Research Section
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OREGON DEPARTMENT OF TRANSPORTATION

SPR Quarterly Progress Report

October 1, 2016 through December 31, 2016

Date December 21, 2016

TO: Technical Advisory Committee Members:
Larry Ilg, ODOT
Cole Mullis, ODOT
Justin Moderie, ODOT
Antony Boesen, FHWA
Todd Scholz, GeoDesign
John Duval, Pavement Services, Inc.

1. Project

Title: Adjusting Asphalt Mixes for Increased Durability and Implementation of a Tester to Evaluate Fatigue Cracking of Asphalt Concrete
SPR # 785

2. Project Investigator

Name: Erdem Coleri, PhD
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3. Project Coordinator

Name: Norris Shippen, Research Coordinator
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4. Key Dates

Project start date: 10/1/2015
Project completion date: 6/30/2017

First Fiscal Year: [year]
Final Fiscal Year: [year]
[List revised dates and corresponding amendment numbers]

5. **<u>Project Status</u>** (Completed by project investigator)

Task 1: TAC Meeting
Percent completed reported in last quarterly report: 100%

Task 2: Draft Literature Review and Draft Methodology
Percent completed reported in last quarterly report: 99%
Percent completed after this quarter: 99%

Key Progress-To-Date
- Draft literature review was completed.
- Interim report for the literature review was sent to the TAC.

Specific Progress This Quarter
- Recent studies on cracking were investigated.

Problems
- None

Work Planned for Next Quarter
- Literature review document will be updated and improved.

Task 3: TAC Meeting
Percent completed reported in last quarterly report: 100%

Task 4: Data Collection – Laboratory Testing
Percent completed reported in last quarterly report: 40%
Percent completed after this quarter: 60%

Key Progress-To-Date
- Field cores and blocks were collected. Field samples were cut at OSU asphalt lab to get them ready for lab testing.
- A meeting was held to determine the type of material and sampling for experimental plans #2, 3, and 4. Plant sampling was done in early September before construction.
- Plant sampling has been completed. Binders, loose production mix, virgin and RAP aggregates for the US30 road construction were collected. As stated in the experimental plan, there are three mixes to evaluate: i) PG70-22ER-3/8in NMAS-20%RAP; ii) PG70-22ER-1/2in NMAS-20%RAP; and iii) PG70-22-1/2in NMAS-20%RAP.
- Experimental plan #1 completed.
- Samples for experimental plan #2 were produced.
- Majority of tests for experimental plan#2 were completed.

Specific Progress This Quarter

- Samples for experimental plan #2 were produced and prepared for testing.
- Majority of tests for experimental plan#2 were completed.

Problems

- None

Work Planned for Next Quarter

- Complete experimental plan#2 early February, analyze test results, and determine the most effective cracking test. Discuss results with TAC and decide on a plan for experimental plan#3 testing.
- In March, complete 40% of sample production for experimental plan#3 and start conducting experiments.

Task 5: Analysis of Laboratory Results

Percent completed reported in last quarterly report: 20%
Percent completed after this quarter: 40%

Key Progress-To-Date

- A MATLAB code is developed to extract cracking parameters from semi-circular bend test.
- 80% of test results for experimental plan #1 are analyzed.
- Results for experimental plan#2 were started to be analyzed.

Specific Progress This Quarter

- A MATLAB code is developed to extract cracking parameters from semi-circular bend test.
- Test results for conducted experiments were analyzed.

Problems

- None

Work Planned for Next Quarter

- Continue conducting experiments and analyzing data.
- Complete experimental plan#2 early February, analyze test results, and determine the most effective cracking test. Discuss results with TAC and decide on a plan for experimental plan#3 testing.

Task 6: Field Performance Data

Percent completed reported in last quarterly report: 30%
Percent completed after this quarter: 50%

Key Progress-To-Date

- Field performance data (cracking) for some sections were determined by using past reports to determine candidate sections for field sampling. These sections and field sampling were discussed at the 2nd TAC meeting in February to make a final decision.
- Analyzed and evaluated the data collected in previous ODOT research projects for the sections that are started to be tested in experimental plan #1.

Specific Progress This Quarter

- Analyzed the field data and compared the results with lab test results.

Problems

- None

Work Planned for Next Quarter

- Continue comparing field performance data with lab test results to determine the most effective cracking experiment.

Task 7: MEPDG Simulations
Percent completed reported in last quarterly report: 10%
Percent completed after this quarter: 20%

Key Progress-To-Date

- MEPDG software is purchased and OSU started to work on the models to decide the type of analysis that will be conducted for field performance simulation.
- Model coefficients for the tested samples were started to be developed.

Specific Progress This Quarter

- Model coefficients for the tested samples were calculated.

Problems

- None

Work Planned for Next Quarter

- Continue developing model coefficients for MEPDG using the test results.

Task 8: Data Collection – Mixture Properties/ Durability
Percent completed reported in last quarterly report: -
Percent completed after this quarter:20%

Key Progress-To-Date

- -

Specific Progress This Quarter

- -

Problems
- -

Work Planned for Next Quarter
- OSU will start calculating the parameters, preparing the plots, and results summary for the report.

Task 9: Draft Final Report
Percent completed reported in last quarterly report: -
Percent completed after this quarter:-

Key Progress-To-Date
- -

Specific Progress This Quarter
- -

Problems
- -

Work Planned for Next Quarter
- -

Task 10: Draft ODOT Research Note
Percent completed reported in last quarterly report: -
Percent completed after this quarter:-

Key Progress-To-Date
- -

Specific Progress This Quarter
- -

Problems
- -

Work Planned for Next Quarter
- -

Task 11: TAC Meeting

Percent completed reported in last quarterly report: -
Percent completed after this quarter:-

Key Progress-To-Date

- -

Specific Progress This Quarter

- -

Problems

- -

Work Planned for Next Quarter

- -

Task 12: Final Report
Percent completed reported in last quarterly report: -
Percent completed after this quarter:-

Key Progress-To-Date

- -

Specific Progress This Quarter

- -

Problems

- -

Work Planned for Next Quarter

- -

Task 13: Final ODOT Research Note
Percent completed reported in last quarterly report: -
Percent completed after this quarter:-

Key Progress-To-Date

- -

Specific Progress This Quarter

- -

Problems

- -

Work Planned for Next Quarter

- -

6. **Project Coordinator's Comments** (Completed by ODOT)

7. **Finances** (Completed by ODOT)

SPR Project Summary

VENDOR	FY'16	FY'17	FY'18	FY'19	TOTALS
ORIGINAL BUDGET					$ -
WORK PLAN BUDGET	$ 73,262	$ 96,738	$ -	$ -	$ 170,000
REVISED BUDGET	**$ 36,000**	**$ 123,000**	**$ 11,000**	**$ -**	**$ 170,000**
EXPENDITURES - VENDOR	$ 37,023	$ -	$ -	$ -	$ 37,023
BALANCE	$ (1,023)	$ 123,000	$ 11,000	$ -	$ 132,977
ODOT	FY'16	FY'17	FY'18	FY'19	TOTALS
ORIGINAL BUDGET	$ 57,000	$ 95,000	$ 38,000	$ -	$ 190,000
REVISED BUDGET	**$ 6,000**	**$ 6,000**	**$ 9,000**	**$ -**	**$ 21,000**
EXPENDITURES - ODOT	$ 6,742	$ 2,837	$ -	$ -	$ 9,579
BALANCE	$ (742)	$ 3,163	$ 9,000	$ -	$ 11,421
PROJECT	FY'16	FY'17	FY'18	FY'19	TOTALS
ORIGINAL BUDGET	$ 57,000	$ 95,000	$ 38,000	$ -	$ 190,000
REVISED BUDGET	**$ 42,000**	**$ 129,000**	**$ 20,000**	**$ -**	**$ 191,000**
EXPENDITURES - PROJECT	$ 43,765	$ 2,837	$ -	$ -	$ 46,602
BALANCE	$ (1,765)	$ 126,163	$ 20,000	$ -	$ 144,398

(a)

(b)

Specimens prepared for testing (a) Compacted blocks for beam sample extraction (b) Tested SCB cores.