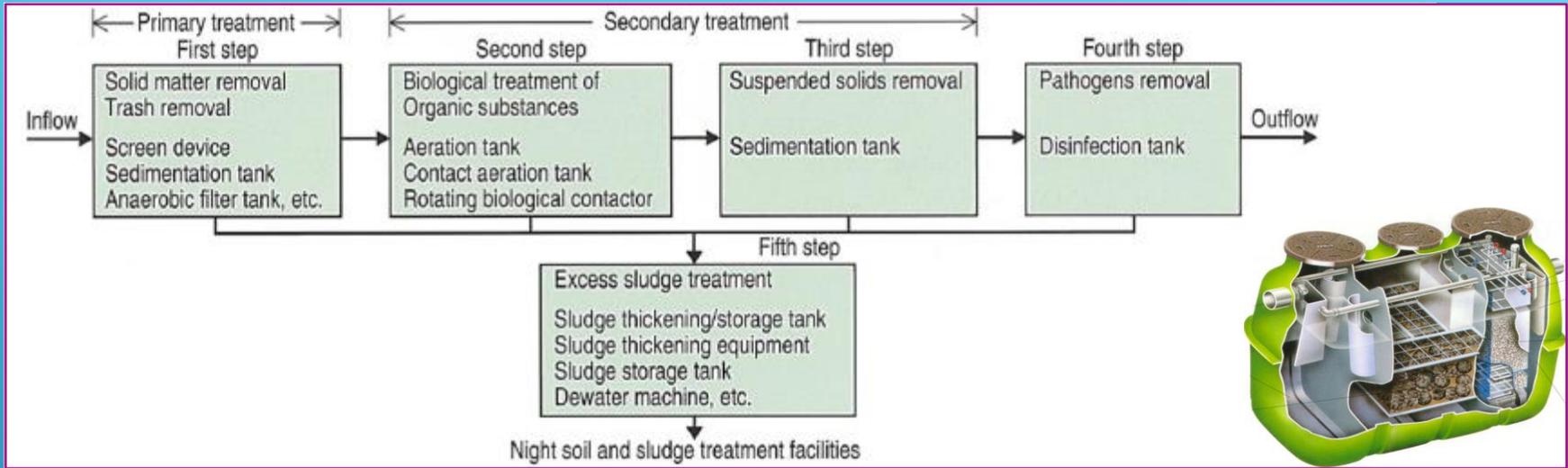


OPERATION AND MAINTENANCE OF JOHKASOU SYSTEM IN JAPAN

Shinhi Kumokawa Ph.D

Center for International Cooperation of Johkasou System
Japan Education Center of Environmental Sanitation (JECES)

WHY O&M INSPECTIONS OF JOHKASOU ARE NEEDED?



	Device/equipment in johkasou
Primary treatment (1 st step)	Sedimentation tank, Anaerobic filter tank, Slit screen, Aerated screen, Grit chamber, Bar screen, Flow equalization tank,
Secondary treatment 2 nd step	Contact aeration tank, moving bed tank, aeration tank,
3 rd step	Sedimentation tank
4 th step	Disinfection tank
5 th step	Sludge thickening/storage tank, sludge storage tank,
Mechanics	Electromagnetic blower, Control panel, mechanical blower, pump,

DEFINITION OF JOHKASOU O&M

Operations concerning to inspecting, maintaining and repairing johkasou (Johkasou Act, Article 2-3)



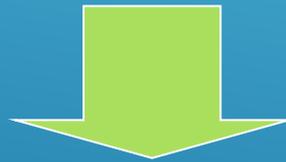
- Prevent loss of unit function and device breakdown
- Maintain normal treatment performance
- Promote proper regular desludging



DEFINITION OF JOHKASOU DESLUDGING

Desludging involves extracting the generated sludge and scum from johkasou and conditioning sludge in the tank, as well as cleaning tanks and auxiliary equipment.

(Johkasou Act, Article 2-4)



Recover/reset treatment performance of johkasou by removing sludge regularly

TECHNICAL STANDARDS FOR JOHKASOU O&M

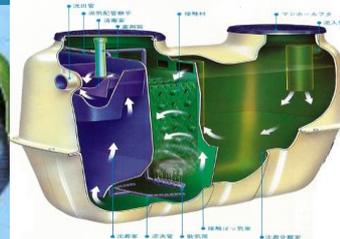
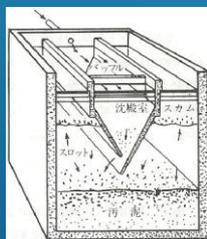
- **Technical standard for operation and maintenance (Article 2, Ordinance for Enforcement of Johkasou Act)**
This standard stipulates maintenance items and adjustment/repair items that must be carried out during operation and maintenance for every johkasou and the auxiliary device.
- **Technical standard for desludging (Article 3, Ordinance for Enforcement of Johkasou Act)**
Desludging standards stipulate items to be carried out for each unit and auxiliary device during desludging (e.g. methods for drawing out sludge)
- **Guidelines for johkasou operation and maintenance (Official notice)**
These guidelines are issued by the Ministry of the Environment as specific policies for operations and maintenance technicians. They are designed to ensure that operation and maintenance as well as desludging are carried out optimally and in line with the specific characteristics of each treatment process.

GUIDELINES FOR JOHKASOU O&M

□ Technical standard for johkasou O&M, (1984, Johkasou Act)

- Guideline for O&M of Tandoku-shori johkasou (2000)
- Guideline for O&M of small-scale johkasou (1993)
- Guideline for O&M of medium/large-scale johkasou (2000)
- Guideline for O&M of N/P removal type johkasou (2000)
- Guideline for O&M of Membrane johkasou (2000)

□ Technical standard for johkasou desludging (1984, Johkasou Act)



1950s

Tandoku-shori johkasou (treat black water only)

1980s

Johkasou (treat black + grey water)

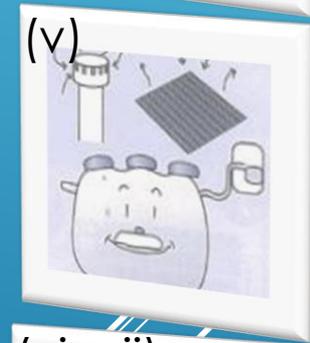
2010s

ORDINANCE FOR ENFORCEMENT OF JOHKASOU ACT

(Rule of Using)

Article 1 Rules of using johkasou under the provisions prescribed in Article 3 paragraph 3 of Johkasou Act (hereinafter referred to as "Act") shall be as follows.

- (i) Water amount for flushing toilet shall be appropriate.
- (ii) Materials like insecticide, detergent, deodorant, fatty, disposable diaper, sanitary goods etc. which interfering with the normal functioning of johkasou, shall not be flowed.
- (iii) abbr.
- (iv) Industrial wastewater, rain water and other special wastewater shall not be flowed into johkasou.
- (v) Johkasou with electric equipment shall not be turned the power supply off.
- (vi) The top or around of johkasou shall has no structural object that may interfere with operation, maintenance and desludging of johkasou.
- (vii) The top of johkasou shall not be loaded which may interfere with its normal functioning.
- (viii) The opening part of aerator shall not be blocked.
- (ix) When the failure or malfunction is found in the johkasou, it should be notified to the johkasou manager immediately.



O&M FREQUENCY OF JOHKASOU

(Article 6-2, Ordinance for Enforcement of Johkasou Act)

Treatment process	Type/size of johkasou	Frequency
<ul style="list-style-type: none"> ● Separation-contact aeration process ● Anaerobic filter-contact aeration process ● Denitrification type anaerobic filter-contact aeration process 	1. Johkasou with a size less than 20 PE	4 month
	2. Johkasou with a size more than 21 PE and less than 50 PE	3 month
<ul style="list-style-type: none"> ● Activated sludge process 	(> 100PE)	1 week
<ul style="list-style-type: none"> ● Rotating biological contactor process ● Contact aeration process ● Trickling filter process 	1. Johkasou with sand filter device, activated carbon adsorption device or flocculation tank (> 50PE)	1 week
	2. Johkasou with screen and flow equalization chamber (> 50PE)	2 week
	3. Other Johkasou (> 50PE) (without screen equipment, etc.)	3 month

Inspecting wastewater flow



Measuring transparency



Checking remaining disinfectant



Measuring deposited sludge



An Example of johkasou O&M

Explaining inspection results



Creating maintenance inspection report



Blower inspection



Measuring circulating water volume



Measurement of residual chlorine

**Check the water quality onsite
(pH, DO, NO₂, residual chlorine)**

pH

pH meter

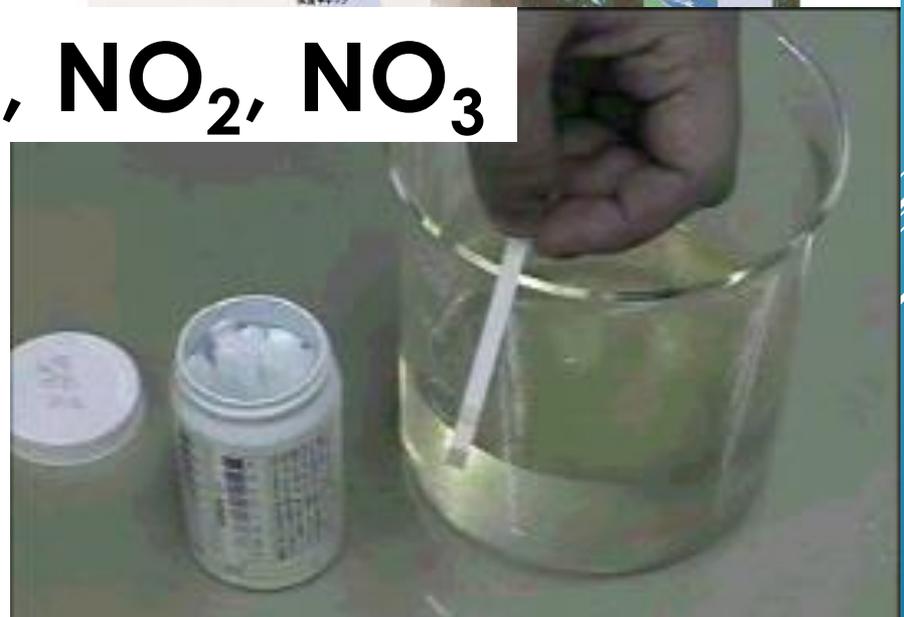
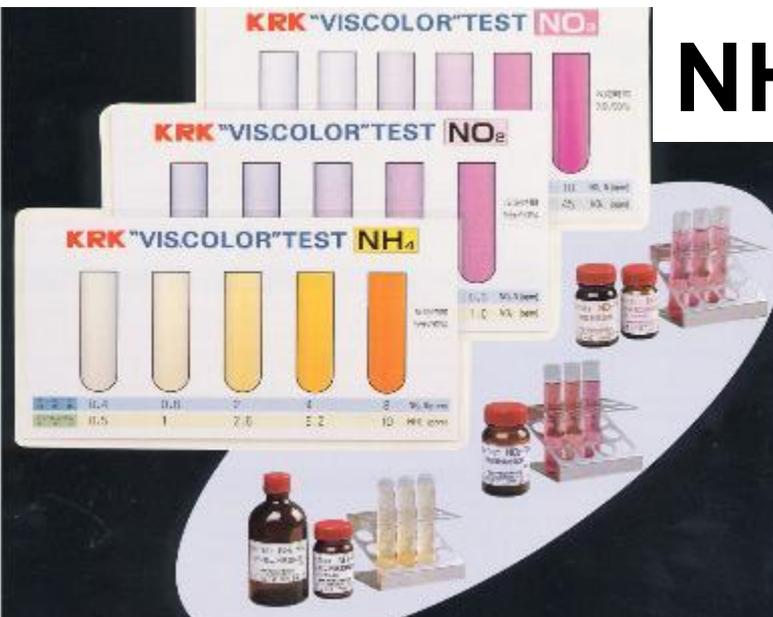


DO

DO meter



NH₄, NO₂, NO₃



NH₄, NO₂, NO₃ portable testing unit

NH₄, NO₂, NO₃ test paper

Preparation work



Drawing sludge out of the 1st-room of anaerobic filter tank



Drawing sludge out of the 2nd-room of anaerobic filter tank



An examples of johkasou desludging

Reporting the results of desludging to the owner



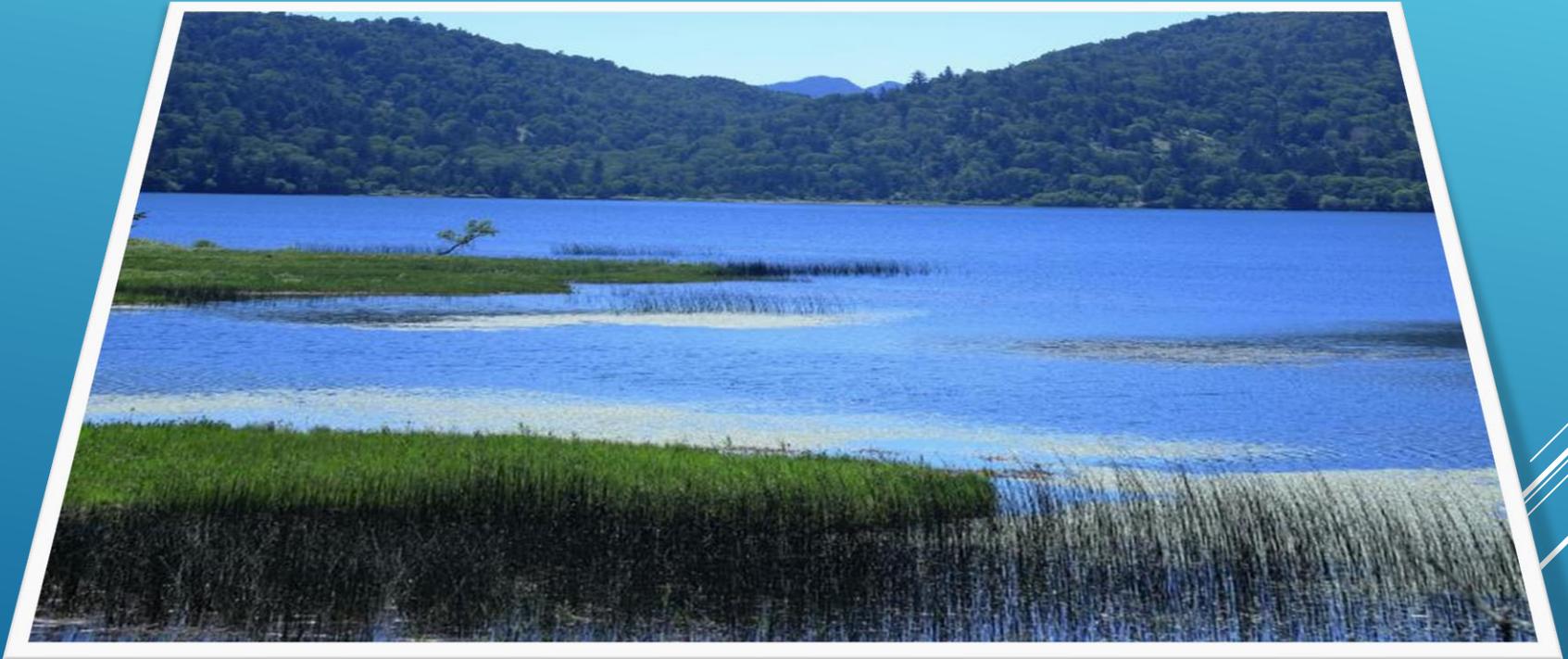
Filling the tanks with water



Cleaning the tank



THANK YOU FOR YOUR ATTENTION !



VIDEO ON JOHKASOU OM AND DESLUDGING
[HTTPS://WWW.YOUTUBE.COM/WATCH?V=8DP4FKIGSWE](https://www.youtube.com/watch?v=8DP4FKIGSWE)