Pongpat Srikajohn 2006: Optimization for Treatment of Wastewater Containing Chromium (VI) by Iron - Oxide Coated Sand. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Associate Professor Vinai Leangchareansit, D.Eng. 102 pages.
ISBN 974-16-2195-7

This research is conducted to study the optimal condition for treatment of wastewater containing chromium (VI) by adsorption on iron-oxide coated sand (IOCS) with batch and continuous processes. The scope of works includes (1) study the chromium (VI) removal efficiency in synthetic wastewater using the IOCS adsorption system, (2) study the parameters and optimal condition for the treatment of synthetic wastewater containing chromium (VI), and (3) study the adsorbent useful life and method of adsorbent regeneration.

The experimental results show that the optimum pH for IOCS adsorption is about 4.0 and the suitable contact time at equilibrium is 30 minutes. Sand with small grain size can provide higher removal efficiency compared with sand with larger grain size. It is found that the adsorption kinetic follows the Langmuir isotherm. One gram of IOCS can adsorb 0.0319 mg of chromium (VI) at this optimal condition. In the study on the adsorbent useful life and effect of adsorbent height on the treatment efficiency in the continuous process, it is found that with the initial chromium (VI) concentration of 25 mg/l, initial pH of 4.0, media volume of 3.5 litres, and wastewater inflowing rate of 120 ml/min, the adsorbent useful life is about 2 hours considering the effluent chromium (VI) concentration not more than 0.25 mg/l which satisfies the effluent standard of the Department of Industrial Works (DIW). The chromium (VI) removal efficiency is found to increase with adsorbent height. In studying the suitable adsorbent regeneration method, it is found that the saturated IOCS can be regenerated by using sodium hydroxide solution. However, the treatment efficiency of the regenerated adsorbent has decreased, and the remaining chromium (VI) in the effluent is found to be higher than the allowable concentration of the DIW's effluent standard at all adsorbent heights.

PONGPAT SRIKAJOHN — Student's signature

Thesis Advisor's signature — 25 / May / 2006