Management of transport caused road runoff pollution in the Republic of Slovenia

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Presented by: Mihael Brenčič (with some additions)
First programs 1991
Started in 1994 finished in 2006
Over 550 km
Investment 6 billion €
<table>
<thead>
<tr>
<th></th>
<th>Slovenia</th>
<th>Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precipitation</td>
<td>1567 mm</td>
<td>734 mm</td>
</tr>
<tr>
<td>Evapotranspiration</td>
<td>650 mm</td>
<td>415 mm</td>
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<tr>
<td>Discharge</td>
<td>917 mm</td>
<td>319 mm</td>
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95% of drinking water is supplied from groundwater
Road run-off management

• Very strict regulation
  • Decree of emissions and heat in respect to drainage of waste water from sources of pollution – valid until 1996
    • Strict requirements
    • Many open questions and uncertainties – open space for the interpretation

• Decree on the emission of substances in the discharge of meteoric water from public roads (Official gazette RS 47/2005)
Decree

- Transport of pollutant (rainwater)
- Area of implementation (roads)
- Method of drainage (point oriented or diffused)
- Definition of most appropriate method of drainage in a situation
- Criteria for use in cases of point oriented drainage of rainwater, concerning the type of aquifer which the road was built upon, and traffic load (PCE – passenger car equivalent)
  - Intergranular aquifer and more than 12,000 PCE
  - Karst and crack aquifer and more than 6,000 PCE
  - Aquifer with an average permeability of $10^{-6}$ m/s and more than 40,000 PCE
  - Direct outflow from the roadway to a watercourse or the sea and more than 12,000 PCE

- Point oriented i.e. controlled drainage is to be lead from the roadway through canals and ditches to a recipient (aquifer/river or sewer).

- Collected rainwater can be drained directly into the environment, if its chemical composition does not exceed the specified values

- If the water is not clean enough after leaving the retainer, the critical wave (15 min of rainfall with an intensity of 15 l/s/ha) has to be cleaned by a cleaning system.
Facilities

- Over 800 retention basins
  - Earth basins
  - Concrete basins

- Dual purpose
  - Flattening flood wave and settling
  - Oil separation
    - Lamela filters

- Accidents
  - Preventing spill-off in sensitive areas
Data base - EVIZAC

• All retention basins are included into GIS supported data base
  • Coupled with the data base – Bank of road data

• Information included into the data base
  • Cleaning of the retention basin
  • Rehabilitation and refurbishment
  • Recharge area data
    • Important in the case of pollutant spill – information helping proper sanitation and prevention measures

• The database has been in use for the past 10 years; however, we still feel that it’s potential isn’t being utilized to the fullest extent!
Future

• Until 2016 we have experienced severe economic crisis in construction sector – all activities were stopped
  • This prevent us to further expand activities in the field of road run-off management

• Further tasks and open questions
  • Establishing a live monitoring system for all retention systems on Slovenian highways,
  • Expansion of the EVIZAC database,
  • Implementation of similar retention systems as used on highways, for use on main and regional roads, cities and local roads,
  • Updating the 47/2005 to better fall in line with modern challenges and goals,
  • Implementing results of the PROPER project