

Research on pollutant loads in public waters

Whole term

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(Purpose)

An important challenge for creating a good water environment is analysis of the pollutant loads placed on public waters by sewerage systems, including combined sewage systems and separate storm sewer systems. However, under the present condition, adequate basic data necessary for such an analysis (road surface pollutant loads, sediment loads in pipes, sediment loads in catch basins and roadside ditches) could not be obtained.

Therefore, a decision was made to conduct a survey of the initial residual road surface loads, adding nitrogen and phosphorus to previously-studied items, and study the runoff pollutant load on public waters in the Technical Development Liaison Committee by Tokyo and 14 government-designated cities over a period of 2 years (FY2005-FY2006).

In this study, the object was narrowed to the amount of road surface pollutant loads. A survey of road surface pollutant loads was carried out by application zone using a simulated rainfall generating devices at 36 points in 4 cities. Unified data for N and P were collected, and the data for SS, BOD, and COD, which had been used for many years, were reviewed and updated. The correlation characteristics of water quality items were also studied. Representative non-water areas were selected from the areas where the survey was carried out, and trial calculations of the impact on public waters were made based on the newly-obtained data. In addition, techniques to enable efficient simple estimation of runoff loads were also studied.

(Results)

(1) Survey of initial road surface residual loads

Referring to a similar study by the Public Works Research Institute (PWRI), which was carried out in 1979, initial road surface residual loads were obtained for roads in 3 types of application zones (commercial, residential, industrial) for BOD, COD, and SS, and for the newly-added items N and P. When these results were compared with the initial road surface residual loads presented by the PWRI, it was found that the values of all water quality items (BOD, COD, SS) were lower in the recent study. As factors in this, it is considered that, when the PWRI carried out its study, environmental awareness was low in comparison with today, and the supply of pollutant loads via the atmosphere was larger than at the time of the current survey.

The relationship with items which are conceivable as influencing factors was also investigated, including the volume of vehicular traffic, number of days without rainfall prior to the survey, and the like, but no clear relationship could be found. Thus, the knowledge that the accumulation of pollutant loads cannot be explained by any one factor was obtained.

(2) Study of correlation with water quality items

In combination with the survey of road surface loads, turbidity, electrical conductivity, etc. were also investigated, and the correlation with water quality items was considered.

(3) Trial calculation of runoff pollutant loads on public waters

The initial road surface loads newly obtained in the present survey were verified using a numerical calculation model, and examples (case studies) of trial calculations of the total runoff pollutant load on public waters were presented based on the new initial road surface loads.

(Summary)

This research clarified the most recent values of initial road surface residual loads. Unit values were calculated from the results of this survey, and trial calculations of surface-derived (urban area) loads were made by a method of calculation based on the basic policy of Comprehensive Basin-wide Planning of Sewerage Systems (CBPSS) and prefectural CBPSS. As a result, it was possible to estimate the total runoff load and the runoff load to bays by a simple method, and also to propose a method which roughly verifies the impacts of pollutant loads given to public waters by urban non-point loads as examples of trial calculations.

The study was carried out as joint research with Tokyo and 14 government-designated cities (Technical Development Liaison Committee)

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Key words

Initial road surface pollutant load, public waters, sprinkling survey, separate storm sewer system