

EXTERNAL INDIRECT INSPECTIONS METHODS EVALUATION (ECDA) OF NEW BURIED STEEL PIPELINES WITH 3-LAYER HDPE COATING

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ABSTRACT

MEKOROT – National Water Company is the major producer and supplier of Water in Israel. He is responsible for development of a various new engineering infrastructures such as pipelines, tanks, wells, reservoirs, and is responsible for their maintenance.

The external HDPE coating for steel pipelines had adopted 20 years ago and shows excellent mechanical and corrosion characteristics.

The integrity of a new buried steel pipelines begins by their careful installation.

During the installation process, some coating damage (construction coating defects) is generated and can reduce dramatically the designed life cycle.

The quality assurance, based on Visual and Holiday Detector inspections, is not always sufficient to find the coating defects.

The research included more than 160 km from more than 30 projects (contractors) with wide diameter range (6" to 100") water distribution pipelines with different technical characteristics: Length, Diameter; Installation Depth, Pipeline Thicknesses; Coating Types, Soil Resistivity and Conditions (Dry/Wet); Backfilling, Big quantity of T-joints, Steel Casings, etc.'.

Different Indirect Inspections Methods were investigated (ACVG, DCVG, CIS, Alternating Current Attenuation Survey), mentioned in ANSI/NACE SP0502-2008 "Pipeline External Corrosion Direct Assessment Methodology" and NACE Standard TM0109-2009 "Aboveground Survey Techniques for the Evaluation of Underground Pipeline Coating Condition". Other techniques, like Drainage Test, also were tested.

Basing on technical and economic considerations, the recommendations are as below:

- Two methods: DCVG and Drainage Test were recommended to be adopted as obligatory quality assurance stages after installation of new water pipelines.
- The HDPE coating defects are often referred to single distribution defects and not to equal distribution defects as in other pipelines coatings (bitumen, cold tapes, etc.). There is no good correlation between % IR severity index between above different coating types so repair recommendations for HDPE should be revised (ANSI/NACE SP0502-2008 – Appendix A – par. A6.4 – Categories 1-4). For example, the repair recommendations for Category 1 defects (1 to 15% IR), in most cases are also necessary.
- Based on Number and Severity of Coating Defects, Each Contractor should receive the Final Quality Grade (Index of Installation Quality). In poor quality projects, penalties should be fined by the contractors and even in extreme cases the contractor's work will be stopped.