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Energy Efficiency Improvement for MSMEs in Limekiln Sector

Issue 4

Tirunelveli

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e-newsletter

Simple measures save 31– 66 kg of Charcoal per ton of quick lime

The detailed energy audit conducted in few units in the cluster resulted in identification of various opportunities for reduction of energy consumption and improvement of productivity. Few no to low cost performance improvement actions have been implemented by several units resulting in reduction of 31 – 66 kg of charcoal consumed per ton of quick lime produced. Details are mentioned below.

Measure 1: Avoiding fines in kiln charging

Present Practice

A 5 mm stationary screen is provided just before the conveyor belt to separate the fine material (<5mm); at the crushing stage. This is required to avoid channeling which causes un-burnt and over-burnt and a reduction in the effective capacity of the kiln by upto 20%.

Problem

Upto 24% of the lime stone included in the charge comprise particles of size less than 5mm. The impact is on the quality of conversion to quick lime, i.e over-burnt/ un-burnt in the final product which are rejected in the pulverizer.

Recommendation

Use a vibrating/ rotary screen in place of a stationary screen. Almost all the fines are expected to be removed giving the effective proper-sized limestone fed to the kiln to be 100%. Thus, a net increase of 20-24% is attainable in the kiln capacity And a reduction in the specific charcoal consumption



Rotary Screens



Vibrating Screens

Measure 2: Optimizing CO loss (Air distribution)

Present Practice

For initial ignition, some amount of charcoal (approx 1-2% of total charcoal used) is first loaded and fired before loading the kiln with the charge. When the kiln is fully loaded, the forced draft blower is started.

Problem

After about 1 hour, thick brown smoke is emitted from the kiln; which lasts for about 3-4 hrs. CO measurements show out of range and the CO to CO2 ratio during this period is about 0.5

Recommendation

A minor change in the operating procedure was proposed as follows:

1. No change in the initial firing process
2. During the charging; when the kiln is up-to ½ to ¾ full; a thin layer of charcoal is spread over the charge and firing is done
3. The remaining charge is added over this layer.
4. Blower is started



Current and Modified Arrangement for Air Distribution

The data provided is purely for indicative or informational purposes only. No liability will be accepted for any usage of or reliance on, the data or information provided herein.

GEF-WORLD BANK PROJECT- Financing Energy Efficiency at MSMEs



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Bureau Of Energy Efficiency

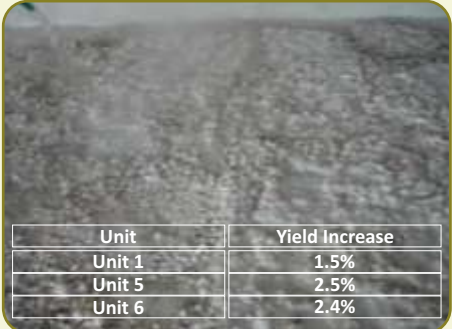
By following this process, the CO is expected to burn fully leading to 50 % reduction in CO escape. Overall quantity of charcoal used is less to the extent of heat liberation from captured CO. Unit specific trials are required to establish the revised ratio of charcoal to limestone.

Other improvements implemented to reduce CO formation include the increase of the curvature of the perforated CI plate over the air pipe; so that the distribution of air is improved across the radius of the kiln.

| | Reduction in Charcoal Consumption (Kg/ ton of Lime produced) | | | | | |
|--|--|-----------|-----------|-----------|-----------|-----------|
| Energy Performance Improvement Actions | Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 |
| Measure 1 | 34 | 25 | 29 | 36 | 21 | 44 |
| Measure 2 | 29 | 6 | 10 | 22 | 14 | 22 |
| Total Saving | 63 | 31 | 39 | 58 | 35 | 66 |

Proper water addition during hydration to improve Yield by 1.5 – 2.5 %

Quick lime typically requires over 35 % of water to be added for hydration for better slaked lime yield. However, lime kiln units in Tirunelveli do not have adequate controls on the water addition process during Hydration and as a result, some of the quick lime remains as it is resulting in lower yield. The audit team recommended adding adequate quantity of water to convert all quick lime into the product. Pre-determined quantity of water may be stored in an overhead tank and the persons involved in the process may be requested to empty the tank. Alternatively, a sprinkler system may be made which will sprinkle water till the water is emptied from the tank.



| Unit | Yield Increase |
|--------|----------------|
| Unit 1 | 1.5% |
| Unit 5 | 2.5% |
| Unit 6 | 2.4% |

Cluster News

A delegation from World Bank, BEE and SIDBI visited the cluster on 05 September as part of project review. The team visited M/s. Metrocoat Rajapalayam Pvt. Ltd., M/s. Sri Bhuvaneshwari Enterprises and Sri Laxmi Enterprises. Following the field visits, a meeting was held to discuss the implementation issues. The participants in the meeting included members of Nellai Lime Manufacturers Association, Nellai Small and Tiny Industries Association, GM, DIC, Tirunelveli. During the meeting, it was decided to design a standard kiln of 5 TPD capacity which will be energy efficient as well as handle dolomitic and calcitic raw materials.

Upcoming Activities

2 Day Training (including industry visit) in Ankleshwar for Energy Professionals and O&M personnel by Devki Energy Consultancy

To be organized between Nov. '13 and Jan. '14

NO participation fee

Who should Participate : Energy professionals engaged with MSME sector in Ankleshwar region, production and maintenance personnel from Chemical MSME units.

For any further information and clarification related to project activities, please contact



BUREAU OF ENERGY EFFICIENCY

(Ministry Of Power, Govt. of India)

Sewa Bhawan, 4th floor, R.K. Puram, New Delhi 110 066

Tel: 26179699 (5 Lines) Fax No. 011-2618328 / 26178352

email: save-energy@beenet.in