

Saharuethai Sansom 2014: Improvement of Color and COD Removal Efficiency of Constructed Wetland and Grass Filtration System by Utilizing Lignite Fly Ash in Activated Sludge Treated Pulp and Paper Industry Wastewater. Master of Science (Environmental Science), Major Field: Environmental Science, Department of Environmental Science. Thesis Advisor: Associate Professor Kanita Tungkananuruk, M.Sc. 82 pages.

This research was to investigate the removal efficiency of color and COD from activated sludge treated Pulp and Paper industry wastewater by lignite fly ash as adsorbent. Lignite fly ash is generated as a residue of lignite coal combustion in process for pulp and paper production. The batch experiments were carried out and found that lignite fly ash 5 g. per 50 ml. of wastewater and 4 hr. of contact time that gave maximum removal percentage of color(72.58%) and COD (60.76%). The ratio by weight of lignite fly ash to soil at 1:20 was the best efficiency. The experiments were also carried out on a continuous basis in a glass column (5 cm i.d. x 30 cm.L.) 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 at 16.5 cm. constructing as the grass filtration and the constructed wetland system of The King's Royally Initiated Laem Phak Bia Environmental Research and Development Project (LERD). Two sets of experiments ,set 1 was designed as the grass filtration wastewater treatment system by collecting the wastewater which passed through the column after filled in the column for 5 days then let growing material dried for 2 days. While the experiments set 2 was designed as the constructed wetland wastewater treatment system by every 0.5 hr. after the wastewater passed through the column was collected to examine. The results indicated that the grass filtration(exp.set 1) had higher color and COD removal efficiency than the constructed wetland. Furthermore,the filtrated lysimeter technique were conducted in square plastic tank with size 51x51x54 cm. that containing the growing material as the column experiment and growing *Cyprinus alternifolius* and *Vetiveria zizanioides* found that the efficiency of the two wastewater treatments system were similar and *Vetiveria zizanioides* had higher color and COD removal efficiency than *Cyprinus alternifolius*.

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Thesis Advisor's signature

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