EXPLANATORY TEXT FOR PHOTOGRAPHS OF PERMEABLE CONCRETE IN betoni MAGAZINE

1. Normal dense surfaces impermeable. Water flows off to water systems, may overload urban drainage systems.

2. Permeable surfaces function well where low traffic loads – parking areas, lightly trafficked roads, pavements etc. Pervious concrete surface products already available in Finland.

   a. Stone surface, joints 10%, joint material 1/5 washed rubble.
   b. Stone surface, joints 10%, joint material mortar.
   c. Stone surface, joints 5%, joint material 1/5 washed rubble.
   d. Pervious concrete LB-0.
   e. Pervious concrete LB-1.
   f. Heavy rain 2.17 x10^{-5} m/s.

4. CLASS-project handbook for designing, building and maintenance of permeable surfaces.


6. Parking area with pervious concrete.

7. Water permeability of measured by Rig-testing and with single-ring-method (ASTM).

8. Structure of pervious concrete. System of connected 1-8 mm water-permeable voids. Very small air voids in cement paste (<0.8 mm) guarantee good freeze-thaw resistance of pervious concrete.

9-14. Examples of suitable water permeable concrete products made by Finnish concrete companies e.g. paving stones and slabs. Finnish Concrete Industry environment group also developing structural solutions in CLASS project. In pilot projects functionality of structures is tested. As a result of further work new concrete products and pavement materials are being developed.

15. “Viherä”: colorful concrete blocks, fits well between tram rails.

16. Water permeable surface of concrete blocks before filling joints with permeable material. During construction work and after it is important to avoid deposition of any material which may cause blocking.

17. In pilot-projects:
   • different water permeable surface materials are monitored, with consideration of hydrology and structural functionality.
   • functionality, condition and durability are monitored long-term.
   • when possible, water-permeable surface materials and other normally used materials are compared - e.g. skid-resistance of surface and behavior in presence of frost in the ground.


19a. Open system where all water is absorbed into ground.
19b. Closed system where all water is taken and conducted elsewhere.

19c. Combined system where part of the water is absorbed into ground and part is conducted elsewhere.

20. Pilot study where different water permeable materials are tested. In test area there are different parking areas which are isolated from each other, and where different materials are tested and monitored.


22. Pervious concrete can be pigmented (coloured). Good pore structure is essential - air content alone is not enough - pore structure must remain stable during placing, compaction, and when concrete is hardening. Results show that pervious concrete can withstand severe freeze-thaw exposure. Practically, to increase durability, it helps to use very permeable material under the pervious concrete and to avoid de-icing salts.

23. In centre of Tapiola extensive use of 700x700x80 concrete slabs with 20 mm joints. Joints work as a part of water conducting system.

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