

FY 2010 RESEARCH PROBLEM STATEMENT

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ODOT Research Unit
200 Hawthorne Ave. SE, Suite B-240
Salem, OR 97301-5192

Office Phone: (503) 986-2700
FAX Phone: (503) 986-2844

TITLE ([more info](#))

Applicability of Porous Friction Courses in Oregon: Evaluation of Particulate Fouling

PROBLEM (Description of need) ([more info](#))

Porous friction courses (PFCs) are increasingly being used by state DOTs across the U.S. as an innovative way to manage stormwater runoff from highways. Among the benefits of PFCs are reduced splash and spray, improved visibility, improved traction, reduced highway noise, and improved stormwater quality. Despite these potential benefits, many questions remain regarding the design, construction and maintenance of PFCs and whether they are appropriate for installation in the Pacific Northwest. Specifically, the lifetime of PFCs and maintenance requirements, especially in northern climates is a significant concern. For example, improvements in water quality are gained largely through filtration of the stormwater through the PFC prior to discharge at the edge of the roadway. Over time, it is likely that the pore spaces will become clogged with particulate matter or fines from aggregates applied during the winter months and the benefits of the PFC will be diminished or lost altogether. Further research is necessary to determine whether or not PFCs are a viable alternative for ODOT to consider in improving safety, noise pollution, and stormwater quality.

PROPOSED RESEARCH, DEVELOPMENT OR TECHNOLOGY TRANSFER ACTIVITY ([more info](#))

The proposed research would examine the factors influencing the rate of PFC clogging and the potential reversibility of that clogging through routine cleaning. This work would focus on removal of total suspended solids as stormwater runoff passes through PFC matrices in bench and pilot scale tests. For example, sample cores of a PFC installation would be subjected to intermittent applications of particle laden water designed to simulate highway stormwater runoff. Simulated rainfall rates and storm frequencies would be designed to emulate weather conditions in the various eco-regions of Oregon. Furthermore, because one of the primary concerns with PFC installations in northern climates is their performance in freezing conditions, the effects of the application of aggregate for improved traction on the rate of PFC fouling will also be examined. Measurements of the reduction in flowrate and/or increased headloss through the PFC over time will indicate clogging of the porous matrix. This data will be used to predict the time to complete clogging along with appropriate cleaning intervals. Various cleaning procedures, including pressure washing and vacuuming that are currently employed in Europe will be investigated as means to clean the PFC media. Bench-scale experiments would be followed by pilot scale installations on actual or test roadways. It is likely that the work would also include progress toward developing improved PFC mixes that may be more applicable in Oregon.

BENEFITS [\(more info\)](#)

Porous friction courses are one of many innovative stormwater management techniques available to ODOT. However, many questions remain regarding the applicability of PFCs in Oregon. Chief among those concerns is the lifetime of PFCs and the associated maintenance requirements. PFC clogging by suspended solids washed off of vehicles, or applied to roads in the form of aggregates for improved traction is likely to be a primary determinant of PFC lifetime and maintenance requirements. Data generated during this study will allow ODOT to more knowledgeably evaluate whether or not PFCs are a viable and cost-effective alternative for improving safety, reducing noise pollution and improving stormwater quality. There is also the potential for the development of new PFC mixes that may be more applicable in Oregon.

CONTACT INFORMATION:

Name ¹ :	<input type="text" value="Jeffrey Nason"/>	Name ² :	<input type="text"/>
Address ¹ :	<input type="text" value="School of Chemical, Biological, and Environmental Engineering
Oregon State University
103 Gleeson Hall
Corvallis, OR 97331"/>	Address ² :	<input type="text"/>
Email ¹ :	<input type="text" value="jeff.nason@oregonstate.edu"/>	Email ² :	<input type="text"/>
Phone ¹ :	<input type="text" value="541-737-9911"/>	Phone ² :	<input type="text"/>

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