

## Research on pollutant load reduction measures for preservation of water environment in urban areas

Whole term

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### **(Purpose)**

In June 2005, the Law Concerning Special Measures for Conservation of Lake Water Quality (common name: Clean Lake Law) was revised, and regulations on points sources were reviewed and promotion of non-point load countermeasures and other matters were specified. Then, in March 2006, the "Basic Concept of Basin Countermeasures for Lake Water Quality" was drawn up by the Ministry of Land, Infrastructure and Transport (MLIT), Ministry of Agriculture, Forestry and Fisheries (MAFF), Forestry Agency, and Ministry of the Environment (MOE), presenting the basic concept for implementation of non-point load countermeasures. Under these circumstances, study of countermeasures for non-point pollutant loads from urban areas in sewerage projects, and in particular, the nitrogen/phosphorus reduction effect, has become an urgent matter.

As items to be added to the existing "Handbook on Non-Point Countermeasures for Urban Areas (Draft)," in the present research, a survey was carried out and materials were arranged on cases in which countermeasures were implemented using combined sewer system improvement technology and infiltration stormwater inlets in order to conduct a study of evaluation of impacts on the water environment, the efficiency of measures, etc. for nitrogen/phosphorus effluents from urban areas accompanying rainfall.

### **(Results)**

- (1) The necessary materials were collected and arranged for a study of the possibility of effects when applying the combined sewer improvement technology developed in the SPIRIT21 Project as a non-point countermeasure. Focusing on high speed filtration technology and coagulation/sedimentation technology as technologies which can be applied even to water quality items of comparatively low concentration, the applicability of these methods was also studied.
- (2) An evaluation of the effect on the water environment of non-point countermeasure techniques using the combined sewer improvement technology was carried out, and the removal rates of high speed filtration technology and coagulation/sedimentation were investigated by extracting data on low concentration rain water. The results confirmed that the removal rates for these technologies are on substantially the same level as the evaluated rate for the combined sewer improvement technology.
- (3) In order to compare pollutant load reduction efficiency with that of infiltration facilities, etc., a site survey of the pollutant load reduction effect of infiltration catch basins (infiltration stormwater inlets) was conducted, and the pollutant load reduction rate was calculated from the measured results. In spite of the small number of data, the results confirmed that a high pollutant load reduction rate of more than 90% can be obtained stably when the infiltration capacity of the infiltration inlet is 5mm/h or more.
- (4) Based on the results of the site survey, the annual pollutant load reduction effect was investigated in a model case. A high pollutant load reduction rate exceeding 90% was achieved with a water reduction rate of 74%, confirming that the installation of infiltration inlets is an extremely effective countermeasure.
- (5) Based on the current status of non-point countermeasures and related issues, together with recent progress in knowledge, a draft revision of the "Handbook on Non-Point Countermeasures for Urban Areas" was compiled.

**(Summary)**

This research confirmed the possibility that the combined sewer improvement technology developed in the SPIRIT21 Project can also be effective as a non-point countermeasure. The effectiveness of non-point pollutant load reduction countermeasures using infiltration facilities was clarified from the results of a site survey, demonstrating that the multiple effects of infiltration facilities can contribute to the promotion of efficient projects.

In addition to these study results and other new knowledge, a draft revision of the “Handbook on Non-Point Countermeasures for Urban Areas” was published by MLIT.

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Key words

Non-point, pollutant load, urban area, infiltration