

Corrosion Protection for Industrial Waste Power Plant Project (IWPP) in Thailand

Yut Panitanwong^{a,*}, Pinai Mungsantisuk^b and Chawis Thongyothee^c

^a*The Concrete Products and Aggregate Co., Ltd. (CPAC), 1516 Wong Sawang, Bang Sue, Bangkok 10800, Thailand*

^b*Thai Marine Protection Co., Ltd. (TMP), 555/8 Moo12, Bang Phasi, Bang Len, Nakhon Pathom, 73130, Thailand*

^c*CPAC SB&M Lifetime Solution Co., Ltd., 1516 Wong Sawang, Bang Sue, Bangkok 10800, Thailand*

*yuttanas@scg.com

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This project is operated at the Maptaphut Eco Energy Plant, Rayong Province, Thailand where SCG Cement Co., Ltd. is combining gasification with ash melting technology to manage industrial waste through the process of incineration that can be used for various hazardous and non-hazardous waste materials. The entire process is located within a closed system with pollution and waste control system that meets international standards, from collecting waste from businesses, transporting the waste to sorting facilities to prepare for incineration, to entering the incineration process. Scraps from incinerations such as aluminum, steel and fly ash can be reused, while incombustibles may be further utilized as materials for road construction. The facility can process up to 65,000 metric tons of industrial waste per year.

CPAC and TMP worked together to provide the prevention method based on engineering principle and the right material selection. Sacrificial anodes for corrosion prevention and protection of reinforced concrete structures are more reactive metals such as zinc or zinc alloy. The zinc anodes are intentionally encapsulated with activated mortar that has a high pH to prevent passive film formation. The encapsulated zinc anode is called concrete anode. The concrete anodes are galvanically connected to the steel reinforcement with galvanized steel wire and the resistance between the wire and reinforcement must be less than 1 ohm to facilitate the current flow. When the concrete is cast in place, concrete anodes will generate current flow to protect the steel from corrosion by sacrificing themselves. Concrete anodes are easy to install, low maintenance, and desirable in prestressed concrete structures. The Maptaphut Eco Energy Plant project requires an investment of 2,400 MB and takes 7 months to construct between October 2018 and April 2019. Concrete anodes cost 7 MB or equivalent to 0.3% of 2,400 MB with 10-year warranty have been used to protect foundation of the power plant. The concrete anodes in this project were tested in accordance with ASTM C0876 and ASTM G109. NACE Standard RP0100-2000 was used to interpret the test result and 100 mV polarization decay was obtained.