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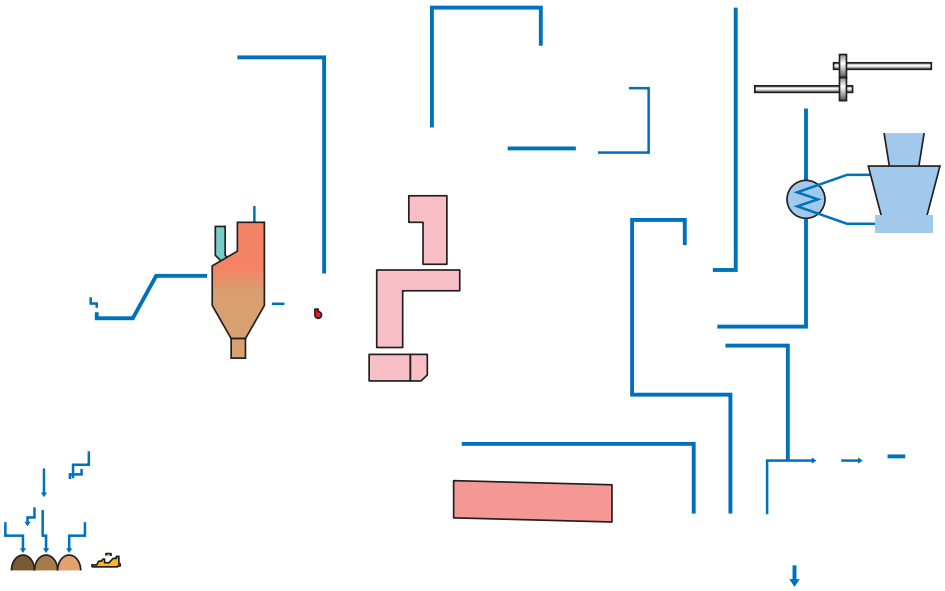
The CKK System is a new waste incineration system jointly developed by Kawasaki and the Anhui Conch Group, its joint venture partner in China. This



3 Development of the CKK System

(1) Basic concept

- Build a waste incineration facility next to a cement manufacturing facility, and continue cement (clinker) manufacturing
- Make full use of the components of the existing cement manufacturing facility in constructing the waste incineration facility
- Minimize impact on cement (clinker) quality by building the waste incineration facility next to the cement manufacturing facility

(2) Selecting the waste incineration technology

In selecting a waste incineration technology, we considered the type of incinerator to use based on Kawasaki's proprietary technology.

As a result, we adopted the fluidized-bed type gasification furnace, which boasts minimal gas volume and low gas temperature at the furnace outlet, a characteristic that makes it possible to reduce the furnace size (Table 1).

(3) Determining the pyrolysis gas injection point

The pyrolysis gas generated in the fluidized-bed type gasification furnace can be injected into the cement

manufacturing facility either at the calciner (precalciner) or rotary kiln. As shown in

(i) Waste status

The analysis results of waste in Tongling City are summarized in Table 3. The lower heating value was approximately 5,900 kJ/kg, which was equivalent to the standard waste at the time of planning. While sulfur concentration is considerably higher than that of the standard waste, this is presuthi d)u2 the' "e b' bis presu.pt5[jpt5 a6her t d 1awa r

(iii) Concentration of dioxins in exhaust gas

Measurement results of dioxins at the stack inlet of the cement manufacturing facility shown in Table 4 demonstrate that regulatory values are fully met. Incidentally, this plant does not incorporate spraying of activated carbon to reduce dioxins in exhaust gas.

(iv) Non-combustibles discharged from gasification furnace

Non-combustibles discharged from the bottom of the gasification furnace as shown in Fig. 5(a) have been confirmed to be usable as cement material. Iron as shown in Fig. 5(b) has been confirmed to be recyclable in an unoxidized state.

(v) Clinker quality

Ever since it started operation, the plant has never experienced any suspension of the cement manufacturing facility due to low clinker quality. This shows that mixed combustion of waste has no negative impact on the quality of clinker.

(vi) Mixed combustion of dewatered sludge

In China, the increasing number of sewage treatment facilities has made detoxification of sewage sludge (dewatered sludge), which is generated in huge quantities, an issue of great importance. To test whether it is possible to treat dewatered sludge with the CKK System, we had conducted mixed combustion of dewatered sludge starting at the plant in November 2011. As a result, we found that there is no problem if the amount of dewatered sludge is kept within the range of 10-20%.

Concluding remarks

Orders for the CKK System have been steadily increasing in China, where a total of 8 plants are in operation, and 10 plants are under construction as of the end of September 2015.

Furthermore, growing population and rising standard of living in the emerging economies of Southeast Asia as well as India and Brazil have led to increased demand for the hygienic treatment of municipal waste in these countries and regions. The low cost of the CKK System will make it an ideal solution to meet their needs.

The CKK System is also effective in reducing greenhouse gas emissions, a pressing issue across the globe. We will continue to further refine the system to contribute to a healthier planet.

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