EVALUATION OF CLEANING METHODS FOR PERVIOUS CONCRETE PAVEMENT

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Outline

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Introduction

- Pervious pavements allow water to percolate through and charge the ground water table.
- Void content 20-40%
- UTC analyzed debris found in pervious pavements and cleaning methods.
  - Sweeping
  - Pressure washing
Benefits of Pervious Pavements

- Recharge the ground water table with water from precipitation.
- On safety, pervious pavements reduce hydroplaning.
- Increased surface friction/skid resistance.
- Pavement noise reduction.
- Excellent insulator when used in walls.
Project Description - Finley Stadium
Laboratory Testing

- Cores: 4in. wetted core drill bit, air dried and stored in the refrigerator.
- Modified falling head infiltration rate test on:
  - Original, swept cores and pressure washed cores
- Standard sieve analysis (ASTM C136)
- Atterberg limits (ASTM D4318)
- Organics test (UW Lab, 2004)
Results and Analysis

Flow Comparison

Mass Removed From Cleaning
## Statistical comparison of the samples

<table>
<thead>
<tr>
<th>Original un-cleaned samples: Post Sweep</th>
<th>Post Sweep: Post Pressure Wash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample</td>
<td>p-Value</td>
</tr>
<tr>
<td>--------</td>
<td>---------</td>
</tr>
<tr>
<td>A</td>
<td>7.7E-07</td>
</tr>
<tr>
<td>B</td>
<td>3.2E-07</td>
</tr>
<tr>
<td>C</td>
<td>1.4E-01</td>
</tr>
<tr>
<td>E</td>
<td>3.3E-07</td>
</tr>
<tr>
<td>F</td>
<td>4.9E-02</td>
</tr>
</tbody>
</table>
Conclusions and recommendations

- The debris that clogged the samples was mainly non-cohesive material passing No. 40 sieve.
- Depth of clogged voids was found to be about 1 in.
- Not all the clogged material was from the surroundings some was brought in by other means.
Conclusions and recommendations

- On average, sweeping increased infiltration rate by average of 144%.
- About 1 g. (0.0022 lb.) of material was removed per sample ~ 0.3 lb/ft\(^2\) of debris.
- Pressure washing, on average increased infiltration rate by average of 288%.
- It removed about 8.6 g (0.019 lb.) of debris from the samples ~2.5 lb/ft\(^2\).
Conclusions and recommendations

- Sand, salts and deicing materials were not used on this site.
- Sweeping removed some debris from the sample, pressure washing removed significant amount of debris from the samples.
- Organic materials were tested to be <5% and soil from the garden around 30%.
- Clogging debris should not be expected to decompose.
References


Sanford Charles, (2014) A Study on The Debris Found in a Pervious Concrete Sample Master’s Thesis submitted to the University of Tennessee at Chattanooga. May 2014.
