

Study on Grit Pump System with Collecting Nozzles

Whole term

2003.6 ~ 2005.3

(Purpose)

“Bucket grit elevator” has been a main system for collecting and lifting grit in the grit chambers in WWTPs and pumping stations. And “Belt conveyor system” has been equipped as a main transport system for carrying it out. But “Grit pump system with collecting nozzles” is becoming popular system because of its excellent properties such as preventing bad work environment caused by odors and complicated passages for maintenance, and so on. And “Dry operation of grit chamber”, which uses this system is taken notice as one of the measures to improve CSOs problems.

“Grit pump system with collecting nozzles” is an effective system for reducing malodor, securing of maintenance spaces, dry operation of grit chamber, and so on, because in this system, treatment water or raw water in pump pit will be using to transport of grit by pipe line. Now there are few technical reference for designing this system. Therefore, we decided to assemble field data about this system and to compile these knowledge in a technical design manual about “Grit Pump System with Collecting Nozzles” which will describe the design method, the excellent properties to conventional systems, and so on.

(Result)

1 . Characteristics and effects of installing this system (based on our experiences in the existing plants and the results of the questionnaire to users).

【Characteristics】

- (1) Transfer system by use of pipeline instead of mechanical belt conveyors
- (2) Securing of maintenance spaces above grit chamber
- (3) Few number of machines and few sliding parts

【Effects of installing】

- (1) To do “Dry operation of grit chamber” after rainfall easily
- (2) Simplification of deodorizing equipments
- (3) Simplification of maintenance
- (4) Simplification of operation

2 . Step of planning and some notes

- (1) Arrangement of planning terms
- (2) Selection of grit pumps
- (3) Selection of grit collecting nozzles
- (4) Examination of appropriateness in combination of grit pumps and grit collecting nozzles

3 . In the experiments of collecting nozzles in a water tank, we confirmed that collecting grit with no grit rolled up could be accomplished.

4 . By the examinations about water quality and odor with the water stayed in grit chamber of combined sewer system for about one week after rainfall, we confirmed the effect of the dry operation as follows. Besides, for a case in which the treated wastewater was exchanged grid chamber after dry operation, we also examined its water.

- (1) Generally, water qualities and odors are worse in Non-dry operation grit chamber.
- (2) Especially, sulfide series (Methyl Mercaptane, Hydrogen Sulfide, Methyl Sulfide, Dimethyl Sulfide) odors in dry operation grit chamber are lower than in Non-dry operation grit chamber.

5 . We conducted questionnaire to the municipalities those installed the grit pump systems. We have received many favorable responses, for example, “It’s improved work environment because of the reduction of odors.”, “It’s made easy to operate and maintain the grit chamber.” And for the trouble cases among the opinions we received, we examined and arranged the improving measures.

Based on above results,we published “Thechnical manual of grit pump system with collecting nozzles”.

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key words

grit chamber, grit pump , CSO control , dry operation , collecting nozzeles