Investigation on the reciprocal sludge collector		
Whole term	2000.12~2002.11	

(Purpose)

The reciprocal sludge gathering device and scum gathering device of this research are totally different from the existing chain-flight-sludge collector. Because of its simple structure and light weight, it is much strong including easy maintenance, short construction time and low cost, and thus it is very suitable for current needs of cost reduction, maintenance and improved durability.

The objectives of this research were to examine the application of this reciprocal sludge and scum gathering device to the preliminary and final settling tank of the wastewater treatment plant and to summarize it as a technical manual, based on the investigation on the existing systems and the result of small scale experiments.

(Results)

1) Reciprocal sludge gathering device

(1) Comparison with the existing sludge collector

Generally, the efficiency of the reciprocal collector device is the same as that of the existing sludge collector. Nevertheless, a rise of the sludge or denitrification-sludge was observed according to the treatment condition in some treatment plants.

(2) Examination of the gathering speed

One of the important characteristics of the reciprocal sludge gathering device is that it can change the gathering and return speed. The change of the treatment efficiency according to the change of the gathering speed was examined.

- Impact of the change of gathering speed on efficiency

The change of gathering speed (standard state [gathering 1.5 m/min, return: 4.5 m/min]) had no influence on the treated wastewater quality.

- Control of sludge rise by changing the speed

By controlling the gathering and return speed, the rise of sludge was controlled and turbidity and SS concentration were reduced. It was confirmed that the over-reduction of the speed could bring the pin floc (especially for nitrification-accelerating operation) generation with the increase of sludge thickness and the retention time, thus cautious operation would be required.

- Effect of soft start/stop

The introduction of soft start/stop, which means a gentle change of speed when the operation is switched on and off, was investigated for the prevention of sludge damage during the operational switch being turned on and off [gathering-return]. As a result, it was concluded that the introduction of soft start/stop would result in higher turbidity and lower SS concentration. And it was observed that the pin floc which occurred before the introduction was controlled.

- Examination of the height of the scraper

It was showed that the sludge rise was controlled by increasing the scraper height when the sludge height was low. The deficiency of gathering due to the low height of scraper was not confirmed.

2) Reciprocal scum gathering device

It was confirmed that the reciprocal scum gathering device was more efficient than the existing chain-flight-scum collector.

3) Summary

As per the investigation of existing operations, it was concluded that generally the performance of the reciprocal sludge collector had the same efficiency as the existing sludge collector. The sludge rise for the case that the height of sludge interface was low and the denitrification sludge rise for the case of nitrification accelerating operation were observed. However, those can be improved by the change of the gathering and return speed, and the introduction of soft start/stop.

The reciprocal scum collector was proved to be more efficient than the existing chain-flight-scum collector. The results of this research were summarized in the " Technical manual of the reciprocal sludge collector and scum collector."

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