

4th Quarterly Status Report

Project Title: EXTERNAL PIPELINE COATING INTEGRITY		
DOT PHMSA Advances Coatings R&D Contract # DTPH56-06-T-000022		
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Executive Summary

In this quarter, research focuses have been placed on the sample preparation and experimental setup for long-term durability evaluation of 3-layer pipeline coatings under various steel surface treatment conditions. The sample surface conditions to be evaluated include (1) phosphate acid contamination, (2) four different salt levels of exposure, (3) three different levels of surface anchor profiles, and (4) three different steel substrate temperatures for curing fusion-bonded epoxy (FBE). The long-term durability tests include (1) adhesion degradation tests, (2) free film degradation tests, and (3) stress relaxation tests. All the sample preparation and test setups were completed in August 2007. All the data are being generated and will be reported in the next quarter. In the meantime, finite element method (FEM) modeling has also been carried out to determine how the thicknesses of FBE and polyethylene (PE) adhesive and top-layer PE affect residual stress build-up at the steel and FBE interface of a 3-layer coated pipe. It is shown that FBE coating thickness has minimal effect on residual stress build-up in the dry film thickness range studied. However, the PE top-coat thickness is shown to exhibit a dominant effect on residual stress build-up in the cut-back region (edge) of the pipe. Optimization of 3-layer coating thicknesses to minimize residual stress build-up and to improve scratch resistance of the pipeline coatings is now being pursued.