

Quarterly Report

Public Page

Date of Report: *December 31, 2015*

Contract Number: *DTPH56-14-H-00003*

Prepared for: *Government Agency: DOT*

Project Title: *Strain-based design and assessment in critical areas of pipeline systems with realistic anomalies*

Prepared by: *Center for Reliable Energy Systems (CRES), C-FER, NIST, and CANMET*

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For quarterly period ending: *December 31, 2015*

1 Work Completed in this Quarter

All pipes needed for the project were received. All girth welds for the curved wide plate (CWP) tests were received. Trial welds for the full-scale tests have been made and are undergoing weld qualification testing.

Finite element analyses for pipes with transition welds or various anomalies, i.e., corruptions and dents, were continued. The analysis was focused on (1) supporting the refinement of specimen designs and testing procedures, (2) developing preliminary recommendations on assessment guidelines and procedures, and (3) evaluating the preliminary assessment guidelines and procedures using testing data.

The studies on the corrosion anomaly size for full-scale bending-burst tests were continued. The recommended anomaly sizes and longitudinal strains for the tests were further revised and finalized based on the new findings.

Preliminary assessment guidelines or procedures for transition welds and various anomalies were developed. The preliminary guidelines for assessing the tensile and compressive strain capacity of pipes with corrosion anomalies were evaluated with experimental data. The assessment results are consistent with the experimental tests.

The small-scale tests of the pipe and weld materials used in the full-scale and curved wide plate tests are underway.

The weld profiles of all curved wide plate specimens were reviewed. The flaw sizes and locations of all specimens were determined based on the weld profiles and estimated



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tensile strain capacity.

Seven out of ten full-scale bending tests were completed. The completed tests include one reference test, three tests with dents, and three tests with corrosion anomalies. Three out of four full-scale bending-burst tests, including one reference test and two tests with corrosion anomalies, were completed.

Monthly reports were submitted online. Two progress review meetings were held on 10/28/2015 and 11/02/2015, respectively.

2 Work Planned for the next Quarter

The work planned for the next quarter includes: (1) small-scale tests, (2) curved-wide plate tests, (3) finite element analyses, model evaluation, and model refinement, (4) full-scale bending tests for pipes with transition welds, and (5) project management, monthly and quarterly reports, and meetings.



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