

Study on non-point pollutant loading

Whole term

1993 ~ 1995

(Purpose)

Along with the development of sewerage systems, pollutant loadings from households and industries to public water bodies have decreased. On the other hand, pollutant loads from non-point sources, such as urban road and roof runoff pollutants, have been increasing with the advancement of urbanization.

Consequently, the pollutant loadings from urban areas to public water bodies need to be reduced immediately. However, the characteristics and runoff mechanisms of the pollutant loads from the non-point sources have not yet been figured out adequately.

Accordingly, this study intends to grasp the situation of the pollutant loadings from urban non-point sources. Water qualities and flow rate of runoff water were measured and the basic data which will be required to take measures for reduction of urban drainage pollutant loadings were collected. The study was carried out for three years from 1993 to 1995. Monitoring runoff water had been conducted from 1993 to the first half of 1995, and the measured data were analyzed in the latter half of 1995.

(Results)

Four drainage districts were selected and the water qualities and flow rate of runoff water were measured. These four drainage districts, which are all residential districts, are in Abiko City in Chiba Prefecture, Ushiku City in Ibaraki Prefecture, Chino City in Nagano Prefecture and Shiga Town in Shiga Prefecture.

Automatic water samplers were used for the sampling and monitoring runoff water. The specifications of the samplers are as follows:

Rainfall and the water level are regularly measured and recorded at every one cumulative minute .

Water temperature, EC (electric conductivity), turbidity and pH are measured every one minute when a rainfall and the water level exceed the set points.

It is possible to collect 48 samples (1.7 liters per one sample) after starting water sampling, and it is possible to change sampling interval from 2 to 30 minutes.

It is possible to keep the samples in a refrigerator.

All the monitoring data are automatically recorded in the hard disk of the control device.

To avoid unexpected operation by dry weather flow from water spray or car wash, and to avoid water sampling of an extremely small quantity of a rainfall, the water sampling was set to start on the condition that the water level is more than 40mm and rainfall is more than 0.3mm (10minutes duration).

The following sampling intervals were set to measure first flush pollution by an initial rainfall.

The first 16samples three minutes interval

The next 16samples seven minutes interval

The next 16samples fifteen minutes interval

For the measurement of the runoff flow rate, in the case of a closed conduit, it was calculated by Manning formula using a pressure type water level sensor. In the case of an open conduit, it was calculated by the overflow depth. Regarding the water quality analysis, water quality sensor was used during water sampling to measure temperature, EC, turbidity and pH, but SS, BOD, COD, T-N and T-P were measured manually.

Through the above methods, the data of wet weather flow including first flush pollution were collected. Data collection will be continued in 1994.

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Keywords

non-point source, wet weather flow, initial pollution, automatic water sampler