

# Application results of a dosage controller for acid gas neutralizing chemical

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## Abstract

Slaked lime is mainly used in Japan to treat acid gases such as HCl and SO<sub>x</sub> generated from waste incineration facilities. In order to stably treat acid gas, it is necessary to change the amount of slaked lime added according to the load fluctuation of acid gas, and usually PID control is performed according to the acid gas concentration at the stack.

On the other hand, if the properties of the acid gas change due to changes in the quality of waste, the control settings also need to be changed. However, there are many cases in which the control setting is not adjusted, and the dosage amount is an excess or deficiency. To deal with these issues, we have developed a control device "S.sensing<sup>TM</sup>HP" that is easy to install and highly responsive to fluctuations in acid gas concentrations. This time, we will introduce an application example of this device.

## 1. Features of S.sensing<sup>TM</sup>HP

Figure1 shows the installation flow of S.sensing<sup>TM</sup>HP.

The signal of the acid gas analyzer measured at the stack is branched and input to this device, and the necessary addition amount of slaked lime is calculated in the device. The calculated addition amount can be used as an output signal and input to an acid gas neutralizing agent addition device. In this way, the device can be easily installed.

In addition, there are many cases where conventional PID control is performed only for the instantaneous value of acid gas, but with this device, it is possible to perform more stable control by considering load fluctuations. Furthermore, it has a function to vary the dosage according to the 1-hour moving average value,

eliminating the need for manual intervention by the operator even when the concentration rises.

## 2. Application example

An application example at the A industrial waste incineration facility shown in Table 1 is introduced.

Table 1 Facility overview

Incinerated matter	Industrial waste (Plastic, acid, alkali, sludge, etc.)
Incinerator model	Full continuous kiln furnace
Incineration capacity	45 tons/day
HCl control target value	60 ppm
Slaked lime consumption	55 tons/month

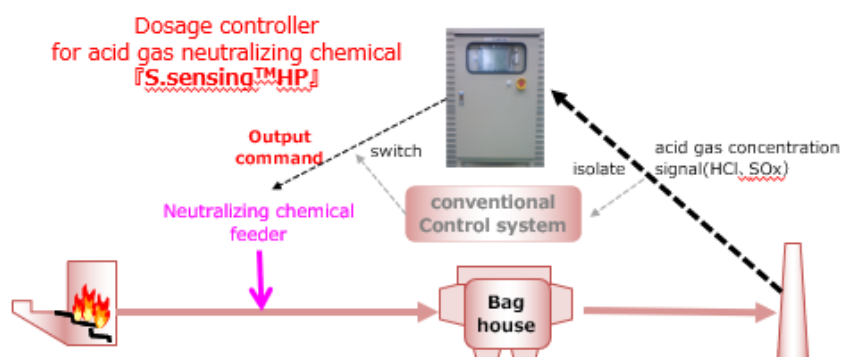


Fig.1 the installation flow of S.sensing<sup>TM</sup>HP

As shown in Fig. 2(a), the fluctuation of acid gas load derived from waste was large, and although the conventional control was performed, the instantaneous value fluctuated greatly.

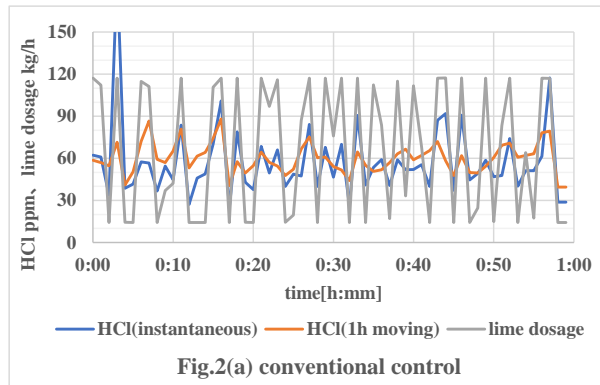


Fig.2(b) shows the results of applying S.sensing<sup>TM</sup>HP to this facility. The acid gas concentration was able to become more stable by controlling the injection amount by high responsivity.

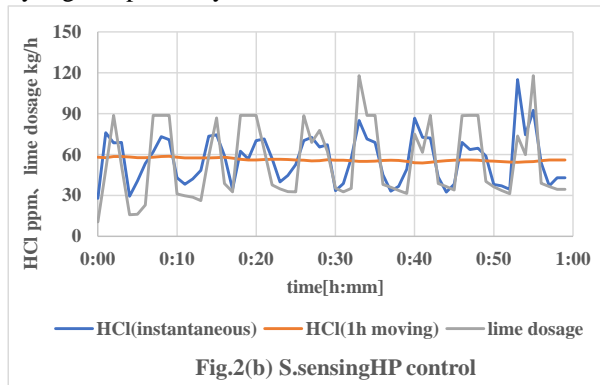
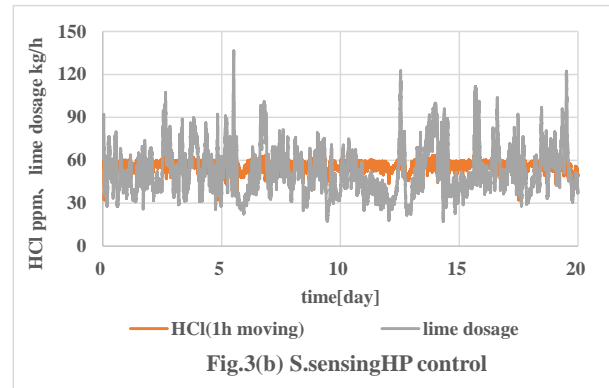
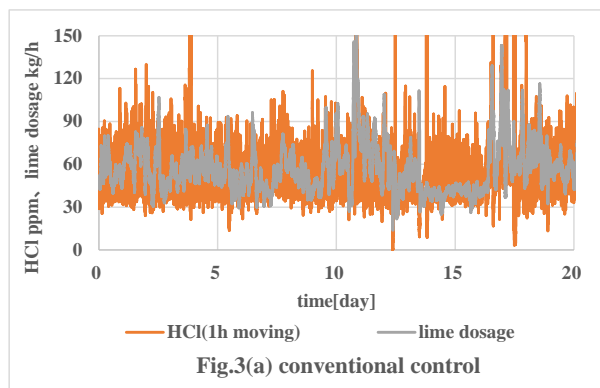


Fig.3(a) and Fig.3(b) show the results of long-term data acquisition at this facility.

Even in continuous operation for 20 days, it was demonstrated that the treatment using S.sensing<sup>TM</sup>HP (Fig.3(b)) was able to treat acid gas



concentrations more stably than the conventional control (Fig.3(a)).

Table 2 shows the analysis results of fly ash collected during the test period.

Compared to the conventional control, when S.sensing<sup>TM</sup>HP was used, the Cl/Ca ratio was higher, suggesting that the effective utilization of Ca was increased.

Table 2 Examples of ash analysis

	Ca	Cl	Cl/Ca
	mg/kg	mg/kg	-
Conventional control	312,311	304,067	0.97
S.sensing <sup>TM</sup> HP control	271,800	306,600	1.1

### 3. Summary and Future Considerations

As shown above, it was found that by reviewing the conventional control and using S.sensing<sup>TM</sup>HP, slaked lime can be used more effectively, contributing to a reduction in the amount and stable treatment.

Reducing the amount of slaked lime used leads to a reduction in the unreacted alkali content remaining in the fly ash. The reduction of the unreacted alkali content increases the applicability of inorganic heavy metal immobilizing agent and is expected to replace organic heavy metal immobilizing agent, which have been facing price increases and supply instability in recent years.

We will continue to work to reduce the amount of waste generated by reducing the amount of slaked lime and reduce the load on final disposal sites due to organic matter.