

Nontawat Siraphatthananan 2013: Wastewater Treatment from Primary Clarifier Pond of Pulp and Paper Industry by Lignite Fly Ash Adsorption in Combination with Filtrated Lysimeter Technique. Master of Science (Environmental Science),
Major Field: Environmental Science, Department of Environmental Science. Thesis
Advisor: Associate Professor Nipon Tungkananuruk, Ph.D. 94 pages.

This research was to investigate the possible use of lignite fly ash as adsorbent in the removal of color and COD contained in pulp and paper industry wastewater. The results from batch experiments showed that the maximum removal percentage of color 62.06 and percentage of COD 30.11 were achieved at 5 g. of lignite fly- ash per 50 ml of wastewater and 4 hr. of contact time. Furthermore, it was found that the best efficiency of color and COD reduction was at the ratio of lignite fly ash and soil 1:20 Also, adsorption model of lignite fly ash was conformed of both Freundlich and Langmuir isotherm. The experiments were also carried out on a continuous basis in a glass column (5 cm i.d. x 30 cm.) and packed with gravel 9.6 cm., coarse sand 4.2 cm., sand 2.8 cm. and mixed lignite fly ash and soil at the ratio 1:20 were constructed as the constructed wetland and the grass filtration system of The King's Royally Initiated Laem Phak Bia Environmental Research and Development Project (LERD). Two sets of experiments were conducted in continuous flow columns. In the experiments set 1, every 0.5 hr. after the wastewater passed through the column was collected to examine the color and COD value that similar to the constructed wetland wastewater treatment system. While the experiments set 2 was designed as the grass filtration wastewater treatment system by collecting the wastewater which passed through the tank after filled in the column for 5 days then let growing material dried for 2 days and repeated the experiment. The results indicated that the grass filtration (exp. set 2) had higher color and COD removal efficiency than the constructed wetland (exp. set 1). In addition, the filtrated lysimeter technique were conducted in square plastic tank with size 51x51x54 cm. that containing the growing material as the column experiments and growing *Cyperus alternifolius* Linn. and *Vetiveria zizanioides* in each tank. The results demonstrated that approximate percentage 70.00 to 80.00 and 60.00 of color and COD were removed respectively and had higher removal efficiency than the use of only soil at percentage 5.00 to 15.00 and 20.00 respectively

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Thesis Advisor's signature

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