

## Performance evaluation research about the belt type filtration thickening system

Whole term

2003.6 ~ 2005.3

### ( Purpose )

In the Arao sewage treatment plant of Arao city, the quality of supernatant of digestion tank from Heisei 5 age, and the effluent of sludge gravity thickener from Heisei 6 age have been getting worse. So, normal sludge treatment processing became the difficult situation. As the present measure, Arao city reduced the amount of sludge injections to the digestion tank, and dehydrated directly the gravity thickening sludge without digestion. Furthermore, Arao city, uniquely, developed the belt type filtration thickener with which the belt had mesh structure by metal, made the examination machine as an experiment, and has conducted fundamental investigation. In response to this, "utilization evaluation research of the belt type filtration thickening system" has been carried out in Heisei 13 - 14 fiscal year as the functional highly advanced promotion enterprise (new technical practical use type) in the new generation sewer support enterprise system.

In case of the Nakahama sewage treatment plant of Osaka city, "high concentration digestion" is adopted as a system which processes sludge efficiently and stably. This system carries out gravity thickening of primary sludge and excess sludge respectively at first, gravity thickened excess sludge is further concentrated with a centrifugal thickening machine, and they are supplied to the digestion tank. Although the processing performance is comparatively stable the place by present, the subject that repair cost and an electric power cost are large also occurs, and development of the concentration machine in low cost of operation and maintenance is desired. Therefore, the preliminary survey of Osaka city has been uniquely carried out about the belt type filtration thickener from the Heisei 14 fiscal year.

In response to the result of the utilization evaluation research of Arao city, and the preliminary survey of Osaka city, this research was carried out over 2 years (the Heisei 15 fiscal year and the 16 fiscal year) using the practical system as the performance evaluation research.

As the performance target, it was set that thickened sludge concentration becomes 4% or more for excess sludge, primary sludge and mixed sludge (mixture of excess sludge and primary sludge), and about 5% for gravity thickened excess sludge, and that solid capture rate of each sludges is 95% or more. Moreover, this research has been carried out as the functional highly advanced promotion enterprise (new technical practical use type) in the new generation sewer support enterprise system.

### ( Result )

The results obtained from the joint research in the Heisei 15-16 fiscal year are as follows.

#### ( 1 ) Quality of supply sludges

The quality of the supply sludge of Arao city and Osaka city were investigated. The amount of fiber was much to the sludge of Arao city since a part of primary sludge was bypassed to the reactor. Moreover, the quality of sludge in seasonal change, it was observed in both cities that VTS goes up in winter and sludges are presenting difficulty thickenability.

#### ( 2 ) Thickenability

About excess sludge, thickened sludge concentration satisfied 4% or more and the solids capture rate did 95% or more in general. And about gravity thickened excess sludge, although sludge concentration falls a little because of difficult thickenability of supply sludge in winter, it evaluated through the four seasons that thickened sludge concentration satisfied about 5% and the solids capture rate did 95% or more in general.

( 3 ) Stability

In continuation operation of about 170 hours, there was no big change of processing capability through the term, so it checked that this filtration thickener could demonstrate the stable performance.

( 4 ) Operation and maintenance

The contents and the frequency of required work were arranged from the operation situation of this filtration thickener, and the maintenance management vote was created. Since this filtration thickener had few auxiliary machines, and there was no part which carries out high-speed rotation except for electric motors, check work on everyday and maintenance work about main parts were easy.

( 5 ) Economical efficiency

It was confirmed about this filtration thickener that construction costs and the running cost are economically excellent and that operation and maintenance nature was easy as compared with the centrifugal thickener and the dispersed-air floatation thickener.

**( Conclusion )**

As a result of operating the practical system in the performance evaluation research, it was confirmed that the belt type filtration thickener accomplished a performance target under the original performance exertion conditions and good operation was carried out. By adopting this technology widely, it is expectable that sludge concentration progresses cheaply and easily.

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key words

mesh belt , filtration thickening