Determination of stormwater first flush treatment strategies at tropical urban catchments

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ABSTRACT

This study was conducted to determine the first flush magnitude and treatment strategies of stormwater pollutants at tropical urban catchments. Stormwater samples were manually grabbed and the flow rates were measured during 52 storm events at residential, commercial and industrial catchments. The mass based first flush (MBFF) ratio was used to quantify the first flush magnitude of stormwater pollutants. The treatment effectiveness factor [$E(v)$] was determined in order to identify the treatment strategies for first flush runoff volume at different urban land uses. The results showed that commercial catchment has the strongest MBFF for BOD, COD, TSS, NO_3–N and SRP. Residential catchment showed the highest MBFF for NH_3–N and Zn while industrial catchment exhibited the highest MBFF for O&G, TP and NO_2–N. The study found that treating the first 10% of runoff volumes can remove most of the pollutant loadings for NH_3–N, SRP, TP and Zn at residential and commercial catchments. Meanwhile, majority of the stormwater pollutants at industrial catchment could only be treated effectively in the first 30%–50% of runoff volumes.

Keywords: Event mean concentration; Mass based first flush; Stormwater; Treatment strategy; Tropical urban catchment

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