INFLUENCE OF LOCAL HYDRAULIC CHARACTERISTIC TO WATER QUALITY IN A RIVER

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Water resource problems today, on both quantity and quality, have arisen in many places around over the world. Since human activities nearby the river have increased, more water is required and more polluted water has been discharged. As a result, water quality problems which harm ecosystem, social, economy especially on the downstream could be expected. Therefore, it is necessary to figure out both hydrodynamic, water quality and the relationship between them. The temporal and spatial distribution of water quality constituents are controlled by a complex physical-biological-chemical interaction process. Several computer models are already available to represent the processes occur in the real catchment. However, an application to some areas is limited due to the lack of data in the area.

The influence of hydraulic parameter (Froude number, *Fr*) to water quality parameters is analyzed in order to provide a simple analytical tool which could be applied to area where the set of data measurement is scarce. Froude number is easy to obtained parameter and it relates to turbulence which could lead to the change of dissolved oxygen level. The study shows the numerical relationship between *Fr* and water quality in three different typical conditions of clean river, municipal river, and agricultural river respectively. The local characteristic is considered at 1 kilometer from upstream point.

The water quality model, in the study, constitutes a complex of four interacting systems: dissolved oxygen, nitrogen cycle, phosphorus cycle, and phytoplankton dynamics. Eight water quality components are included: dissolved oxygen (DO), phytoplankton as carbon (PHYT), carbonaceous biochemical oxygen demand (CBOD), ammonium nitrogen (NH4), nitrite and nitrate nitrogen (NO3), ortho-phosphorus (OPO4), organic nitrogen (ON), and organic phosphorus (OP).

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