

Study on renovation of water cycle system in Yokohama-city (Part 2)

Whole term

1997.6 ~ 1998.3

(Purpose)

The environment of the Hiratonagatani river basin has been changing rapidly, and different noticeable water environmental problems such as increased risk of flood related damages, worsening of living environment, water pollution, decline of water related amenities and so on have been inflicted because of recent urbanization.

This study is aimed at determining the scheme of renovation of water cycle system and creation of an desirable water environment in Hiratonagatani River basin in Yokohama. This basin was selected as one of the model basins to conduct investigations in relation to preparation of 'the Manual for determining the scheme of renovation of water cycle system'. In the FY1996, a comprehensive appraisal of the existing water cycle of the basin was conducted and the associated problems were identified. In the FY 1997, goals for renovation of water cycle system were set, and the countermeasures to achieve the goals were explored. Finally, the appropriate scheme of renovation of water cycle system was proposed.

(Result)

1. Problems related to water cycle system

1.1 Increase of difference between flood flow and normal flow

Expansion of impervious areas due to urbanization results in colossal amount of rainwater runoff into the river in case of heavy rainfall. On the other hand, the river flow tends to dry up in dry weather.

1.2 Water quality change

As the sewage system covers most part of the Hiratonagatani River basin, water quality of this river meets the environmental quality standards (BOD 8 mg/l) since 1992 (BOD value at Watado Bridge in the downstream is 5.8 mg/l).

2. Program objective of renovation of water cycle system

The effect of countermeasures taken for renovation of water cycle system can be evaluated by monitoring the condition of river which represents both natural and artificial water cycle system. Therefore, the program objective of renovation of water cycle system was set as following.

Along with restoration of river channel, measures to control flood so as to improve degree of safety against flood shall be taken. At the same time, river bed will be restored giving proper consideration for ecology and water related amenities.

The river flow will be restored to the inherent level before regional development.

3. Measures taken to achieve targets

The contribution of the following measures to improvement of renovation of water cycle system was assessed.

- (1) Conservation of green open space.
- (2) Installation of rainwater infiltration facilities.
- (3) Installation of rainwater storage facilities.

4. Evaluation of the adopted countermeasures

Reduction in the peak flood flow and restoration of the normal river flow as predicted by runoff simulation analyses were considered as indicators of efficiency of the adopted measures.

4-1. Stormwater flow

The countermeasures such as 'conservation of green open space', 'Installation of rainwater infiltration facilities', and 'Installation of rainwater storage facilities' will realize 8 % reduction in the storm water flow as compared to that without any modifications. Inclusion of residential areas into the list of areas designated for installing rainwater storage facilities will enable 15 % reduction in the peak storm discharge.

4-2. Normal river flow

Without any restoration attempts, the river flow will amount to around 65 % of the target flow, which is the original flow that prevailed before the regional development. However with measures like 'Conservation of green open space' and 'Installation of rainwater infiltration facilities', the amount of flow is predicted to be recovered to more than 80 % of the target flow.

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Keywords

Hiratonagatani River, renovation of water cycle system, Storm water flow, Normal river flow