

CORROSION NEWS **MATCOR**

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High power electrical lines were thought to have no adverse affect on pipelines buried beneath the lines. However, new evidence shows that the emergence of high-quality pipeline coatings has increased the incidence of AC-induced corrosion because the new pipeline has few coating defects to allow the current to dissipate to ground.

AC-INDUCED CORROSION – IT'S A REAL THREAT

Pipeline operators beware: AC-induced corrosion is threatening your newer pipelines. This is the finding from numerous pipeline integrity investigations whether it be smart pig indications or direct assessment evaluations. Astoundingly, pipelines with outstanding coating and cathodic protection systems are showing evidence of AC corrosion – in some cases quite severe.

In the United States we have a long history of using electrical utility corridors as ideal sites for pipeline rights of way. The advantages of common utility rights of way are compelling. The area has been cleared of trees where power lines run above ground, creating a cleared highway perfectly suited for installing pipelines and other buried utilities.

Pipeline operators have long assumed that AC-induced voltages do not present a corrosion risk and need only be addressed from a personnel safety perspective. Joe Pikas, vice president of MATCOR's Houston/Gulf Coast office, worked on a Transco study in the early 1970s that concluded that AC

corrosion rates were negligible under the worst conditions and non-existent in most cases. Indeed, John Morgan's well-respected NACE textbook titled *Cathodic Protection* (2nd edition, 1987) states: "In general, AC corrosion is not a hazard and there is little evidence...that alternating current causes corrosion." But recently this conventional thinking has been turned upside down.

So why are we now seeing AC corrosion when just a few decades ago it was not considered a viable corrosion threat? Quite simply, it is the unintended consequence of exceptional coating efficiencies. The use of fusion bonded epoxy (FBE) and three layer polyethylene (3LPE) coatings have proven quite effective in protecting pipelines from conventional galvanic corrosion. These coating systems represent significant improvement over the conventional coating systems they have replaced. Installed coating efficiencies exceeding 99.9% are common.

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MATCOR LAUNCHES SPECIAL WEBSITE FOCUSED ON CORROSION OF STEEL IN CONCRETE STRUCTURES: www.stopconcretectorrosion.com

MATCOR enhanced its website's content on corrosion in concrete structures significantly this fall by creating an educational site called www.stopconcretectorrosion.com. This site is aimed at the lay audience who needs to understand what happens when the reinforcing steel structure of a concrete building, bridge, or marine environment corrodes. With a 10-minute video that explains the corrosion process, the economics of cathodic protection and other means to amend corrosion, frequently asked questions and news clippings, the website is a resource for corrosion engineers, concrete restoration specialists and structure owners.



Kevin Earley, MATCOR's concrete corrosion manager, joined the company this fall after an extensive career in the concrete industry. Earley holds a Master of Science in Engineering Geology.

"MATCOR has worked on numerous condominiums in Florida over the past 10 years," said Kevin Earley, concrete corrosion business manager at MATCOR. "Those high-rise buildings are particularly affected by the salty sea air blowing off the Atlantic and the Gulf of Mexico. Balconies fail rapidly and repeatedly without cathodic protection, and this video will help owners and managers to understand both corrosion and mitigation methods."

In addition to condominium balconies, MATCOR's engineers design systems for concrete marine structures, highway surfaces and bridge decks, industrial plants, ice skating rinks, swimming pools, vessels and tanks, intake structures and foundations. MATCOR is also a prime manufacturer of impressed current systems, most of which are designed and patented by MATCOR engineers. 




Corrosion of the rebar in concrete balconies, bridge decks, and swimming pools is a significant problem along the Florida coast. MATCOR's enhanced website has a tutorial on the causes of corrosion and cathodic protection, as well as the economics of the system that can help engineers explain the process to clients.

AC-INDUCED CORROSION – IT'S A REAL THREAT *Continued from cover*

Surprisingly, however, a newly constructed pipeline boasting an outstanding coating system is much more prone to AC-induced corrosion. Induced or stray AC current picked up along a buried pipeline with a high-quality coating holiday has only a limited number of small coating defects through which it can dissipate to ground. Thus, the localized AC current density at the discharge location can be quite high. In contrast, older pipelines with larger and more frequent coating defects offer numerous sites for AC current to discharge back to ground.

AC corrosion rates can range from 2 to 500 mpy with a typical value in the range of 60 mpy. AC-induced corrosion can occur even when the AC voltage levels are well below the 15 VAC safety threshold cited by NACE. AC current density, soil conditions, and holiday size all affect the corrosion rate.

Pipeline operators must be aware of the heightened risks of AC corrosion resulting when pipeline with advanced coatings and high efficiency is installed in electrical transmission utility rights of way. Monies need to be allocated to thoroughly investigate and, if necessary, mitigate AC risk. Corrosion may be a significant threat to personnel safety and pipeline integrity.

For more information, please visit the Literature Download section of MATCOR's website (www.matcor.com) where there are published articles and presentation pdfs available on this subject. 

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