Research on automation of cement production process at Xuan Thanh Cement Plant

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Abstract: This study investigates the automation of cement production processes at the Xuân Thành Cement Plant, aiming to enhance operational efficiency, product quality, and environmental compliance. The research analyzes the current manual and semi-automated stages of raw material grinding, clinker production, and cement milling, identifying critical bottlenecks and quality inconsistencies. A comprehensive automation framework is proposed, integrating Programmable Logic Controllers (PLCs), Distributed Control Systems (DCS), and advanced sensors for real-time monitoring and control. Key parameters such as kiln temperature, material flow rates, and fineness of grind are optimized through feedback loops and predictive algorithms. The findings demonstrate that full automation significantly reduces energy consumption by up to 12%, minimizes raw material waste, and ensures uniform product quality. Furthermore, the system facilitates remote operation and data logging for predictive maintenance. This research provides a scalable model for modernizing cement manufacturing in Vietnam, contributing to sustainable industrial practices and reduced environmental impact.

Keywords: Automation, cement production, Xuan Thanh Factory, production process