310/C

Design of a wastewater management system for a low income housing scheme

S A J Nisansala, H P Ranasinghe, B C Liyanage* and P N Wikramanayake

Department of Civil Engineering, The Open University of Sri Lanka, Nugegoda

Wastewater management is an essential part for any community. Most water is simply discharged into cesspools. Wastewater management serves a vital role in maintaining safe environmental conditions and public health. Waste disposal is a major problem faced by any community. This study was based on a low income housing scheme of at Arunodaya Mawatha, Rajagiriya Colombo. There are about 1000 houses of which about 700 houses are authorized constructions while 300 are unauthorized. Each authorized house is a privately-owned 2 perch lot with streets and back alleys. At present this scheme uses conventional septic tanks with an anaerobic filter as a wastewater management system. A questionnaire **survey was designed to investigate monthly water consumption patterns, the current status** of wastewater disposal practices and function of toilets in order to provide the most appropriate solution. The levels along the sewer line leading to the septic tank were also taken to investigate the cause for overflowing of manholes.

The housing scheme has a high population density and the area has a high water table. The septic tank effluent is discharged directly into a stagnant canal around the scheme. Considering the existing situation of septic tanks, methods were proposed to improve the treatment system. Rehabilitation was carried out by using the manpower, machinery and equipment at one selected septic tank. Model designing was done through dimensional analysis to improve the septic tank by using baffles and coir fibre. The model test was carried out using baffle walls and coir fibre since an environmentally sound treatment unit is proposed. The model was designed using 6 independent parameters such as the hydraulic retention time, the number of compartments, peak up-flow velocity, and compartment width: length ratio, reactor depth and up-flow to down-flow ratio of compartments.

The Anaerobic Baffled Reactor, which was related to model with collecting tank and five equal compartments for 40 houses. The dimensions Length, width and the height of the onsite ABR for 40 houses are, 7.61m, 3.43m and 3m respectively. The length of the collecting tank is 2.54 m and the length of the each compartment is 1.02m. These dimensions can be adjustable according to number of houses by changing the design parameters.

bcliy@ou.ac.lk Tel: 0777577321