



OREGON DEPARTMENT OF TRANSPORTATION

Research Unit  
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Salem, OR 97301

**SPR Quarterly Progress Report**  
April 1, 2009 through June 30, 2009

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**TO:** Technical Advisory Committee Members:

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**1. Project**

Density Verification for Hot Mixed Asphalt Concrete Pavement  
SPR # 666

**2. Key Dates**

Start Date for ODOT: October 1, 2007  
Completion Date for ODOT: September 30, 2009

**3. Principal Investigator**

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**4. Progress**

- Completed the statistical analysis of remaining correlations for test results obtained thus far.
- Completed a draft of the final report from *Introduction to Discussion of Results*, but excluding *Conclusions and Recommendations*. The scope of the draft report includes evidence to answer the following questions:

- Is it necessary to correlate nuclear gauge readings to cores from each lift of hot mix asphalt (HMA) placed in multiple lifts with the same mix design for each lift?
- On mill & fill (inlay) plus overlay projects, is there a significant difference between the nuclear gauge calibration factors for the fill (inlay) material and the overlay material?
- Began finalizing the appendices (summaries of data and statistical analyses) for the final report.
- Prepared a report for the TAC meeting on June 15<sup>th</sup>, 2009 where evidence was provided to suggest that core correlations are necessary because of significant difference between gauge density values and core density values.
- Results related to non-nuclear gauges have been summarized.
- In the process of gathering and summarizing if core correlations must be performed on each and every lift of a paving project. A core correlation recommendation procedure is in the process of being created (i.e. when to perform core correlation; which lift to perform core correlation; how many cores to use?).
- Conducted nuclear gauge measurements and obtained cores for two projects (one on I-5 and one on OR 18) to answer the following questions:
  - For projects incorporating different mix designs for individual lifts (e.g., use of a rich-bottom base), is there a significant difference between nuclear gauge calibration factors for the different mixtures?
  - Is there a significant difference between core correlation factors derived from cores obtained from the corner of the overlapping portion of the nuclear gauge measurement footprint and cores obtained from the center of the overlapping portion of the footprint?
- Obtained blocks from the I-5 project.

## 5. **Problems**

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## 6. **Work Planned for Next Quarter (Apr-Jun 2009)**

- Complete all testing of the cores obtained from the I-5 and OR 18 projects.
- Cut and test the blocks, core the blocks, and test the cores.
- Summarize and analyze the results from the I-5 and OR 18 cores.
- Choose a project to answer: Can a dedicated location marked on the lift surface be used to spot-check nuclear gauge readings to determine if recalibration (e.g., a new core correlation) is necessary?
- Review the data collected and analyzed thus far to answer: Is it appropriate to continue to allow use of the saturated surface-dry (SSD) method for determining the bulk specific gravity of a core even if the water absorption of the core is greater than 2%.

7. **Finances**

SPR Project Summary

<b>VENDOR</b>	<b>FY'08</b>	<b>FY'09</b>	<b>FY'10</b>	<b>FY11</b>	<b>TOTALS</b>
ORIGINAL BUDGET	\$ 55,000	\$ 85,000			\$ 140,000
<b>REVISED BUDGET</b>	\$ 29,569	\$ 60,000	\$ 30,431		\$ 120,000
EXPENDITURES - VENDOR	\$ 29,569	\$ 49,642	\$ -	\$ -	\$ 79,211
<b>BALANCE</b>	\$ -	\$ 10,358	\$ 30,431	\$ -	\$ 40,789

<b>ODOT</b>	<b>FY'08</b>	<b>FY'09</b>	<b>FY'10</b>	<b>FY11</b>	<b>TOTALS</b>
ORIGINAL BUDGET	\$ 4,000	\$ 5,000			\$ 9,000
<b>REVISED BUDGET</b>	\$ 3,148	\$ 8,758	\$ 1,500		\$ 13,406
EXPENDITURES - ODOT	\$ 3,148	\$ 8,758	\$ -	\$ -	\$ 11,906
<b>BALANCE</b>	\$ -	\$ -	\$ 1,500	\$ -	\$ 1,500

<b>PROJECT</b>	<b>FY'08</b>	<b>FY'09</b>	<b>FY'10</b>	<b>FY11</b>	<b>TOTALS</b>
ORIGINAL BUDGET	\$ 59,000	\$ 90,000	\$ -	\$ -	\$ 149,000
<b>REVISED BUDGET</b>	\$ 32,717	\$ 68,758	\$ 31,931	\$ -	\$ 133,406
EXPENDITURES - PROJECT	\$ 32,717	\$ 58,400	\$ -		\$ 91,117
<b>BALANCE</b>	\$ -	\$ 10,358	\$ 31,931	\$ -	\$ 42,289