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Development of Waste Gas Recirculation System with Improvement of Sintering Productivity

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Extended Abstract

Recently, several type of the waste gas recirculation system have been wildly applied to reduce total volume of waste gas to be treated and reduce the coke breeze consumption. In conventional sintering process, the waste gas conditions below sinter bed is specific distributions under usual operation such as permeability, flowrate, temperature, moisture and SOx, Nox, Dioxine emission. A various layouts of the waste gas recirculation system has been developed to satisfy the demand of a specific plant condition. EOS and LEEP recycle 45~50% of the mixed waste gas onto the entire sinter bed and resulting in a 45~50% decrease of the waste gas treatment and emission. EPOSINT recycles 35% of waste gas from the bottom of the bed where temperature is high and the hot exhaust gas from the sinter cooler is mixed with the gas to increase energy efficiency. In these three types of waste gas recirculation system, the hot waste gas is reused in fore or middle part of sinter bed to help drying the raw material and coke combustion, therefore energy savings are verified.

In this paper, a novel waste gas recirculation system possible to improve the sintering productivity has been successfully introduced into the iron ore sintering process in Pohang sinter plant, POSCO. It consists of two layout, the waste gas recirculation and the cooler gas recirculation parts. Compared with existing conventional processes, it is focused on maximizing the total suction flowrate through sinter bed which is known as important factor to increase the sintering productivity. Also, the hot gas from sinter cooler is reused to sinter bed to reduce energy consumption.

Firstly, the absorption part for recycling was selected through lowest permeability zone where the flame front of combustion layer reaches the bottom of sinter pallet. To increase the suction flowrate at the zone, a high pressure blower compared to the main blower was applied and extended sealing flap was installed to prevent the flow interference between the main blower and the additional high pressure blower under the sinter pallets. Furthermore, to select the absorption zone, the temperature of recycling gas should be carefully considered to prevent recycling duct corrosion due to the moisture and SOx in the waste gas. The zone of recirculation hood was selected through highest permeability zone where the rear end of sinter strand to accept the plenty of recycling gas. Because the sintering process is almost finished in the zone, low oxygen and some moisture have no influence to sintering process. Secondly, the hot exhaust gas from cooler is recycled to forepart of sinter strand to reuse the sensible heat.

After installation the new waste gas recirculation system. the operation data was improved, the productivity increased of 3.6% and coke bleeze consumption decreased of 8.6%.

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