

Research for utilization of the facility of sludge condensation by filtration with a filter cloth

Whole term

1999. 6~ 2001.3

(Purpose)

In Tokyo, it is required to develop a highly efficient piece of equipment to condense sludge in large quantities, because the integration of the process of sludge treatment makes it easy to decompose.

The purpose of this study was to construct an actual facility which is composed of a condenser having a width equal to a 3m-filter cloth, and supplemental equipment in the Kasai Treatment Plant; to investigate and evaluate the maintenance method such as cleaning the filter cloth in order to achieve a target of 4% condensed concentration and over 95% SS withdrawal rate, for a sludge with a concentration of 0.2~0.5% at a supply rate of over 40 m³/h; and eventually, to induce the utilization of the technology of filter-cloth -condensation.

(Results)

This research conducted from 1986 to 1987 with Tokyo as a co-worker, was likes of the “ Utilization of new technology to promote functional advancement in projects” under the “ New generational projects to support sewerage systems” . In 1986, it was impossible to achieve the targeted concentration of the condensed sludge. Thus, the facility was reformed and the experiment was kept continue in 1987.

1. Investigation on the performance.

(1) Investigation on the operational conditions.

- When the sludge in the distribution tank (average solid content of excess sludge is 27%) was used as the experimental object, the filter cloth velocity needed to be 20 m/min and the poly iron addition rate to be 15% to achieve the aforementioned target.

- For mixed excess sludge in which the solid content was more than 50%, though the filter cloth velocity was 20 m/min and the poly iron addition rate was 20%, the poly iron addition rate could have been 15% by pH control using sulfuric acid.

(2) Investigation on the control characteristics

When sludge in the distribution tank was used as the experimental object and was controlled constantly, sludge (Content of the original sludge was 0.2~0.5%) was condensed to 4% constantly and safely.

(3) Investigation on the functional safety.

- Clogging was solved by chemical washing. Hence the attached components such as the filter cloth did not need to be changed.

- There was no scum occurrence in the operation period.

- Settled particle had to be removed once in several months.

(4) Investigation on the effect on the characteristics of dewatered sludge and etc. due to the inducement of this facility.

- Condensed sludge in this experiment possessed the same characteristics as the dewatered sludge from the Kasai Treatment Plant.

- Comparing with the other technologies, the loading rate of phosphorus and suspended solids decreased in the reverse flow.

2. Evaluation of the arrangement and maintenance of the condenser.

- The site for installation is almost the same compared with the centrifugal condenser of 150m³/h in the Kasai Treatment Plant and it was difficult to find a way to compare it with that of the gravity condenser.

- Supplemental materials are simple and maintenance is easy because the operational factors are filter-cloth velocity, quantity of cohesive agent and clogging only.

3. Economical evaluation

As per the results of the overall comparison of the centrifugal condenser with regard to the constructional, maintenance and repairing costs; it is economically feasible.

(Future task)

- Selection of an optimal cohesive agent should be investigated.
- The filter clothe has to be verified with an actual equipment in order to investigate the chemical washing and the life time of it.

Collaborators: Tokyo Metropolitan Government

Japan Institute of Wastewater Engineering Technology

Personnel in charge of the study: Takashi Eto, Fumio Suzuki, Yukio Shinkai

Keywords

Head loss, Cake filtration, Concentration of condensed sludge,
Constantly-controlled system