



SPR Quarterly Progress Report
Jan. 1, 2009 through March 31, 2009

Date March 31, 2009

TO: Technical Advisory Committee Members:

James Garrard, ODOT
Ray Bottenberg, ODOT
Steven Soltesz, ODOT
Tim Rogers, FHWA
Bernie Covino

FROM: Steve Soltesz, Research Engineer, phone: (503) 986-2851

1. Project

Replacing Thermal Sprayed Zinc Anodes
SPR # 682

2. Key Dates

Start Date for ODOT: July 2008
Completion Date for ODOT: September 2010

3. Principal Investigator

Xianming Shi, PhD, PE
Associate Research Professor
Corrosion and Sustainable Infrastructure Laboratory
Western Transportation Institute
Montana State University
Bozeman, MT 59717-4250

4. Progress

- Task 1: Survey of the current practice (98% complete)

The research team has conducted a comprehensive literature review to gather existing information relevant to this project, including CP basics, concrete surface preparation, anode material options, methods of testing anode performance and predicting anode service life, methods of anode application/installation and replacement, methods of

monitoring performance of CP systems, and other advancements in the CP technologies. A detailed Internet-based search was conducted, using online databases; and a draft literature review report has been prepared. On the basis of the literature review, the research team has also designed and widely distributed two online surveys aimed to identify key contacts and to capture the CP field experience of ODOT and other identified agencies, with particular emphasis on their successes or failures with the use of thermally sprayed zinc to protect bridge substructures and methods for old anode removal and surface preparation before the new anode application. CP experience of other industries such as those protecting naval facilities and parking structures were sought, through the survey of consulting firms (such as Corrpro and Vector) and targeted practitioners and researchers. The two surveys were delivered to the TAC for review and comments and then the revised surveys were distributed to the identified contacts and professional forums. In the last reporting period, we obtained the survey responses and completed the literature review report draft.

- Task 2: Investigation methods of zinc anode removal and concrete surface preparation (15% complete)

The research team coordinated with ODOT and NETL to identify the samples from previous research projects related to this topic and obtained the concrete samples. Experiments have been designed to conduct the preliminary laboratory investigation, on the basis of the information gathered from the comprehensive literature review and the surveys. We also identified ways of renting several critical equipment needed for the laboratory experiments. Some trials were conducted to explore the reasonable ranges of influential factors. In the next quarter, more experiments will be conducted in order to produce useful data to guide the design of experiments to be conducted on the field concrete structure.

- Task 3: Final report and presentation (0% complete)

5. **Problems**

- None encountered so far. It should be noted, however, that the actual research contract was not signed until August 7, 2008, which caused some delay in the project schedule. The research team at WTI-MSU has requested to borrow the thermal spray equipment from ODOT if it can be located; but we decided to move forward with the renting option.

6. **Work Planned for Next Quarter**

- We plan to accelerate the progress on Task 2 in the next quarter. We will identify, investigate and compare the various methods used to remove existing thermally sprayed zinc anodes and to further treat the concrete surface prior to the new anode application. To identify key factors to be investigated and to aid the experimental design, the research team will consult existing surface preparation standards. In the WTI Corrosion and Sustainable Infrastructure Laboratory, the research team will

experiment various methods to remove existing TS-Zn anodes and methods to further treat the concrete surface prior to the new TS-Zn anode application, using hundreds of specimens cored from reinforced concrete slabs provided by the NETL, which feature TS-Zn anode coating electrochemically aged to various degrees.

7. Finances

VENDOR	FY'09	FY'10	FY11	FY'12	TOTALS
ORIGINAL BUDGET	\$ -	\$ -			\$ -
REVISED BUDGET	\$ 125,227	\$ 64,773	\$ -		\$ 190,000
EXPENDITURES - VENDOR	\$ 57,049	\$ -	\$ -	\$ -	\$ 57,049
BALANCE	\$ 68,178	\$ 64,773	\$ -	\$ -	\$ 132,951
ODOT	FY'09	FY'10	FY11	FY'12	TOTALS
ORIGINAL BUDGET	\$61,250	\$122,500	\$61,250		\$ 245,000
REVISED BUDGET	\$6,000	\$5,000	\$0		\$ 11,000
EXPENDITURES - ODOT	\$ 5,203	\$ -	\$ -	\$ -	\$ 5,203
BALANCE	\$ 797	\$ 5,000	\$ -	\$ -	\$ 5,797
PROJECT	FY'09	FY'10	FY11	FY'12	TOTALS
ORIGINAL BUDGET	\$ 61,250	\$ 122,500	\$ 61,250	\$ -	\$ 245,000
REVISED BUDGET	\$ 131,227	\$ 69,773	\$ -	\$ -	\$ 201,000
EXPENDITURES - PROJECT	\$ 62,252	\$ -	\$ -		\$ 62,252
BALANCE	\$ 68,975	\$ 69,773	\$ -	\$ -	\$ 138,748

Account Description	Budget	Spent	Outstanding	Remaining
Expense				
61111 Vacation	0.00	1,693.33	0.00	(1,693.33)
Total Acct Type:	0.00	1,693.33	0.00	(1,693.33)
61124 Professionals	78,585.00	26,113.64	182.00	52,289.36
61125 Classified	0.00	238.84	0.00	(238.84)
61127 Grad Research Assist	0.00	125.56	0.00	(125.56)
Total Acct Type: FAC/PROF/CLASSI/GRAD	78,585.00	26,478.04	182.00	51,924.96
61225 STUDENT LABOR	0.00	328.53	0.00	(328.53)
Total Acct Type: Temp Hrly/Stud/W-S	0.00	328.53	0.00	(328.53)
Total Salary	78,585.00	28,499.90	182.00	49,903.10
61499 Benefits-General	25,934.00	11,114.74	0.00	14,819.26
Total Acct Type:	25,934.00	11,114.74	0.00	14,819.26
Total Benefits	25,934.00	11,114.74	0.00	14,819.26
Total Personnel Services	104,519.00	39,614.64	182.00	64,722.36
62198 Campus Services	0.00	315.00	0.00	(315.00)
62199 General Contracted S	10,365.00	0.00	0.00	10,365.00
Total Acct Type: Contracted Services	10,365.00	315.00	0.00	10,050.00
62210 Minor Tools/Inst/Equ	0.00	33.69	506.61	(540.30)
62244 Chemicals	0.00	0.00	33.33	(33.33)
62299 General Sup/Materi	13,000.00	0.00	0.00	13,000.00
62827M Admin Cost - IDC	55,724.00	17,014.67	0.00	38,709.33
Total Acct Type: Supplies	68,724.00	17,048.36	539.94	51,135.70
62304 Postage/Mailing	0.00	71.18	0.00	(71.18)
62399 General Communicatio	200.00	0.00	0.00	200.00
Total Acct Type: Communications	200.00	71.18	0.00	128.82
62499 General Travel	6,192.00	0.00	0.00	6,192.00
Total Acct Type: Travel	6,192.00	0.00	0.00	6,192.00
Total Operations	85,481.00	17,434.54	539.94	67,506.52
TOTAL EXPENSE	190,000.00	57,049.18	721.94	132,228.88
BALANCE	190,000.00	57,049.18	721.94	132,228.88

WTI Expenditures

Account Description	Budget	Spent	Outstanding	Remaining
Expense				
61499 Benefits-General	4,516.00	2,465.51	0.00	2,050.49
Total Acct Type:	4,516.00	2,465.51	0.00	2,050.49
Total Benefits	4,516.00	2,465.51	0.00	2,050.49
61124 Professionals	13,685.00	6,359.03	1,662.50	5,663.47
61125 Classified	0.00	43.72	0.00	(43.72)
Total Acct Type: FAC/PROF/CLASSI/GRAD	13,685.00	6,402.75	1,662.50	5,619.75
Total Salary	13,685.00	6,402.75	1,662.50	5,619.75
Total Personnel Services	18,201.00	8,868.26	1,662.50	7,670.24
62299 General Sup/Materi	3,000.00	0.00	0.00	3,000.00
62827M Admin Cost - IDC	8,799.00	3,680.30	0.00	5,118.70
Total Acct Type: Supplies	11,799.00	3,680.30	0.00	8,118.70
Total Operations	11,799.00	3,680.30	0.00	8,118.70
TOTAL EXPENSE	30,000.00	12,548.56	1,662.50	15,788.94
BALANCE	30,000.00	12,548.56	1,662.50	15,788.94