

Effect of the high calorific sludge on the existing facility

Whole term

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(Purpose)

Increasing amount and concentration of primary sludge will probably cause variation of the sludge characteristics in the future, and it is predicted that its calorific value will become very high. In this case, the sludge incinerating process will be mostly affected.

This investigation is a quantitative examination on the effect of high-calorific sludge upon the performance and the life expansion of the incinerating process in order to investigate the remodeling and the reconstruction of the incinerating process according to high-calorific values.

The method of fluidized incineration which will be the main process is focused on in the incinerating system.

(Results)

A research on 1) the effect of high calorific conditions and 2) measures for high calorific conditions and the technology of incineration was conducted. A company manufacturing fluidized incinerating plants for treating sewage sludge offered information of the technology. High calories such as 500, 650 and 850 kcal/kg-cake were investigated, and the estimated maximum value was 1,000 kcal/kg-cake by considering 350 kcal/kg-cake which was the existing condition.

1) Effect of high calorific conditions

The effect of a high calorific condition in the fluidized incinerating facility was as follows:

- (1) The high temperature in the facility generated clinker
- (2) The management of the incinerating facility became complex.
- (3) The high temperature and the strength in the heat recovery equipment became low.
- (4) There was a bad effect on the emission-treatment facility
- (5) The performance of the treatment process of incineration deteriorated.

2) Measure for high calorific conditions and the technology of incineration

In case that the initial calorific value of the input cake in the existing facility changes to a high calorific value, the measure is as follows:

(The measure in case of under auto ignition point)

- (1) Reduce the assistant fuel

(The measure in case of over auto ignition point)

- (1) Adjust the water content in the input cake
- (2) Direct input of water to the incinerating facility
- (3) Equip the air freezer
- (4) Blow cool air to the free board

3) Quantitative examination on the high calorific effect

For the quantification of high calorific effect, the cost according to the calorific value is offered by the manufacturer in case of new establishments. In addition, the example 1 was that the basic flow was R-2 and the air freezer was equipped in case of high energy progression, and the example 2 was that the rotational fluidized incineration was adopted in over a generated energy of 850 kcal/kg-cake. The treatment scales were 50, 75, 100 w-t cake/day.

(Example 1: air freezer method) Because of the air freezer, the cost of the machinery increased by 15 percent, which was independent of the treatment scale.

(Example 2: rotational fluidized incineration + waste heat boiler method) In case that the holding energy of the cake was 1,000 kcal/kg-cake, the cost of the mechanical facility increased by 24~36% in comparison with the current level.

4) Future assignment

In case that the high-calorification of sludge is progressed, it is possible to propose an alternative technology to the existing and new facility in accordance with the results of the investigation of each plant manufacturing company. An investigation on a method of effective heat recovery in the viewpoint of effective energy use will be done in the future.

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Keywords

High-calorification of sludge, Fluidized incineration, Alternative technology, Reconstruction