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No more Gridlock – take the ring route

TED HUCK, DIRECTOR OF MANUFACTURING AT MATCOR INC, OFFERS A GUIDE TO INSTALLING A BETTER CATHODIC PROTECTION SYSTEM

Cathodic Protection of the external tank bottom for large diameter tanks has been adopted as good engineering practice around the world.

Distinguished international standards organisations, including API and NACE, have developed guidelines and specifications governing the application of cathodic protection for aboveground storage tanks. Unfortunately, too many owners and operators have experienced premature failures of the cathodic protection systems installed on their tanks resulting in excessive corrosion and reduced tank floor life leading to costly tank bottom replacement projects.

In many cases, this is the result of the anode system design being employed. Starting in the 1990s the use of the grid CP system was common. It consisted

of MMO ribbon anodes and titanium conductor bars that are assembled in the field. This system requires a perfect design and flawless installation to be effective; however, there have been numerous tank installations where the design was not properly performed or where the installation was less than flawless. In those cases, the results are generally catastrophic.

The field-erected grid system consists of coiled MMO coated titanium ribbon that is cut in the field into parallel strips and laid out on the sand base during the foundation construction. Titanium conductor bars, also supplied in coils, are then field cut and laid perpendicular to the MMO ribbons and then the grid is tack welded in the field at each of the points of intersection – for larger diameter tanks this could be hundreds of field welds. Separate power

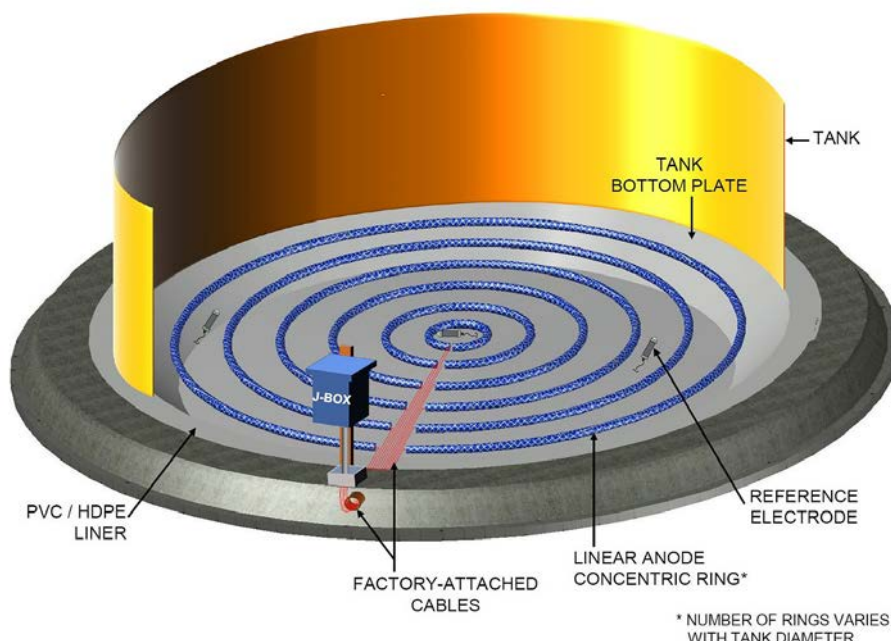
A key advantage of the concentric ring system is its inherent redundancy

conductors are then tack welded to the grid assembly in quadrants with cabling that is field routed back to a penetration in the tank and routed to a junction box. All of this is being done in the midst of a frenetic construction schedule that has an anxious foundation contractor with truckloads of sand backed up and waiting to unload on top of the tack welded grid and then compacted with heavy equipment.

As a field erected system, there are several areas of concern with the grid design, poor weld connections, coil memory of the metallic ribbon causing shorting or near shorting to the tank bottom, vulnerability of the system during backfilling operations and power feed connection failures are common issues with this design.

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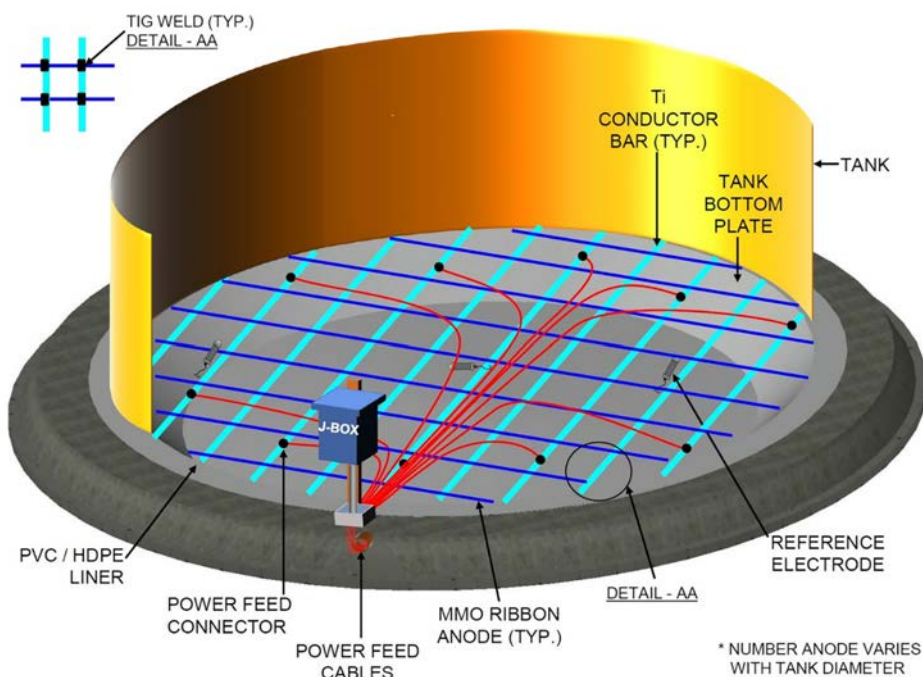
There is a better alternative. The use of custom manufactured, concentric ring coke backfilled packaged linear anode assemblies provide for a much easier, quicker and more reliable installation. These anodes are simply unreeled and laid out according to the design without any field cutting or splicing. The anode assembly weight holds it securely in place during backfilling. The cables are easily routed to the ring wall penetration and the sand backfilling operation can commence quickly and without delay. ►



Unlike the tack welded grid assembly that has no mechanical protection, the coke backfilled sock provides a significant degree of mechanical protection for the internal anode assembly making it much more tolerant to the heavy equipment being used to backfill the sand over the anode system.

Another key advantage of the concentric ring system is its inherent redundancy – each ring segment has two feeds assuring that any single break would not adversely affect the performance of the ring. For the grid system, the loss of a single power feed would render an entire quadrant ineffective with no means of supplying current to that area. Even in a worst-case scenario where one ring was to be damaged, the use of resistors could be employed to force additional current to each adjacent ring to mitigate the loss of an individual ring.

Owners and operators have been abandoning the use of the field erected 1990s anode ribbon grid system. They are instead insisting that their tanks be supplied with factory assembled and tested custom concentric ring assemblies to assure a more reliable CP system that is designed to be installer friendly



and assure longer life of the cathodic protection system.

If you haven't looked at your tank cathodic protection specifications, or if you

have experience system failures with ribbon anode grid type systems, it may be time to consider taking the ring route to avoid grid lock. www.matcor.com ■

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