

Research on the Double-layer Cylindrical Filter Press

Year of Research

2006•2007

(Purpose)

In Japan's sewage sludge plants, the number of dewatering machines using a metal mesh filter has recently increased. We have now developed the Double-layer Cylindrical Filter Press (DCFP) as a new type dewatering machine using a metal filter, which can achieve lower moisture-content in dewatered cake than a conventional type.

This research is intended to organize its characteristics, construction, and performance, to compile a technical manual of technical matters related to process planning, designing, and maintenance.

(Result)

Figure 1 is a schematic diagram of the DCFP. This machine consists mainly of the following parts; i.e. inner and outer cylindrical screens, spiral wall, and back pressure plate set around the end of the spiral wall. Sludge is transported and dewatered by rotating double cylindrical screens and a fixed spiral wall.

This machine has the following features;

- ① It can achieve lower moisture-content than a conventional machine.
- ② Its installation area can be reduced by its vertical layout.
- ③ It consumes low power and is easy to maintain.

(1)Target

The performance of the DCFP was compared with that of a conventional dewatering machine in a four season test and through short-term use of raw mixed and digested sludge. The target performance is a reduction of the moisture-content 4% or more in raw mixed sludge and 1% or more in digested sludge from the levels obtained by a conventional machine.

(2)Result

The DCFP achieved the target performance improvements over a conventional dewatering machine for two types of sludge (raw mixed and digested sludge), which have different sludge characteristics and are thickened by different processes (gravity settling tank and mechanical process such as flotation and centrifuge).

As standard dewatering performance for sludge with each set of characteristics have been set. Table1 is the standard dewatering performance of raw mixed sludge of mechanical thickening, for example.

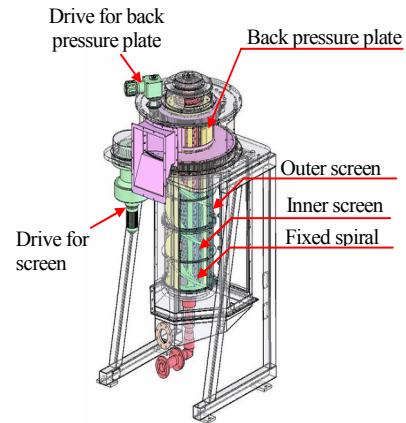


Figure 1 Schematic diagrams of DCFP

(3)The technical manual

The results of this research have been compiled in a technical manual “Technical manual of Double-layer Cylindrical Filter Press”.

Table 1 Standard dewatering performance (raw mixed sludge of mechanical thickening)

Sludge type			Raw mixed sludge																	
Sludge properties	Ignition loss	(%·TS)	83 ~ 80						80 ~ 77						77 ~ 75					
	Sludge concentration (TS)	Gravity thickening	(Separate system) 1.5						2.0						(Combined system) 2.5					
		Mechanical thickening	3.5						3.5						3.5					
	Fiber (100mesh residue)	(%)	10			20			10			20			10			20		
Mechanical thickening	Operation type*		a	b	c	a	b	c	a	b	c	a	b	c	a	b	c	a	b	c
	Moisture content of cake (%)		74	76	78	72	74	76	74	76	78	72	74	76	73	75	77	71	73	75
	Throughput (kg-DS/m ² ·h)		34	68	102	39	77	116	34	68	102	39	77	116	34	68	102	39	77	116
	Dosage of polymer flocculant (%·TS)		≦ 1.0			≧ 1.0			≦ 1.0			≧ 1.0			≦ 1.0			≧ 1.0		
	SS recovery rate (%)		≧ 95			≧ 95			≧ 95			≧ 95			≧ 95			≧ 95		

※ a; priority to moisture content b; standard operation c; priority to throughput

■ ; standard design performance for standard sludge.

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Key words

Double-layer Cylindrical Filter Press, Dewatering machine using a metal filter,
Higher-DS content, Vertical layout