

6th Quarterly Status Report

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

In this quarter, much of the effort focuses on the continuation of the past work. The pull-off testing methodology has been refined and now yields much lower standard deviation as well as better consistency. This methodology will be used for the remainder of the pull-off testing. All data collected so far are presented in the appendix of this report. In light of the fact that the pull-off tests have not been able to provide consistent data as of yet, focus will be shifted toward employing the ASTM scratch test method. Stronger tips for the scratch study are currently being fabricated so that adhesion degradation can be studied through the Texas A&M scratch methodology. Free film degradation testing has continued and data for the first few months of immersion exposure will be presented. Experiments to observe the onset temperature of thermal relaxation for single layer FBE coating on steel have been carried out. A temperature of ~ 106 °C was obtained which is in agreement with the 3LPE system studied in the same experiment conducted last quarter. Tensile tests have been conducted to validate the value of FBE free film Young's Modulus at Texas A&M University. The new Young's Modulus was adopted in numerical modeling work for the thin strip case (single FBE layer plus 3L pipeline coating). While the numerical modeling shows good as agreement with experimental findings, the accuracy of implemented material parameters is critical. Discussion and suggestions are made to address the PE adhesive layer effect on the residual stress build-up as the next stage of research work. Optimization of the PE adhesive layer that minimizes the influence of PE topcoat on residual stress build-up will be modeled to show feasibility.