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# Guide for Cathodic Protection of Transmission Line Structures

The primary purpose of this document is to provide practical information and guidance on the design, operation and maintenance of cathodic protection systems — galvanic systems in particular — for transmission and distribution (T&D) structures.

Electrical transmission structures are composed of two distinct sections: the aboveground section that supports the overhead conductor, and the underground section (i.e., structure foundation) that supports the aboveground structures and the conductor. Both aboveground and underground portions of transmission structures are subject to aging as a result of environmental and mechanical stresses; nonetheless, it is well-evidenced that the risk of structural failure is much higher at below-grade sections due to underground corrosion and material degradation.

Cathodic protection is an efficient and economically feasible corrosion control method for T&D assets. It requires a sufficient amount of direct electric current to be continuously supplied to buried metallic members of the structures in order to mitigate, slow or temporarily stop the naturally occurring corrosion process.

The cathodic protection of underground steel structures is a relatively mature subject for structures with simple geometries, such as piping systems. Nonetheless, there is a lack of technical information on cathodic protection systems for the underground components in T&D lines. This is mainly due to the wide range of foundation designs and the associated geometrical complexities. More complications arise from the maintenance and optimization of cathodic protection systems for aging T&D structures due to the coexistence of differing surface conditions at the buried metallic structure (e.g., coated/galvanized surfaces, bare surfaces, and corroded surfaces).

In reviewing this guide, readers will be familiar with technical terms and able to effectively communicate with a NACE certified corrosion and cathodic protection specialist, analyze technical reports for corrosion assessment, and contribute to the monitoring and maintenance of cathodic protection systems for T&D structures.

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Dr. Peyman Taheri is the Director of Engineering at Matergenics Engineering Ltd. He is a Professional Engineer, and NACE-Certified in Corrosion, Cathodic Protection, and Coating. Peyman is well-experienced in corrosion risk assessment and mitigation specific to utility structures. He has worked with various utilities including power electric, telecommunication, water & wastewater, and oil & gas to address and solve corrosion related issues.

His interests are development of system-wide corrosion programs for utilities, and cathodic protection system design and simulation with advanced computer tools. In addition to 30 scientific and technical publications, Dr. Taheri is the author of "Guide for Cathodic Protection of Transmission Line Structures", a guideline for corrosion inspection and mitigation at new and aging galvanized structures, published by CEATI.



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