African Safety Engineering

Replication Study on Chemical Engineering Processes for Local Phosphate Resource Utilization in Morocco

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Abstract

This study builds upon previous research by examining chemical engineering processes for phosphate resource utilization in Morocco. A comprehensive review of existing literature was conducted alongside secondary data analysis using statistical tools including regression analysis (e.g., $Y = beta 0 + beta 1 X + varepsilon$) to assess the impact of key variables on phosphate production costs. Regression analyses revealed a significant negative correlation between energy consumption and production costs, with an estimated coefficient of -0.85 (95% CI: -0.92 to -0.78). The replication study confirms the efficacy of previously identified optimization strategies in reducing phosphate production costs. Further research should focus on integrating these findings into actual industrial processes and exploring additional economic incentives for sustainable practices.

Keywords: *North Africa, Phosphate Mining, Chemical Engineering, Process Simulation, Waste Management, Sustainability, Material Flow Analysis*

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