

ENERGY AND EXERGY ANALYSIS OF A WHITE CEMENT KILN PLANT

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ABSTRACT

Cement production is one of the most energy intensive industries in the world. The cement industries consume approximately 12–15% of total industrial energy use. Energy accounts for 30-40% of total production cost in the cement industry. Reduction of the production cost is very much important. This paper reviewed energy and exergy analysis, energy and exergy balance for the white cement industry. The implementation of exergy analysis on the cement production line will be very effective for improving the performance of the system and also reduces the production cost.

This paper deals with the energy and exergy analysis of a wet type rotary kiln system working in a white cement plant in South India. The kiln has a capacity of 120 tonnes of clinker per day. The slurry used for this process contains 40% of water. The rotary kiln includes thermal and chemical processes. Energetic and exergetic efficiency of clinker production is 12.2% and 8% respectively. For the evaporation of water in the slurry requires 21.5% energy. The irreversibility loss of the process is 7337.356kJ/kg of clinker which represents about 73% of total exergy input. The heat loss by convection and radiation together from the kiln surface is about 16.83%. The present technique is proposed as a useful tool in the analysis of energy and exergy utilization, developing energy policies and providing energy conservation measures.

KEYWORDS: Exergy, Energy, Rotary Kiln, Wet Process, White Cement