Failure of PC Wire for PCC Pipes Due to Corrosion in Man-Made River Project Investigation of Possible Causes and Relation of Wire Breaks with Potential Measurement

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Abstract : Pre-stressed wire is considered the most important in manufacturing pre-stressed concrete pipes, this is because the life of the mentioned pipes depends on the integrity of the wire. When the wire is wrapped around the concrete core, it provides a compressive strength that enables the concrete cores to withstand internal and external pressures. Since LIBYA has constructed different stages of man-made river projects using pre-stressed concrete pipes in different diameters (1.6, 2.2, 3.6 and 4.0 m) to transport water from the south part of the country to the north-populated area, pipe failures due to corrosion have occurred after several years of operation at different locations of the pipeline route. The PC wire is corroded and, in the end, breaks and becomes unable to withstand internal water pressure. The wire breaks recorded using the hydrophone technique added extra pressure on the project management staff and engineers to resolve and study the possible main cause of wire break and pipe failure. Information regarding the PC wire used will be provided in this paper which includes specifications, manufacturing etc. In this paper, the causes of wire corrosion and wire breaks after several years of PCCP operation will be discussed and explained, in addition to that, the correlation between wire breaks and pipe potential will be addressed and highlighted.

Keywords : wire technical specification, wire break, corrosion causes, potential measurement, failure concrete pipe
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