

## A collaborative study of an excess sludge reduction technique using an oxidant

Year of Research

2008

### (Purpose)

A total of 1,075 small-scale treatment plants with a projected treatment population of approximately 10,000 or less were in service at the end of fiscal 2006. These account for almost half of all treatment plants. At the majority of these small-scale treatment plants, the form of operation management is sludge treatment operation. The smaller the scale of the facility, the higher the cost of sludge disposal. Therefore, reducing the maintenance cost is a pressing issue. The method of tackling this issue, described below is performing solubilized treatment of the excess thickened sludge using an oxidizing agent, draining the solubilized excess thickened sludge back into a reaction tank, and performing aerobic treatment in order to reduce the amount of discharged excess thickened sludge by 60%, thereby cutting the cost of disposing of sludge in the sewage treatment plant.

The present study, which was a verification test carried out in an actual facility, investigated the amount of sludge reduction and the associated cost and verified the validity of the technique. The study quantified the introduction effect, collected technical information on planning, design, construction, and maintenance, and prepared a technical manual.

### (Results)

#### (1) Outline of the technique

The technique described in this report involves supplying part of the excess sludge thickened in the thickener tank to the chemical agent reaction tank and using a chemical agent to perform solubilized treatment of microorganisms in the excess thickened sludge. Rate of solubility at this time is 20 to 35%. Solubilized excess thickened sludge is returned to the reaction tank and aerobic treatment is performed. The excess thickened sludge is treated by a chemical agent, so decomposition proceeds further than it does in the case of untreated sludge under the same conditions. Excess thickened sludge taken out of the plant can be reduced by about 60%. Fig.1 is a simple flow chart of the technique.

#### (2) Development target

- ① Treatment cost including sludge disposal cost: lower than conventional desiccation disposal cost.
- ② Weight reduction rate of generated amount of excess sludge: 60% or more on average per year.
- ③ Quality of discharged water of applied water system: BOD 15mg/l or less

#### (3) Test results

The following items are the results of a verification test and an applicability test of different kinds of sludge.

##### 1) Results of verification test

At treatment facilities where the OD method is adopted, the year-round sludge reduction effect was verified. No seasonal fluctuation of the sludge reduction effect was seen, and it was verified that it can achieve a 60% reduction from the conventional discharged amount.

The introduction of the sludge reduction equipment can cut discharged water BOD by 5mg/l or less and obtain favorable water quality.

However, since T-P rises to a level of approximately 1 to 1.7mg/l above that before the introduction and the amount of discharged BOD into a reaction tank also increases, it was necessary to change the aeration time from 16 hours per day applied before the start of the experiment to 20 hours per day.

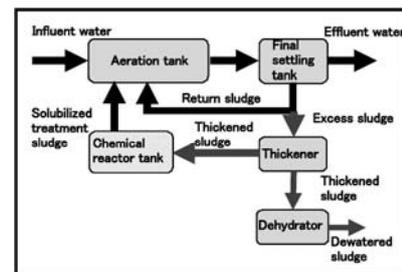


Fig.1 Schematic flow

2) Results of applicability test to different kinds of sludge

At 7 treatment facilities nationwide, the chemical agent treatment effect on excess thickened sludge was confirmed in each season.

As a result, seasonal variation in solubility rate was small, but differences were observed between treatment facilities. It was shown that the solubility rate depends on water temperature and the chemical agent injection rate.

(4)Effect of Installation

It is roughly calculated that treatment cost can be reduced by 49% in the case of 500m<sup>3</sup> per day of incoming dirty water with no dehydrator installed, and by 11% in the cases of both 1,000m<sup>3</sup> per day with a dehydrator installed.

(5) Technical Manual

The above results are collected in the Technical Manual; “Excess Sludge Reduction Using an Oxidant”.

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Key words

excess sludge reduction amount, maintenance cost reduction, solubilization of sludge