African Structural Engineering

Environmental Remediation Techniques for Industrial Pollution Control in Zambia

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Abstract

Industrial pollution is a significant environmental challenge in Zambia, leading to health risks and ecological damage. A review of existing literature on environmental engineering solutions was conducted, followed by field assessments at selected industrial sites. Expert consultations were used to identify the most suitable techniques based on site-specific conditions. Concrete waste from a zinc smelter was found to be predominantly inorganic with approximately 60% calcium and 35% sulfur content, necessitating specific remediation strategies for stabilization and immobilization. The review highlighted the importance of tailored environmental engineering solutions that consider both economic feasibility and ecological impact. Implement multi-layered environmental management systems in industrial operations to reduce pollution and enhance sustainability. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Zambian, eco-restoration, bioremediation, phytoremediation, wastewater-treatment, sustainable-development, remediation-techniques*

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