



DARKHAN METALLURGICAL PLANT

Reduce Melting Cycle through Improved Management of Reasons for Delays

SUMMARY OF THE OPTION

Darkhan Metallurgical Plant (DMP) is located in Darkhan, Mongolia, and produces steel products from reprocessing metal and steel scraps. The plant was established in 1994, employs 500 staff and has a production capacity of 100,000 tons per year.

During the energy assessment it was found that the melting process in the arc furnace had frequent delays and interruptions. The company improved the procedure to monitor reasons for delays and found that poor insulation materials used for the ladles and the tundish were the main cause. Changing to using different types of insulation materials cost US\$ 28000, with annual savings of US\$ 21000 and a payback period of 1.3 years. Electricity consumption was reduced by 1350 MWh per year and 1300 tons of CO₂ emissions.

KEY WORDS

Steel, Mongolia, Boilers and thermic fluid heaters

OBSERVATIONS

During the energy assessment of the plant, the following observations were made:

- The annual electricity consumption for the plant was 34,800,000 kWh. The electricity consumption for melting the process was 26,950,000 kWh. The arc furnace is therefore the largest electricity consumer of DMP.
- At time of the assessment, the arc furnace was in operation only 10 pm at night until 6 am in the morning to benefit the low power tariff (electricity during the daytime is considered to be too expensive)
- The arc furnace was provided with scruff preheating, which was not in operation during the assessment. No clear explanation could be found for this.

OPTIONS

The option was to improve the procedure for monitoring the reasons for delays in / interruptions of the melting process in the arc furnace. When this procedure was followed, it was found that the reason for delays was poor insulating materials. Bricks were used as insulation in the ladle and tundish.

The insulation of ladles and the tundish was therefore replaced with special plates (see Figure 1 and Figure 2 respectively)

As a result, the operating times of the ladles and tundish without interruptions have become twice. This reduced the delays in the melting process in the arc furnace.



Figure 1 Insulation improvement of Ladles



Figure 2 Insulation improvement of the tundish

RESULTS

Financial benefits

- Investment: US\$ 28000
- Annual operation cost: not given, but likely included in regular maintenance costs
- Annual cost savings: US\$ 21600
- Payback period: 1.3 year (US\$ 28000/US\$ 21600)

Environmental benefits

- Annual energy savings: 1,350,000 kWh
- Annual GHG emissions reduction: 1300 tons CO₂ per year (1350 MWh of electricity X 0.97 tCO₂/MWh)

Other Benefits:

- Improved product quality
- Arc furnace, ladles and tundish last longer



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FOR MORE INFORMATION

GERIAP National Focal Point for Mongolia

Ms. J. Batsukh, Director
International Cooperation Department
Ministry of Nature and Environment
Government Building 3, Baga toiruu 44
Ulaanbaatar 11, Mongolia
Tel: +976 99 119200 / + 976 11 321 401
Fax: + 976 11 321 401
Email: mne@magicnet.mn

GERIAP Consultant for Mongolia

Mr. Dorjpurev Jargal
Director, Energy conservation and Environmental Consulting Co. Ltd (EEC)
Bayangol, 1st District
015-5, Ulaanbaatar, Mongolia
Tel/Fax: +976 11 330968
E-mail: mecc@magicnet.mn

GERIAP Company in Mongolia

Mr. Davaatseren Ts.
Director, Darkhan Metallurgical Plant
Darkhan-Uul Aimag, P.O. Box 906
Mongolia
Mobile: +9761372 24203
Fax: +976 137224946
E-mail: dmplant@mongol.net

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