

Public Page
Improvements to the External Corrosion Direct Assessment
Methodology by Incorporating Soils Data
Agreement DTRS56-03-T-0003; 5th Quarterly Status Report
April 1, 2004 to June 30, 2004
Contractor: Battelle

The subject contract covers two projects: (1) adding soils data to the previously developed external corrosion direct assessment (ECDA) datasets and methodology and (2) developing a quantitative basis for evaluating certain time-dependent threats. Status of the first project is reported here.

Project 1: ECDA Soils Model

The objective of this project is to add soils data and a soils model to the previously collected external corrosion direct assessment (ECDA) datasets and methodology. This project includes (1) working with pipeline operators as they conduct ECDAs, (2) collecting soils-related data, and (3) modifying an existing soils model for ECDA.

Marr Associates has created an external corrosion model by aligning soil survey data with ILI data along several valve sections of a pipeline. The valve sections were chosen first based on coating type, as different coatings behave quite differently and therefore require separate models.

The only soil properties considered were drainage, soil type and texture, and topography. This data was then correlated to the ILI data, and the result was corrosion distributions, in number of features per meter for each unique pair of soil properties. An example of the output is shown below.

ILI-Soil Model Correlation Example

Corrosion Features per meter	Terrain Type			
	A	B	C	Total
Drainage Type				
A	1	0	10	11
B	1	143	0	144
C	0	8	0	8
Total	2	151	10	163

The results from correlation tables are used to create model criteria for this line. For this example an environment with Drainage Type B and Terrain Type B would be considered corrosive. The model could also be modified to account for corrosion severity, corrosion depths, or growth rate instead of the number of features. Different soil properties, coatings, and cathodic protection could also be accounted for. Basic, easily determined properties were used for the initial model because the model needs to be applied to a broad range of pipeline environments. At the completion of this program the various drainage types, coating types and terrain types for these line segments will be used to characterize the expected severity of the corrosivity of these particular locations.

By combining data from a number of valve sections, correlations can be developed between the number of corrosion features and certain types of soil property combinations. These combinations are then ranked on an arbitrary, qualitative scale, but one that operators can use to estimate or predict where problems are most likely.

The soil model is not meant to be used by itself; rather, it is meant to be combined with cathodic protection and coating survey data to help prioritize pipeline segments for investigation. As more soil data is used, the more accurate the model will be.

As data on a specific pipeline is collected through additional excavations, this new information is used to refine the criteria used for that pipeline. Not only does this increase confidence in the model, but this also allows specific corrosion problems such as a poorly applied coating or cathodic protection system problems to be addressed.

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