Abstract

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EFFECT OF MIXING INDUSTRIAL and DOMESTIC WASTEWATER ON SETTLING BEHAVIORS IN PRIMARY SETTLING TANKS

Abstract: About 50 % of the industries in Egypt, on statistical analyses done for 37 industries in Egypt, violate the Egyptian environmental law and discharge their untreated effluents into public sewage network. This had lead to the obvious deterioration of the sewage network, pumping stations, settling tanks, the biological activity during treatment in WWTPs and threatening the aquatic life in streams and rivers. 10th of Ramadan city is considered to be the largest industrial city in Egypt. In this city the industrial WW is mixed with domestic sewage at the existing treatment plant. Currently, the efficiency of TSS removal in primary settling tanks (PST, during 2010) ranged from 30% to 45% compared to international standards (50% to 70%, Metcalf & Eddy, 2003). Another case includes Abu Rawash WWTP, which receives domestic WW only, the efficiency of TSS removal in PST ranged from 50% to 65 %. There is a clear reduction in the removal efficiency of TSS in PST in case of 10th of Ramadan city WWTP due to the mixing of industrial and domestic WW despite that the operational parameters (Retention time and Surface loading rate) coincide with those in the international standards. The reduction in the removal efficiency of primary treatment should affect the organic and solid loading rates on the subsequent treatment units. The present study aims to re-establishment the settling behaviors and operation of PST which receive raw and combined domestic and industrial wastewaters (with different mixing ratios). This has been done using laboratory batch settling column tests. Results have been validated using computer modeling (GPS-X). Experimental investigations of this study showed that, at a RT of (1.5 -2.5 hr), and a SLR of (30 – 50 m/d), the removal efficiency of TSS ranged between 51 and 61% for Domestic WW, from 35 to 45% for Industrial WW, from 45 to 56% for mixed WW (25% industrial), and from 40 to 50% for mixed WW (50% industrial).
KEYWORDS: batch settling, computer modeling, domestic ww, flocculent settling, GPS-X, industrial ww, primary sedimentation tank, TSS removal.