

1. Introduction

The screenings removed at pumping stations and sewage treatment plants are a collection of various types of miscellaneous debris. In transporting screenings out of these facilities, a belt conveyor or skip hoist is generally used. However, this equipment was prone to trouble due to its complex structure and large number of com-

poor sanitation and leakage of foul odors were problems.

This report introduces a product called “Grit Chamber Screenings Piston Pump System: ‘PisPo_mini’,” which realizes sanitary, space-saving, and energy-saving transportation of grit chamber screenings from separate sewer systems.

2. Features

2.1 Sanitation and Ease of Maintenance Control

Because transportation of screenings is performed by a closed piping route, splashing of wastewater and leakage of foul odors are not concerns, and a sanitary working environment is realized. Furthermore, because the moving equipment is limited to the grit screenings piston pump, the structure is simple and maintenance control is easy.

2.2 Compact Design and Easy Retrofitting in Existing Facilities

Conveyor systems include a drive mechanism, the supporting structure for the equipment, etc., and require a large amount of space. In contrast, because construction of the “PisPo_mini” screenings piston pump system comprises mainly laying of the piping route, the system achieves a large space saving. The system can be laid out freely in any direction, including horizontal

facilities. In particular, when a “PisPo_mini” system is installed as part of the renovation of an existing facility, the space available for maintenance is increased and maintenance control is improved.

2.3 Energy Savings and Other Cost Advantages

The “PisPo_mini” system is energy saving in comparison with conventional transportation systems because the pump is operated automatically, corresponding to the actual amount of screenings generated.

Construction costs are also greatly reduced, particularly in plants with a long transportation distance, because the “PisPo_mini” system requires only construction of piping (in addition to the pump).

3. Outline of Screenings Piston Pump System

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matter which is larger than the diameter of the hydraulic cylinder enters the screenings piston pump, this cutting edge cuts the large foreign matter to enable pumping into the conveying pipe.

The standard hydraulic unit power is 2.2 kW or 3.7 kW and is selected depending on the actual pump head and the transportation distance (length of the piping

Table 2.

4. Example of Calculation for Device Selection

- Sewage flow: 300 000 m³/day (maximum hourly
- Concentration of screenings: 1–15 mg/l¹⁾
- Screenings generation rate:
300 000 m³/day × 1–15 × 10⁻⁶ = 0.3–4.5 m³/day

- Pump operating time: 6 h/day
- Necessary hydraulic pump capacity:
4.5 m³/day ÷ 6 h/day = 0.75 m³/h

1.0 m³/h. Accordingly, it is possible to meet the requirements of this plant with 1 unit.

5. Conclusion

