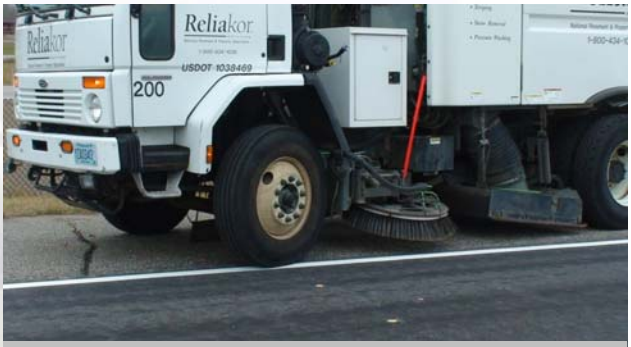
EXPLORING POROUS PAVEMENT MAINTENANCE STRATEGIES

Mn/DOT demonstrated a porous pavement vacuuming process using equipment owned and operated by Reliakor, a Minnesota based Company at MnROAD on November 4, 2009. Pervious concrete test cells 85 and 89 and porous asphalt cells 86 and 88 were vacuumed. Representatives from Mn/DOT Metro District, Mn/DOT Research, Mn/DOT Tech Support, Mn/DOT Maintenance Research, the City of Minneapolis, DNR, and Reliakor Services Inc were in attendance.



Reliakor Vacuum at MnROAD.

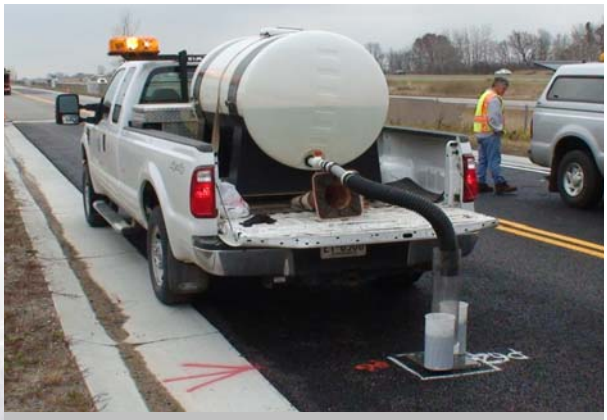
The test cells were approximately one year old at the time of the demonstration and were in good condition. The pervious concrete test cells had no surface raveling or joint distress and very few fine cracks. The porous asphalt test cells had isolated areas of surface raveling and light rutting. The voids in the pervious concrete and porous asphalt test cells appeared to be clean and free of debris. It is important to note that the brush on the vacuum was not used. The brush could pack debris further into the voids and increase clogging in the pervious/porous pavements.

Debris removed by Reliakor Vacuum.

The contents of the vacuum were emptied after vacuuming each test cell. While the test sections did not have visible debris in the voids, there was some surface material, likely from the shoulders and neighboring test cells. In the porous asphalt test cells 86 and 88 there were some areas of surface raveling where loose aggregate was removed by the vacuum.

Permeability Measurement

Flow measurements were made the day before and immediately after vacuuming. The change in permeability was measured using a falling head permeability device. This device consisted of a 90 centimeter long clear vertical six inch diameter tube that was sealed to the pavement surface using duct seal compound. A water tank and hose was then used to fill the tube with water. The water was then allowed to calm down and drain smoothly before timing began. The time that it took the water to drain from 37 cm to 11 cm was recorded at each test spot.



Mn/DOT Permeability Device.

One spot was tested in each test cell at the wheel path. Since the pervious concrete test cells (85 and 89) were very clean with no surface distress there was very little change in flow time. In the porous asphalt test cells, there was a 30% and 23% decrease in flow time in cells 86 and 88 respectively. This greater improvement is likely due to the removal of the raveled surface aggregate.

TABLE 1 Flow Times Before and After Vacuuming

Cell No.	Type	Before Time (s)	After Time (s)	% Change
85	Pervious Concrete	6.0	6.0	0
86	Porous Asphalt	7.2	5.0	30
88	Porous Asphalt	9.4	7.3	23
89	Pervious Concrete	17.0	15.5	9

Remarks

Mn/DOT Research plans to perform routine vacuuming of the porous cells 39, 85, 86, 88, & 89 two or three times a year.

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