



OREGON DEPARTMENT OF TRANSPORTATION

Research Unit  
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**SPR Quarterly Progress Report**  
Oct. 1, 2008 through Dec. 31, 2008

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Date Jan. 27, 2009

**TO:** Technical Advisory Committee Members:

James Garrard, ODOT  
Ray Bottenberg, ODOT  
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Tim Rogers, FHWA  
Bernie Covino, NETL

**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  
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**4. Progress**

- Task 1: Survey of the current practice (90% 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 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 will be sought, potentially through the survey of consulting firms such as Corpro and Vector. In the last reporting period, 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.

- Task 2: Investigation methods of zinc anode removal and concrete surface preparation (10% 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 start the laboratory investigation in the next reporting period.

- 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. Otherwise, the research team will procure the equipment using project funds.

## 6. **Work Planned for Next Quarter**

- We plan to complete Task 1 in the next quarter and deliver a literature review report documenting Task 1 findings before Feb. 15, 2009.
- We will accelerate the progress on Task 2 once we identify a detailed plan for coating removal etc. Utilizing the research findings from Task 1, the research team 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

Account Description	Budget	Spent	Outstanding	Remaining
<b>Expense</b>				
61111 Vacation	0.00	1,693.33	0.00	(1,693.33)
<b>Total Acct Type:</b>	<b>0.00</b>	<b>1,693.33</b>	<b>0.00</b>	<b>(1,693.33)</b>
61124 Professionals	78,585.00	19,033.23	3,409.14	56,142.63
61125 Classified	0.00	192.24	0.00	(192.24)
61127 Grad Research Assist	0.00	125.56	0.00	(125.56)
<b>Total Acct Type: FAC/PROF/CLASSI/GRAD</b>	<b>78,585.00</b>	<b>19,351.03</b>	<b>3,409.14</b>	<b>55,824.83</b>
61225 STUDENT LABOR	0.00	328.53	0.00	(328.53)
<b>Total Acct Type: Temp Hrly/Stud/W-S</b>	<b>0.00</b>	<b>328.53</b>	<b>0.00</b>	<b>(328.53)</b>
<b>Total Salary</b>	<b>78,585.00</b>	<b>21,372.89</b>	<b>3,409.14</b>	<b>53,802.97</b>
61499 Benefits-General	25,934.00	8,280.52	0.00	17,653.48
<b>Total Acct Type:</b>	<b>25,934.00</b>	<b>8,280.52</b>	<b>0.00</b>	<b>17,653.48</b>
<b>Total Benefits</b>	<b>25,934.00</b>	<b>8,280.52</b>	<b>0.00</b>	<b>17,653.48</b>
<b>Total Personnel Services</b>	<b>104,519.00</b>	<b>29,653.41</b>	<b>3,409.14</b>	<b>71,456.45</b>
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
<b>Total Acct Type: Contracted Services</b>	<b>10,365.00</b>	<b>315.00</b>	<b>0.00</b>	<b>10,050.00</b>
62299 General Sup/Materi	13,000.00	0.00	0.00	13,000.00
62827M Admin Cost - IDC	55,724.00	12,766.83	0.00	42,957.17
<b>Total Acct Type: Supplies</b>	<b>68,724.00</b>	<b>12,766.83</b>	<b>0.00</b>	<b>55,957.17</b>
62304 Postage/Mailing	0.00	71.18	0.00	(71.18)
62399 General Communicatio	200.00	0.00	0.00	200.00
<b>Total Acct Type: Communications</b>	<b>200.00</b>	<b>71.18</b>	<b>0.00</b>	<b>128.82</b>
62499 General Travel	6,192.00	0.00	0.00	6,192.00
<b>Total Acct Type: Travel</b>	<b>6,192.00</b>	<b>0.00</b>	<b>0.00</b>	<b>6,192.00</b>
<b>Total Operations</b>	<b>85,481.00</b>	<b>13,153.01</b>	<b>0.00</b>	<b>72,327.99</b>
<b>TOTAL EXPENSE</b>	<b>190,000.00</b>	<b>42,806.42</b>	<b>3,409.14</b>	<b>143,784.44</b>
<b>BALANCE</b>	<b>190,000.00</b>	<b>42,806.42</b>	<b>3,409.14</b>	<b>143,784.44</b>

## WTI Expenditures

Account Description	Budget	Spent	Outstanding	Remaining
<b>Expense</b>				
61499 Benefits-General	4,516.00	138.51	0.00	4,377.49
<b>Total Acct Type:</b>	<b>4,516.00</b>	<b>138.51</b>	<b>0.00</b>	<b>4,377.49</b>
<b>Total Benefits</b>	<b>4,516.00</b>	<b>138.51</b>	<b>0.00</b>	<b>4,377.49</b>
61124 Professionals	13,685.00	379.73	3,720.60	9,584.67
61125 Classified	0.00	43.72	0.00	(43.72)
<b>Total Acct Type: FAC/PROF/CLASSI/GRAD</b>	<b>13,685.00</b>	<b>423.45</b>	<b>3,720.60</b>	<b>9,540.95</b>
<b>Total Salary</b>	<b>13,685.00</b>	<b>423.45</b>	<b>3,720.60</b>	<b>9,540.95</b>
<b>Total Personnel Services</b>	<b>18,201.00</b>	<b>561.96</b>	<b>3,720.60</b>	<b>13,918.44</b>
62299 General Sup/Materi	3,000.00	0.00	0.00	3,000.00
62827M Admin Cost - IDC	8,799.00	233.19	0.00	8,565.81
<b>Total Acct Type: Supplies</b>	<b>11,799.00</b>	<b>233.19</b>	<b>0.00</b>	<b>11,565.81</b>
<b>Total Operations</b>	<b>11,799.00</b>	<b>233.19</b>	<b>0.00</b>	<b>11,565.81</b>
<b>TOTAL EXPENSE</b>	<b>30,000.00</b>	<b>795.15</b>	<b>3,720.60</b>	<b>25,484.25</b>
<b>BALANCE</b>	<b>30,000.00</b>	<b>795.15</b>	<b>3,720.60</b>	<b>25,484.25</b>

VENDOR	FY'09	FY'10	FY11	FY'12	TOTALS
ORIGINAL BUDGET	\$ -	\$ -			\$ -
<b>REVISED BUDGET</b>	<b>\$ 125,227</b>	<b>\$ 64,773</b>	<b>\$ -</b>		<b>\$ 190,000</b>
EXPENDITURES - VENDOR	\$ 32,411	\$ -	\$ -	\$ -	\$ 32,411
<b>BALANCE</b>	<b>\$ 92,816</b>	<b>\$ 64,773</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 157,589</b>
<b>ODOT</b>					
	FY'09	FY'10	FY11	FY'12	TOTALS
ORIGINAL BUDGET	\$61,250	\$122,500	\$61,250		\$ 245,000
<b>REVISED BUDGET</b>	<b>\$5,000</b>	<b>\$5,000</b>	<b>\$0</b>		<b>\$ 10,000</b>
EXPENDITURES - ODOT	\$ 3,773	\$ -	\$ -	\$ -	\$ 3,773
<b>BALANCE</b>	<b>\$ 1,227</b>	<b>\$ 5,000</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 6,227</b>
<b>PROJECT</b>					
	FY'09	FY'10	FY11	FY'12	TOTALS
ORIGINAL BUDGET	\$ 61,250	\$ 122,500	\$ 61,250	\$ -	\$ 245,000
<b>REVISED BUDGET</b>	<b>\$ 130,227</b>	<b>\$ 69,773</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 200,000</b>
EXPENDITURES - PROJECT	\$ 36,184	\$ -	\$ -		\$ 36,184
<b>BALANCE</b>	<b>\$ 94,043</b>	<b>\$ 69,773</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 163,816</b>