with an extensive soil corrosivity analysis, is one way to predict tank

bottom corrosion. The soil composition in contact with the underside of the tank bottom can be one of the most revealing indicators in how quickly corrosion may occur. Corrosive soil may have high moisture content, high electrical conductivity or low resistivity, high levels of dissolved salt, and/or be considered acidic. With these conditions present, the soil acts like the electrolyte in a battery, creating a potential difference and electric current flow between specific points resulting in accelerated corrosion (uniform or localized).

Soil corrosion initially appears as a roughened surface or a localized deeper attack becoming visible. The area that faces the most significant effect is the underside of the tank bottom. When a tank bottom is in direct contact with highly corrosive soil, there may be few ways to protect the existing infrastructure from a decreased service life. Due to the varying degrees of corrosivity present and other potential environmental factors, there is no universal method to mitigate

the impact. Therefore, a thorough soil sample analysis must be performed to identify the best ways to uniquely protect a tank from tank bottom corrosion.

API 653, along with subsequent testing, is a valid and valuable assessment tool in the periodic inspection of storage tanks. It can identify trends and potential areas of concern requiring additional evaluation. Tank owners can rely on this method to identify areas needing additional assessment prior to leakage or failure. This will save in the degree of repair or assessment of potential fines due to environmental contamination.

Tank bottom corrosion can not only be damaging to the tank service life, but also lead to financial burden for the owners due to environmental pollution. Proactive measures such as testing and thorough evaluation methods are key to avoiding preventative failure and preserving the longevity of your asset.

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