

Corroborative Research on Countermeasures Against MAP Generation by Injection of Poly-ferric Sulfate in the Sludge Digestion Facility of the Chubu Wastewater Treatment Center

Year of Research

2012 • 2013

Appropriate stock management

(Purpose)

In the Chubu wastewater treatment center, we changed the digestion process from two-step digestion to one-step digestion, concentrated the sludge injected into the digester tank, and shortened the digestion period for the purpose of reducing the amount of dewatered cake. With this change in digestion process, increased risk such as pipe blockage due to MAP generation has become an issue.

In this research, we studied the effectiveness of suppressing the MAP generation by injecting a chemical agent (poly-ferric sulfate) and of reducing the risk such as pipe blockage in order to collect and organize the data necessary for reviewing the operating method of the digestion tank in the future.

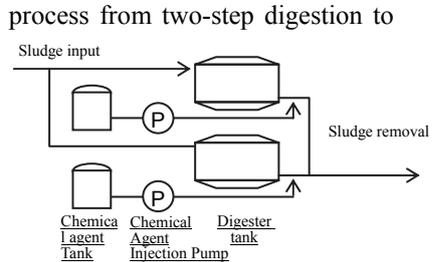


Figure 1: Overview flowchart of the demonstration experiment

(Results)

(1) Information on the demonstration test

An overview flowchart of the demonstration experiment is shown in **Figure 1**. A chemical agent is injected into the sludge removal pipe in which pipe blockage frequently occurs due to MAP scale build-up. The setting values for the chemical agent injection rate during the experiment are shown in **Table 1**. By checking how much scale is built up on the SUS plate sample installed inside the sludge removal pipe, we confirmed a suppressing effect on MAP generation at each chemical agent injection rate.

(2) Results of the demonstration test

The status of MAP generation on the sample piece for each chemical agent injection rate is shown in **Figure 2**. A large amount of MAP deposit was confirmed in Test 1. No MAP deposit was confirmed in Tests 2 to 6. However, in Test 1, we could not confirm when the MAP deposit started and other conditions.

(3) Discussion

Before starting to inject the chemical agent, the pipe needs to be washed about every seven months. However, no MAP deposit was observed during the inspection in March, which was eight months after starting to inject chemical agent. Hence it was confirmed that the poly-ferric sulfate had a suppressing effect on the MAP generation. In addition, the operation of the valve installed in the pipe becomes lighter. From this fact, we may expect a dissolution effect on the MAP scale.

(Conclusion)

By injecting poly-ferric sulfate that has a suppressing effect on MAP generation, it is possible to significantly reduce the cost of washing inside the pipe. In addition, if we could find the limit to the injection rate of the chemical agent where MAP is no longer generated by conducting a long-term operation, it would be possible to reduce the amount of chemical agent usage.

Table 1: The setting value for the chemical agent injection rate during the experiment

Test No.	Period	Chemical agent injection rate
Test 1	4/10/2013 to 7/24/2013 (106 days)	0 ppm
Test 2	7/24/2013 to 9/12/2013 (51 days)	0 ppm
Test 3	9/12/2013 to 10/8/2013 (27 days)	500 ppm
Test 4	10/8/2013 to 11/12/2013 (36 days)	1000 ppm
Test 5	11/12/2013 to 12/12/2013 (31 days)	1500 ppm
Test 6	12/12/2013 to 3/13/2014 (92 days)	1000 ppm

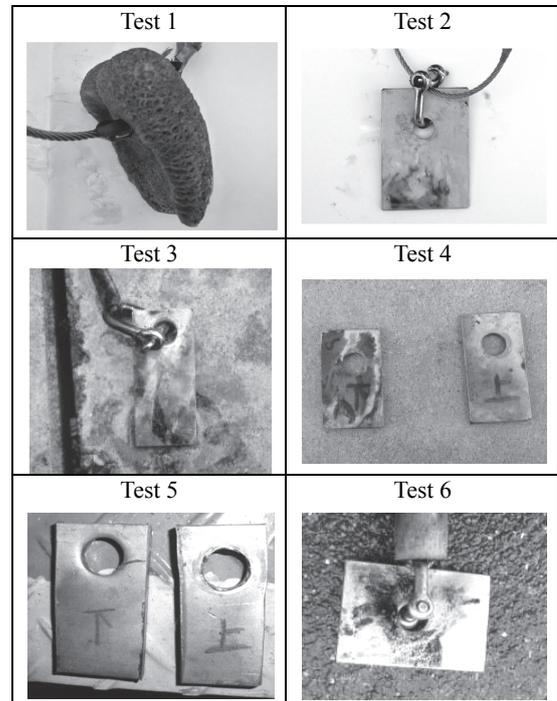


Figure 2: The status of MAP generation on the sample piece

※ Fukuoka city, Japan Institute of Wastewater Engineering and Technology
 Inquiries ; Resource Recycle Research Department, Takashi Ishida, Shuichi Ochi, Sadahiro Ito
 [03-5228-6541]

Key words

MAP, digestion, scale, pipe blockage, poly-ferric sulfate