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RESEARCH ARTICLE

Concept of Sinter Plant Using Automation

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Abstract

The goal of the Sintering Process is to convert iron into steel. Recently some Sinter plants have been equipped with modern machines and automation equipment such as PLC, SCADA, and HMI etc.

By implementing modern control technology using advanced automation technology to operate sinter plant more efficiently and reliably. Moreover, it provides all the required functions, including instrumentation and drive technology, safety technology, and energy management, in an integrated solution to minimize manpower, loss of quality & quantity, space, cost, training and operator time.

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Introduction

Sinter plants agglomerate iron ore fines (dust) with other fine materials at high temperature, to create a product that can be used in blast furnace. In order to improve the economic feasibility of steel making, a concept will take over: Sintering Process. The function of the Sinter Plant is to supply the blast furnaces with sinter, a combination of blended ores, fluxes and coke which is partially 'cooked' or sintered. In this form, the materials combine efficiently in the blast furnace and allow for more consistent and controllable iron manufacture.

Requirements for availability, process quality, and productivity of sinter plants are continuously growing, while at the same time a growing number of environmental regulations necessitate extensive investment. As plant designers, our job is to create concepts that offer the best possible solution to meet environmental requirements and economical necessities simultaneously.

Controls and Methods:

Main controls that can be done by Automation Technology:
1-Ignition hood **temperature** control
2- Ignition hood **pressure** control
3-Calorific value control of **ignition fuel**
4-**burn-through point** control
5-Main fan and **waste gas over-temperature** control
6- Cooler speed control
The main process steps in a biogas plant are outlined:

Factors that can be controlled by automation:

- Mix control and Moisture content
- Weight and Particle size
- Ignition hood temperature and pressure along with chemistry

- Bed Depth & Warm Screens

Control automationscheme:

The plant is equipped with numerous onlinemeasurement devices, powerful programmable logiccontrollers (PLC) and a modern PC-based supervisory control and data acquisition (SCADA) system. Furthermore, it is possible to operate the plant via remote control. The system is also equipped with a digital process fieldbus. The data can be usedfor numerous different ICA applications, e.g. a virtually complete automatic balanceof solid, fluid and gaseous material flows (volume, weight) is possible. The type ofsubstrate can also be recorded. A comparison of calculated and measured sinter materials is possible. All this information is very important for controlling and benchmarking aswell as for plant operation. The temperature, which is measured continuously indigester/post-digester, can be controlled by automatic control of the heating system. The changing of thesinter composition and the sinter flow rate can also be used to avoid/identifycritical operating conditions. In caseof industrial applications it is already possible to measure on-line and off-lineconcentrations of sinter materials by using NIRS. Due to the fact that these parameters are also very importantfor sinter plants, there is a good chance that full-scale automated sinter plant applicationwill be adapted in nearest future which can be useful for quality production with reduced man work.

Result and Discussion

Sinter plants equipped with modern equipment and reliable/adapted machineries and engines, can reach very good operational results. Minimized manpower, loss of quality & quantity, space, cost, training and operator time can be an alternative to largecentralized power plants. E.g. modern automation is possible to connect numerous sinter plants into one vast plant.

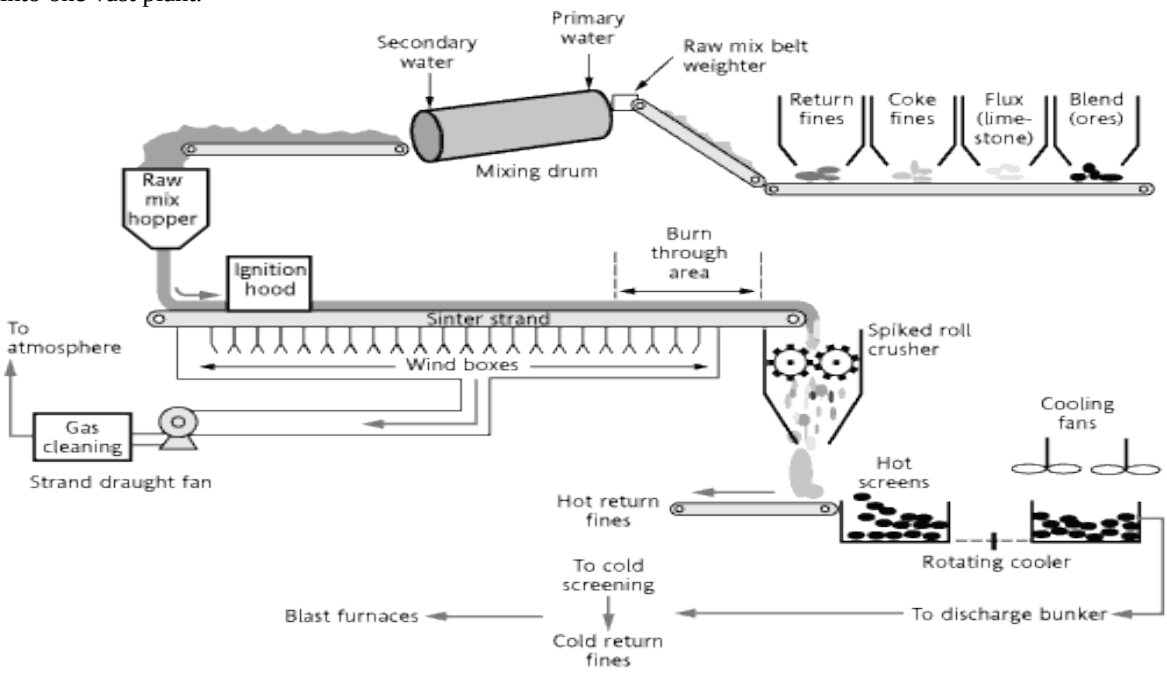

Figure 1: Process steps of sinter plant in steel making technologies

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