Development of a Briquetting Machine and the Construction of a Recycling System for Steelmaking Dust

Overview

In Japan, approximately 500,000 tons of steelmaking dust annually occurs in steelmaking electric furnace plants. This type of “waste” has been traditionally disposed of by landfill, dezincification or reuse.

Now, disposal by landfill poses problems—increasingly limited availability of landfill sites and mounting costs. Incidentally, costs for dezincification are high, including expenses needed for transportation. Therefore, it is necessary to reduce the amounts of steelmaking dust to be disposed of.

Various recycling techniques for steelmaking dust have been proposed. However, to be able to improve melting efficiency and cost-effectiveness, NTN has chosen DAIWA STEEL CORPORATION as a partner. Consequently, the team has successfully developed a unique steelmaking dust recycling method that realizes both mitigation in environmental impacts and reduction in costs.

In the newly developed recycling system, which is schematically illustrated in Fig. 1 below, carbon and water are added to steelmaking dust, and then the mixture is pelletized. The resultant pellets are formed into cylindrical briquettes by pressure, without using glue, and then the resultant briquettes are loaded into an electric furnace together with steel scraps.

Because the carbon content included in the briquettes serves as a fuel/reducing agent, NTN’s new recycling system boasts higher degree of melting efficiency. In addition, the density of steel content in the briquettes obtained from the NTN’s novel steelmaking dust recycling system is high compared with the previous methods. Thus, more iron content will be melted in the molten bath and recovered as an iron. Note that with previous steelmaking dust disposal methods, steelmaking dust either unmodified or pelletized was fed into an electric steelmaking furnace.

This new development has already resulted in improved economy, total elimination in amount of disposal by landfill and improved electricity use in the NTN Group. The resultant recycling ratio of steelmaking dust (increase in recovered iron material) has helped decrease the amount of steelmaking dust being subjected to dezincification. Thereby, NTN has been contributing to mitigation in environmental impacts resulting from its manufacturing activities.

While environmental conservation poses challenges to manufacturers, this novel steelmaking dust briquetting system has been positively contributing to realization of the recycling-oriented society.

Photo of author (Representative)

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Fig. 1 Briquetting Machine and Recycling System for Steelmaking Dust

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