

RINGKASAN

Limbah dari industri *electroplating* mengandung logam berat yang termasuk dalam golongan limbah B3 (Bahan Berbahaya dan Beracun). Limbah ini dapat menyebabkan kerusakan ekosistem lokal dan berpotensi membahayakan kesehatan manusia jika langsung dibuang ke lingkungan. PT X merupakan industri bidang *electroplating* yang belum lama berdiri, sehingga pengolahan limbah yang ada masih sederhana dengan cara sedimentasi alami saja. Rancang bangun sistem pengolahan limbah untuk mengolah limbah cair *electroplating* di PT X menjadi sangat penting untuk memaksimalkan sistem pengolahan limbah yang sudah ada. Penelitian ini bertujuan 1) membuat rancang bangun sistem pengolahan limbah menggunakan metode koagulasi-flokulasi, dan 2) mengetahui performansi dari rancang bangun sistem pengolahan limbah metode koagulasi-flokulasi.

Penelitian dilaksanakan di PT X yang berada di Kabupaten Bekasi, Jawa Barat. Penelitian telah dilaksanakan selama 6 bulan dari Oktober 2023 hingga Maret 2024. Penelitian dimulai dengan mengidentifikasi masalah yang ada di PT X, menentukan skema sistem pengolahan limbah yang akan dirancang bangun, menganalisis rancangan secara fungsional dan struktural, dan selanjutnya melakukan uji coba sistem. Variabel yang diamati meliputi pH, TDS (*Total Dissolved Solid*), *turbidity*, dan kadar logam berat Zn.

Hasil penelitian menunjukkan bahwa rancang bangun sistem pengolahan air limbah *electroplating* dengan metode koagulasi flokulasi telah berjalan dengan optimal, dan mampu menurunkan kandungan Zn secara signifikan. Performansi rancang bangun sistem pengolahan air limbah *electroplating* dengan metode koagulasi flokulasi menunjukkan hasil penurunan pH dari limbah awal 9,17 menjadi 7,77 setelah melewati sistem pengolahan. Efisiensi penurunan TDS sebesar 59%, turbiditas 95%, dan efisiensi penurunan kadar Zn sebesar 97%.

SUMMARY

Waste from the electroplating industry contains heavy metals which are included in the B3 waste group (Hazardous and Toxic Materials). This waste can cause damage to local ecosystems and has the potential to endanger human health if it is dumped directly into the environment. PT X is an electroplating industry that has recently been established, so that there is a simple waste treatment by natural sedimentation. The design of a waste processing system to process electroplating liquid waste at PT X is very important to maximize the existing waste processing system. This research aims to 1) create a waste treatment system design using the coagulation-flocculation method, and 2) determine the performance of the waste treatment system design using the coagulation-flocculation method.

The research was carried out at PT X in Bekasi Regency, West Java. The research was carried out for 6 months from October 2023 to March 2024. The research begins by identifying the problems that exist at PT X, determining the waste processing system scheme that will be designed, analyze the design functionally and structurally, and then carry out system testing. The variables observed included pH, TDS (Total Dissolved Solid), turbidity, and levels of the heavy metal Zn.

The research results show that the design of the electroplating wastewater treatment system using the coagulation flocculation method has run optimally and is able to reduce the Zn content significantly. The design performance of the electroplating wastewater treatment system using the coagulation flocculation method shows the results of a decrease in pH from the initial wastewater from 9.17 to 7.77 after passing through the treatment system. The efficiency of reducing TDS was 59%, turbidity was 95%, and the efficiency of reducing Zn levels was 97%.