

Study on High rate Pressure-type Screw Press Dehydrator

Whole term

2004.10 ~ 2006.3

(Purpose)

The pressure-type screw press dehydrator was jointly studied by Japan Institute of Wastewater Engineering Technology and six private companies in 1999 and 2000. The results were compiled in the form of a technical manual, so that the features of the plant were widely recognized, culminating in the fact that more than 100 units of this kind have so far been implemented in Japan. However, there has been high demand for even higher dehydration performance. A particularly important challenge has been to increase the dehydration performance for hard-to-dehydrate digested sludge and other sludge. This high rate pressure-type screw press dehydrator is the result of dehydration improvement by increasing the thickening efficiency in this thickening zone with attention given to the thickening zone, which is the first stage of dehydration, based on a review of the dehydration mechanism in order to increase the dehydration performance.

This research aims to systematize the knowledge about dehydration experiments, determine the standard performance of this technology through comparative experiments (using conventional and high rate demonstrative test plants) and operation status surveys (based on a real plant), organize and consider the design specifications and maintenance, and compile the results in the form of a technical manual.

(Research details)

1 . Overview of this technology

The pressure-type screw press dehydrator (hereinafter referred to as “conventional model”) researched in the preceding project is so designed that, as illustrated in Fig. 1, coagulated sludge is forced-fed into the clearance made between the outer screen and the screw and that the screen is turned against the fixed outer screen, thus performing thickening, filtration, and compression for dehydration.

The high rate pressure-type screw press dehydrator in this technology is provided with a mechanism for turning the outer screen in the thickening zone in reverse direction of the screw as illustrated in Fig. 2. This outer screen is thus turned to increase thickening efficiency in the thickening zone, resulting in a higher throughput. This also results in a

higher sludge-filling rate in the following zone: filtration and compression zone. The dehydration performance is thus higher than in the conventional model. The development targets are summarized in Table 1.

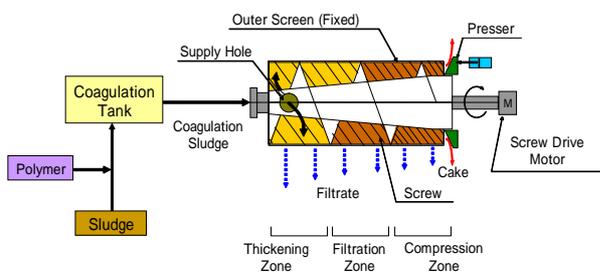


Fig.1 Details of Conventional Model

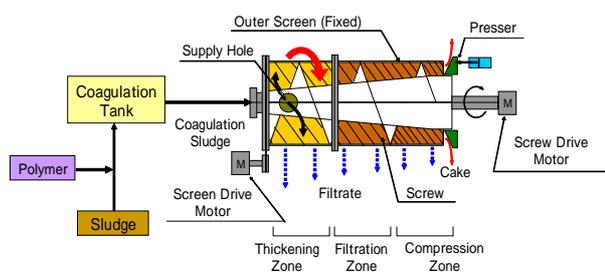


Fig.2 Details of High rate Model

2 . Research items

- (1) Systematization knowledge about dehydration experiments
- (2) Obtaining an overview of the operation status of the real plant
- (3) Comparative experiments (winter test) using conventional and high rate-type demonstrative test plants

Table 1. Development targets

Item	Target performance
Throughput	At least 1.3 times the conventional model, if the moisture content of cake is made equal to that of the conventional
Moisture content of cake	1.5 to 2.0 points lower than the conventional model, if the throughput is made equal to that of the conventional
Chemical dose	Performance equal to that of the conventional model
SS recovery rate	Performance equal to that of the conventional model

(The schedule in the future)

- (1) A comparative experiment (summer test) will be performed using conventional and high rate demonstrative experiment plants in order to verify the various aspects of the performance.
- (2) The operation status of the real plants will be surveyed to monitor the dehydration performance and maintenance.
- (3) The standard performance will be set, design specifications organized, and design methods organized. A technical manual will then be prepared.

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key words

Dehydration , Screw press