IMPROVEMENT OF THE SCHEME HEATING GASES IN FRONT OF THE BURNER BLAST FURNACE AIR HEATER WITH THE PURPOSE OF INCREASING THE ENERGY EFFICIENCY OF BLAST FURNACE PRODUCTION

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Improving energy efficiency in blast furnace production leads to reduced production costs for cast iron and enhances the competitiveness of the finished metallurgical products, as well as directly and indirectly contributes to reducing harmful emissions into the atmosphere. These issues can be addressed by increasing the temperature under the dome of blast furnace stoves (cowpers), reducing the specific coke consumption through increased blast temperature, reducing material usage and capital expenditures on heating blast furnace air by upgrading or constructing new air preheaters.

The process of heating blast furnace air requires a special approach in addressing issues from the design of air preheaters to their operation. In refining fuel combustion modes, it is necessary to consider both the release of natural gas and the enhancement of masonry durability and reduction of harmful emissions into the environment.

The existing system heats air and gas fuel to temperatures of 50°C and 90°C, respectively, by utilizing the heat from flue gases. Such heating temperatures of combustion components indicate the low efficiency of the heat recovery system, including due to the unsatisfactory condition of the heat exchangers.

To achieve the maximum combustion temperature of 1350°C under the dome of the air preheater, a mixture of blast furnace gas with natural gas is used.

The proposed design solutions involve the application of a burner for preheating flue gases and improving the heat recovery system to increase the air and gas temperatures at the air preheater input by 150-200°C, which will ensure:

- An increase in the average heating temperature of the blast by 60-110°C without the use of natural gas,
- An extension of the heat exchangers' operational life by at least 10 years,
- Improved technical and economic indicators of the blast furnace process.

The proposed scheme for organizing the process of air heating in air preheaters (cowpers) of blast furnaces at metallurgical plants can also be directly used in boiler units operating at metallurgical enterprises.

References:

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