

Painjit Pinyodom 2006: Detention Time and Wastewater Treatment Efficiency in Large Scale of Oxidation Ponds System: A Case Study of Wastewater Treatment System of Phetchaburi Municipality. Master of Science (Environmental Science), Major Field: Environmental Science, College of Environment. Thesis Advisor: Professor Kasem Chunkao, Ph.D. 126 pages.
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This study investigated detention time and wastewater treatment efficiency in large scale oxidation ponds system. Phetchaburi Municipality's wastewater system was used as a case study. The main objectives of this study were to investigate the detention time and to study efficiency of large scale oxidation pond to treat wastewater from municipality. According to Phetchaburi Municipality's wastewater system, it was found that wastewater flowed into the treatment system was 4,267 cubic metre per day. The calculation of wastewater detention time in each pond indicated that detention time of wastewater in sedimentation pond, 1st, 2nd and 3rd oxidation pond and polishing pond were 5, 12, 15, 13 and 14 days respectively. The entire duration of wastewater treatment was 59 days. As a consequence, the collection of wastewater in each pond for further analysis was based on calculated detention time.

According to an analysis of water quality within 45 days of detention time in the third pond, BOD level was reduced from 63 milligram per liters to 3 milligram per liters which was still under 20 milligram per liters of Housing Estate Effluent Standards. The results of this case study also indicated that within 45 days of detention time, the efficiency of large scale oxidation pond system to treat BOD was 95%. Although suspended solids was reduced to 44 milligram per liters, this level was still above 30 milligram per liters of Housing Estate Effluent Standards.

This case study also investigated the relationships between detention time and water quality index and indicated positive relationship between detention time and total solids, dissolved solids and conductivity at 0.01 and correlation coefficients were 0.971, 0.966 and 0.968 respectively. However, it was found that there were negative relationship between detention time and BOD and COD. The correlation coefficients were -0.795 and -0.704 respectively. Furthermore, there was no relationship between suspended solids and detention time. More importantly, the detention time of wastewater was only an indirect factor playing a less significant role on the alteration of pH and dissolved oxygen

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