



DARKHAN METALLURGICAL PLANT

Improve Boiler Combustion Process and Insulation of Pipelines and Building

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.

It was found that coal consumption was high, which was caused by poor insulation and a low boiler efficiency. To boiler efficiency was improved from 40% to 70% by insulation and replacement of bent tubes. Doors and windows were insulated to reduce heat loss from heating the plant. The quality control of coal was also improved to reduce coal consumption by the boiler and for heating. Investment costs were US\$ 28000, annual savings were US\$ 7700 and the payback period was 3.6 years. Coal consumption was reduced by 290 tons per year, which equals to 728 tons CO₂ emissions.

KEY WORDS

Steel, Mongolia, Boilers and thermic fluid heaters, Insulation

OBSERVATIONS

The observations made were:

- The annual coal consumption was 1462 tons for 200 days of boiler operation
- The coal consumption varied from 3 tons to 10 tons per day depending on the outside temperature
- The coal presently used in the boiler contains more than 50% fines
- These types of boilers can use coal of sizes between 25 mm to 40 mm
- The estimated efficiency of this boiler was 40% (based on the coal consumption and the amount of steam produced)

OPTIONS

The option recommended was to increasing the efficiency of existing district heating boilers by improving the combusting process and by improving the insulation of heating pipelines and building insulation.

The following options were implemented:

- Bent-tubes were changed for the existing BZU boilers (see Figure 1)
- The insulation of boilers was improved
- The internal heating system was improved
- Eleven doors in shops were changed in order to save energy (see Figure 2a)
- Twenty large windows were changed by modern energy efficient windows (see Figure 2b)
- Insulation of roofs of two shops were improved



- The quality management of coal was improved

The efficiency of boilers was improved from 40% to 70%.



Figure 1a: Installation of new bent-tubes



Figure 1b: removed old bent-tubes



Figure 2a: Energy efficient doors



Figure 2b: Energy efficient windows

RESULTS

Financial benefits

- Investment: US\$ 28000, including
 - US\$ 24000 for boilers and bent tubes
 - US\$ 4000 for insulation of windows and doors
- Annual operation cost: none
- Annual cost savings: US\$ 7700
- Payback period: 3.6 year

Environmental benefits

- Annual energy savings: 290 tons of coal
- Annual GHG emissions reduction: 728 tons CO₂ (= 290 tons coal X 2.51 tCO₂/t coal)

Other benefits

- Increased life time of boilers
- Improvement of working environment

The reduction of coal consumption through better quality control will require continued support from management and staff.



FOR MORE INFORMATION

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