“Promoting Energy Efficiency and Renewable Energy in selected MSME clusters in India”

With an aim to develop and promote a market environment for introducing energy efficiency and enhanced use of renewable energy technologies in process applications in the selected energy-intensive MSME clusters, United Nations Industrial Development Organization (UNIDO), in collaboration with Bureau of Energy Efficiency (BEE), is implementing a project titled “Promoting Energy Efficiency and Renewable Energy in selected MSME clusters in India” funded by Global Environment Facility (GEF) and co-financed by Ministry of Micro, Small and Medium Enterprises (MoMSME) and Ministry of New and Renewable Energy (MNRE). The project supports MSME units in implementing various energy conservation measures and thus result in reduced energy consumption and Green House Gas (GHG).

Reducing the Dead Weight of the Kiln Car Using Low Mass Kiln Furniture

Company Profile _______________________

Patna Ceramic located at GT Road, Khurja, Uttar Pradesh is one of the leading HT and LT insulator manufacturer in the Khurja ceramic cluster.

Objective _______________________

Improve the efficiency of tunnel kiln by reducing the dead weight of the kiln car with the help of improved low mass kiln furniture.

Intervention _______________________

Removed the existing insulating bricks in the bottom of the kiln car and filled the hollow space with ultralite (which is an improved insulated material with lowest specific heat compared to the insulating bricks) with a supporting block to give proper support and increase the strength of the kiln base.

Outcomes _______________________

- 10 to 13% fuel saved per cycle
- Almost 30% reduction in dead weight of the kiln car
- Easy maintenance
- Durability

Activity conceived and implemented with technical help from project

Principle _______________________

- Low thermal mass materials, when used for kiln car construction, reduces the weight of the kiln car considerably.
- The weight reduction of the kiln cars in tunnel kilns provides significant amount of energy savings and also improve material to car weight ratio.

Implementation _______________________

- The weight of the existing kiln car was 1186 kg. Therefore the existing kiln car was reconstructed with the help of improved insulating materials such as ultralite and hollow bricks.
- The excess dead weight in the bottom of the old kiln car was removed and filled with ultralite insulating material with a supporting block to give proper support and increase the strength of the kiln base.
- Replacement of refractory bricks with the hollow ceramic coated pipes at the supporting pillars for holding the racks.
- Use of ceramic fiber blankets at the base of the car instead of refractory brick base.
- The weight of the newly built kiln car is 983 kg and it is 17% less than the old kiln car.
### Cost-Economics

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating hours per annum</td>
<td>7488</td>
</tr>
<tr>
<td>Expected fuel savings per annum</td>
<td>10800 Liters</td>
</tr>
<tr>
<td>Cost of fuel</td>
<td>₹ 28/Liter</td>
</tr>
<tr>
<td>Expected monetary savings per annum</td>
<td>₹ 302400</td>
</tr>
<tr>
<td>Total investment for single kiln car</td>
<td>₹ 55000</td>
</tr>
<tr>
<td>Payback period</td>
<td>2 - 3 Months</td>
</tr>
</tbody>
</table>

*Assumption

### RESULTS

- **Fuel Saving**
  - 10800 Liters
  - Annual saving of approx. 10800 liters of furnace oil worth of INR 3 lakhs

- **CO₂ Emission**
  - Upto 30 tonnes reduction in CO₂ emission per annum

- **Kiln Car Weight**
  - 17% reduction in kiln car weight
  - 10 to 13% fuel saving per cycle

- **Replication Potential**
  - This type of measure can be implemented on all the kiln cars used across tunnel and shuttle kilns
  - It is advised to take proper care regarding the strength of kiln car during redesigning. To start, implement in one kiln car and later replicate to the other kiln cars based on the results.

### CONTACT DETAILS:

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