Long-term Performance of Stormwater Infiltration Facilities

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Urban stormwater: Resource or Risk?

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What is WSUD?

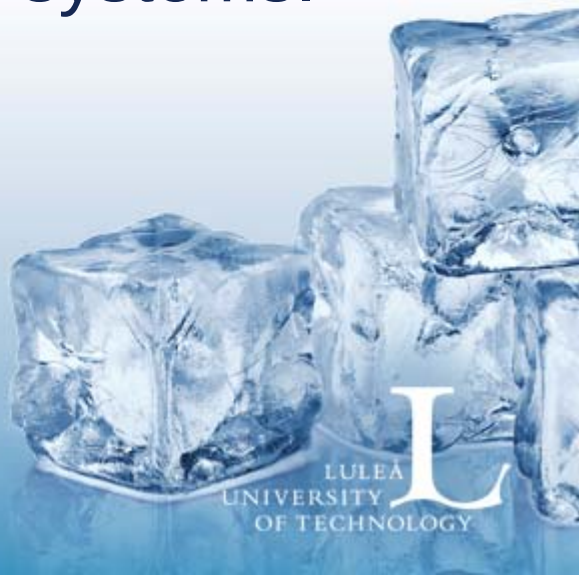
- Water sensitive urban design **(WSUD)** methods are an alternative approach to conventional urban drainage systems. There are various WSUD methods which can be used as the long term solution to reduce stormwater runoff and peak flows, improve water quality, and integrate stormwater treatment into landscape. Furthermore, they can be used for stormwater harvesting and reuse.

Common methods

- Green roofs
- Swales
- Buffer strips
- Sediment basins
- Bioretention systems
- Wetlands
- Porous pavements

Objectives

The objectives of my research are to investigate the long-term performance of infiltration systems (Porous asphalt, concrete gird paver, wetland, bioretention, and green roof) in field and lab, and to investigate maintenance measures to maintain and recover the function of infiltration systems.



Materials and Methods

- In first study (Long-term performance of porous asphalt pavements in northern Sweden) , the infiltration capacity and porosity of two porous asphalt pavements were investigated in two housing streets located within Luleå and Haparanda, northern Sweden. It was also investigated if vacuum cleaning could recover the infiltration capacity and porosity of the asphalts.

Site description

Luleå site

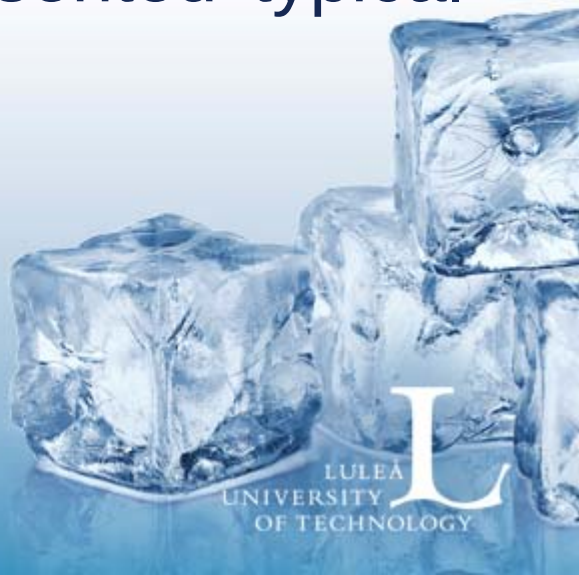
- Constructed in 1993/94.
- Each winter, fine gravel (2 - 4 mm) is applied to the street 2 to 4 times as an anti-slipping agent.
- The gravel is removed with a mechanical sweeper each spring after snowmelt.
- The asphalt was regularly vacuum cleaned (in addition to the annual sweeping after snowmelt).

Haparanda site

- Constructed in 1986/87.
- Each winter, a sand mixture (0 - 6 mm), mixed with 2 % road salt) is applied to the street 5-10 times as an anti-slipping agent.
- The sand is removed with a mechanical sweeper, similar to Luleå.
- The asphalt was never vacuum cleaned.

Sampling

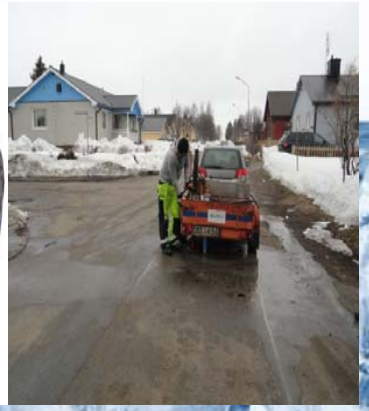
- Measurements were conducted in April and May 2011. Three locations were chosen in Luleå and two locations in Haparanda. In Luleå, each location represents a particular point of interest in the street. The two locations in Haparanda were chosen randomly and represented typical conditions along the street.



Sampling

- Infiltration capacity measurements

- Porosity test



- Vacuum cleaning

Results

- Clogging had significantly reduced the infiltration capacity of the asphalts.
- There was no clear change in the porosity of the asphalts before and after vacuum cleaning.
- Vacuum cleaning could partly restore the infiltration capacity.
- The porous asphalt would not be suitable for long-term use if it is not vacuum cleaned regularly.

Thank you for listening!